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# The predictive validity of oral reading fluency measures on the Louisiana Educational Assessment Program for third and fourth grade students

Tracy Elkins Bennett

# THE PREDICTIVE VALIDITY OF ORAL READING FLUENCY MEASURES ON THE LOUISIANA EDUCATIONAL ASSESSMENT PROGRAM FOR THIRD AND FOURTH GRADE STUDENTS

by

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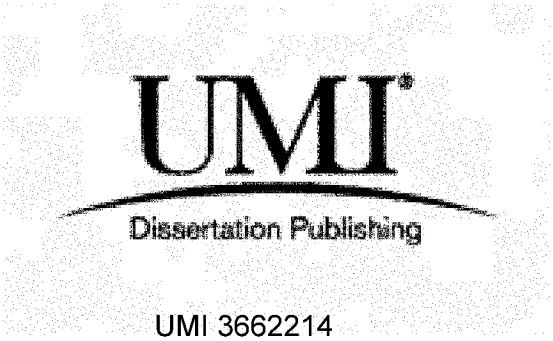





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## ABSTRACT

Good, Kaminski, Simmons and Kamenui (2001) declared a national awareness of the benefits of early reading success and the negative consequences of early reading failure. One method discussed for prevention of reading failure was the implementation of screening programs employed to measure reading skills, predict success of future reading success, and inform instruction that would hopefully eliminate reading failure. In the current study, the primary research question was to investigate the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Oral Reading Fluency (DIBELS ORF) benchmark and screening program and its predictive abilities on reading comprehension achievement measured by the *integrated* Louisiana Educational Assessment Program English Language Arts (*i*LEAP ELA) scores for third-grade students. The secondary research question was to examine whether the AIMSweb Reading-Curriculum Based Measurement (R-CBM) oral reading fluency benchmark and progress monitoring system could predict reading comprehension achievement on the Louisiana Educational Assessment Program English Language Arts (LEAP ELA) scores for fourth-grade students. Finally, determining accuracy of risk status determined by oral reading fluency screening programs, DIBELS ORF and AIMSweb R-CBM, and their relation to reading comprehension achievement, according to *i*LEAP ELA and LEAP ELA, was an additional purpose of the study.

A non-experimental, causal comparative study was conducted to examine oral reading fluency scores and reading comprehension scores in the school year 2011-2012. The data were obtained from third- and fourth-grade students who attended five elementary schools within one rural Louisiana district.

The findings revealed the strongest correlation and prediction between oral reading fluency and reading comprehension existed when oral reading fluency was measured by DIBELS ORF, administered in Grade 3, and reading comprehension was measured by *i*LEAP ELA Standard 1: Reading, comprehending, and responding, also administered in Grade 3. However, significant correlations and evidence of predictive validity were also verified when oral reading fluency was measured using DIBELS ORF and Reading Standard 7 in third grade. Additionally, when AIMSweb R-CBM and reading comprehension measures LEAP ELA Reading Standards 1, 6 and 7 were employed to examine relationship in Grade 4, significant correlations and predictions were found. Furthermore, findings revealed that the scores from the oral reading fluency measures and the scores from the reading comprehension measures were dependent on one another.

Research revealed the importance of the Reading First (RF) initiative developed to improve American reading programs (U.S. Department of Education, 2012). One of the reading programs developed under RF was DIBELS. This study confirmed that oral reading fluency screening programs, like DIBELS ORF and AIMSweb R-CBM, were significantly related to reading comprehension measured in standardized assessments.

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Author Tracy Elkins Bennett

Date March 24, 2014

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## DEDICATION

This dissertation is dedicated to my Heavenly Father and Constant Provider! Thank you, Lord, for leading me every step of this journey. Day after day, I believed You to guide my thoughts, bring clarity to materials I read, provide me with mental and physical strength, and to remind me that we could do this together...You and me. We did it! I love You, sweet Savior! All honor and praise to You!

I can do all things through Christ who strengthens me. (Philippians 4:13, God's Word)

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# CHAPTER ONE

## INTRODUCTION

Good, Kaminski, Simmons and Kamenui (2001) declared a national awareness of the benefits of early reading success and the negative consequences of early reading failure. The researchers identified an American goal as one to improve reading achievement at local, state and national levels. The newfound solution for improvement was for American educators to focus on prevention of reading failure before focusing on high-stakes assessments. One method of prevention named was implementation of screening programs employed to measure reading skills, predict success of future reading success, and inform instruction that would hopefully eliminate reading failure.

As part of the national awareness to improve reading achievement, the National Reading Panel (NRP) was formed in 2000 to review research concerning reading strategies and programs put in place to improve reading success in America (Shanahan, 2006). The NRP first sought to clearly define and then place value on the specific reading components found throughout reviewed research. Included in the reading components were oral reading fluency and reading comprehension. A national reading initiative, Reading First (RF), was later developed to advance and fund school improvement, especially in the area of reading achievement.

## Reading, Oral Reading Fluency, and Reading Comprehension

Researchers have settled on the idea that reading comprehension must be the overall goal of reading (Barone, Hardman & Taylor, 2006; Good, Kaminski, et al., 2001; National Reading Panel, 2000; Paris, Carpenter, Paris, & Hamilton, 2005). Further research suggested oral reading fluency skills are vital for successful comprehension (National Reading Panel; Paris et al.). Defining reading and reading components, oral reading fluency and reading comprehension, has been accomplished by many researchers (Barone et al.; Bush & Huebner, 1979; Clay, 1979; Good, Kaminski, et al.; National Reading Panel; Paris et al.).

Reading is a complex process that may be taught and assessed in a variety of ways (Bush & Huebner, 1979; Clay, 1979). Bush and Huebner further suggested that reading can be defined in many ways according to situations and its relationship to each situation. Depending on the variety of skills involved in each situation, reading may be simply defined as inferring meaning from text symbols. Clay further defined reading as a message-gaining, problem-solving activity in which practice of reading will enhance the reader's power of reading and flexibility within their reading world.

Clay (1979) also identified the need for early reading interventions. Children who are experiencing difficulty in early reading may grow confused about meaning, purpose, and identification of print placing them at risk for future reading failure. The author claimed interventions may vary from method to method. For example, a bottom to top method of intervention is when children learn the smallest unit of language first and then move to the larger units. Although Clay recognized the need for early interventions with reading, the author also mentioned the need for waiting until readers have had about one

year of experience with reading instruction before placing students in risk categories according to their reading performances. The reasons supporting the one-year delay in classification of readers were:

- children enter school with different levels of reading ability;
- children enter school with different pre-school experiences and knowledge; and
- children will learn according to the groups with which they are placed. Therefore, accuracy of classification is crucial to children's learning.

The NRP (2000) revealed the understanding that fluency instruction improved oral reading fluency and overall reading achievement. Researchers defined oral reading fluency as the act of reading aloud while reading accurately, quickly, and with proper expression (National Reading Panel; Paris et al., 2005). In addition to defining oral reading fluency, these researchers suggested oral reading fluency is essential for comprehension. However, Good, Kaminski, et al. (2001) described fluency measures as procedures assessing only accurate and fluent reading of text. Good, Kaminski, et al. did not include prosody, or the expression of oral reading, in their definition of oral reading fluency.

More recently, reading comprehension has become the focus of reading research for policy-makers and educators (Calkins, Ehrenworth, & Lehman, 2012; Paris et al., 2005). Reading comprehension has taken much effort to define. It includes multiple processes and is measured by a variety of assessments that range from micro-processes to global-processes (Paris et al., 2005). Reading comprehension, like reading, may also be defined differently according to the situation in which it is being applied. Researchers

defined reading comprehension as the act of constructing meaning from text as readers perform a variety of reading strategies employing various reading sub-skills (Barone et al., 2006; Good, Kaminski, et al., 2001; National Reading Panel, 2000; Paris et al., 2005). These researchers agreed reading comprehension must be the overall goal of reading.

Higher-level comprehension is heavily weighted by a set of new academic standards in the United States (Calkins et al., 2012). Adopted by 45 states so far, the Common Core Standards (CCSS) are academic standards that have been recently employed to raise the bar for education. The standards are more rigorous, more focused, and more relevant to long-term success of students than former standards. The CCSS focus more on higher-level comprehension requiring readers of all ages to: (a) evaluate the author's point of view, (b) integrate information from multiple texts, (c) analyze accounts of an event, and (d) identify connections between ideas. Higher-level comprehension involves text studies that are objective, close, and analytical. These text studies prepare readers for reading comprehension at the university level.

## National Focus on Reading

In 2000, the NRP, a fourteen-person committee of researchers, educators, and parents, revealed findings from a two-year, national research study concerning reading instruction and achievement (National Reading Panel, 2000; Shanahan, 2006). The panel was developed to interpret research of reading instruction and teaching philosophies and then to share findings that would assist educators in doing their very best for young readers. Overall, findings were positive. The 2000 NRP report exposed findings that current phonemic awareness training and systematic phonics instruction improved the quality of reading and spelling for early readers. The importance of guided, repeated oral

reading and vocabulary instruction in order to improve word recognition, fluency, and comprehension was also discussed in the 2000 NRP report.

A few years later, the NRP issued a monograph hoping to assist in the explanation of the lengthy 2000 NRP report (Shanahan, 2006). The condensed 2005 NRP report highlighted essential components of reading achievement: (a) phonemic awareness, (b) phonics, (c) oral reading fluency, (d) vocabulary and comprehension strategies, and (e) emphasized professional development. Although the components were deemed to be essential in children learning to read, areas such as oral language, writing, and motivation, also identified as important components in the reading process, were not included in the list of essential components (Cummins, 2006; National Reading Panel, 2000). The 2005 NRP report stressed again the importance of phonemic awareness training and phonics instruction in the early stages of children learning to read (Shanahan). Another repeated finding of the 2005 NRP report was that the use of oral reading fluency instruction and consistent vocabulary instruction improved reading skills for readers as measured by standardized tests. Finally, intentional comprehension instruction was shown to improve reading achievement for readers. The overall findings of the two reports suggested teaching reading worked best when strategies of practice were comprehensive, including the essential components of reading, and when strategies of practice were closely and carefully aligned with current scientific research findings.

National focus to improve reading programs was also initiated by the National Association for the Education of Young Children (NAEYC) and the International Reading Association (IRA) (National Association for the Education of Young Children, 1998). These groups conducted research revealing the importance of effective reading

programs, interventions and assessments. NAEYC and IRA joined together in stating, "Learning to read and write is critical to a child's success in school and later in life" (p. 1). Research divulged the idea that children begin learning to read long before they recognize reading and writing skills. For example, children may learn to use symbols to express themselves before they can recognize and name letters. The two organizations defined reading as a complex, multifaceted process that must begin early in life to be most effective. NAEYC and IRA recognized the need for careful planning and instruction during the early years in order for children to become literate.

Following the dissemination of the 2000 NRP report, President George W. Bush proposed the reauthorization of an aid program for disadvantaged students (U.S. Department of Education, 2014). The No Child Left Behind Act (NCLB, 2001) was implemented to raise educational standards and goals in order to improve individual student outcomes. As part of the NCLB Act of 2001, the RF federal program was adopted and approved with the mandate to ensure all American children would read on grade level before leaving third grade (U.S. Department of Education, 2012). The scientific research-based RF program was developed to assist states and districts in establishing kindergarten through third-grade reading programs that included instruction of the essential components of reading instruction. The reading programs included instruction for children, development of screening programs, and professional development for teachers.

## Assessments and Predictive Validity

Concerns about the predictive validity of screening measures on standardized, state assessments have caused researchers to explore this relationship. According to the NCLB Act, each state was required to develop its own set of standards and to assess all students in order to receive federal school funding (U.S. Department of Education, 2008). The National Assessment of Educational Progress (NAEP), a national representation of American students' knowledge and abilities, declared assessments could be varied by state as long as state assessments were nationally representative of what every American student was taught in various subject areas (U.S. Department of Education, 2008). State assessments were to include subject matter from reading, mathematics, science and writing. The NAEP state assessments were designed to be the same year after year and serve as a common measuring tool for all of the United States schools.

NCLB assisted in funding states to implement effective screening programs through the RF grants (U.S. Department of Education, 2012). The screening programs were to be developed based on scientific research and to be useful in predicting achievement on state assessments. In order to create these scientifically based programs, research was performed and analyzed on correlational evidence proving the reliability and validity of various screening programs and their predictive validity of achievement on future reading assessments (Paris et al., 2005).

One of the screening programs provided was the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) measurement of reading achievement (Good, Kaminski, et al., 2001). Since 2001, DIBELS has been widely used in monitoring early literacy skills and in predicting future reading achievement among students in kindergarten

through Grade 6 (Good, Gruba & Kaminski, 2001). Specifically, DIBELS was designed to quickly and effectively measure children's reading skills, such as: (a) letter name fluency (LNF), (b) initial sounds fluency (ISF), (c) phonemic segmentation fluency (PSF), (d) nonsense word fluency (NWF), (e) oral reading fluency (ORF) and (f) retell fluency (RTF).

Many studies have examined the ability of the DIBELS oral reading fluency (DIBELS ORF) subtest to predict future success on standardized assessments measuring reading comprehension (Bellinger & Diperna, 2011; Carlisle, Schilling, Scott & Zeng, 2004; Goffreda, Diperna & Pedersen, 2009; Munger, 2010; Petscher & Kim, 2011; Riedel & Samuels, 2007; Schatschneider, Wagner & Crawford, 2008; Schilling, Carlisle, Scott & Zeng, 2007; Shapiro, Solari & Petscher, 2008). A significant, positive correlation among DIBELS ORF and reading comprehension as measured on standardized assessments was found by several researchers (Bellinger & Diperna, 2011; Carlisle et al., 2004; Goffreda et al., 2009; Munger, 2010; Petscher & Kim, 2011; Riedel & Samuels, 2007; Schilling et al., 2007; Shapiro et al., 2008).

An additional screening program developed for measuring reading achievement was the AIMSweb Reading Curriculum-Based Measurement (AIMSweb R-CBM) (Pearson Executive Office, 2012). Similar to DIBELS, AIMSweb R-CBM was designed to briefly measure and progress monitor oral reading for readers in Grades 1 through 8.

Along with the DIBELS and AIMSweb screening programs, the Louisiana Educational Assessment Program (LEAP) is a measure of academic growth and achievement implemented under the rules of NCLB and NAEP (Louisiana Department of Education, 2008). Assessments, such as the *integrated* Louisiana Educational Assessment

Program (*i*LEAP) and the LEAP, are assessments currently utilized by the state of Louisiana (Louisiana Department of Education, 2008; Louisiana Department of Education, 2013a). The LEAP and *i*LEAP assessments provide results pertaining to subject-matter achievement, academic instruction, and school environment. The LEAP annual assessment tests Louisiana students in Grades 4 and 8 in their ELA, mathematics, science and social studies abilities (Louisiana Department of Education, 2008; Louisiana Department of Education, 2013c). The *i*LEAP annual assessment tests third-, fifth-, sixth-, and seventh-grade Louisiana students in their English language arts (ELA), mathematics, science and social studies abilities (Louisiana Department of Education, 2013b). No research has been conducted to validate the ability of DIBELS oral reading fluency (ORF) screening program or AIMSweb R-CBM screening program to predict outcomes of the *i*LEAP or LEAP ELA reading subtest.

## Statement of the Problem

Oral reading fluency performance scores are used to inform instruction, monitor student progress, and help predict future reading comprehension achievement (Fuchs, Fuchs, Hosp, & Jenkins, 2001). DIBELS is a state-adopted early literacy screening measure used to assess reading skills, to forecast students' future success in reading, and to identify the amount of intervention students receive in preparing them to pass the state, standardized assessment and move them to the next grade level (Louisiana Department of Education, 2014). DIBELS ORF is the subtest of DIBELS employed to screen fluency skills in early readers. The *i*LEAP and LEAP are standardized assessments implemented for measuring reading comprehension achievement for readers in Louisiana. The Louisiana Department of Education believes assessing students reveals how prepared

students are for future challenges in life, and it desires Louisiana students to be as prepared as students from other states and other countries around the world. The State of Louisiana raised the bar for education over the past decade, and employing the DIBELS screening program, the AIMSweb screening program and the LEAP assessments were three of the tools used (Good, Gruba, et al., 2001; Louisiana Department of Education, 2013a). Revealing a correlation between DIBELS ORF and AIMSweb R-CBM and the *i*LEAP ELA and LEAP ELA is of critical importance and is long overdue.

## Purpose of the Study

According to DIBELS experts Good, Gruba, et al. (2001), reading has been shown to be a necessary tool for accomplishing academic success and success in life. Children who were strong readers were identified as more productive citizens and were less likely to exhibit behavior problems in life than those who were unsuccessful in reading. As the job of state and federal educational administrators and teachers, proper screening and assessment tools were developed to gauge students' reading achievement levels. The DIBELS and AIMSweb R-CBM screening tools were designed to identify students' reading instructional needs at an early age in order to provide instructional support in the early years and hopefully eliminate future reading failure.

The purpose of this study was to examine whether the DIBELS ORF benchmark and screening program could predict reading comprehension achievement on the third-grad *i*LEAP ELA scores. Another purpose for the study was to examine whether the AIMSweb R-CBM oral reading fluency benchmark and progress monitoring system could predict reading comprehension achievement on the fourth-grade LEAP ELA scores. Determining accuracy of risk status determined by oral reading fluency screening

programs, DIBELS ORF and AIMSweb R-CBM, and their relation to reading comprehension achievement, according to iLEAP ELA and LEAP ELA, was an additional purpose of the study. The primary focus was to examine student scores on the DIBELS ORF in third-grade and the AIMSweb R-CBM in fourth-grade for predictive validity of reading comprehension achievement on the *i*LEAP/LEAP ELA scores in third- and fourth-grades.

A number of studies found the DIBELS ORF to effectively predict student achievement on standardized assessments of reading comprehension (Bellinger & Diperna, 2011; Carlisle et al., 2004; Goffreda et al., 2009; Munger, 2010; Petscher & Kim, 2011; Riedel & Samuels, 2007; Schilling et al., 2007; Shapiro et al., 2008). This study informs educators of the predictive relationship between oral reading fluency and reading comprehension. It also informs Louisiana educational administrators and others involved in making decisions related to reading achievement of the relationship among the DIBELS ORF and AIMSweb R-CBM and the *i*LEAP/LEAP ELA assessments.

