Determining the Relationship Between State Achievement Scores and Curriculum-Based Measurement Scores

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Abstract

The purpose of this study was to identify whether there was a relationship between student performance on the Reading Curriculum-Based Measurement (CBM), and maze CBM, to student performance on the reading portion of the Kansas state assessment for third grade students. Additionally, the study examined how gender, ethnicity, and socioeconomic status affected the relationships between R-CBM and the reading portion of the Kansas state assessment, and the maze CBM and the reading portion of the Kansas state assessment. A quantitative inferential research study was conducted that included approximately 289 third grade students. The study used the data that was collected from a Northeast Central Kansas school district over one school year, from August 2012 to May 2013. After the data analysis the researcher concluded that performances on the R-CBM and maze CBM had a moderately strong relationship to performance on the reading portion of the Kansas state assessment for third grade students for the 2012-2013 school year.

Dedication

This study is dedicated to my husband and son who have encouraged and supported this journey. To my husband, yes I am finished. Your continued patience and understanding has been what I love about you. Your faith in my ability to complete this journey provided me with the stability I needed when it became overwhelming. No matter what the situation is you continue to be my rock when I am not strong. Wesley, my greatest accomplishment in my life, Mommy's back. At the age of eleven your continued concern for how I was doing on my "paper" filled my heart with so much joy, and provided me motivation to complete. I hope someday you can look back and recognize that hard work and dedication will take you places you never imagined.

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Table of Contents

List of Tables

Chapter One

Introduction

In a time of increased accountability, American school districts are working to better understand and monitor student achievement. Annual Yearly Progress (AYP) and standards-based reform have created a movement in which educators try to understand student academic performance based upon state standards. Educators are working to find ways to measure individual student performance and progress toward state standards. Demand for increased accountability has created the need for frequent, valid, and reliable monitoring of student achievement (Shinn, 2012). This frequent measuring and reporting of student achievement has allowed educators to make decisions regarding individual instructional needs in a timelier manner.

In the state of Kansas the state assessment has been used as a summative assessment. School districts wait until the start of the following year to receive these results. Waiting for these yearly state assessment results has not provided educators the time to address student needs within the year the students were assessed. In order to better address individual instructional student needs, school districts across the nation have been employing student benchmarking systems. These benchmarking systems are used to assess students three times a year. Benchmarking takes place in the fall, winter, and spring, with formative assessments such as Curriculum-Based Measurements (CBMs) (NCS Pearson Education, 2012a). CBMs are formative assessments that measure skills in the areas of reading, writing, spelling, and mathematics (Shinn, 2002).

Formative assessments allow educators to evaluate student achievement during instruction, as opposed to summative assessments, which evaluate student achievement

after instruction (Shinn, 2002). As student strengths and weaknesses are determined through formative assessments, timely instructional decisions are made based upon data collected on student performance on these CBMs. These decisions can be made through a problem-solving model, such as Response to Intervention (RtI). RtI is a multi-tiered level approach for early identification and targeting of specific student weaknesses to be addressed through intervention (RtI Action Network, n.d.). This approach allows for more frequent monitoring of student achievement. When using RtI, educators are not only able to make informed data-based decisions regarding student instructional needs in preparation for the yearly state assessment, but decisions that are also in the best interest of the individual student progress throughout the year. With the implementation of RtI and use of formative assessments such as CBMs, educators can be better equipped to address instructional needs for students before any summative assessment is administered (Shinn, 2002).

Background

Previous research on the relationship between CBM scores and state assessment scores has been conducted. Published research has focused on the relationship between Reading Curriculum Based Measurements (R-CBMs), which measure reading fluency, and state achievement tests for third grade students. Ax (2004) found that R-CBM scores were strongly related to third grade student performance on the Florida Comprehensive Assessment Test. In addition, the author also found that the relationship between R-CBM scores and the Florida Comprehensive Assessment Test (FCAT) scores was statistically significant, so R-CBM was an instrument that could predict the success of students on the FCAT. McGlinchey and Hixson (2004) reported that the results of an

eight year study indicated a moderately strong positive relationship between R-CBM scores and the Michigan Educational Assessment Program (MAEP) results. In his dissertation on *The Functional Outcomes of Curriculum-Based Measurement And Its Relation To High Stakes Testing*, Webb (2007) looked at the maze CBM, another formative assessment, which measures reading comprehension, and found that a combination of R-CBM and maze CBM, were moderate predictors for student success on the Texas Assessment of Knowledge and Skills (TAKS). The above mentioned studies represent some of the research that has been conducted in the area of CBMs and state achievement testing through various states.

The sample for this study included all third grade students in a Northeast Central Kansas school district who participated in the R-CBM, maze CBM benchmark testing, and the Kansas State Assessment in reading. See Table 1 and Table 2 for population demographics in the district.

Table 1

2012-2013 District Ethnicity Groups

	Ethnicity						
School Year	African Am.	Am. Indian	Asian	Hispanic	Multi.	White	Total
2012-2013	718	13	59	351	377	2348	3866

Note. African Am. = African American Students, Am. Indian = American Indian Students, Multi. = Multi Ethnic Students. Adapted from Kansas K-12 Reports, Kansas State Department of Education, 2014 http://online.ksde.org/k12/CountyStatics.aspx?org_no=D0453.

Table 1 above, includes the ethnicity groups within the school district for the 2012-2013 school year. The student population included 60.7% white students, 18.6% African American students, 10% Multi-Ethnic students, 9% Hispanic students, 1% Asian

students, and .03% American Indian students. The total student population for the Northeast Central Kansas school district during the 2012-2013 school year was 3,866.

Table 2

2012-2013 District Demographics

Demographic	*N*	%
ELL Status		
ELL	75	2
Not ELL	3,791	98
SES Status		
F/R	2,347	60
Full pay	1,519	40
Academic Status		
General Ed	3,157	82
SPED	709	18
Gender		
Male	2,069	54
Female	1,797	46

Note. ELL=English Language Learners; SES=Socioeconomic Status; F/R=Free and Reduced lunch; General Ed=General Education; SPED=Special Education. Adapted from Kansas K-12 Reports, Kansas State Department of Education, 2014 http://online.ksde.org/k12/CountyStatics.aspx?org_no=D0453.

Table 2 contains demographic information for students within the school district for the 2012-2013 school year. This information is disaggregated into groups that identify students who are English Language Learners (ELL), students who receive Free and Reduced lunch (F/R), and students who receive special education services through an Individualized Education Plan (IEP). Students who are F/R represent 60% of the student

population, students receiving special education services represent 18% of the student population, while students who are ELL represent 2% of the student population.

Statement of the Problem

With the increasing demands of No Child Left Behind (NCLB) Act 2001, school districts became more vigilant in monitoring student achievement on a more frequent basis. The adoption of formative assessments became an option to predict state assessment scores, which were being used to evaluate how well school districts were meeting the demands of NCLB. In order for school districts to participate in constant reflection and review of data, there must be ongoing assessment of student progress throughout the school year. Ongoing assessment of student progress allows educators to determine areas of need before any type of summative assessment, such as state achievement testing, takes place. This ongoing assessment also allows educators to make adjustments to instruction prior to a summative assessment to help ensure students are progressing through the standards (Shinn & Bamonto, 1998). Without the use of ongoing assessment throughout a school year, educators only have the state assessments to provide feedback, which would not be received by school districts until the student has progressed to the next grade level. Monitoring students frequently throughout the year will provide educators with information that will help ensure students are meeting the grade level expectations.

Purpose Statement

The purpose of this study was to identify whether there was a relationship between the reading portion of the Kansas state assessment and the R-CBM and maze CBM for third grade. The state of Kansas begins assessing students with the state

assessment starting with third grade students. Within the study the researcher also determined if there was a relationship between the Kansas state assessment reading scores and the R-CBM and maze CBM scores; and was this relationship affected by gender, ethnicity, and or socioeconomic status.

Significance of the Study

According to Deno (1985), research was needed to assess the relationship between CBM scores in reading and the more traditional measures of reading achievement. Since Deno's 1985 claim for the need to further determine the relationship between traditional reading assessments and CBM scores, several studies have been conducted. The researcher reviews some of the previous research conducted in other states, which is reported in chapter two. The results of the current study should inform educators at the building, district, and state level how well research-based CBMs relate to state assessments, specifically the reading portion of the Kansas state assessment. Both R-CBM and maze CBM results may be effective tools that could help educators in Kansas identify students who perform at the Approaching Standards and Academic Warning levels of the reading portion of the Kansas state assessment. This allows educators the opportunity to address student needs before the assessment, and before the student progresses to the next grade level.