## Justification of the Study

Although it seemed for years that improving reading achievement was a strong focus of educational systems, readers have continued to struggle and exhibit failure in reading achievement (Good, Kaminski, et al., 2001). Enforcing reading success has slowly become a local, state and national issue. Educators have begun to find ways to help ensure all children become competent readers by the end of their third-grade school year. The NAEP's enforcement of high-stakes testing and the NRP's encouragement of effective screening tools have led to the creation of DIBELS and AIMSweb screening programs. DIBELS and AIMSweb are tools used in the primary grades to (a) assess

growth of foundational reading skills such as oral reading fluency, (b) predict success or failure on criterion measures of reading comprehension and overall reading performance, and (c) provide instructional goals to help prevent reading failures. DIBELS and AIMSweb screening programs assist teachers and administrators in identification of foundational skills of early readers and evaluate growth of these foundational skills in a timely manner, so that students have a fair chance to perform well on the high-stakes tests.

Currently, Louisiana uses DIBELS and AIMSweb screening programs to assess and progress monitor students' oral reading fluency, and it employs the *i*LEAP and LEAP standardized assessments to assess reading comprehension. Local education agencies have spent considerable amounts of money to comply with the state mandates of screening programs and state assessments measuring reading comprehension. Therefore, if there is no predictive validity between the DIBELS ORF and AIMSweb R-CBM scores and the *i*LEAP/LEAP ELA reading comprehension scores, then money and other resources are being wasted. Time spent assessing and monitoring may also be wasted. If there is no predictive validity, then an alternative method for assessing oral reading fluency must be found.

## Theoretical Framework

### The Reading Process

According to Samuels (2006), the reading process consists of four components.

1. First, readers decode, or generate a sound, to represent each word in a text.
2. Readers also construct meaning from the text through comprehension, a process involving using the information on a page and adding in prior knowledge to understand what is being read.
3. A third component of reading is metacognition. Metacognition is the self-awareness of the reader and whether they understand the text. If the reader does not understand the text, they will employ various strategies to break down the text until it makes sense.
4. Finally, attention is the cognitive energy readers use to process the information they are reading. Samuels declared that readers will fail in their reading efforts, if more attention to the other tasks is required than is available.

As readers direct their attention to various reading skills while reading a passage, various components of attention are noted (LaBerge & Samuels, 1974). One component mentioned is a reader's limited capacity to actually hear and process all the information coming into their ears and eyes at one time. As readers become more practiced and skilled with individual sub-skills of reading, less attention has to be devoted to those various less complicated skills. More attention can be given to newer, less practiced, more complex skills. As practice increases for the reader, so should the timing of responses become faster, the accuracy of text read increase, and amount of cognitive effort used decrease (Samuels, 2006).

A second component of attention is selectively activating new information while other reading processes are taking place. La Berge and Samuels (1974) posited that readers are most likely able to process many ideas at one time as long as only one new idea requires direct attention and the other ideas are automatic. A third attention component mentioned in the research is alertness, but this component did not receive much attention of theoretical research.

**Theory of Automaticity Defined**

LaBerge and Samuels (1974), known for developing the theory of automaticity, defined reading as a complex journey of combining many literacy skills into the eventual activation of constructing meaning from the written text. According to the theory of automaticity, if part of the reading skills can become automatic for the reader, the reader's remaining attention can be focused on other more complex reading components. The reader can then successfully perform the act of reading and comprehending what is being read. Lexical processes are processes that convert letters and sounds into words and words into meaningful applications. Automaticity in lexical processes allows readers to focus less on sub-skills like word-identification and focus more on sub-skills requiring resources and experiences like comprehension. However, researchers found that if each reading sub-skill required individual attention throughout one's reading journey, then reading performance would suffer (Carlisle et al., 2004).

Practicing reading sub-skills promotes automaticity in reading (LaBerge & Samuels, 1974). A fluent reader should be able to focus attention on semantics as the brain automatically decodes letters and sounds into words. As readers begin to make connections between words and semantics, automaticity of meaning takes place. Once a

reader is considered fluent in reading, there are no longer dividing lines between sub-skills of reading. All readers invariably enter through stages of attention being placed on various sub-skills until practice upon practice allows for automaticity of each sub-skill and eventually automatic integration of all reading processes.

**Examples of Automaticity**

An example of automaticity in early readers is when a young child has learned his letters and letter sounds and can give less attention to letter recognition and more attention to semantics (LaBerge & Samuels, 1974). The reader's brain capacity will have more room for deciphering meaning from new words now that letters and sounds are known. Also, as readers reread passages, they recognize the number of errors decreasing and their reading rates are faster (Samuels, 2006). Oral reading practice is used to improve reading fluency and signs of automaticity may develop for the reader. Because readers want to sound good as they read, they will orally reread passages over and over to hear themselves read fluently.

In order for successful reading to occur, automatic processing must take place (LaBerge & Samuels, 1974). Much like practice of reading sub-skills, basketball players handle the ball in a variety of ways consisting of many sub-skills. These sub-skills include dribbling, passing, and catching, and these sub-skills must be practiced over and over to become automatic. Some of these skills must be automatic for successful ball-handling. Ball players cannot devote attention to each skill and play the game as it was designed to be played. Reading requires the same kind of automatic transactions within the reader in order to be a successful reader.

**Automaticity and Comprehension**

LaBerge and Samuels (1974) defined comprehension as the "organization of these word meanings receiving attention one-by-one and later becoming automatic and recognized as a coherent whole" (p. 319). Readers bring their individual experiences to the task when they assign meaning to words and sentences and this act makes comprehension a complex operation. This act of adding one's own association is also what helps readers successfully apply what they have read into their memory.

Fuchs et al. (2001) revealed a clear understanding of how fluency influenced comprehension and the complex process of reading. As readers translated text into language through automaticity and attention to only one complex task at a time, reading skills were coordinated in a seemingly effortless manner and fluency became recognized as a way to identify successful readers. According to researchers, a reader's fluency level was an indicator of his comprehension level as well. Assuming a reader could (a) attach meaning to text within and between sentences, (b) infer the macrostructure of the text, (c) apply the text meaning to their present understanding, and (d) infer where needed to make sense of the text, the reader would be labeled a fluent reader from orally reading a passage. Also, when readers recognized words in a timely manner, it showed that the readers could successfully and automatically glide through the reading process applying selective attention only to new, occasional text material.

**Automaticity and Fluency Used to Predict Achievement**

Without automatic attention to comprehension while reading, readers in early elementary grades may have been at risk for reading failure (Fuchs et al., 2001). Presumably, as young readers exhibited skills of oral reading fluency, predictions of

future reading expertise became apparent. Predictive validity refers to how accurately one measurement predicts achievement on a future measurement (Ravid, 2011). Studies were conducted investigating the predictive validity of oral reading fluency on reading comprehension. In many cases, DIBELS ORF has been verified as a significant predictor of reading comprehension achievement as measured by state assessments (Good, Gruba, et al., 2001). DIBELS employed ORF subtest to examine performance levels of readers as they read aloud. DIBELS has been used to help administrators and educators track a reader's development of reading comprehension.

## Research Questions

The following research questions were addressed in this study:

1a: What is the relation of the DIBELS ORF subtest given in Grade 3 and Reading Standard 1 of the *i*LEAP ELA assessment given in Grade 3?

1b: What is the relation of the DIBELS ORF subtest given in Grade 3 and Reading Standard 7 of the *i*LEAP ELA assessment given in Grade 3?

2a: To what extent does the DIBELS ORF subtest given in Grade 3 predict performance on Reading Standard 1 of the *i*LEAP ELA assessment given in Grade 3?

2b: To what extent does the DIBELS ORF subtest given in Grade 3 predict performance on Reading Standard 7 of the *i*LEAP ELA assessment given in Grade 3?

3: How accurately do DIBELS ORF cut scores classify the risk status (at risk, some risk, low risk) of third-grade students, based on their future reading achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) measured with *i*LEAP ELA given in Grade 3?

4a: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 1 of the LEAP ELA assessment given in Grade 4?

4b: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 6 of the LEAP ELA assessment given in Grade 4?

4c: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 7 of the LEAP ELA assessment given in Grade 4?

5a: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 1 of the LEAP ELA assessment given in Grade 4?

5b: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 6 of the LEAP ELA assessment given in Grade 4?

5c: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 7 of the LEAP ELA assessment given in Grade 4?

6: How accurately do AIMSweb R-CBM cut scores classify the risk status (at risk, some risk, low risk) of fourth-grade students, based on their future reading achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) measured with LEAP ELA given in Grade 4?

## Definition of Key Terms

The following definitions were used in this study:

*Comprehension*: the complex, cognitive process where readers make intentional interactions to extract meaning from text (DIBELS, 2009); the act of understanding information written in a text and applying meaning to the text (Shanahan, 2006).

*Dynamic Indicators of Basic Early Literacy Skills (DIBELS)*: DIBELS is a tool developed to monitor growth of early readers' skills, to identify their need of instructional interventions, and to evaluate the effectiveness of interventions (Good, Gruba, et al., 2001).

*Oral reading fluency*: The gateway to comprehension revealing that readers who can read both accurately and quickly will most likely comprehend what they read (DIBELS, 2009); the reader's ability to accurately and fluently read connected text within a given time frame (Good & Kaminski, 2002); the ability to accurately read text while reading aloud, reading in a timely manner and reading using proper expression (National Reading Panel, 2000).

*Phonological awareness*: The reader's recognition of a relationship between letter sounds and combinations of letter sounds and how to apply them to a written word (Morrow & Morgan, 2006).

*Phonemic awareness*: "The ability to hear, identify, and manipulate the individual sounds (phonemes) in spoken words" (Barone et al., 2006, p. 35).

*Vocabulary*: The reader's ability to recognize words and their meanings (Shanahan, 2006).

# CHAPTER TWO

## LITERATURE REVIEW

In order to provide insight into the research questions of this study, this chapter reviews literature related to the essential components of reading considered to be critical to the complex process of reading. Major components of reading that were reviewed included: (a) phonological awareness (Barone et al., 2006; Good & Kaminski, 2002; Morrow & Morgan, 2006), (b) phonemic awareness (Enz, 2006; Honig, 2001; NRP, 2000), (c) phonics (Barone et al.; Morrow & Morgan; Shanahan, 2006), (d) vocabulary (Barone et al.; Flood, Lapp & Flood, 2006; Honig, 2001), (e) comprehension (Block, 2006; Calkins et al., 2012; Miller, 2001), and (f) oral reading fluency (Fuchs et al., 2001; Rasinski, 2006; Samuels, 2006). The CCSS later identified additional major components of reading: (a) higher-level comprehension and (b) oral language (Calkins et al., 2012; Cummins & Stewart, 2006; National Governors Association Center for Best Practices, 2014).

Additional research reviewed contained information regarding the theory of automaticity (LaBerge and Samuels, 1974; Samuels, 2006; Fuchs et al., 2001). Samuels (2006) described automaticity in reading as a time when the human brain is no longer focusing attention on individual skills required to read but is strictly taking in new information and processing it with automatic skills previously learned. Predictive validity and its relationship to assessment were also discussed in the review of literature (Johnson

& Johnson, 2002; Messick, 1980; Messick, 1990). McMillan & Schumacher (2001) declared that assessment results may affect predictions of achievement in education.

## Phonological Awareness

Phonological awareness consists of knowing how to divide the spoken language into isolated sounds or phonemes from sentences, words, syllables and eventually sounds (Barone et al., 2006). Morrow and Morgan (2006) identified phonological awareness as an important component of the reading process. Phonological awareness consists of the ability to learn letter sounds and related symbols through the process of (a) hearing sounds, (b) matching letters with the sounds, (c) matching and creating patterns in words, and (d) segmenting and blending words.

Grasping the concept of letters and sequence of letters representing sounds in words was another way to describe the notion of phonological awareness (Barone et al., 2006). Included in phonological awareness were the (a) letter-sound correspondences containing consonants and vowels (letters and sounds), (b) consonant blends, (c) digraphs, and (d) phonograms or word families. Teaching phonics, as readers experience new sounds and words, was noted as an effective way to create phonological awareness.

Good and Kaminski (2002) identified preschool and kindergarten years as the time frame for assessing phonological awareness. Recognition and production of initial sounds have been assessed in young children using the DIBELS ISF screening assessment. One example of measuring a child's phonological awareness would be for an assessor to point to a picture of gloves and ask the child to orally produce the beginning sound /g/. Recognizing sounds, putting consonants and vowels together, creating blends and digraphs were all recognized as part of the phonological awareness component in the

reading process (Morrow and Morgan, 2006). Making sense of these patterns within words allows readers to eventually become independent readers as they become able to decode new words in various texts.

## Phonemic Awareness

An important component identified in the reading process was phonemic awareness, which is the ability to recognize individual sounds or phonemes in words as they are spoken (Barone et al., 2006; National Reading Panel, 2000 Shanahan, 2006). Enz (2006) described phonemes as the smallest sounds in spoken words which affect a word's meaning. These individual sounds work together to make words. Noticing, thinking about and even manipulating these individual sounds teaches children how words are created from various speech sounds or phonemes. Barone et al. explained that children have to hear the sounds or phonics, identify the sounds and finally learn to manipulate the sounds. For example, when children hear the word "top," they can isolate the phonemes or sounds as /t/ /o/ /p/ and then manipulate those sounds to sound like the word "top." Changing the "t" to a "p" would be an example of children manipulating the phonemes to become "pop" just by changing one letter. Phonological awareness is the understanding of dividing the spoken word, and phonemic awareness assists children in making connections between spoken words and various letter combinations made from the alphabet.

In related research, Honig (2001) declared phonemic awareness and decoding as dependent on one another and necessary in connecting letters to sounds in words. He further defined phonemic awareness as the interchanging of sound chunks while paying close attention to hearing phonemes, manipulating more than one phoneme and even

creating phonemes. Beginning readers must be aware of each sound and how they work together to create words or phonemes. Kindergarten and first-grade readers are assessed on phoneme segmentation using the DIBELS PSF (Good & Kamniski, 2002). This screening assessment measures readers' ability to fluently segment three and four-phoneme words into individual phonemes. Early readers learn to use letters as symbols for sounds and to decode and spell words as part of the phonemic awareness component (Honig).

## Phonics

The 2005 NRP report identified phonics as the identification of letter sounds and the recognition of pronunciations of spelling patterns (Shanahan, 2006). Utilizing phonics enables readers to decode sounds and sound out words. When phonics are taught in a comprehensive manner, readers gain exposure to and a better understanding of (a) consonant letters and sounds, (b) consonant blends, (c) long and short vowels and sounds, (d) digraphs, and (e) phonograms or word families (Barone et al., 2006). The overall goal of phonics instruction is for readers to exhibit abilities in which they can independently decode words by identifying sounds or phonemes and patterns in words (Morrow and Morgan, 2006).

Purposeful, or systematic, phonics instruction may be taught using four basic approaches (Morrow and Morgan, 2006). A synthetic phonics approach includes teaching sounds and sounds represented by letters and instructs readers how to blend sounds in order to produce and pronounce words. After sounds and sound combinations are learned, readers put sounds together and are able to decode new words. An analytic approach involves readers learning sight words and learning how to break the sight words down to

build other words. Teaching phonics, using words the readers already know, to help them build new words is an approach called analogy-based phonics. An example of analogy-based phonics is teaching readers that they can read the word "book" once they learned to read the word "look." Focusing on letters and spelling, while teaching readers patterns of sounds and corresponding phonemes, is another phonics instructional approach discussed by Morrow and Morgan.

Although phonics instructional approaches have been a debate in American educational history, the systematic phonics involves teaching phonics with a distinct program in contrast to an adaptable style of teaching phonics (Shanahan, 2006). According to the 2005 NRP research, teachers felt more supported through systematic phonics and agreed the method overtook opportunistic approaches. However, teaching phonics, informally, as readers experience new sounds and words was noted as an effective way to create phonological awareness (Shanahan, 2006). Early phonics instruction provided significant impact on spelling achievement while the impact of phonics was found to decrease in grades beyond kindergarten (National Reading Panel, 2000). Phonics instruction was discovered to provide spelling and reading benefits for readers from kindergarten through Grade 6 (National Reading Panel, 2000). Moreover, research has shown that phonics instruction was most effective when introduced to readers early in their reading process, continued being taught for a few years and practiced beyond the teaching years (Barone et al.).

## Oral Language

Oral language has been recently recognized as an important component in the reading process (Calkins et al., 2012). Developing language skills, including practice in

speaking and listening, was a difference recognized between the NCLB expectations and the recently, nationally adopted CCSS. Although these skills were written in former standards so that language skills would be taught along with writing and reading, not in isolation, they did not receive the same emphasis of importance as other components of the reading process.

Two main goals of teaching oral language skills are teaching readers how to communicate effectively with others and appropriately building upon readers' reading, writing, and content knowledge (Cummins and Stewart, 2006). Reading instructors may expect oral language to develop naturally, but this has not been found to be true. Strategies of (a) modeling, (b) practicing, (c) monitoring, and (d) assessing are employed to teach readers to read while meeting expectations associated with the essential components of reading. Oral language also must be taught through targeted opportunities of talking with other readers and the reading instructor and through read-aloud sessions.

Rather than teaching these skills as supplemental lessons, it was suggested in the CCSS that language skills be interwoven throughout the day and become a seamless part of the reading and writing lessons (Calkins et al., 2012). By including language skills in reading and writing lessons, readers will hopefully become skilled collaborators, presenters, critics and reporters while also gaining exposure to various types of media, round-table discussions, and planning sessions with peers.

## Vocabulary

Knowing and understanding words, whether in text or in spoken language, was described as the vocabulary component in the reading process (Barone et al., 2006). Knowing words and understanding the meaning behind them becomes the foundation of

reading any type of text. In order to become fluent, readers must be able to quickly assign meaning to words. According to Honig (2001), vocabulary is the most important component of the reading process as readers cannot understand the text being read if they do not know the meaning of the words being read.