Delimitations

Delimitations are the variables in a study the researcher can control. As defined by Roberts (2004), delimitations explain the boundaries of the study and define how the study's scope was narrowed.

1. This study was delimited to the time period of September 2012 through May 2013.
2. The study was confined to a Northeast Central Kansas school district.
3. The study was delimited to students in the third grade who were assessed with the R-CBM, the maze CBM, and the reading portion of the Kansas state assessments.

Assumptions

This section of the study lists the researcher assumptions. Assumptions are factors the researcher has taken for granted relative to the study (Roberts, 2004).

1. The researcher made the assumption the R-CBMs and the maze CBMs were administered according to testing protocol.
2. The researcher made the assumption the reading portion of the Kansas state assessment was administered according to testing protocol.
3. The researcher made the assumption students taking the R-CBMs and the maze CBMs put forth their best effort.
4. The researcher made the assumption students taking the reading portion of the Kansas state assessment put forth their best effort.

Research Questions

As discussed by Roberts (2004), the research questions in this section of the study were used to guide and provide structure to the study. In this section the researcher stated the research questions to define the purpose statement (Roberts, 2004).

1. To what extent is there a relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment for third grade students?
2. To what extent is the relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment affected by gender?
3. To what extent is the relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment affected by ethnicity?
4. To what extent is the relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment affected by socioeconomic status?
5. To what extent is there a relationship between performance on the maze CBM and performance on the reading portion of the Kansas reading assessment for third grade students?
6. To what extent is the relationship between performance on the maze CBM and performance on the reading portion of the Kansas state assessment affected by gender?
7. To what extent is the relationship between performance on the maze CBM and performance on the reading portion of the Kansas state assessment affected by ethnicity?

8. To what extent is the relationship between performance on the maze CBM and performance on the reading portion of the Kansas state assessment affected by socioeconomic status?

Definition of Key Terms

Achievement gap. A term that refers to the observed disparities that appear in student assessment performance among student groups defined by specific characteristics such as: race, ethnicity, gender, disability category, and socioeconomic status (Editorial Projects in Education Research Center, 2014).

Achievement Improvement Monitoring System (AIMS) web Online. A system which uses scientifically based, formative assessment to inform the teaching and learning process by providing continuous student performance data and reporting improvement to parents, teachers, and administrators (NCS Pearson Education, 2012a).

Adequate Yearly Progress (AYP). A measurement determined by federal legislation, NCLB Act 2001, informs the U.S. Department of Education on the academic performance of every public school in the country receiving Title 1 funds. NCLB requires that states establish targets in annual proficiency, attendance and graduation rates, and participation rates (No Child Left Behind, 2001).

Curriculum framework. A group of related subjects which fit together according to a predetermined set of criteria to cover the area of study. The framework is an organized plan or set of standards encompassing educational outcome standards in a specific content area. These standards define what students are expected to know. As these standards are defined, the curriculum is aligned to these standards to foster student learning (Marsh, 2009).

Dynamic Indicators of Basic Skills (DIBS). Dynamic refers to the sensitivity to differences, which includes sensitivity among individuals and sensitivity within persons over a period of time. Indicators are correlates of key behaviors indicative of overall academic performance. Basic Skills refers to the measure's ability to assess only the basic skills of reading spelling, mathematics computation, and written expression. Basic Skills does not refer to the content of a curriculum. DIBS are the general outcome indicators that measure the foundational skills of student achievement in important areas of basic skills or literacy (Shinn & Bamonto, 1998).

Elementary and Secondary Education Act (ESEA). On April 11, 1965 the United States enacted the Elementary and Secondary Education Act (ESEA). The law requires equal access to primary and secondary education for all students and establishes high standards and processes for accountability. The law authorizes federally funded education programs to be administered by the states. In 2002 ESEA was reauthorized, and is now known as No Child Left Behind Act (NCLB) 2001, (Elementary and Secondary Education Act 1965).