Barone et al. (2006) announced that vocabulary may be learned through individual experiences or through context teaching and context clues. In every day speaking, readers use words that were referred to as oral vocabulary. Oral vocabulary words may positively or negatively affect readers in assigning correct meaning to a word in text, depending on whether or not they learned the correct definition of the word as they heard it. The lack of oral vocabulary could hinder readers from understanding words or passages (Barone et al.; National Reading Panel, 2000).

While a lack of vocabulary decreases the level of learning support from an environment, the 2005 NRP report suggested vocabulary can be learned through various formal reading strategies (Shanahan, 2006). Through such reading strategies as (a) independent reading, (b) reading aloud, (c) direct instruction and (d) student-centered activities, teachers can teach vocabulary in a way that involves ensuring an in-depth knowledge of words. Exposing readers to large volumes of texts, both at home and at school, was recognized by Honig (2001) as the most important act in teaching vocabulary. The author mentioned the fact that over 80,000 words and word families were employed in texts used for students in kindergarten through 12$^{th}$ grade. Effective vocabulary instruction strategies identified were exposure to the thousands of words, feedback from vocabulary instruction, and practice of reading.

Flood, Lapp, and Flood (2006) mentioned the additional strategy of including illustrations to help support vocabulary awareness. These researchers also emphasized that communicating with readers about their oral vocabulary and meanings of these familiar words was effective in young readers learning new vocabulary. With older readers, vocabulary words were taught more through experiences with print and much practice of vocabulary awareness. Knowing and understanding words and being able to apply the appropriate meaning, based on the context with which the words were used, were parts of the vocabulary component of the reading process.

## Reading Comprehension

As a major component of the reading process, comprehension was described as more than simply the ability to answer questions after reading a text (Barone et al., 2006). The researchers defined comprehension as the ability to create meaning from what has been read. It was suggested that comprehension means automatically manipulating the components of reading while engaged with a text in order to construct meaning. The 2005 NRP report further identified comprehension as the application of various comprehension processes in order to gather meaning from text (Shanahan, 2006). Shanahan described comprehension as an active process in which readers actively think about and interpret information according to their own personal experiences. At the same time, readers are applying a thought process concerning the author's plan for writing the information and inferring what the author means by what is explicitly told and what is not told.

Miller (2001) suggested interactions between readers and readers and teacher must take place to further develop comprehension skills of the readers, since readers

continue to make connections with the text even after the text is read. She announced the need for reading instructors to consider (a) prior knowledge of their readers, (b) readers' interest in reading materials, (c) purpose for reading materials, and (d) readers' abilities to pronounce words used in reading materials.

Block (2006) and Miller (2001) recognized the need for several types of lessons employed for comprehension instruction.

1. Literal comprehension is when readers seek to understand exactly what an author means by exactly what he writes in words and sentences (Block). An example of this is identifying a main idea or following a sequence based upon what is written.
2. Readers learn to infer, draw conclusions and interpret while participating in inferential comprehension lessons. This is a type of lesson teaching readers to gather meaning from the written word when the meaning is not stated in exact words and sentences.
3. Lastly, metacognitive comprehension lessons include readers considering their own thinking along with what they are reading from the author. This type of comprehension takes place before, during and after reading.

Miller added in a comprehension lesson type between the inferential and metacognitive levels. This type of comprehension is when readers evaluate the material by asking questions about the text, decide their opinion of the text, and interpret the text.

The 2005 NRP report established the idea that comprehension instruction must be taught through effective comprehension lessons such as question asking, monitoring, summarizing, question answering, story mapping, graphic organizing, and cooperative

grouping (Shanahan, 2006). Barone et al. (2006) added to the list of comprehension instruction strategies: predicting, self-monitoring, and identifying the main idea, all of which allows comprehension to occur before, during and after reading a text. Using visual imagery was an additional strategy for teaching comprehension. Readers must have access to visual images depicting text and must be closely monitored by reading instructors in order to be successful with the reading comprehension process. Reading instructors must enforce research-based strategies ensuring the improvement of reading comprehension of readers.

In NCLB, reading comprehension was recognized as equal in importance to phonemic awareness and vocabulary, but in the CCSS higher-level comprehension is seen as extremely important in student achievement (Calkins et al., 2012). Children from kindergarten through 12$^{th}$ grade are presented with opportunities to comprehend and manipulate information from texts in multiple ways, such as (a) identifying similarities and differences in multiple authors' points of view, (b) analyzing multiple characters' accounts of various events, and (c) integrating information from multiple texts. In higher-level comprehension, reader tasks include reasoning, synthesizing, evaluating, and assessing. These tasks are not personal connection tasks but are all dealing directly with the assigned texts and clear comprehension of the text information. Without adequate comprehension skills, readers may have trouble meeting reading standards of the CCSS.

## Oral Reading Fluency

Rasinski (2006) defined fluency as a reader's ability to focus more on meaning of text without also having the task of decoding words and their meanings. As fluent readers decode many pieces of information automatically and at one time, they are processing the

meaning of the passage (Samuels, 2006). Readers not only process and mentally apply the information they are decoding, but they also examine the text for consistencies with existing knowledge and make inferences about the text in order to supply missing information needed for comprehension (Fuchs et al., 2001). Fluent readers read accurately and effortlessly with speed while exhibiting signs of clear, oral expression and appropriate phrasing of words (Rasinski; Shanahan, 2006). In other words, fluency is a way of telling more than a reader's word recognition but also a tool in understanding his complex, comprehension level.

Researchers associated with DIBELS screening program, Good and Kaminski (2002), defined oral reading fluency as accurate and fluent reading of connected text. They declared fluency is the gateway to comprehension. AIMSweb is another screening program that defined oral reading fluency as speedy, accurate and fluent reading of connected text (Daniel, 2010). These two screening programs assess readers' oral reading fluency rates by counting number of words read correctly in a one-minute time frame.

All readers venture through similar stages of reading development including fluency (LaBerge & Samuels, 1974). However, they may enter these stages at varying rates according to their experiences, instruction, and mental abilities. Truly fluent readers are unaware of accessing each sub-skill as they use them. They simply view reading as a holistic process. Most readers become fluent by adulthood after having had years of practicing decoding words and gaining meaning of thousands of different vocabulary words (Rasinski, 2006). In the 2005 NRP report, it was determined that fluency skills were developed through repeated reading practice over time significantly impacting reading achievement (Shanahan, 2006). Also, important in fluency development was the

feedback from reading instructors as readers read orally and were monitored by instructors. Improving word recognition and comprehension was found to be the result of fluency-developing practices for readers of various ages and skills.

Fluency was discussed as being taught in a variety of ways (Shanahan, 2006). Teaching fluency with oral reading, instead of silent reading, was the most common way mentioned. Repetition of texts through both listening and reading was shown to be a common way of teaching fluency. Revealing feedback or giving guidance to students, as they read aloud, was another way mentioned in teaching fluency. Although elevated noise levels and the challenge of partners to assist with listening were two limitations of the suggested ways of teaching fluency, the researcher recognized the limitations were minimal and results of teaching strategies were positive.

**Oral Reading Fluency Screening Measures**

The DIBELS ORF subtest and the AIMSweb R-CBM are oral reading fluency screening measures comprised of standardized passages used to assess accuracy and fluency with a developmentally appropriate text (Good & Kaminski, 2002; Pearson, 2012). The assessments were designed to assist teachers in planning instructional support and in monitoring student progress toward academic, instructional goals. Readers are asked to orally read a passage for one minute, and they are scored according to the number of words accurately read. ORF is not intended to be speed-reading without meaning; however, readers reading accurately and quickly are allowed to continue during their screening. The ORF score reflects the reader's oral fluency rate which consists of reading connected text accurately and fluently (Good & Kaminski). Assessors and

teachers can quickly determine what reading level the reader is on and what type of instruction they require to reach their full reading potential.

The DIBELS ORF subtest was designed to be given to students for the first time during the middle of their first-grade year and again at the end of their first-grade year. In both second and third-grades, readers are assessed using the DIBELS ORF in the beginning (fall), middle (winter) and end (spring) of the school year (Dynamic Indicators of Basic Early Literacy Skills, 2009). The AIMSweb R-CBM is administered to readers beginning in the middle of Grade 1 and continues through Grade 12 (Pearson, 2012). For both screening assessments, readers are grouped for instruction upon completion of scoring. For DIBELS ORF, the groups are divided by risk levels, such as (a) low risk, (b) some risk, and (c) at risk (Good & Kaminski, 2002). For AIMSweb R-CBM, the readers are placed in Tiers 1, 2, or 3 (Pearson, 2013).

After readers are placed in risk categories, they are taught according to their group and reading ability levels which are labeled either (a) benchmark, (b) strategic, or (c) intensive/targeted progress monitoring (Good & Kaminski, 2002; Pearson, 2013). Benchmark level means the readers are able to read at their given grade level and require no extra instruction besides what would normally be given. Strategic signifies the need for additional interventions for readers labeled at some risk for future reading failure. When readers are placed in the at risk or targeted category, the need for substantial, intensive interventions exists for the readers.

## Assessment and Predictive Validity

Assessment was defined by authors as a collection of information to inform an audience of an individual's or group's achievement (Johnson & Johnson, 2002; Lapp,

Flood, Brock & Fisher, 2007; Miller, 2001; Nitko, 2004). In order to realize readers are learning and to improve instruction for the benefit of readers, educators are required to instruct readers and assess readers' learning (Johnson & Johnson). Effective assessment requires an assessor to collect information concerning readers' quality and quantity of work. In order for the assessments to be successful and meaningful, it is to be significant in purpose motivating the assessor and those being assessed. Also, when assessments take place, clearly defined procedures are necessary for assessments to be effective and be considered high quality. Finally, researchers announced the importance of providing the direction of assessment for future learning and instruction.

Three purposes of assessments were identified by Johnson and Johnson (2002).

1. Diagnostic assessments, like DIBELS and AIMSweb, are performed to determine where readers are in the process of learning and are never used for assigning grades.

2. Formative assessments, such as graded weekly or unit tests, are conducted to monitor progress and inform instruction. These assessments are constructive for readers to receive feedback in how they are achieving their learning goals and to inform teachers of how effective is their instruction.

3. The third purpose of assessment is to provide a summative outcome of learning which judges readers' overall performance at the end of the instructional program. An example given was finals given at the end of a semester.

Methods for evaluating assessments were identified as criteria-referenced and norm-referenced (Johnson & Johnson, 2002). Criterion-referenced evaluations are employed when judging an individual's achievement against a fixed set of standards. The

*i*LEAP and LEAP assessments serve as criterion-referenced evaluations for the State of Louisiana (Louisiana Department of Education, 2013a). As long as readers achieve up to the set standard, they pass the evaluation. If they are unable to achieve the set standard, they fail. In norm-referenced evaluation, the achievement of others serves as a guideline for critiquing an individual's performance (Johnson & Johnson). When teachers grade on a curve, they are exemplifying the use of norm-referenced evaluation.

Standardized assessments were developed in the early 1900s to set apart students who were of average intelligence from those who exhibited special needs (Lapp et al., 2007). These assessments were comprised of formal testing materials with standard instructions for assessing and scoring and were set with strict time limits (Miller, 2001). Over the last 30 years, standardized assessments have grown more prominent and have been mandated by every state in the United States. The *i*LEAP standardized assessment involves the use of criterion-based components and norm-referenced components while the LEAP standardized assessment involves strictly criterion-referenced components (Louisiana Department of Education, 2013a). The DIBELS assessments are comprised of benchmark assessment and progress-monitoring materials and were created to provide support for early reading achievement as evidenced in standardized assessments such as the *i*LEAP and LEAP assessments in Louisiana (Good, Kaminski, et al., 2001).

Educators have found themselves in various situations in which they were forced to make predictions and decisions based on assessments (McMillan & Schumacher, 2001). For example, teachers have assessed students and later used their predicted achievement levels to place students in groups according to their performance and instructional needs. Also, educators and administrators have sought to predict future

achievement of students after examining assessment scores from various tools used. Messick (1990) defined predictive validity as the degree to which an individual's current assessment predicts achievement on a future assessment. As one type of criterion validity, prediction validity is meant to be applied to a specific setting for the purpose of highlighting a specific relationship between two measures. Messick suggested that although validity evidence is never quite complete, inference of a prediction is made considering the current assessment and current research needed to understand meaning of scores and how it applies to future predictions.

Messick (1980) declared that an assessment should be evaluated for its proposed purposes before employing it. Predictive validity was explained as more focused on specific sets of data in specific settings, such as the DIBELS and AIMSweb measures predicting achievement of reading comprehension as measured by the *i*LEAPand LEAP in Grades 3 and 4. The researcher suggested that empirical evidence of a prediction may be necessary to justify a prediction study. Multiple research studies have been conducted on the predictive validity of ORF and various measures of reading comprehension (Bellinger & Diperna, 2011; Carlisle et al., 2004; Goffreda et al., 2009; Munger, 2010; Petscher & Kim, 2011; Riedel & Samuels, 2007; Schilling et al., 2007; Shapiro et al., 2008).

In summary, Johnson and Johnson (2002) suggested that assessments should be purposeful in motivating the assessor and those being assessed in order to be deemed successful. Specifically, diagnostic assessments may be performed to determine where students are in the process of learning and what type of instruction is needed for success. Successful assessments must also provide direction for future learning. Knowing how

well achievement on a current assessment predicts success on a future assessment was the definition for predictive validity provided by Messick (1990). When data are collected from two measures of both a predictor and a criterion, the scores are correlated to obtain a validity coefficient that proves prediction or no prediction. The purpose of predictive validity is to provide insight into a relationship between two measures.

## Predictive Validity of Oral Reading Fluency on Reading Comprehension

Researchers have studied the relationship between the predictive validity of various reading sub-skills and reading comprehension (Bellinger & DiPerna, 2011; Carlisle et al.; 2004; Goffreda et al., 2009; Munger, 2010; Petscher & Kim, 2011; Riedel & Samuels, 2007; Schatschneider et al., 2008; Schilling et al., 2007; Shapiro et al., 2008). ORF happens to be the most researched measure of reading achievement and the most accurate predictor of readers' future reading achievements (Dynamic Indicators of Basic Early Literacy Skills, 2009). ORF allows readers the opportunity to translate text into something meaningful as they automatically employ many complex skills at one time while maintaining attention on new information not yet in their memory (Fuchs et al., 2001; LaBerge & Samuels, 1974). Assessors and teachers can reliably examine a reader's level of reading expertise upon rating their oral reading fluency rate.

Many studies have been conducted on screening programs, such as the DIBELS, which were designed to monitor student progress toward academic, instructional goals such as mastering reading comprehension (Good & Kaminski, 2002). Not only was the DIBELS ORF intended to reflect the reader's oral fluency rate but also to shed light on the reader's reading comprehension level. Screening programs give assessors and

teachers insight as to what kind of instruction would best assist readers in reaching their full reading potential.

### Cross-Sectional Research Studies of the Predictive Validity of ORF on Reading Comprehension

Examining the relation between ORF scores and reading comprehension scores, Bellinger and DiPerna (2011) initially sought to obtain evidence of reliability and validity of DIBELS RTF scores. Instead, the researchers found a significant correlation between the DIBELS ORF scores and reading comprehension scores. Researchers chose a sample of 44 fourth-grade students from Pennsylvania. The students were representative of the school district's population. Approximately 80% of the English-speaking students were White, and over half of all students had parents that were highly educated.

Researchers (Bellinger & DiPerna, 2011) employed three assessments to obtain scores for the study. The DIBELS RTF subtest and the DIBELS ORF subtest were individually administered. Also, scores from the Woodcock-Johnson III-Tests of Achievement (WJ-III NU ACH, Form A) were collected after the assessment was individually administered. The WJ-III NU ACH was a test of academic skills for ages two through 90, and it consisted of a passage comprehension subtest and a reading vocabulary subtest that together produced a reading comprehension score. In addition to the assessments, parents were asked to complete a five-item questionnaire containing demographic questions and information involving parent levels of education. Lastly, digital voice recordings were used to closely examine students' responses on all three assessments.

The fourth-grade students were given the DIBELS RTF, DIBELS ORF and the WJ-III NU ACH RC in the spring of the school year. The students received one DIBELS

ORF score and two DIBELS RTF scores, one score from real time response and one score from a recorded and later transcribed response (Bellinger & DiPerna, 2011). Paired *t* tests were used to determine the difference between real time RTF and recorded RTF scores. Evidence of a significant difference ($r \geq .98, p < .001$) between real time retell fluency scores and recorded retell fluency scores was found by researchers. Bellinger and DiPerna also found a significant correlation between DIBELS ORF scores and the reading comprehension scores of all three passages. For DIBELS ORF passages one and two, correlations of $r = .63$ and $r = .61$ ($p < .001$; $p < .05$) were found between the passages and reading comprehension measure. A correlation of $r = .49$ ($p < .05$) was found between DIBELS ORF passage three and the reading comprehension measure.

In addition to seeking a predictive utility of reading measures including ORF on reading comprehension, Carlisle et al. (2004) sought to examine the accuracy of cut-off scores in predicting future achievement in reading. Researchers examined scores from a total of 49 Michigan Reading First schools which comprised nearly 3,000 first-grade students, over 1,000 second-grade students, and nearly 2,000 third-grade students. The participants were administered both the DIBELS and the Iowa Test of Basic Skills (ITBS) assessments. The DIBELS screenings were given during the fall, winter, and spring of the same year in which the ITBS was administered in the spring. The DIBELS subtests employed were (a) LNF, (b) PSF, (c) NWF, (d) ORF, and (e) word use fluency (WUF). The subtests were comprised of cut-off created benchmark scores used to label the students as at risk, some risk, and low risk. The ITBS standardized assessment was comprised of reading and reading-language subtests, such as (a) vocabulary, (b) word analysis, (c) listening, (d) language, and (e) reading comprehension.

Carlisle et al. (2004) ran hierarchical regression analyses to more closely examine which subtests at each grade level would better predict reading achievement on the spring, standardized assessment. Multiple regression analyses were employed to strongly enforce the idea that DIBELS subtests could effectively identify students at risk for reading achievement. Researchers utilized a Pearson correlation to identify the relation between DIBELS subtests and ITBS subtests for each grade level.

Significant predictive relations were discovered between DIBELS subtests and ITBS subtests (Carlisle et al., 2004). WUF subtest was of little value in predicting future reading success at all three grade levels, and ORF subtest was of the greatest value in predicting future reading success at all three grade levels. For Grade 2, a significant relation ($r = .71$; $p < .001$) was found between the ORF assessment score given in the fall and the ITBS Reading Total score given in the spring. For Grade 3, a significant relation ($r = .70$; $p < .001$) was found between the ORF assessment score given in the fall and the ITBS Reading Total score given in the spring. Many students identified as low risk were found to perform at or above grade level in reading, according to the ITBS spring, standardized assessment. However, some students (less than 50%) in both Grades 2 and 3 were categorized as low risk but were eventually labeled as reading below grade level on the ITBS assessment.

In a quasi-experimental study, Petscher & Kim (2011) collected data from over 30,000 first-, second-, and third-grade students in some of Florida's Reading First schools. The student sample was diverse and equally representative of similar Florida Reading First schools. The DIBELS ORF assessment was administered four times per year (fall, winter 1, winter 2, and spring) for Grades 1, 2, and 3 instead of the typical

three times per year. Also, the Stanford Achievement Test, 10th Edition (SAT-10) was administered in the same year. First- and second-grade students took the SAT-10 in the winter, and the third-grade students took the SAT-10 in the spring. The SAT-10 was administered as an untimed, standardized measure of reading comprehension.

Petscher and Kim (2011) chose a quantile regression-analytic approach to analyze the predictive validity of oral reading fluency scores on later reading comprehension. Strong correlations were found among the reading comprehension passages for all grades, and students performed at similar levels across passages throughout the year. Average correlations of passages were estimated to be $r = .97$. Finally, Petscher and Kim agreed there was a significant correlation of $r = .33$ ($p < .001$) between DIBELS ORF scores and reading comprehension making DIBELS ORF a strong predictor of future reading outcomes.

A similar study of relations between oral reading fluency and comprehension was performed by Schilling et al. (2007). The researchers examined the correlation between DIBELS reading screening program and the ITBS. First- through third-grade students, from nine RF school districts, were selected as the sample. Approximately two-thirds of the students were placed in the at risk category as their DIBELS scores were below the 50th percentile.

Schilling et al. (2007) employed multiple DIBELS reading subtests: (a) LNF, (b) PSF, (c) NWF, and (d) ORF. First-grade students were assessed on every subtest, but second-grade students were only given the NWF and ORF subtests. Third-grade students were assessed using only the ORF subtest. DIBELS was administered in the fall, winter, and spring of the year, and the ITBS was administered to all three grades of students in

April of the same year. The ITBS subtests examined were (a) vocabulary, (b) word analysis, (c) listening, (d) language, and (e) reading comprehension.

In order to more closely examine which subtests best predicted reading total scores on the ITBS, hierarchical regression analyses were run by researchers (Schilling et al., 2007). Researchers found significant relations among the DIBELS subtests and ITBS subtests in each testing session and with all three grades. Interestingly, ORF was most strongly related to ITBS subtests performance scores with the exception of listening. As students gained experience with reading connected texts, ORF proved more closely related to comprehension. In the first-grade correlation scores, researchers discovered ORF and ITBS were more significantly related from winter ($r = .69$; $p < .001$)) to spring ($r = .75$; $p < .001$) assessments. For second-grade students, winter and spring correlations of $r = .75$ and .75 ($p < .001$) were stronger than fall correlations of $r = .69$ ($p < .001$). Lastly, researchers pointed out that the fall DIBELS ORF scores for third-grade students were slightly less significantly related to the ITBS assessment ($r = .65$, .67, and .65 for fall, winter, and spring) than first- and second-grade students.

Utilizing students in Grades 3, 4, and 5, Shapiro et al. (2008) performed a study to examine more closely the relationship between ORF and reading comprehension. Researchers studied the possibility of a relationship between an ORF score, a reading comprehension score, and a standardized reading assessment score. Shapiro et al. chose a sample of 1,000 third-, fourth-, and fifth-grade students. The students were selected from six schools across three districts in Pennsylvania. The student population appeared equal in the average ethnic makeup, although some schools were comprised of a dominant ethnicity.

Shapiro et al. (2008) employed three assessments' scores for their study.

1. The DIBELS ORF assessments were given in September and January.
2. The 4Sight Benchmark Assessment was administered to groups of students in September and December. This assessment was comprised of multiple-choice and open-ended items emphasizing the use of reading comprehension techniques.
3. The Pennsylvania System of School Assessment (PSSA), given in March, included multiple-choice items, performance tasks, and open-ended tasks. The PSSA is a state-standardized assessment selected to show student outcomes, especially in the area of reading.

Receiver Operating Characteristic (ROC) curves were employed to test for validity of measurement tool scores (Shapiro et al., 2008). Researchers found the reading comprehension assessment tool, 4Sight, scores to have a stronger relationship with student outcomes on the standardized reading assessment, PSSA, than DIBELS ORF. They found 4Sight scores to more accurately predict PSSA scores in the fourth- and fifth-grade students than the DIBELS ORF. For third-grade students, correlations between 4Sight and PSSA were shown to be $z = 2.91$ for the fall and $z = 3.78$ for the winter. In fourth-grade students, fall correlations between 4Sight and PSSA were found to be $z = 2.24$ and $z = 2.09$ in the winter. No significant correlations were found in the fifth-grade students. Overall, these researchers demonstrated that adding the variable of a reading comprehension assessment tool was a better predictor of reading fluency than that of an oral reading fluency assessment tool used alone.

In summary, researchers (Bellinger & DiPerna, 2011; Carlisle et al., 2004; Petscher & Kim, 2011; Schilling et al., 2007; Shapiro et al., 2008) agreed that DIBELS ORF was significant in assessing a reader's oral reading fluency in relation to their reading comprehension levels. While Bellinger and DiPerna, Carlisle et al., and Petscher and Kim and found a significant correlation among oral reading fluency and reading comprehension, Shapiro et al. found that employing a separate reading comprehension assessment tool, in addition to the ORF measure, proved more accurate in assessing comprehension than the ORF measure alone. Also, Schilling et al. found a significant correlation among the various DIBELS subtests and ITBS subtests of reading comprehension. Although results revealed that as students gained experience with reading connected texts ORF proved to be more closely related to comprehension, ORF was most strongly related to ITBS subtests performance scores with the exception of listening. Based on research, ORF scores were significantly related to reading comprehension allowing educators to quickly determine what reading level the reader was on using ORF screenings and determine what type of instruction they required to reach their full reading potential.

### Longitudinal Research Studies of the Predictive Validity of ORF on Reading Comprehension

Goffreda et al. (2009) investigated the predictive validity of DIBELS screening measures on two standardized assessments, the Terra Nova California Achievement Test (CAT) Assessment and the PSSA. Researchers selected a sample of 67 first-grade, Pennsylvania students. The majority of students were males, and over 70% of the total students assessed were White. Approximately 10% of the students received special education services.

Goffreda et al. (2009) employed three variables for this study. The DIBELS subtests employed were the (a) LNF, (b) PSF, (c) NWF, and (d) ORF, and they were administered in the fall, winter and spring of first grade. The Terra Nova was administered in the spring of second grade, and it consisted of 145 standardized assessment items pertaining to reading and language arts. Finally, the PSSA was administered in the spring of third grade. The PSSA scores evaluated both individual student achievement and the effectiveness of the school program.

Goffreda et al. (2009) conducted statistical analyses for the non-experimental design study. Researchers employed logistic regression analysis to examine relations among first-grade students' winter benchmark DIBELS scores, the Terra Nova and the PSSA. In order to determine relations among categories from DIBELS to standardized assessments, researchers employed the model's overall goodness-of-fit test. Sensitivity and specificity were also calculated to determine the DIBELS' classification accuracy. Lastly, receiver operating characteristics were used to visually represent indicators for individual DIBELS' subtests.

Overall, Goffreda et al. (2009) reported moderate correlations ($r \geq .30$; $p \leq .001$) with the DIBELS subtests' scores and the two standardized assessment scores. Researchers found significant predictions of proficiency when all DIBELS subtests were considered. In isolation, ORF was the only predictor to significantly predict performance on the Terra Nova and PSSA assessments. ORF was found to have sensitivity and specificity in relation to the recommended risk cutoff scores.

Additional research was performed by Munger (2010). He sought to investigate the predictive validity of the DIBELS reading screening measure given in first grade on

three different third grade reading comprehension measures. The researcher additionally pursued a relationship among vocabulary measures assessed in first grade and three measures of reading comprehension assessed in third grade. Lastly, Munger researched the accuracy of DIBELS ORF cut scores in their classification of students at risk of reading failure.

Participants, in the two-year longitudinal study, were 35 elementary school students from Central New York (Munger, 2010). The sample was comprised of approximately 40% girls and 60% boys from lower- to middle-income families, and about 70% of the students received free- or reduced-lunches during their third grade testing year. First-grade students were given five DIBELS subtests plus a vocabulary assessment. Students were assessed using the DIBELS (a) LNF, (b) PSF, (c) NWF, (d) WUF, and (e) ORF subtests. In addition to the DIBELS subtests given, the Peabody Picture Vocabulary Test-Third Edition (PPVT-III), form B was given to first-grade students as an untimed test measuring students' understanding of vocabulary words. Examiners spoke words, and students were asked to select one of four pictures to match the spoken word.

Third-grade students were given the DIBELS ORF and were assessed using three reading comprehension measures (Munger, 2010).

1. The Wechsler Individual Achievement Tests-Second Edition: Reading Comprehension subtest (WIAT-II) was used as an individually administered assessment.
2. An additional assessment given to third-grade students was the Group Reading Assessment and Diagnostic Evaluation (GRA+DE: Level 3).

3. A third reading comprehension measure given to third-grade students was the New York State English Language Arts Test (NYSELA).

Munger (2010) utilized hierarchical linear regression analyses in order to explain variance in third-grade reading comprehension measures and to explore the first-grade DIBELS subtests and each subtest's contribution to predicting comprehension. Correlational analyses were employed to determine the relationship between the first-grade vocabulary assessment measures and third-grade measures of reading comprehension and the relationship between the third-grade DIBELS ORF subtest and the third-grade measures of reading comprehension. Finally, cross-tabulations were created in order to closely examine the accuracy of the first-grade DIBELS cut scores in classifying first-grade students and how well the classifications matched outcomes on the third-grade reading comprehension measures.

Moderate to strong correlations were found among the DIBELS ORF and the third-grade measures of reading comprehension (Munger, 2010). For first-grade students, DIBELS ORF and the three measures of reading comprehension showed correlations from ($r$ = .56 to .72; $p$ < .01). Specifically, DIBELS ORF proved to be a strong predictor of reading comprehension in early elementary grades for group administered tests and individually administered assessments such as the NYSELA. In addition, the first-grade DIBELS ORF strongly predicted third-grade reading comprehension scores and accounted for almost half of the variance among the DIBELS ORF and reading comprehension measures. Correlations were found to be strongest between the GRA+DE reading comprehension measure and DIBELS ($r$ = .85; $p$ < .01) and between the WIAT-II and NYSELA reading comprehension measures and DIBELS ($r$ = .77, $r$ = .70; $p$ < .01)

for third-graders. A third significant finding was that both PPVT-III and the DIBELS ORF subtest were strong predictors of third-grade reading comprehension, but the DIBELS WUF was not a strong predictor of third-grade reading comprehension. Finally, findings revealed that DIBELS ORF cut scores were relatively accurate in classifying students in risk categories with the exception of the students who were classified as some risk.

The overall purpose of a study by Riedel and Samuels (2007) was to determine if there was a relation between the DIBELS assessment subtests, including ORF, and reading comprehension assessments administered to both first- and second-grade students. Also, Riedel and Samuels examined the optimal cut scores to use when employing DIBELS to predict reading comprehension as well as studied characteristics of students for whom DIBELS was a poor predictor of reading comprehension.

Riedel and Samuels (2007) selected over 1,000 first-grade students for their study. The students attended schools with a Reading Excellence (REA) grant and participated in related assessments, DIBELS and Group Reading Assessment and Diagnostic Evaluation (GRA+DE). Over 90% of the students were African American, and the majority of the students were English-speaking. Also, most students came from poverty-stricken homes and qualified for free- or reduced-lunches. Riedel and Samuels examined variables from three assessments:

1. Various subtests were selected from the DIBELS assessment administered in the fall, winter, and spring of first grade. Selected subtests were (a) LNF, (b) PSF, (c) NWF, (d) ORF, and (e) RTF.

2. Researchers also employed the GRA+DE assessment of overall reading ability. During the spring of first grade, vocabulary, comprehension and oral-language skills were three abilities assessed in a multiple-choice, un-timed format.

3. The Terra Nova Reading assessment was administered through a multiple-choice, timed format during the spring of second grade.

ROC analysis was employed to examine the relation among DIBELS, GRA+DE, and Terra Nova subtests and reading comprehension (Riedel & Samuels, 2007). Logistic regression was used by Riedel and Samuels to further investigate the use of subtest combinations as predictors of reading performance on future assessments. Analysis of variance (ANOVA), Pearson's chi-square test, and logistic regression were used by researchers to identify student scores for which DIBELS poorly predicted reading comprehension. In order to more closely calculate between DIBELS subtests and comprehension measures, they utilized Pearson correlations.

Overall, Riedel and Samuels (2007) found the DIBELS ORF assessment to be the best predictor of reading comprehension for first- and second-grade students. Evidence was found showing the correlation of DIBELS ORF and reading comprehension were as closely related in first-grade students ($r = .67$; $p < .001$) as in other studies examining third-grade students ($r = .45$; $p < .001$). PSF proved to be the weakest predictor of reading comprehension in this study, and other DIBELS subtests (LNF, NWF, RTF) were weaker than ORF.

Although evidence of predictive validity was not found, Schatschneider et al. (2008) performed a study to investigate and compare the predictive validity of measures of achievement and growth against future reading skills. They sought to address concerns

related to the traditional approach of identifying struggling readers as late as second grade when these struggles were harder to reverse. Researchers examined relations between (a) achievement status and future reading achievement, (b) student growth and future reading achievement, and (c) both achievement status and student growth and future reading achievement.

Over 20,000 first-grade students were selected from RF schools in Florida (Schatschneider et al., 2008). Gender was equally represented among the students, and the majority of the students were either White or Black. Over three-fourths of the students received free- or reduced-lunches.

Variables were selected from two measures assessing both oral reading fluency (ORF) and reading comprehension (Schatschneider et al., 2008). Assessing oral reading fluency, the DIBELS ORF subtest was individually administered in the months of September, December, February, and April to first- and second-grade students. Secondly, Schatschneider et al. employed the use of a standardized assessment, given in a group format, to assess reading comprehension. The SAT-10 was administered to the students at the end of both first grade and second grade. As researchers analyzed ORF growth for students, two models were applied to the data. First, a linear growth model was applied as a straight line estimating linear growth over a first grade period. Second, a quadratic model was applied showing acceleration or deceleration where more rapid growth may have taken place in first grade. Ordinary least squares estimates were obtained and used in a multiple regression to predict reading comprehension scores.

Results revealed that student growth did not add to the prediction of future reading skills (Schatschneider et al., 2008). Two main reasons were given why this

revelation may have occurred. First, a majority of students would show at least some growth in the final assessment of a school year; therefore, students would have to grow slowly or not at all to show a relation between growth and future reading achievement. The second reason identified was the end-of-year status estimates far exceeded the slope estimates, and the difference in reliability was responsible for inconclusive correlation and regression results. Many measures collected over a long period of time were assumed to be more reliable than one measure collected at one time of the year.

While Riedel and Samuels (2007) and Goffreda et al. (2009) sought to identify a significant relationship between DIBELS and reading comprehension, Munger (2010) purposed to examine relationships between DIBELS, a vocabulary assessment measure and multiple reading comprehension measures. Riedel and Samuels and Goffreda et al. found the DIBELS ORF subtest to be the best predictor of reading comprehension for students in Grades 1, 2, and 3 even when paired with PSF, LNF, NWF, and RTF. Munger discovered DIBELS ORF to be a strong predictor of reading comprehension in early elementary grades for group administered tests and individually administered assessments. However, predictive validity was not always found when expected, as in the study by Schatschneider et al. (2008). These findings proved helpful in providing teachers with information that can more successfully predict students' future success in reading comprehension and achievement (Carlisle et al.; Munger; Riedel & Samuels).

## Theory of Automaticity

LaBerge and Samuels (1974) established the theory of reading as an automatic exercise in which readers merge separate literacy skills into the launch of gaining meaning from text. In reading, automatic processes begin when readers no longer take

time to sound out letters and words or decipher meanings. Readers learn information necessary for reading, and readers practice reading and related sub-skills until the process of reading becomes automatic. Samuels (2006) explained that the human brain is incapable of processing individual skills necessary for reading if attention is needed for each skill at one time. As readers decode sounds, they may say each word aloud slowing down the reading process, or they may simply read over words if their understanding of the words exists. The latter option would allow for greater fluency in reading. As reading becomes automatic, fluency and related comprehension are more easily achieved (LaBerge and Samuels; Samuels).

Comprehension refers to the act of a reader combining prior knowledge with new information being read in the text (Samuels, 2006). Comprehension is another skill that can either slow down or speed up the reading process, depending on the reader's level of comprehension. Additional components of the reading process are metacognition and attention. Metacognition is what readers do when they self-monitor their reading through awareness of what they understand or do not understand. If understanding is not taking place, readers employ various strategies to break down the material in order to enhance understanding. The cognitive energy expended to process information being read is identified as attention in the reading process. In order for the reading process to take place, readers must be automatically decoding, comprehending, and self-monitoring what they are reading. Otherwise, too much attention will be placed in one area and lost in another area.