Fidelity. For the purposes of this study, fidelity refers to whether assessment guidelines were followed during the administration of the assessment (National Research Center on Learning Disabilities, 2006).

English Language Learners (ELL). A student whose first language is not English, including students who may have no English language, are just beginning to learn English, and those who have already developed English proficiency (George Washington University, 2005).

Florida Comprehensive Assessment Test (FCAT). A grade span criterion referenced assessment designed to measure student performance toward meeting Florida's Sunshine State Standards in mathematics, reading, science, and writing (Florida Department of Education, 2005).

Formative assessment. A type of assessment that evaluates the process of assessing student achievement during instruction, which allows educators to determine whether an instructional program is effective for individual students (Shinn, 2002)

Individualized Education Plan (IEP). A plan for any public school child who has been identified as an individual with a disability, and who receives special education and/or related services. Every IEP must be designed for each student's specific needs. The IEP creates an opportunity for teachers, parents, school administrators, related service personnel, and students to work together to improve full access to educational opportunities and educational results for children with disabilities (No Child Left Behind Act, 2001).

Kansas Curricular Standards. The curricular standards that contain targeted indicators, or learning outcomes, students in Kansas school districts are expected to know and be able to do. These standards guide what is assessed by the Kansas state assessment in these content areas: Reading, Mathematics, Social Studies, Science, Writing, and English for Speakers of Other Languages (Poggio, Yang, Irwin, Glasnapp, & Poggio, 2007)

Kansas state assessment. The assessment in the state of Kansas that provides information in the monitoring of AYP in the areas of reading and mathematics. Student performance on the assessment is broken into five categories: exemplary, exceeds standard, meets standard, approaches standard, and academic warning (Poggio et al., 2007).

Maze Curriculum-Based Measurement (CBM). A multiple-choice cloze task that students complete reading silently. In a cloze task the first sentence of a passage is left intact. Thereafter, every seventh word is replaced with three words inside parenthesis. One of the words is the correct word from the original passage. The other two words are called distracters. One is a near distracter, a word of the same "type" (e.g., noun, verb, adverb), that does not make sense. The other is a far distracter, a word not of the same type but a word that is selected randomly from the story that does not make sense. The student has three minutes to complete as much of the task as possible (Shinn & Shinn, 2002). The student's score is then compared to national norms to determine at what level the student is functioning (NCS Pearson Education, 2012a).

Michigan Curriculum Framework. The identified standards to aid public and private school systems in designing, implementing, and assessing students in core content curricular areas (Michigan Department of Education, 1996).

Michigan Educational Assessment Program (MEAP). A standardized assessment used in the state of Michigan for grades 3-9 to assess a student's knowledge in the Michigan Curriculum Framework (Michigan Department of Education, 2001-2013).

No Child Left Behind (NCLB). The reauthorization of the Elementary and Secondary Education Act of 1965, which defines the role of the federal government in education. The No Child Left Behind Act is an act designed to close the achievement gap (U.S. Department of Education, 2003).

Problem-solving model. A systematic approach designed to monitor student strengths and weaknesses. As weaknesses are defined, evidence-based instructional interventions are implemented to address the targeted weakness, while student progress is frequently monitored to determine the effectiveness of the intervention with the student. Student weaknesses are addressed in the general classroom population first. If the implemented interventions are not successful, the process cycles again with newly selected evidence-based instructional interventions with frequent progress monitoring. A student's response to these interventions in the general education classroom determines his/her need for special education services (Canter, 2004).

Progress monitoring. The National Center on Student Progress Monitoring (n.d.) reads as follows: "a scientifically based practice that is used to assess student academic performance and evaluate the effectiveness of instruction" (para 2).

Reading Curriculum-Based Measurement (R-CBM). A measurement used to assess students' general reading achievement skills. With R-CBMs students read aloud for one minute under standard conditions and the number of words read correctly is counted (Shinn & Shinn, 2002a). The student's score is then compared to national norms to determine at what level the student is functioning.

Science-based research. The application of rigorous, systematic, and objective procedures to obtain reliable and valid knowledge relevant to educational activities and programs. This involves six criteria:

- Research will employ systematic, empirical methods that draw on observation or experiment,
- involve rigorous data analyses adequate to test the stated hypotheses and justify the general conclusion,
- rely on measurements or observational methods that provide reliable and valid data across evaluators and observers across multiple measurements and observations, and across studies by the same or different investigators,
- be evaluated using experimental or quasi-experimental designs in which individuals, entities, programs, or activities are assigned to different conditions, and with appropriate controls to evaluate the effects of the condition of interest, with a preference for random-assignment experiments, or other deigns to the extent that those designs contain within-condition or across-condition controls,
- ensure that experimental studies are presented in sufficient detail and clarity to allow for replication or, at a minimum, offer the opportunity to build systematically on the findings and,
- be accepted by a peer-reviewed journal or approved by a panel of independent experts through a comparably rigorous, objective, and scientific review." (North Central Regional Education Laboratory, n.d.)

Socioeconomic status. A classification system based on a family's social or economic position determined by income, occupation, wealth, and education (American Psychological Association, 2011). Within this study socioeconomic status refers to students who participate in a free lunch program or reduced lunch program.

Standards-based education reform. A movement that refers to clear measurable academic standards. These standards are a guide for educators of what students should know and be able to perform. Students are measured against the standards individually, rather than being ranked with a norm referenced measure (K-12 Academics, 2011).

State achievement assessments. An assessment administered yearly to measure academic achievement of students, by using specific assessment levels determined by the National Assessment Governing Board. These levels are used to measure what students have learned and how they can perform what they have learned. State departments of education define the guidelines for assessment according to each state's curriculum framework (National Assessment Governing Board, 2002).

Sunshine State Standards. The standards that include statements of expected learning in the area of Language Arts, Math, Science, Social Studies, Health, Physical Education, the Arts, and Foreign Language for the state of Florida. These standards define the outcomes of the curriculum (Florida Department of Education, 2009).

Texas Assessment of Knowledge and Skills (TAKS). A grade span standardized test used to assess student skills in the areas of science, social studies, mathematics, reading, and writing according to the Texas Essential Knowledge and Skills (TEKS) assessment (Texas Education Agency, 2013).

Overview of the Methodology

The setting for the study was a suburban school district in Northeast Central Kansas, with a population of 3,866 students. Data analyzed in this quantitative study was collected by the district over one school year, from August 2012 to May 2013. The scores for students who were assessed using the R-CBM, maze CBM, and the reading portion of the Kansas state assessment were used to calculate correlation coefficients to measure the strength and direction of the relationship between the variables. A *t* test was used to test the significance of each of the correlations, while the Fisher's Z transform was used to test for differences between pairs of correlations based on the various demographics (gender, ethnicity, and socioeconomic status).

Organization of the Study

The remainder of the study is organized into four chapters. Chapter two is a review of the literature related to CBMs and the state assessments. Chapter three outlines the methodology and research design of this study. Included are the design, sample, and population sampling used to collect the data, the reliability and validity of the instrumentation, data collection procedures, and data analysis. Chapter four presents the results of the data analyses and hypotheses testing. Finally, chapter five contains a summary of the study, reviews the methodology, discusses the major findings, compares findings to the literature, discusses possible implications, and makes recommendations for further research.

Chapter Two

Review of the Literature

Currently in American education, school districts are working to understand student academic performance and effective instructional methods. With the passing of NCLB in 2001, states began evaluating student learning by administering state assessments, and using the results to report AYP. These assessments are summative in nature and do not provide educators ongoing information throughout the year. With the need to have continuous data on student performance, school districts turned to the use of ongoing formative assessments. CBMs are one example of formative assessments used by school districts. The nature of formative assessments and the administration schedule of CBMs allow for ongoing evaluation of student academic performance for all students. This ongoing evaluation of student learning allows educators to determine student needs prior to the summative state assessment (NCS Pearson Education, 2012a)

In this review of literature the researcher provides information about what CBMs are, the development and history of CBMs, and the intended purposes of CBMs. Along with the information on CBMs, the researcher also provides information on federal and state legislation that evolved into the development of state assessments, as well as information specific to the development of the Kansas state assessment. Chapter two is organized into five sections: Curriculum-Based Measurements, the history of Curriculum-Based Measurements, the history of state testing, the history of assessments in the state of Kansas, and CBMs and statewide tests of achievement. Additionally, chapter two includes information on the legislation that created the need for state

assessments, and a review of previous research among relationships between CBMs and state achievement testing.