Fuchs et al. (2001) identified a relationship between ORF and reading comprehension, which supported the theory of automaticity. Researchers described

reading as a complex process involving many skills such as letter recognition and phonemic awareness along with vocabulary and oral reading fluency. Fuchs et al. declared the more automatic readers were with translating text into spoken language, the more fluently they read and the more effectively they comprehended the text. Researchers found that readers were competent in comprehension when they were able to quickly and automatically make connections from sentence to sentence, infer the overall point of the passage, and relate to the purpose of the passage.

## Summary of Related Literature

The review of literature in this study was influenced by many authors of educational research in education. In the beginning of the review, essential components of reading were discussed: (a) phonological awareness, (b) phonemic awareness, (c) phonics (d) oral language, (e) vocabulary, (f) reading comprehension and (g) oral reading fluency (Barone et al., 2006; Calkins et al., 2012; Cummins, 2006; Cummins & Stewart, 2006; Honig, 2001; NRP, 2000; Shanahan, 2006). Additional research was reviewed pertaining to (a) assessment, (b) predictive validity and (c) the role of predictive validity in assessment (Goffreda et al., 2009; Johnson & Johnson, 2002; McMillan & Schumacher, 2001; Messick, 1980; Messick, 1990; Schatschneider et al., 2008). Messick (1980) revealed the importance of empirical evidence in predicting future achievement.

Also, highlighted in the literature review were the topics of oral reading fluency and reading comprehension and how these two reading components were related. Researchers found that screening programs, such as the DIBELS ORF, were significant in assessing a reader's oral reading fluency rate in relation to their reading comprehension levels (Bellinger & Diperna, 2011; Good & Kaminski, 2002; LaBerge &

Samuels, 1974; Petscher & Kim, 2011; Schilling et al., 2007; Shanahan, 2006a; Shapiro et al., 2008). Additional researchers discovered DIBELS ORF to be a strong predictor of reading comprehension (Carlisle et al., 2004; Munger, 2010; Riedel & Samuels, 2007; Samuels, 2006). Goffreda et al. (2009) discovered significant prediction of proficiency as measured by standardized assessment when using the DIBELS ORF assessment. Schatschneider et al. (2008) did not find predictive evidence of student growth adding to the prediction of future reading skills.

Included in the literature review was a brief review of the theory of automaticity (Fuchs et al., 2001; Good, Gruba, et al., 2001; Good, Kaminski, et al., 2001; LaBerge & Samuels, 1974). Fuchs et al. (2001) found that the more automatic readers were, the more fluently they were able to read and the more successfully they comprehended the text.

# CHAPTER THREE

# METHODOLOGY

This study explored the relationship between the DIBELS ORF scores and the *i*LEAP ELA Reading standard scores and the AIMSweb R-CBM scores and the LEAP ELA Reading standard scores. The primary focus was to determine whether predictive validity was evident between the DIBELS-ORF and the *i*LEAP ELA Reading standards in third-grade students and whether predictive validity was evident between the AIMSweb R-CBM and LEAP ELA Reading standards in fourth-grade students. This chapter includes a discussion of the research design, sample, instrumentation, validity and reliability, procedural details, null hypotheses, data analysis and study limitations.

## Research Design

The present study was designed as a non-experimental, causal comparative study. In a causal comparative (ex post facto) study, researchers examine the effect of an independent variable on a dependent variable (Ravid, 2011). The independent variable is not manipulated. The primary focus of this research was on the effect of DIBELS ORF and AIMSweb R-CBM scores on the *i*LEAP ELA and LEAP ELA scores. DIBELS ORF

scores and AIMSweb R-CBM scores were the independent variables examined in this study. The dependent variables studied were the *i*LEAP ELA and LEAP ELA scores.

The DIBELS ORF subtest was administered to third-grade students during the winter benchmark assessment in the School Year 2011-2012. The AIMSweb R-CBM subtest was administered to fourth-grade students during the winter benchmark assessment in the School Year 2011-2012. The *i*LEAP ELA was administered to third-grade students during the spring of the School Year 2011-2012. The LEAP ELA assessment was administered to fourth-grade students during the spring of the School Year 2011-2012. Table 1 shows the time of year the four assessments were administered.

Table 1

*Assessments Administered and Time of Year*

| | Third Grade | | Fourth Grade | |
|---|---|---|---|---|
| Time of Year 2011-2012 | DIBELS ORF | iLEAP ELA | AIMSweb R-CBM | LEAP ELA |
| Winter | X | | X | |
| Spring | | X | | X |

*Note.* ORF = Oral Reading Fluency; ELA = English Language Arts; R-CBM = Reading-Curriculum Based Measurement

## Population and Sample

Data was collected from five Louisiana elementary schools within one rural district. Participants were 154 third-grade students and 188 fourth-grade students. Out of over 2,000 students in the school district, an average of 67% of the students qualified for free- or reduced-lunches, 52% were Black, 46% were White, 1% was Hispanic, and less than 1% was Asian. The demographic information per school examined in this study is

indicated in Table 2. No personal identifiers were used in order to maintain the participants' confidentiality.

Table 2

*School Demographics (School Year 2011-2012)*

| Schools | Lunch Status | | Race Represented | | | |
|---|---|---|---|---|---|---|
| | Free/ Reduced | Paid | White | Black | Hispanic | Asian |
| A | 51.6% | 48.4% | 92% | 6.9% | .6% | .2% |
| B | 85.8% | 14.2% | 7.8% | 88.4% | 2.3% | 1.4% |
| C | 85.2% | 14.8% | 9.2% | 89.5% | 1.3% | 0% |
| D | 73% | 27% | 41.6% | 56.7% | 1% | .7% |
| E | 52.8% | 47.2% | 76.8% | 22.9% | .3% | 0% |
| Average | 69.7% | 36.8% | 45.5% | 52.9% | 1.1% | .5% |

## Instrumentation

### Dynamic Indicators of Basic Early Literacy Skills: Oral Reading Fluency (DIBELS ORF)

The sixth edition of the DIBELS ORF is a standardized, individually administered assessment (Good, Gruba, et al., 2001; Good & Kaminski, 2002). The assessment was designed to identify students needing additional reading support and monitor student progress toward reading goals. The assessment tests for accuracy and fluency with a specified text. Students are asked to read three passages aloud for one minute per passage. Any words omitted, substituted, or not spoken after three seconds are counted as errors. Readers are scored based on how many words are accurately read within the allotted time. The median from the three passages is the reader's oral fluency rate.

For each grade level, there are benchmark goals pre-set for readers, and the benchmark goals determine the type and amount of reading instruction readers should receive after the assessment and after their rate is determined (Good, Gruba, et al., 2001).

There are indicators of risk or cutoff scores for each benchmark level, and these correspond to the 20th and 40th percentile based on the system-wide percentile ranks (Good & Kaminski, 2002). For third grade, ORF benchmark goals are for readers to read at least 67 words per minute, or they are placed in the at risk category of needing substantial intervention. If readers read between 67 and 92 words per minute, they score in the some risk benchmark category and will need some additional intervention. Finally, if readers are reading 92 words or more per minute, they are considered low risk and are reading on or above grade level. The benchmark goals and indicators of risk for the third grade DIBELS ORF middle of third grade are summarized in Table 3.

Table 3

*DIBELS ORF Benchmark Goals and Indicators of Risk Middle of Third Grade*

| Performance/ Benchmark Goal | Descriptor/ Risk Category | Instructional Recommendation |
|---|---|---|
| DORF<67 | At Risk | Intensive-Needs Substantial Intervention |
| 67<=DORF<92 | Some Risk | Strategic-Additional Intervention |
| DORF>=92 | Low Risk | Benchmark-At Grade Level |

*Note.* DORF is the DIBELS oral reading fluency (ORF) score. The number represents the number of words accurately read within one minute.

Research studies have demonstrated reliability and validity of DIBELS ORF. Good and Kaminski (2002) confirmed that elementary students ranged from .92 to .97 with test-retest reliabilities and from .89 to .94 on alternate-form reliability of various additional reading passages at the same development level. Predictive validity was found to be .52 to .91.

**AIMSweb: Reading-Curriculum Based Measurement (R-CBM)**

Similarly to DIBELS ORF, AIMSweb R-CBM is an individually administered, standardized assessment for readers in Grades 1 through 12 (Pearson Executive Office, 2012). The brief assessments were designed to screen students' reading fluency at the beginning, middle, and end of the school year and to use as progress monitoring tools for students at risk for reading failure. Three probes are presented to readers, and readers are given one minute to read aloud each probe. Readers are scored based on the number of words read correctly. Evaluators do not count the words as being read correctly if it takes the reader longer than three seconds to read the word. Like DIBELS ORF, the reading fluency rate is the median score from the three passages.

AIMSweb assessments are set up in three tiers. The first tier is employed to set benchmarks. In order to help identify students at risk for reading failure, inform instruction, and monitor reader progress, benchmarks are set three times a year with the aid of AIMSweb assessments (Pearson Executive Office, 2013). For fourth grade, the winter target score for words read correctly in Tier 1 is 120 or more words per minute (Pearson Executive Office, 2011). The second tier is used to begin monthly progress monitoring of readers who are at risk of reading failure. Readers, who score between 86 and 120 words per minute receive monthly progress monitoring from Tier 2. Finally, the third tier is utilized to target progress monitoring of readers who are receiving intensive intervention. These readers receive a score of fewer than 86 words read accurately in one minute. The third tier of monitoring may include weekly or monthly monitoring. Two default cut scores are provided at each grade and season. The higher cut score divides Tier 1 and 2 and is considered the target score. The lower cut score divides Tier 2 and 3.

The benchmark goals and indicators of risk for the AIMSweb R-CBM middle of fourth grade are summarized in Table 4.

Table 4

*AIMSweb R-CBM Benchmark Goals and Indicators of Risk: Middle of Fourth Grade*

| Performance/ Benchmark Goal | Descriptor/ Risk Category | Instructional Recommendation |
|---|---|---|
| ORF>=120 | Tier 1 | Benchmark-At Grade Level |
| 86<=ORF<120 | Tier 2 | Begin Monthly Progress Monitoring |
| ORF<=86 | Tier 3 | Begin Intensive Instruction and Progress Monitor Monthly or Weekly |

*Note.* ORF is the AIMSweb R-CBM oral reading fluency (ORF) score. The number represents the number of words accurately read within one minute.

AIMSweb R-CBM, for fourth grade, has a test-retest reliability score of .95 (Daniel, 2010). The correlation was determined using the mean score of the three reading probes which is similar to the median when representing the central tendency of the three values. The alternate-form reliability score of .94 is for the AIMSweb R-CBM for fourth grade.

**Louisiana Educational Assessment Program (LEAP)**

The LEAP is a criterion-referenced, high-stakes assessment administered to students in grades 4 and 8 (Louisiana Department of Education, 2008). Criterion-referenced components measure a student's mastery of the state content or academic standards being assessed. Beginning in the spring of 1999, students were assessed in English Language Arts (ELA) and mathematics. The following year, students were also assessed in science and social studies. LEAP assessments are directly aligned with state

standards. Students earn scores placing them in achievement levels, such as: (a) Advanced (408-500), (b) Mastery (354-407), (c) Basic (301-353), (d) Approaching Basic (263-300), and (e) Unsatisfactory (100-262). In order for students in Grade 4 to pass to Grade 5, they must achieve a score of Basic or above on either the ELA test or the mathematics test and Approaching Basic or above on the other test.

The LEAP ELA section of the test is comprised of four reading related topics: (a) writing, (b) reading and responding, (c) research to build knowledge, and (d) language (Louisiana Department of Education, 2013c). Each section is timed and assigned a number of points to be achieved. Specifically, the Reading and Responding section of the test covers 3 standards. Standard 1 involves students reading, comprehending and responding to materials while employing a variety of reading strategies. Standard 6 covers students reading, analyzing, and responding to literature. Standard 7 consists of students applying reasoning and problem-solving skills to their reading and related literacy skills. Reading and responding is assigned the most points of 36, which is triple any of the other topics in isolation.

Validity is employed to determine if a test measures what it is designed to measure (Louisiana Department of Education, 2013e). Content validity is further described as a concept testing a set of items to evaluate their adequacy of grade content material, subject or content area, and domain tested. A content review committee was comprised of the test contractor, Louisiana educators, and Louisiana Department of Education staff and verified content validity for the LEAP assessment. Further, reliability identifies the accuracy of test scores explaining that the more reliable the test is the less measurement of error is found with the test score. Test reliability of the LEAP was .88.

**Integrated Louisiana Educational Assessment Program (*i*LEAP)**

In addition to LEAP assessments for students in Grade 4 and Grade 8, other grades are annually assessed. For students in Grades 3, 5, 6, and 7, the *i*LEAP is employed. The assessment combines criterion-referenced components with norm-referenced components (Louisiana Department of Education, 2013a). Criterion-referenced components measure a student's mastery of the academic standards being assessed, and norm-referenced components rank students against other students with a percentile ranking. Students earn scaled scores and content standard scores placing them in achievement levels, such as: (a) Advanced (383-500), (b) Mastery (338-382), (c) Basic (282-337), (d) Approaching Basic (239-281), and (e) Unsatisfactory (100-238). In 2006, the *i*LEAP assessments were first administered assessing students in ELA, mathematics, science and social studies (Louisiana Department of Education, 2013d).

The *i*LEAP ELA section of the test is comprised of four reading related topics: (a) writing, (b) research to build knowledge, (c) reading and responding, and (d) language (Louisiana Department of Education, 2013b). Each section is timed and assigned a number of points to be achieved. Specifically, the Reading and Responding section of the test covers three standards. Standard 1 involves students reading, comprehending and responding to materials while employing a variety of reading strategies. Standard 6 covers students reading, analyzing, and responding to literature. Standard 7 consists of students applying reasoning and problem-solving skills to their reading and related literacy skills. Reading and responding is assigned the most points of 27, which is more than double any of the other topics in isolation.

The content validity, the primary form of validity used to evaluate the *i*LEAP, was identified as acceptable by the content review committees (Louisiana Department of Education, 2013d). The content validity is determined by how well a set of items reflects grade level content, subject matter content, and domain tested. The content review committees consisted of the test contractor, Louisiana educators, and Louisiana Department of Education staff. Test reliability is determined by how consistent and accurate the test scores are on a given test. The reliability of the *i*LEAP was .93.

## Procedural Details

1. The researcher sought and received approval from the Human Subject Research Committee of Louisiana Tech University to collect data.
2. After approval from the Human Subject Research Committee of Louisiana Tech University to collect data, a letter was sent to the superintendent of the North Louisiana district requesting permission to use student assessment data from the previously described instrumentations.
3. Upon receiving permission to use student assessment data, the director of elementary education in the school district collected and de-identified data.
4. All data received were transferred into an Excel worksheet and de-identified by the director of elementary education in the school district.
5. All de-identified student data were analyzed, in SPSS, for use in this study.

## Null Hypotheses

The independent variables in this study were the DIBELS ORF scores achieved in the third grade and the AIMSweb R-CMB scores achieved in the fourth grade. The dependent variables were the scores from iLEAP ELA Reading Standards assessed in the third grade and the scores from LEAP ELA Reading Standards assessed in the fourth grade. The null hypotheses in this study stated that there would be no predictive validity found between the DIBELS ORF and AIMSweb R-CBM scores and the *i*LEAP ELA and the LEAP ELA scores. Inferential statistics were used to test the null hypotheses and the level of significance was set at 0.01. This means there was a calculated risk of less than one percent of the time rejecting the null hypotheses when it was correct.

This study addressed the following research questions and subsequent null hypotheses:

*Research Question 1a: What is the relation of the DIBELS ORF subtest given in Grade 3 and Reading Standard 1 of the iLEAP ELA assessment given in Grade 3?*

$H_0$1a: Third-grade DIBELS ORF will have no relation with third-grade *i*LEAP ELA as measured by Reading Standard 1: Reading, comprehending, and responding (at the 0.01 level of significance).

*Research Question 1b: What is the relation of the DIBELS ORF subtest given in Grade 3 and Reading Standard 7 of the iLEAP ELA assessment given in Grade 3?*

$H_0$1b: Third-grade DIBELS ORF will have no relation with third-grade *i*LEAP ELA as measured by Reading Standard 7: Applying reasoning and problem-solving to reading and related literacy skills (at the 0.01 level of significance).

*Research Question 2a: To what extent does the DIBELS ORF subtest given in Grade 3 predict performance on Reading Standard 1 of the iLEAP ELA assessment given in Grade 3?*

$H_0$2a: Third-grade DIBELS ORF will not predict performance on the third-grade *i*LEAP ELA assessment as measured by Standard 1: Reading, comprehending, and responding (at the 0.01 level of significance).

*Research Question 2b: To what extent does the DIBELS ORF subtest given in Grade 3 predict performance on Reading Standard 7 of the iLEAP ELA assessment given in Grade 3?*

$H_0$2b: Third-grade DIBELS ORF will not predict performance on the third-grade *i*LEAP ELA assessment as measured by Standard 7: Applying reasoning and problem-solving to reading and related literacy skills (at the 0.01 level of significance).

*Research Question 3: How accurately do DIBELS ORF cut scores classify the risk status (at risk, some risk, low risk) of third-grade students, based on their future reading achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) measured with iLEAP ELA given in Grade 3?*

$H_0$3: *i*LEAP ELA achievement of Grade 3 students will be independent of the DIBELS ORF classification of the risk status of third-grade students (at the 0.01 level of significance).

*Research Question 4a: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 1 of the LEAP ELA assessment given in Grade 4?*

$H_0$4a: Fourth-grade AIMSweb R-CBM will have no relation with fourth-grade LEAP ELA as measured by Reading Standard 1: Reading, comprehending, and responding (at the 0.01 level of significance).

*Research Question 4b: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 6 of the LEAP ELA assessment given in Grade 4?*

$H_0$4b: Fourth-grade AIMSweb R-CBM will have no relation with fourth-grade LEAP ELA as measured by Reading Standard 6: Reading, analyzing, and responding to literature (at the 0.01 level of significance).