Curriculum-Based Measurements

Shinn (1998) described Curriculum-Based Measurement as:

> a set of standard simple, short duration fluency measures of reading, spelling, written expression, and mathematics computation. CBM was developed to serve as Dynamic Indicators of Basic Skills (DIBS; Shinn, 1995), or general outcome indicators (Fuchs & Deno, 1991) measuring 'vital signs' of student achievement in important areas of basic skills or literacy. They were developed to monitor student's growth in important skill domains relevant to school outcomes. (p. 1)

These assessments were designed to measure basic foundational skills students need in order to progress through presented curriculum. CBMs include the following testing strategies:

1. In reading, students read aloud from basal readers for one minute. The number of words read correctly constitutes the basic decision-making metric. Maze, a multiple choice cloze reading technique, also has been validated as a CBMs testing strategy (Fuchs & Fuchs, 1992). The number of correct word choices per five minutes is the primary metric.
2. In spelling, students write words that are dictated at specified intervals (either 5, 7, or 10 seconds) for two minutes. The number of correct letter sequences and words spelled correctly is counted.
3. In written expression, students write a story for three minutes after being given a story starter (e.g., "Pretend you are playing on the playground and a spaceship

lands. A little green person comes out, calls your name, and…"). The number of words written, and spelled correctly, and/or instances of correct word sequencing are counted.

4. In mathematics, students write answers to computational problems via two to five minute probes. The number of digits written correctly is counted. (Shinn, 1998, p. 1)

CBMs are formative assessment tools that use "standardized testing practices with short-duration fluency tests" (Shinn, 1998 p. 10). The short-duration of these assessments allows for frequent administration and more time to focus on instruction (Shinn, 1998). This frequent administration allows educators to collect data about student progress. Access to this data allows educators to make data-based decisions about instruction throughout the year rather than after the instruction has taken place, as with a summative assessment.

Uses of Curriculum-Based Measurements

CBMs are often used by public school special education and general education teachers, as well as school psychologists, as a formative evaluation tool in the areas of reading, writing, spelling, and mathematics. CBMs can be used to monitor special education students' progress or to monitor system-wide progress for all students in a Problem-Solving model (Shinn, 1998). CBMs used in a Problem-Solving model can determine area of need for specific students, who may require intensive instructional interventions. Shinn (1998) defined the use of CBMs in three big ideas:

1. CBMs used as DIBS allow for timely formative evaluation to facilitate data-based decisions to improve achievement. 2. The use of CBMs for formative

> evaluation allows educators to continuously assess a student's progress throughout instruction. 3. CBMs can be used as a tool in a Problem-Solving model that allows for data-based decisions regarding student achievement. (p. 5)

The use of CBMs as a formative assessment allows special education and general education teachers to evaluate the effectiveness of their instructional programs (Shinn, 1998). CBMs allow teachers to evaluate students throughout the entire instructional process. This provides data in the area of student progress while instruction is taking place, not at the end when the instruction is complete. Continuous student data provided by the CBMs allows the teacher to evaluate the need to maintain instruction or change instruction, (Shinn, 1998). This feedback can also save instructional time by addressing student needs during the instructional process, rather than at the end of the process.

CBMs used in a Problem Solving model can provide continuous data on student achievement, which allows for data-based decisions to be executed. A Problem-Solving model focuses on a needs-based service delivery system (Shinn, 1998). Individual student needs are defined by comparing an individual student's abilities in the area of basic skills to a set of established norms. In a Problem-Solving model, educators follow these criteria: (a) Problem Identification: Is there a deficit in basic skills that warrants further attention? (b) Problem Certification/Validation: The deficit is significant and requires intervention. (c) Exploring Solutions/Goals/Intervention Content/Intervention Process: A goal is set that addresses the deficit area. The goal should define a direction, the problem to be addressed, a baseline, criteria of how to know when the goal is met, and a timeline to complete the goal. (d) Evaluating Solutions: Review CBM data to determine if the intervention is effective. The goal is on target and will meet or exceed

the components of the goal. (e) Problem Solution: Determine if the problem has been remedied or whether an adjustment needs to be made to the intervention or goal (Shinn, 1998). The use of Shinn's three big ideas, the use of CBMs to improve achievement, monitor student progress, and to make data-based decisions, allow school districts to continuously evaluate instruction for all students throughout the year. This continuous evaluation helps to ensure that student needs are addressed in a timely manner.

History of Curriculum-Based Measurements

Between the years 1977-1983, at the University of Minnesota Institute for Research on Learning Disabilities, Stanley Deno and a group of doctoral students were confronted with the task of creating a set of procedures that would include the following: (a) Measures that were reliable and valid according to typical psychometric criteria (Deno, 1992). These reliable measures would include inter-scorer reliability, as well as test-retest and internal consistency reliability. In addition, the measures would have empirical validity that would include criteria in the areas of age, teacher judgment, performance on standardized tests, and placement in special programs; (b) the measures would be easy to administer, allowing teachers, administrators, students, paraprofessionals, and parents to be involved; (c) the measures would be designed to allow for frequent administration. This would allow for student growth to be monitored on a regular basis; (d) finally, the measures would be time efficient and cost effective. The efficiency in time and cost would ensure that educators would be able to implement the administration of the assessments (Deno, 1992). The need for this development emerged from the use of an instructional approach called Data-Based Program

Modification ((DBPM) Deno, 1992). In 2003 Deno described DBPM as a method to individualize the instruction of a student who may have academic or behavioral deficits.

Deno (1992) cited the three step process used to develop the measurement procedures that must meet the design criteria.

> The first step was to identify as many alternative behavioral indicators of a basic skill that might be used in the measurement system. Once these alternative behaviors were identified, a variety of measurement parameters were considered… Once alternative measurement formats were created, researchers conducted a series of criterion validity studies to establish whether any of the behavioral indicators possessed sufficiently high criterion validity to be included in the measurement system. (p. 10)

Development of R-CBM probes. The R-CBM probes are made up of brief stories written by educators who had knowledge of the types of writings students encounter at different grade levels. The team of educators included nine teachers and seven para-professionals, who received training in the following areas (NCS Pearson Education, 2012b):

- Passage length, based on word count (250 for Grades 1 and 2, 300 words for Grade 3, and 350 words for Grades 4 through 8)
- Grade-appropriate number of syllables and sentences per 100 words, based on the Fry readability formula. (p. 3)

Each passage was reviewed and returned to the author for revisions or was rejected. The process totaled 33 passages for Grade 1, and 50 passages each for Grades 2 through 8 (NCS Pearson Education, 2012b). Passages were then field tested in February and March

of 2001 in grades 1 through 8, with twenty-four students in each group in a suburban/rural school district in the Midwest. A range of abilities was represented in each group with one third each at the seventy-fifth, fiftieth, and twenty-fifth percentiles (NCS Pearson Education, 2012b). Each student was asked to read all of the passages aloud at his/her grade level, while the examiner recorded the number of words read correctly (WRC) and the number of errors. Passages were then evaluated based on difficulty and alternate-form reliability (NCS Pearson Education, 2012b). In each of the three screening sessions, three inter-probe correlations were calculated for each grade, (Probe 1 vs. Probe 2, Probe 1 vs. Probe 3, and Probe 2 vs. Probe 3). Table six represents the three alternate-form correlations that were then averaged (NCS Pearson Education, 2012b).

Development of Reading Maze CBM probes. For the reading maze, which was also published by NCS Pearson Education (2012a), the same passages are used as in the R-CBM. Within the passage, starting with the second sentence, every seventh word is replaced by a set of three words contained in brackets. Within the set of three words one word is the original, another word is a word from the passage that is from the same part of speech but does not preserve the meaning of the sentence, and the third word is a word from the passage that is from a different part of speech and does not preserve the meaning of the sentence. Students are to select one of the three words in brackets that best completes the sentence. Students receive a score based on the correct number of words circled. This score is compared to a set of national norms to determine a percentile rank (Shinn & Shinn, 2002b).