*Research Question 4c: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 7 of the LEAP ELA assessment given in Grade 4?*

$H_0$4c: Fourth-grade AIMSweb R-CBM will have no relation with fourth-grade LEAP ELA as measured by Reading Standard 7: Applying reasoning and problem-solving to reading and related literacy skills (at the 0.01 level of significance).

*Research Question 5a: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 1 of the LEAP ELA assessment given in Grade 4?*

$H_0$5a: Fourth-grade AIMSweb R-CBM will not predict performance on the fourth-grade LEAP ELA assessment as measured by Standard1: Reading, comprehending, and responding (at the 0.01 level of significance).

*Research Question 5b: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 6 of the LEAP ELA assessment given in Grade 4?*

$H_0$5b: Fourth-grade AIMSweb R-CBM will not predict performance on the fourth-grade LEAP ELA assessment as measured by Standard 6: Reading, analyzing, and responding to literature (at the 0.01 level of significance).

*Research Question 5c: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 7 of the LEAP ELA assessment given in Grade 4?*

$H_0$5c: Fourth-grade AIMSweb R-CBM will not predict performance on the fourth-grade LEAP ELA assessment as measured by Standard 7: Applying reasoning and problem-solving to reading and related literacy skills (at the 0.01 level of significance).

*Research Question 6: How accurately do AIMSweb R-CBM cut scores classify the risk status (at risk, some risk, low risk) of fourth-grade students, based on their future reading achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) measured with LEAP ELA given in Grade 4?*

$H_0$6: LEAP ELA achievement of Grade 4 students will be independent of the AIMSweb R-CBM classification of the risk status of fourth-grade students (at the 0.01 level of significance).

## Data Analysis

The independent variables in this study were the DIBELS ORF scores and the AIMSweb R-CBM scores. The dependent variables were the *i*LEAP ELA Reading Standards' scores and LEAP ELA Reading Standards' scores. In order to evaluate predictive validity of the DIBELS ORF scores on the *i*LEAP ELA Reading Standards' scores, only the students who took both assessments were included in the study. Also, in order to analyze the predictive validity of the AIMSweb R-CBM scores on the LEAP

ELA Reading Standards' scores, only the students who took both assessments were included in the study.

Scores were entered into SPSS for data analysis. The data analysis procedures were divided into four parts: (a) linear regression was employed to analyze the relation and predictive validity of DIBELS ORF and *i*LEAP ELA Reading Standards for third-grade students, (b) linear regression was employed to analyze the relation and predictive validity of AIMSweb R-CBM and LEAP ELA Reading Standards for fourth-grade students, (c) Pearson's chi-square test was utilized to examine the independence of the DIBELS ORF classification of risk status (at risk, some risk, low risk) and the *i*LEAP ELA classification of achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) in third grade, and (d) Pearson's chi-square test was utilized to examine the independence of the AIMSweb R-CBM classification of risk status (at risk, some risk, low risk) and the LEAP ELA classification of achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) in fourth grade.

*Research Question 1a: What is the relation of the DIBELS ORF subtest given in Grade 3 and Reading Standard 1 of the iLEAP ELA assessment given in Grade 3?*

*Research Question 1b: What is the relation of the DIBELS ORF subtest given in Grade 3 and Reading Standard 7 of the iLEAP ELA assessment given in Grade 3?*

*Research Question 2a: To what extent does the DIBELS ORF subtest given in Grade 3 predict performance on Reading Standard 1 of the iLEAP ELA assessment given in Grade 3?*

*Research Question 2b: To what extent does the DIBELS ORF subtest given in Grade 3 predict performance on Reading Standard 7 of the iLEAP ELA assessment given in Grade 3?*

To examine Questions 1a and 1b and Questions 2a and 2b, the researcher employed linear regression to analyze the relation and predictive validity of DIBELS ORF and *i*LEAP ELA Reading Standards for third-grade students.

*Research Question 4a: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 1 of the LEAP ELA assessment given in Grade 4?*

*Research Question 4b: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 6 of the LEAP ELA assessment given in Grade 4?*

*Research Question 4c: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 7 of the LEAP ELA assessment given in Grade 4?*

*Research Question 5a: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 1 of the LEAP ELA assessment given in Grade 4?*

*Research Question 5b: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 6 of the LEAP ELA assessment given in Grade 4?*

*Research Question 5c: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 7 of the LEAP ELA assessment given in Grade 4?*

To examine Question 4a, 4b, and 4c and Questions 5a, 5b, and 5c, the researcher employed linear regression to analyze the relation and predictive validity of AIMSweb R-CBM and LEAP ELA Reading Standards for fourth-grade students.

*Research Question 3: How accurately do DIBELS ORF cut scores classify the risk status (at risk, some risk, low risk) of third-grade students, based on their future reading achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) measured with iLEAP ELA given in Grade 3?*

*Research Question 6: How accurately do AIMSweb R-CBM cut scores classify the risk status (at risk, some risk, low risk) of fourth-grade students, based on their future reading achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) measured with LEAP ELA given in Grade 4?*

To examine Question 3 and Question 6, the researcher utilized chi-square to examine the independence of the DIBELS ORF classification of risk status (at risk, some risk, low risk) and the *i*LEAP ELA classification of students' achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) in third grade and to examine the independence of the AIMSweb classification of risk status (at risk, some risk, low risk) and the LEAP classification of students' achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) in fourth grade.

## Limitations

The present study had limitations. First, the study examined only one Louisiana district limiting the generalizability of the study. Also, only one assessment benchmark out of three was examined to determine relation and predictability. Winter benchmark was utilized, but fall and spring benchmarks were not examined in this study. This may have limited the overall depiction of yearly performance. Finally, DIBELS ORF scores were reviewed in only one grade instead of being reviewed in both third grade and fourth grade. The AIMSweb R-CBM was the fluency assessment tool used in the fourth grade.

## Summary of Methodology

The present study was focused on the relationship between the DIBELS ORF scores, the AIMSweb R-CBM scores and *i*LEAP/LEAP ELA Reading Standards' scores of third- and fourth-grade students. This chapter contained information on the research design, sample, instrumentation, validity and reliability, procedural details, null hypotheses, data analysis and study limitations. Results of the study were presented in Chapter Four.

# CHAPTER FOUR

## RESULTS

The purpose of this study was to investigate the predictive validity of oral reading fluency measures on measures of reading comprehension. The primary research question examined DIBELS ORF student scores in third grade for predictive validity of reading comprehension achievement on the *i*LEAP ELA Reading Standards scores in third grade. The secondary research question examined the AIMSweb R-CBM student scores in fourth grade for predictive validity of reading comprehension achievement on the LEAP ELA Reading Standards scores in fourth grade. Additional research questions investigated the accuracy of DIBELS ORF cut scores in classifying the risk status of third-grade students and their achievement on the *i*LEAP ELA and the accuracy of AIMSweb R-CBM cut scores in classifying the risk status of fourth-grade students and their achievement on the LEAP ELA. The researcher conducted a one-year, non-experimental study inspecting scores collected from the DIBELS ORF and the *i*LEAP ELA administered in third grade and the AIMSweb R-CBM and LEAP ELA administered in fourth grade.

The researcher hypothesized that there would be no predictive validity among the DIBELS ORF scores and *i*LEAP ELA scores. Further, the researcher hypothesized that there would be no predictive validity among the AIMSweb R-CBM scores and the LEAP

ELA scores. In addition, it was hypothesized that *i*LEAP ELA achievement of Grade 3 students would be independent of the DIBELS ORF classification of the risk status of third-grade students. Finally, the researcher hypothesized that LEAP ELA achievement of Grade 4 students would be independent of the AIMSweb R-CBM classification of the risk status of fourth-grade students.

## Research Questions

The following research questions and research hypotheses were addressed in this study:

1a: What is the relation of the DIBELS ORF subtest given in Grade 3 and Reading Standard 1 of the *i*LEAP ELA assessment given in Grade 3?

1b: What is the relation of the DIBELS ORF subtest given in Grade 3 and Reading Standard 7 of the *i*LEAP ELA assessment given in Grade 3?

2a: To what extent does the DIBELS ORF subtest given in Grade 3 predict performance on Reading Standard 1 of the *i*LEAP ELA assessment given in Grade 3?

2b: To what extent does the DIBELS ORF subtest given in Grade 3 predict performance on Reading Standard 7 of the *i*LEAP ELA assessment given in Grade 3?

3: How accurately do DIBELS ORF cut scores classify the risk status (at risk, some risk, low risk) of third-grade students, based on their future reading achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) measured with *i*LEAP ELA given in Grade 3?

4a: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 1 of the LEAP ELA assessment given in Grade 4?

4b: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 6 of the LEAP ELA assessment given in Grade 4?

4c: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 7 of the LEAP ELA assessment given in Grade 4?

5a: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 1 of the LEAP ELA assessment given in Grade 4?

5b: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 6 of the LEAP ELA assessment given in Grade 4?

5c: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 7 of the LEAP ELA assessment given in Grade 4?

6: How accurately do AIMSweb R-CBM cut scores classify the risk status (at risk, some risk, low risk) of fourth-grade students, based on their future reading achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) measured with LEAP ELA given in Grade 4?

## Data Analysis Strategy

The third-grade DIBELS ORF scores, the third-grade *i*LEAP ELA Reading Standards percent scores, and the third-grade *i*LEAP ELA scaled scores and benchmark categories were collected from five elementary schools in one rural Louisiana district in the school year 2011-2012. Additionally, the fourth-grade AIMSweb R-CBM oral reading fluency scores, the fourth-grade LEAP ELA Reading Standards' percent scores, and the fourth-grade LEAP ELA scaled scores and benchmark categories were collected from the same schools in the same year. Only those students who took the oral reading fluency screenings were included in this study. There were 154 third-grade students and

188 fourth-grade students involved in this study. Only Reading Standards assessed and recorded were collected from the *i*LEAP and LEAP ELA Reading Standards assessment. For third grade, Reading Standards 1 and 7 were available. For fourth grade, Reading Standards 1, 6, and 7 were available.

The independent variables in this study were the DIBELS ORF scores and risk categories and the AIMSweb R-CBM scores and risk categories. The dependent variables studied were the *i*LEAP ELA Reading Standards scores, the *i*LEAP ELA scores, the *i*LEAP ELA benchmark categories, the LEAP ELA Reading Standards scores, the LEAP ELA scores, and the LEAP ELA benchmark categories. Scores were entered into SPSS for data analysis. The data analysis procedures were divided into four parts: (a) linear regression was employed to analyze the relation and predictive validity of DIBELS ORF and *i*LEAP ELA Reading Standards for third-grade students, (b) linear regression was employed to analyze the relation and predictive validity of AIMSweb R-CBM and LEAP ELA Reading Standards for fourth-grade students, and (c) Pearson's chi-square test was utilized to measure the accuracy of the DIBELS ORF classification of risk status (at risk, some risk, low risk) of students' achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) on *i*LEAP ELA in third grade and (d) Pearson's chi-square test was utilized to measure the accuracy of the AIMSweb R-CBM classification of risk status (at risk, some risk, low risk) of students' achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) on LEAP ELA in fourth grade.

## Findings

*Part One:* The following research questions and hypotheses were addressed in part one of this study.

**Research Question 1a**

What is the relation of the DIBELS ORF subtest given in Grade 3 and Reading Standard 1 of the *i*LEAP ELA assessment given in Grade 3?

**Null Hypothesis 1a**

Third-grade DIBELS ORF will have no relation with third-grade *i*LEAP ELA as measured by Reading Standard 1: Reading, comprehending, and responding (at the 0.01 level of significance).

This study examined the DIBELS ORF subtest administered in winter 2012. To determine the relation of the DIBELS ORF subtest and Reading Standards of the *i*LEAP ELA assessment, linear regression was performed.

The DIBELS ORF scores and the *i*LEAP ELA Reading Standard 1 assessment scores were compared. Based on the results, the researcher found there to be a significant relationship ($r = .594$) at the $p < 0.01$ level (See Table 5) between DIBELS ORF and *i*LEAP ELA Reading Standard 1. An $R^2$ of .353 indicates that 35.3% of the variance in *i*LEAP ELA Reading Standard 1 percent score can be explained by DIBELS ORF. Therefore, Null Hypothesis 1a was rejected at the $p < 0.01$ level.

Table 5

*Linear Regression (Winter DIBELS ORF and Spring iLEAP ELA Reading Standards Assessment-2012) for Third Grade*

| Independent Variable | Dependent Variable | Standardized coeffiecient | t | p |
|---|---|---|---|---|
| DIBELS ORF | *i*LEAP ELA Reading Standard 1 | .594 | 9.10 | 0.01 |
| | | $R^2 = 0.35$ | F (df 1, 152) = 82.79, $p < 0.01$ | |
| DIBELS ORF | *i*LEAP ELA Reading Standard 7 | .542 | 7.94 | 0.01 |
| | | $R^2 = 0.29$ | F (df 1, 152) = 63.07, $p < 0.01$ | |

*Note.* ORF = Oral Reading Fluency; ELA = English Language Arts

**Research Question 1b**

What is the relation of the DIBELS ORF subtest given in Grade 3 and Reading Standard 7 of the *i*LEAP ELA assessment given in Grade 3?

**Null Hypothesis 1b**

Third-grade DIBELS ORF will have no relation with third-grade *i*LEAP ELA as measured by Reading Standard 7: Applying reasoning and problem-solving to reading and related literacy skills (at the 0.01 level of significance).

The relationship between the DIBELS ORF scores and the *i*LEAP ELA Reading Standard 7 assessment scores was assessed. Based on the results, the researcher found there to be a significant relationship ($r = .542$) at the $p < 0.01$ level (See Table 5) between DIBELS ORF and *i*LEAP ELA Reading Standard 7. An $R^2$ of .293 indicates that 29.3% of the variance in *i*LEAP ELA Reading Standard 7 percent score can be explained by DIBELS ORF. Therefore, Null Hypothesis 1b was rejected at the $p < 0.01$ level.

**Research Question 2a**

To what extent does the DIBELS ORF subtest given in Grade 3 predict performance on Reading Standard 1 of the *i*LEAP ELA assessment given in Grade 3?

**Null Hypothesis 2a**

Third-grade DIBELS ORF will not predict performance on the third-grade *i*LEAP ELA assessment as measured by Standard 1: Reading, comprehending, and responding (at the 0.01 level of significance).

This study examined the DIBELS ORF subtest administered in winter of 2012 and the Reading Standards of the *i*LEAP ELA assessments administered in spring of 2012. To assess the predictive validity of the DIBELS ORF subtest and the *i*LEAP ELA Reading Standards assessment, linear regression was performed. In third grade, ORF significantly predicted Standard 1. ($\beta = .594$ $t(152) = 9.10$, $p < 0.01$, see Table 5). ORF explains a significant proportion of variance in Standard 1 scores, $R^2 = .35$, $F(1, 152) = 82.79$, $p < 0.01$. As a result, Null Hypothesis 2a was rejected.

**Research Question 2b**

To what extent does the DIBELS ORF subtest given in Grade 3 predict performance on Reading Standard 7 of the *i*LEAP ELA assessment given in Grade 3?

**Null Hypothesis 2b**

Third-grade DIBELS ORF will not predict performance on the third-grade *i*LEAP ELA assessment as measured by Standard 7: Applying reasoning and problem-solving to reading and related literacy skills (at the 0.01 level of significance).

Research question 2b examined the DIBELS ORF subtest and Reading Standard 7 of the *i*LEAP ELA assessment. To assess the predictive validity of the DIBELS ORF

subtest and the *i*LEAP ELA Reading Standard, linear regression was performed. In third grade, ORF significantly predicted Standard 7. ($\beta$=.542 t (152) = 7.94, $p < 0.01$, see Table 5). ORF explains a significant proportion of variance in Standard 7 scores, $R^2 = .29$, F (1, 152) = 63.07, $p < 0.01$. As a result, Null Hypothesis 2b was rejected.

To summarize, the findings indicated that there was a significant correlation found between the DIBELS ORF scores and the *i*LEAP ELA Reading Standards assessment. However, the correlation was stronger with Standard 1 than with Standard 7. The most significant prediction of future reading achievement in third grade was found between oral reading fluency and reading comprehension Standard 1: Reading, comprehending, and responding; yet, DIBELS ORF also strongly predicted reading comprehension achievement as measured by Standard 7: Applying reasoning and problem-solving to reading and related literacy skills .

Research questions and hypotheses 4a-5c were addressed in part two of this study.

**Research Question 4a**

What is the relation of the AIMSweb R-CBM given in Grade 4 and Reading Standard 1 of the LEAP ELA assessment given in Grade 4?

**Null Hypothesis 4a**

Fourth-grade AIMSweb R-CBM will have no relation with fourth-grade LEAP ELA as measured by Reading Standard 1: Reading, comprehending, and responding (at the .01 level of significance).

This study examined the AIMSweb R-CBM subtest administered in winter 2012. To determine the relation of the AIMSweb R-CBM subtest and Reading Standards of the LEAP ELA assessment, linear regression was performed.

The AIMSweb R-CBM scores and the LEAP ELA Reading Standard 1 assessment scores were compared. Based on the results, the researcher found there to be a significant relationship ($r = .495$) at the $p < 0.01$ level (See Table 6) between AIMSweb R-CBM and LEAP ELA Reading Standard 1.

Table 6

*Linear Regression (Winter AIMSweb R-CBM and Spring LEAP ELA Reading Standards Assessment-2012)for Fourth Grade*

| Independent Variable | Dependent Variable | Standardized coeffiecient | t | p |
|---|---|---|---|---|
| AIMSweb R-CBM | LEAP ELA Reading Standard 1 | .495 | 7.77 | 0.01 |
| | | $R^2 = 0.25$ | F (df 1, 186) = 60.39, $p < 0.01$ | |
| AIMSweb R-CBM | LEAP ELA Reading Standard 6 | .486 | 7.58 | 0.01 |
| | | $R^2 = .24$ | F (df 1, 186) = 57.42, $p < 0.01$ | |
| AIMSweb R-CBM | LEAP ELA Reading Standard 7 | .542 | 8.79 | 0.01 |
| | | $R^2 = 0.29$ | F (df 1, 186) = 77.22, $p < 0.01$ | |

*Note.* R-CBM = Reading-Curriculum Based Measurement; ELA = English Language Arts

An $R^2$ of .245 indicates that 24.5% of the variance in LEAP ELA Reading Standard 1 percent score can be explained by AIMSweb R-CBM. Therefore, Null Hypothesis 4a was rejected at the $p < 0.01$ level.

**Research Question 4b**

What is the relation of the AIMSweb R-CBM given in Grade 4 and Reading Standard 6 of the LEAP ELA assessment given in Grade 4?

**Null Hypothesis 4b**

Fourth-grade AIMSweb R-CBM will have no relation with fourth-grade LEAP ELA as measured by Reading Standard 6: Reading, analyzing, and responding to literature (at the 0.01 level of significance).

The AIMSweb R-CBM scores and the LEAP ELA Reading Standard 6 assessment scores were compared. Based on the results, the researcher found there to be a significant relationship ($r = .486$) at the $p < 0.01$ level (See Table 6) between AIMSweb R-CBM and LEAP ELA Reading Standard 6. An $R^2$ of .236 indicates that 23.6% of the variance in LEAP ELA Reading Standard 6 percent score can be explained by AIMSweb R-CBM. Therefore, Null Hypothesis 4b was rejected at the $p < 0.01$ level.

**Research Question 4c**

What is the relation of the AIMSweb R-CBM given in Grade 4 and Reading Standard 7 of the LEAP ELA assessment given in Grade 4?

**Null Hypothesis 4c**

Fourth-grade AIMSweb R-CBM will have no relation with fourth-grade LEAP ELA as measured by Reading Standard 7: Applying reasoning and problem-solving to reading and related literacy skills (at the 0.01 level of significance).

The AIMSweb R-CBM scores and the LEAP ELA Reading Standard 7 assessment scores were compared. Based on the results, the researcher found there to be a significant relationship ($r = .542$) at the $p < 0.01$ level (See Table 6) between AIMSweb R-CBM and LEAP ELA Reading Standard 7. An $R^2$ of .293 indicates that 29.3% of the variance in LEAP ELA Reading Standard 7 percent score can be explained by AIMSweb R-CBM. Therefore, Null Hypothesis 4c was rejected at the $p < 0.01$ level.

**Research Question 5a**

To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Reading Standard 1 of the LEAP ELA assessment given in Grade 4?

**Null Hypothesis 5a**

Fourth-grade AIMSweb R-CBM will not predict performance on the fourth-grade LEAP ELA assessment as measured by Standard1: Reading, comprehending, and responding (at the 0.01 level of significance).

This study examined the AIMSweb R-CBM subtest administered in winter 2012 and the Reading Standards of the LEAP ELA assessments administered in spring 2012. To assess the predictive validity of the AIMSweb R-CBM subtest and the LEAP ELA Reading Standards assessment, linear regression was performed. In fourth grade, ORF significantly predicted Standard 1. ($\beta = .495$ $t(186) = 7.77$, $p < 0.01$, see Table 6). ORF explains a significant proportion of variance in Standard 1 scores, $R^2 = .25$, $F(1, 186) = 60.39$, $p < 0.01$. As a result, Null Hypothesis 5a was rejected.

**Research Question 5b**

To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Reading Standard 6 of the LEAP ELA assessment given in Grade 4?

**Null Hypothesis 5b**

Fourt-grade AIMSweb R-CBM will not predict performance on the fourth-grade LEAP ELA assessment as measured by Standard 6: Reading, analyzing, and responding to literature (at the 0.01 level of significance).

Research question 5b examined the AIMSweb R-CBM subtest and Reading Standard 6 of the LEAP ELA assessment. To assess the predictive validity of the

AIMSweb R-CBM subtest and the LEAP ELA Reading Standard, linear regression was performed. In fourth grade, ORF significantly predicted Standard 6. ($\beta$ = .486 t (186) = 7.58, $p < 0.01$, see Table 6). ORF explains a significant proportion of variance in Standard 1 scores, $R^2$ = .24, F (1, 186) = 57.42, $p < 0.01$. As a result, Null Hypothesis 5b was rejected.

**Research Question 5c**

To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Reading Standard 7 of the LEAP ELA assessment given in Grade 4?

**Null Hypothesis 5c**

Fourth-grade AIMSweb R-CBM will not predict performance on the fourth-grade LEAP ELA assessment as measured by Standard 7: Applying reasoning and problem-solving to reading and related literacy skills (at the 0.01 level of significance).

Research question 5c examined the AIMSweb R-CBM subtest and Reading Standard 7 of the LEAP ELA assessment. To assess the predictive validity of the AIMSweb R-CBM subtest and the LEAP ELA Reading Standard, linear regression was performed. In fourth grade, ORF significantly predicted Standard 7. ($\beta$ = .542 t (186) = 8.79, $p < 0.01$, see Table 6). ORF explains a significant proportion of variance in Standard 1 scores, $R^2$ = .29, F (1, 186) = 77.22, $p < 0.01$. As a result, Null Hypothesis 5c was rejected.

To summarize, the findings indicated that there was a significant correlation found between the AIMSweb R-CBM scores and the LEAP ELA Reading Standards assessment. However, the correlation was stronger with Standard 7 than with Standards 1 and 6. The strongest prediction of future reading achievement in fourth grade was found

between oral reading fluency and reading comprehension Standard 7: Applying reasoning and problem-solving to reading and related literacy skills; although AIMSweb R-CBM also strongly predicted achievement of reading comprehension Standards 1: Reading, comprehending, and responding and Standard 6: Reading, analyzing, and responding to literature.

Research Question and Hypothesis 3 were addressed in part three of this study.

**Research Question 3**

How accurately do DIBELS ORF cut scores classify the risk status (at risk, some risk, low risk) of third-grade students, based on their future reading achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) measured with *i*LEAP ELA given in Grade 3?

**Null Hypothesis 3**

*i*LEAP ELA achievement of Grade 3 students will be independent of the DIBELS ORF classification of the risk status of third-grade students (at the 0.01 level of significance).

This study examined the DIBELS ORF subtest administered in winter of 2012. To determine the accuracy of the DIBELS ORF subtest cut scores and related classification of risk status assigned to third-grade students and the relation to their classification of achievement on the *i*LEAP ELA assessment, a chi-square analysis was conducted.

Hypothesis 3 stated that third-grade student achievement on the *i*LEAP ELA would not be contingent upon the accuracy of the DIBELS ORF classification of risk status. Chi-square tests were used to examine the independence of the DIBELS ORF classification of risk status and the *i*LEAP ELA classification of achievement. Results

indicated a significant relationship between these variables, $X^2$ (8, N = 154) = 67.03, $p < 0.01$. Results indicate that DIBELS ORF risk status did align with achievement status on the *i*LEAP ELA. Therefore, Null Hypothesis 3 was rejected at the $p < 0.01$ level.

Research Question and Hypothesis 4 are addressed in part four of this study.

**Research Question 6**

How accurately do AIMSweb R-CBM cut scores classify the risk status (at risk, some risk, low risk) of fourth-grade students, based on their future reading achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) measured with LEAP ELA given in Grade 4?

**Null Hypothesis 6**

LEAP ELA achievement of Grade 4 students will be independent of the AIMSweb R-CBM classification of the risk status of fourth-grade students (at the 0.01 level of significance).

This study examined the AIMSweb R-CBM subtest administered in winter 2012. To determine the accuracy of the AIMSweb R-CBM subtest cut scores and related classification of risk status assigned to fourth-grade students and the relation to their classification of achievement on the LEAP ELA assessment, a chi-square analysis was conducted.

Hypothesis 6 stated that fourth-grade student achievement on the LEAP ELA would not be contingent upon the accuracy of the AIMSweb R-CBM classification of risk status. Chi-square tests were used to examine the independence of the AIMSweb R-CBM classification of risk status and the LEAP ELA classification of achievement. Results indicated a significant relationship between these variables, $X^2$ (8, N = 188) =

63.62, $p < 0.01$. Results indicate that AIMSweb R-CBM risk status did align with achievement status on the LEAP ELA. Therefore, Null Hypothesis 6 was rejected at the $p < 0.01$ level.

To summarize, the findings indicated that there was a significant, dependent relationship between the DIBELS ORF risk categories and the *i*LEAP ELA achievement categories for third grade. Additionally, the findings revealed a significant, dependent relationship between the AIMSweb R-CBM risk categories and the LEAP ELA achievement categories for fourth grade. However, the dependent relationship was stronger with the DIBELS ORF and the *i*LEAP ELA than with the AIMSweb R-CBM and the LEAP ELA.

# CHAPTER FIVE

## DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to investigate the relationship between oral reading fluency and reading comprehension. Additionally, the study examined the predictive validity of oral reading fluency towards reading comprehension achievement. Determining the accuracy of oral reading fluency cut scores and their influence on reading comprehension achievement categories was another purpose of the present study.

The researcher analyzed scores from four instruments administered to 154 third-grade students and 188 fourth-grade students from five schools in one Louisiana district. The instruments employed were the DIBELS ORF subtest, the AIMSweb R-CBM oral reading fluency subtest, the *i*LEAP ELA Reading Standards assessment and the LEAP ELA Reading Standards assessment. De-identified data were collected from the school year 2011-2012 and later entered into SPSS for statistical analysis. Linear regression was conducted to analyze the data for relationship and predictive validity between oral reading fluency and reading comprehension. Chi-square was conducted to analyze the data for accuracy of cut scores used in oral reading fluency screening programs.

## Research Questions

This study addressed the following research questions:

1a: What is the relation of the DIBELS ORF subtest given in Grade 3 and Reading Standard 1 of the *i*LEAP ELA assessment given in Grade 3?

1b: What is the relation of the DIBELS ORF subtest given in Grade 3 and Reading Standard 7 of the *i*LEAP ELA assessment given in Grade 3?

2a: To what extent does the DIBELS ORF subtest given in Grade 3 predict performance on Reading Standard 1 of the *i*LEAP ELA assessment given in Grade 3?

2b: To what extent does the DIBELS ORF subtest given in Grade 3 predict performance on Reading Standard 7 of the *i*LEAP ELA assessment given in Grade 3?

3: How accurately do DIBELS ORF cut scores classify the risk status (at risk, some risk, low risk) of third-grade students, based on their future reading achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) measured with *i*LEAP ELA given in Grade 3?

4a: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 1 of the LEAP ELA assessment given in Grade 4?

4b: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 6 of the LEAP ELA assessment given in Grade 4?

4c: What is the relation of the AIMSweb R-CBM subtest given in Grade 4 and Reading Standard 7 of the LEAP ELA assessment given in Grade 4?

5a: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 1 of the LEAP ELA assessment given in Grade 4?

5b: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 6 of the LEAP ELA assessment given in Grade 4?

5c: To what extent does the AIMSweb R-CBM subtest given in Grade 4 predict performance on Standard 7 of the LEAP ELA assessment given in Grade 4?

6: How accurately do AIMSweb R-CBM cut scores classify the risk status (at risk, some risk, low risk) of fourth-grade students, based on their future reading achievement (Advanced, Mastery, Basic, Approaching Basic, Unsatisfactory) measured with LEAP ELA given in Grade 4?

## Discussion of Results

### Relationship between Oral Reading Fluency and Reading Comprehension

Research questions 1a and 1b were presented to reveal a significant relationship between oral reading fluency as measured by DIBELS ORF and reading comprehension as measured by *i*LEAP ELA Reading Standards assessment. Research questions 4a, 4b, and 4c were presented to reveal a significant relationship between oral reading fluency as measured by AIMSweb R-CBM and reading comprehension as measured by LEAP ELA Reading Standards assessment. Based on the findings for these research questions, a significant relationship exists between oral reading fluency and reading comprehension.

The findings revealed the strongest correlation ($R = .594$, $p < 0.01$) between oral reading fluency and reading comprehension existed when oral reading fluency was measured by DIBELS ORF, administered in Grade 3, and reading comprehension was measured by *i*LEAP ELA Standard 1: Reading, comprehending, and responding, also administered in Grade 3. However, significant correlations were also verified when

measured using DIBELS ORF and Reading Standard 7 in third grade. When AIMSweb R-CBM and Reading Standards 1, 6 and 7 were employed to examine relationship in Grade 4, significant correlations were found.

The results of these findings were consistent with former studies identifying a significant relationship between oral reading fluency and reading comprehension (Bellinger & DiPerna, 2011; Petscher & Kim, 2011; Schilling et al., 2007; Shapiro et al., 2008). Specifically, Bellinger and DiPerna found a significant correlation ($r = .63$; $p < 0.001$) between oral reading fluency and reading comprehension. Interestingly, Shapiro et al. found that combining a reading comprehension screening tool with an oral reading fluency screening tool demonstrated a stronger relationship with reading comprehension than simply employing an ORF measure. Schilling et al. discovered that as students gained experience with reading connected texts, ORF conveyed a stronger correlation to reading comprehension.

Oral reading fluency screening measures, such as the DIBELS ORF and the AIMSweb R-CBM, are necessary in teachers identifying readers' oral fluency rates and providing appropriate interventions necessary to help readers achieve reading comprehension success. The findings of this study supported research performed by LaBerge and Samuels (1974). They postulated that assessors and teachers can employ oral reading fluency rates to effectively and successfully determine a reader's level of reading expertise measured in part by their reading comprehension levels. Shanahan (2006a) revealed the importance of fluency development, through fluency development practices, and its impact on word recognition and reading comprehension. These studies

suggested fluency measures to be advantageous in predicting future reading comprehension achievement.

**Predictive Validity of Oral Reading Fluency on Reading Comprehension**

Research questions 2a and 2b were posed to reveal a significant predictive relationship between oral reading fluency measure DIBELS ORF and reading comprehension measure *i*LEAP ELA Reading Standards assessment. Further, research questions 5a, 5b, and 5c were posed to reveal a significant predictive relationship between oral reading fluency measure AIMSweb R-CBM and reading comprehension measure LEAP ELA Reading Standards assessment. Based on the findings for these research questions, a significant predictive relationship exists between oral reading fluency and reading comprehension. Likewise, the ORF measures explained a significant proportion of the variance in the reading comprehension scores.

The findings revealed the strongest prediction between oral reading fluency and reading comprehension existed when oral reading fluency was measured by DIBELS ORF, administered in Grade 3, and reading comprehension was measured by *i*LEAP ELA Standard 1, also administered in Grade 3. However, significant predictions were also identified when reading comprehension was measured with Reading Standard 7 on the *i*LEAP ELA and oral reading fluency was measured with the DIBELS ORF in third grade. In addition, significant predictions were relevant in findings of Grade 4 students. Predictions were identified when measuring oral reading fluency with AIMSweb R-CBM and reading comprehension with the LEAP ELA Reading Standards 1, 6 and 7 in Grade 4. Furthermore, DIBELS ORF and AIMSweb R-CBM explained a significant proportion

of the variance on the iLEAP ELA and LEAP ELA Reading Standards assessments scores.

Multiple researchers exhibited findings consistent with results of this study confirming a predictive relationship between oral reading fluency measures and measures of reading comprehension (Carlisle et al., 2004; Munger, 2010; Riedel & Samuels, 2007; Samuels, 2006). Carlisle et al. discovered a significant correlation ($r = .70$; $p < 0.001$) between DIBELS ORF and the ITBS Reading Total score of the reading comprehension assessment administered to third-grade students. Likewise, Riedel and Samuels revealed a significant predictive relationship ($r = .67$; $p < 0.001$) among DIBELS ORF and the Terra Nova Reading assessment administered to firs-t and second-grade students.

Messick (1980) identified the importance of evaluating an assessment for its proposed purposes, such as measuring oral reading fluency, before employing them. The DIBELS assessments were created to screen readers in their early reading skills, direct instruction and intervention necessary for reading success, and provide support for early reading achievement (Good, Kaminski, et al., 2001). According to Messick (1990), another purpose of an assessment is its predictive validity which can be utilized to predict an individual's achievement on a future assessment using a current assessment. The findings from this study recognized the importance of employing DIBELS ORF and AIMSweb R-CBM screening assessment tools to help predict achievement on standardized assessments, such as the *i*LEAP and LEAP ELA Reading Standards assessments.

### Accuracy of Cut Scores on Oral Reading Fluency Measures

Research questions 3 and 6 were developed to determine the accuracy of cut scores used in oral reading fluency measures such as DIBELS ORF and AIMSweb R-CBM. Based on the findings for research questions 3 and 6, the scores from the oral reading fluency measures and the scores from the reading comprehension measures were dependent on one another. The null hypotheses were rejected. The results of these findings were consistent with research reviewed in this study. Particularly, Rasinski (2006) and Shanahan (2006a) determined that fluency is a tool employed to better understand a reader's complex comprehension level. Moreover, Good and Kaminski (2002) expressed a dependent relationship by suggesting the idea that fluency is the gateway to comprehension.

## Conclusions

This study confirmed that oral reading fluency screening programs were significantly related to reading comprehension measured in a standardized assessment. Specifically, DIBELS ORF significantly predicted reading comprehension achievement measured by the *i*LEAP ELA Reading Standards assessment given to third-grade students. In addition, AIMSweb R-CBM, an oral reading fluency screening program, was significantly related to reading comprehension when measured by the LEAP ELA assessment administered to fourth-grade students. The findings were consistent with recent research related to oral reading fluency scores and their relation to reading comprehension achievement (Bellinger & Diperna, 2011; Good & Kaminski, 2002; LaBerge & Samuels, 1974; Petscher & Kim, 2011; Schilling et al., 2007; Shanahan, 2006a; Shapiro et al., 2008).

Additional research agreed with the findings concerning oral reading fluency employed as a strong predictor of reading comprehension (Carlisle et al., 2004; Goffreda et al., 2009; Munger, 2010; Riedel & Samuels, 2007; Samuels, 2006). Although Goffreda et al. (2009) examined all DIBELS subtests and found significant predictions of subtests on a standardized assessment, the most significant predictor of reading achievement was found with the DIBELS ORF subtest.

A third aspect of the findings was the dependent relationship discovered between risk status of oral reading fluency measures and achievement categories of reading comprehension measures. Good and Kaminski (2002) proclaimed the meaning of benchmark categories as a level where readers require no extra instruction besides the normal instructional level in order to achieve their appropriate grade level of reading. Likewise, when readers are placed in at risk categories, intensive instruction is required for readers to reach his or her highest reading potential. The revelation of a dependent relationship between oral reading fluency and reading comprehension would agree with research conducted on risk categories and benchmark achievement levels.

Furthermore, research revealed the importance of the RF initiative developed to improve American reading programs (U.S. Department of Education, 2012). DIBELS was one of the reading programs developed under RF. The findings indicated the promotion of the RF initiative and expansion of the related reading program, DIBELS, improved reading achievement for third- and fourth-grade students. Correspondingly, the Louisiana assessments, *i*LEAP ELA and LEAP ELA, were state-mandated assessments created to measure reading and reading related skills. These Louisiana assessments were cultivated out of the NCLB Act of 2001 (Louisiana Department of Education, 2008).

Therefore, it was determined that NCLB had a constructive impact on student achievement in the advancement of state-mandated assessments.

## Implications for Practice

The research results ascertained that a significant relationship exists between oral reading fluency and reading comprehension. Furthermore, evidence was found in this study supporting the predictive validity of DIBELS ORF and AIMSweb R-CBM oral reading fluency measures on reading comprehension measured by state assessments, *i*LEAP ELA and LEAP ELA. Identification of this relationship adds value to the screening measures, DIBELS ORF and AIMSweb R-CBM, as these measures greatly influence and inform instruction and remediation for students. Teachers and administrators may find this research relevant as fourth-grade students will or will not be allowed to matriculate into the fifth grade, depending on their LEAP ELA achievement.

As teachers and administrators take an offensive stance with early reading screening programs such as DIBELS ORF and AIMSweb R-CBM, readers have a growing chance of avoiding failures in reading achievement (Good, Kaminski, et al., 2001). The application of this information may guide the progression of interventions to strengthen readers' oral fluency rates in order to improve their reading comprehension levels and future reading success.

Winter oral reading fluency screenings afford teachers a minimum of two benefits in assisting readers to become successful. Winter or mid-year screenings are performed after students have received months of exposure to everyday classroom reading strategies and months of practicing reading skills. For this reason, the mid-year screenings may provide a more accurate picture of their oral fluency rates than screenings administered in

the beginning of a school year. Beginning-of-year screenings may cause readers to feel anxious about new surroundings obscuring the reader's true abilities of fluent, oral reading to be revealed.

Secondly, screening readers' oral fluency rates in the middle of the year permits time for instructors to address reading difficulties using necessary interventions before end-of-year standardized assessments are administered. Exposure to practice of reading skills, including orally reading texts, and effective reading instruction are secrets to success for readers with reading challenges (LaBerge & Samuels, 1974; Samuels, 2006).

Although a significant relationship was discovered between oral reading fluency and reading comprehension, Munger revealed an even stronger correlation to reading comprehension when adding a vocabulary screening measure to an oral reading fluency screening tool. Likewise, Good and Kaminski (1996) suggested using DIBELS in conjunction with other forms of screening assessments to make a clearer decision about reading instruction. For practical purposes, teachers may want to screen students for oral reading fluency and other reading skills, including vocabulary, in order to have a stronger inference in making decisions about students' instructional needs.

In addition to significant relationships and predictive power between oral reading fluency measures and reading comprehension measures employed in this study, *i*LEAP ELA and LEAP ELA achievement categories were found to be significantly dependent upon risk categories established by DIBELS ORF and AIMSweb R-CBM screening programs. This information necessitates teachers to practice proficient instructional delivery of reading strategies and skills required in each risk category. Teachers may need to include additional, individual interventions targeting various reading sub-skills,

depending on where the screenings show student weaknesses. Interventions and experiences may include all sub-skills, not just the skills measured (Kaminski & Good, 1996). Possible interventions might include practice assignments, such as: (a) books assigned to be read aloud to parents or siblings at home, (b) group or buddy activities at school encouraging reading aloud to others, and (c) readers recording themselves reading and listening to their recorded reading. Those listening may be asked to count the number of words read correctly noting any errors made (Fuchs et al., 2001). Teachers may ask the listener to note decoding errors, miscues, self-corrections, pacing, scanning, and prosodic features giving the teacher a better idea of what type of practice each reader requires.

Another strategy for improving student reading success may include administrators offering professional development for teachers to learn appropriate interventions necessary for each risk category. Professional development would comprise teachers learning the importance of placing students in precise groups to read appropriate instructional texts and closely monitoring student progress once screenings are administered and scored (Fuchs et al., 2001). Teachers would also learn how to instruct students and give appropriate feedback in order to improve students' oral reading fluency and other reading skills leading to the overall goal of successful reading comprehension. An example of appropriate feedback may be revealing to the readers the time it took them to read the passage and the number of words read correctly within that time frame (LaBerge & Samuels, 1974). Helping the readers better understand how their oral reading fluency rates compared with their peers may provide incentive to improve their rates with the use of practice and may assist them in knowing where to place attention while reading and employing many reading sub-skills at one time.

The expectation is for students to advance from at risk to low risk of reading failure eventually placing them in a reading achievement category exhibiting reading success. Moreover, as students grow stronger in their reading skill level, they may advance in their overall academic abilities. Correspondingly, they may advance in other academic subjects. Student success in reading may lead to student academic achievement and advancement to the next grade level.

## Recommendations for Future Research

The findings of this study offered a number of opportunities for further research. First, researchers may want to conduct a longitudinal study following these third-grade students through fourth grade examining students who increase their oral reading fluency rates. The researcher would likely notice reading comprehension skills advance, as well. Furthermore, researchers may be interested in extending the longitudinal study following the readers through graduation and comparing their reading comprehension achievement rates to their graduation achievement rates.

In addition, future researchers may prefer using all three benchmarks in the study to examine the strongest correlation of oral reading fluency screening periods and reading comprehension assessed in the spring. The researcher may elect to employ the fall, winter, and spring benchmarks. Moreover, exploratory research may be performed on the various interventions determined by fluency assessments and their year-long impact on end-of-year student reading comprehension achievement.

Finally, future researchers may choose to examine more closely students whose scores were not closely related. Researchers may find evidence of students with special needs upon further investigation of scores. Furthermore, a study including a separate,

larger sample of special education students may be a topic for future research. Examination of special education student scores may reveal a need for an even more intensive instructional category.

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# APPENDIX A

# HUMAN USE COMMITTEE REQUEST, APPROVAL FORM, AND APPROVAL LETTER

| | |
|---|---|
| **Do you plan to publish this study?** YES □ NO | x |
| **Will this study be published by a national organization?** YES x NO | □ |
| **Are copyrighted materials involved?** x YES □ NO<br>**Do you have written permission to use copyrighted materials?** □ YES x NO | |
| **COMMENTS:** | |

**STUDY/PROJECT INFORMATION FOR HUMAN SUBJECTS COMMITTEE**

**Describe your study/project in detail for the Human Subjects Committee. Please include the following information.**

**TITLE:** THE PREDICTIVE VALIDITY OF DYNAMIC INDICATORS OF BASIC EARLY LITERACY SKILLS ON THE LOUISIANA EDUCATIONAL ASSESSMENT PROGRAM FOR THIRD AND FOURTH GRADE STUDENTS

**PROJECT DIRECTOR(S):** Chair of LEC Committee: Dr. Kimberly Kimbell-Lopez

**EMAIL:** kklopez@latech.edu

**PHONE:** 257-2982

**DEPARTMENT(S):** Department of Curriculum, Instruction, and Leadership

**PURPOSE OF STUDY/PROJECT:** The primary focus will be examining student scores on the DIBELS ORF in third grade and the AIMSweb R-CBM in fourth grade for predictive validity of student achievement on the *i*LEAP/LEAP ELA scores in third and fourth grades.

**SUBJECTS:** Participants will be 157 third-grade students and 167 fourth-grade students from only one rural district in North Louisiana.

**PROCEDURE:**

1. The researcher will seek approval from the Human Subject Research Committee of Louisiana Tech University to collect data.
2. After approval from the Human Subject Research Committee of Louisiana Tech University to collect data, a letter will be sent to the superintendent of the one North Louisiana district requesting permission to use student assessment data from the previously described instrumentations.
3. Upon receiving permission to use student assessment data, the director of elementary education in the school district will collect and de-identify data.
4. All data received will be transferred into an Excel worksheet, by the director of elementary education in the school district.
5. All de-identified student data will be analyzed, in SPSS, for use in this study.

**INSTRUMENTS AND MEASURES TO INSURE PROTECTION OF CONFIDENTIALITY, ANONYMITY:** DIBELS ORF, AIMSweb R-CBM, *i*LEAP ELA, and LEAP ELA assessments will be employed for analysis. Names of schools and the one district will remain confidential.

**RISKS/ALTERNATIVE TREATMENTS:** This project will not involve any risks greater than those encountered in everyday life.

**BENEFITS/COMPENSATION:** The participant's identity will remain unknown, and

they will not expect Louisiana Tech to offer financial compensation nor to absorb the costs of medical treatment should any occur as a result of participating in this research study.

**SAFEGUARDS OF PHYSICAL AND EMOTIONAL WELL-BEING:** This study will involve no treatment or physical contact. All information collected from the assessments will be strictly confidential. No person will be allowed access to the assessment results besides the district coordinator and researcher.

**Note: Use the Human Subjects Consent form to briefly summarize information about the study/project to participants and obtain their permission to participate.**

## HUMAN SUBJECTS CONSENT FORM

**The following is a brief summary of the project in which you are asked to participate. Please read this information before signing the statement below.**

**TITLE OF PROJECT:** THE PREDICTIVE VALIDITY OF DYNAMIC INDICATORS OF BASIC EARLY LITERACY SKILLS ON THE LOUISIANA EDUCATIONAL ASSESSMENT PROGRAM FOR THIRD AND FOURTH GRADE STUDENTS

**PURPOSE OF STUDY/PROJECT:** The primary focus will be examining student scores on the DIBELS-ORF in third grade and the AIMSweb R-CBM in fourth grade for predictive validity of student achievement on the *i*LEAP/LEAP ELA scores in third and fourth grades.

**PROCEDURE:**

1. The researcher will seek approval from the Human Subject Research Committee of Louisiana Tech University to collect data.
2. After approval from the Human Subject Research Committee of Louisiana Tech University to collect data, a letter will be sent to the superintendent of the one North Louisiana district requesting permission to use student assessment data from the previously described instrumentations.
3. Upon receiving permission to use student assessment data, the director of elementary education in the school district will collect and de-identify data.
4. All data received will be transferred into an Excel worksheet, by the director of elementary education in the school district.
5. All de-identified student data will be analyzed, in SPSS, for use in this study.

**INSTRUMENTS:** DIBELS ORF, AIMSweb R-CBM, *i*LEAP ELA, and LEAP ELA assessments will be employed for analysis. Names of schools and the one district will remain confidential.

**RISKS/ALTERNATIVE TREATMENTS:** This project will not involve any risks greater than those encountered in everyday life.

**The following disclosure applies to all participants using online survey tools: This server may collect information and your IP address indirectly and automatically via "cookies".**

**EXTRA CREDIT: If extra credit is offered to students participating in research, an alternative extra credit that requires a similar investment of time and energy will also be offered to those students who do not choose to volunteer as research subjects.**

**BENEFITS/COMPENSATION:** The participant's identity will remain unknown, and they will not expect Louisiana Tech to offer financial compensation nor to absorb the costs of medical treatment should any occur as a result of participating in this research study.

**I,** Tracy Bennett **, attest with my signature that I have read and understood the following description of the study, "** THE PREDICTIVE VALIDITY OF DYNAMIC INDICATORS OF BASIC EARLY LITERACY SKILLS ON THE LOUISIANA EDUCATIONAL

ASSESSMENT PROGRAM FOR THIRD AND FOURTH GRADE STUDENTS ", and its purposes and methods. I understand that my participation in this research is strictly voluntary and my participation or refusal to participate in this study will not affect my relationship with Louisiana Tech University or my grades in any way. Further, I understand that I may withdraw at any time or refuse to answer any questions without penalty. Upon completion of the study, I understand that the results will be freely available to me upon request. I understand that the results of my survey will be confidential, accessible only to the principal investigators, myself, or a legally appointed representative. I have not been requested to waive nor do I waive any of my rights related to participating in this study.

_____ _____

**Signature of Participant or Guardian** **Date**

**CONTACT INFORMATION:** **The principal experimenters listed below may be reached to answer questions about the research, subjects' rights, or related matters.**

**Members of the Human Use Committee of Louisiana Tech University may also be contacted if a problem cannot be discussed with the experimenters:**

**Dr. Stan Napper (257-3056)**

**Dr. Mary M. Livingston (257-2292 or 257-5066)**

LOUISIANA TECH
UNIVERSITY

MEMORANDUM

OFFICE OF UNIVERSITY RESEARCH

TO: Dr. Kimberly Kimbell-Lopez and Ms. Tracy Bennett

FROM: Barbara Talbot, University Research

SUBJECT: HUMAN USE COMMITTEE REVIEW

DATE: January 27, 2014

In order to facilitate your project, an EXPEDITED REVIEW has been done for your proposed study entitled:

**"The Predictive Validity of Dynamic Indicators of Basic Early Literacy Skills on the LA Educational Assessment Program for 3rd & 4th Grade Students"**

**HUC 1161**

The proposed study's revised procedures were found to provide reasonable and adequate safeguards against possible risks involving human subjects. The information to be collected may be personal in nature or implication. Therefore, diligent care needs to be taken to protect the privacy of the participants and to assure that the data are kept confidential. Informed consent is a critical part of the research process. The subjects must be informed that their participation is voluntary. It is important that consent materials be presented in a language understandable to every participant. If you have participants in your study whose first language is not English, be sure that informed consent materials are adequately explained or translated. Since your reviewed project appears to do no damage to the participants, the Human Use Committee grants approval of the involvement of human subjects as outlined.

Projects should be renewed annually. ***This approval was finalized on January 27, 2014 and this project will need to receive a continuation review by the IRB if the project, including data analysis, continues beyond January 27, 2015.*** Any discrepancies in procedure or changes that have been made including approved changes should be noted in the review application. Projects involving NIH funds require annual education training to be documented. For more information regarding this, contact the Office of University Research.

You are requested to maintain written records of your procedures, data collected, and subjects involved. These records will need to be available upon request during the conduct of the study and retained by the university for three years after the conclusion of the study. If changes occur in recruiting of subjects, informed consent process or in your research protocol, or if unanticipated problems should arise it is the Researchers responsibility to notify the Office of Research or IRB in writing. The project should be discontinued until modifications can be reviewed and approved.

If you have any questions, please contact Dr. Mary Livingston at 257-2292 or 257-5066.

# APPENDIX B

# PERMISSION LETTER TO SUPERINTENDENT

Dear Superintendent:

As a doctoral student, I am currently working on my dissertation which will investigate the relationship of oral reading fluency and reading comprehension. This study is focused on the predictive validity of the oral reading fluency scores on reading comprehension scores as measured by state, standardized assessments.

It is my intention to use the data for research purposes only. The names of school district, schools, and participants will not be identified in my dissertation.

In order to obtain more precise statistical findings, I have chosen five schools for my study. The measurement instruments for oral reading fluency will be the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) for third-graders and the AIMSweb for fourth- graders. The measurement instruments for reading comprehension will be the *i*LEAP assessment for third-graders and the LEAP assessment for fourth-graders. Scores, from the School Year 2011-2012, will be analyzed.

With your permission, I am requesting access to the third-grade DIBELS scores and fourth-grade AIMSweb scores (School Year 2011-2012) and the 3rd Grade iLEAP ELA scores and 4th Grade LEAP ELA scores from the School Year 2011-2012 of the five mentioned schools. In addition, I need other data which include the black/white student ratio of the schools (3rd and 4th grades), boy/girl ratio of the schools (3rd and 4th grades), and the information regarding free-lunches for these students from the School Year 2011-2012.

Again, I assure you of the highest level of confidence. If you have any questions or need further information, please contact me through e-mail: tebennett@suddenlink.net.
I look forward to hearing from you soon and thank you for your time and attention to this matter.

Sincerely,

Tracy E. Bennett

LEC Doctoral Candidate, Louisiana Tech University

# APPENDIX C

## ACHIEVEMENT LEVEL SCALE FOR RANGE FOR GRADE 3

## *i*LEAP ELA

*integrated* Louisiana Educational Assessment Program (*i*LEAP)
English Language Arts-Grade 3

| Achievement Level and Scaled Score Range | | | | |
|---|---|---|---|---|
| Unsatisfactory | Approaching Basic | Basic | Mastery | Advanced |
| 100-238 | 239-281 | 282-337 | 338-382 | 383-500 |

## APPENDIX D

## ACHIEVEMENT LEVEL SCALE SCORE RANGE FOR GRADE 4

## LEAP ELA

Louisiana Educational Assessment Program (LEAP)
Criterion-Referenced Test
English Language Arts-Grade 4

| Achievement Level and Scaled Score Range | | | | |
|---|---|---|---|---|
| Unsatisfactory | Approaching Basic | Basic | Mastery | Advanced |
| 100-262 | 263-300 | 301-353 | 354-407 | 408-500 |

# APPENDIX E

# LIST OF ABBREVIATED TERMS

Terms

| | |
|---|---|
| CRT | Criterion-referenced Test |
| DIBELS | *Dynamic Indicators of Basic Early Literacy Skills* |
| ELA | English Language Arts |
| iLEAP | *integrated* Louisiana Educational Assessment Program |
| LEAP | Louisiana Educational Assessment Program |
| NAEP | National Assessment of Educational Progress |
| NCLB | No Child Left Behind Act of 2001 |
| NRP | National Reading Panel |
| NRT | Norm-referenced Test |
| ORF | Oral Reading Fluency |
| R-CBM | Reading-Curriculum Based Measurement |
| RF | Reading First |
| SPSS | Statistical Package for the Social Sciences |