History of State Achievement Testing

On April 11, 1965 the United States Statute Elementary and Secondary Education Act (ESEA) was enacted. The statute defined the processes for funding primary and secondary public education in the areas of professional development, resources to promote educational programs, instructional materials, and the need for parental involvement, while forbidding the enactment of a national curriculum. Since 1970 the act has been reauthorized every five years (Office of Superintendent of Public Instruction, n.d). The ESEA did not require states to use standardized assessments to measure student progress but called for academic assessments. ESEA allowed states to determine procedures for measuring student progress through assessments.

No Child Left Behind Act. In the reauthorization of the ESEA the act was renamed No Child Left Behind (NCLB), and was signed into law January 8, 2002. NCLB included 10 titles:

1. Title I: Improving the academic achievement of the disadvantaged,
2. Title II: Preparing, training , and recruiting high quality teachers and principals,
3. Title III: Language instruction for limited English proficient and immigrant students,
4. Title IV: 21st century schools,
5. Title V: Promoting informed parental choice and innovative programs,
6. Title VI: Flexibility and accountability,
7. Title VII: Indian, Native Hawaiian, and Alaska Native Education,
8. Title VIII: Impact aid program,

9. Title IX: General provisions, and
10. Title X: Repeals, re-designations, and amendments to other statutes (U.S Department of Education, 2002)

The 10 titles within the act defined how states would ensure that all public school children had a fair and equal opportunity to have access to a high quality education. The act mandated that all public school children meet proficiency in state defined standards by 2014. Any state accepting federal funding for their schools was required to develop assessments in basic skills to measure achievement that was reported yearly through AYP. States were required to show that students reached proficiency in these standards, as demonstrated through the assessments. This standards based education reform promoted the creation of high standards, which were measured by goals to improve educational outcomes for all students. NCLB was created to reduce the achievement gap within student groups defined by socioeconomic status, ethnicity, and individuals with disabilities (No Child Left Behind Act [NCLB], 2001). Throughout the years, legislation has been enacted to fund the nation's public schools, with the expectation that schools meet the requirements set forth by that legislation. Through the reauthorization of ESEA in 2002, then known as NCLB, the federal government has defined for states what requirements must be met to acquire these funds, while leaving the states the autonomy to determine how these requirements will be met.

History of State Assessment in Kansas. In a letter to the Kansas Legislative Planning Committee dated August 6, 2001, Commissioner Andy Tompkins explained that competency tests had been administered in the 1970's, but a decision had been made by the late 1980's to develop higher standards for student achievement. This resulted in

the School District Finance and Quality Performance Act of 1992, which incorporated outcomes of Quality Performance Accreditation, directing the State Board of Education to develop standards and assessments for reading, mathematics, science, social studies, and writing by 1993. As the State Board of Education began the work of developing new curriculum standards, test items were being developed by Kansas educators and the Center for Educational Testing and Evaluation (CETE) that would align with the State Board and governing legislation (M. Wallis, personal communication, January 14, 2014). The assessments were a reflection of the newly developed curriculum standards, which included objective and performance test items. Due to the cost of the state assessment for local school districts, the State Board implemented a testing administration schedule that would require annual testing of mathematics and reading while alternating writing, science, and social studies assessments. Testing results from these assessments were used to determine accreditation and performance on building report cards, as required by NCLB. By August of 1997, the State Board set out to improve state curriculum standards and assessments, which resulted in a curriculum review process that would take place once every three year (M. Wallis, personal communication, January 14, 2014). This curriculum review process would provide an external review of the revised standards and assessments by a review committee. From 1998-2000 revised standards for reading, writing, mathematics, science and social studies were adopted, with new assessments administered for reading, mathematics, and writing in the 1999-2000 school year. New assessments were administered for science and social studies in the 2000-2001 school year, along with the development of assessments for students with disabilities and/or limited English proficiency (M. Wallis, personal communication, January 14, 2014). .

Research on Curriculum-Based Measurements and Statewide Tests of Achievement

A great amount of research has been devoted to demonstrating the effective use of CBMs in gathering data regarding student performance to guide educational decisions (Deno, 2003). CBMs frequently drive decisions in the areas of improving individual instructional programs, predicting performance on important criteria, enhancing teacher instructional planning, developing norms, increasing ease of communication, screening to identify students academically at risk, evaluating classroom pre-referral interventions, reducing bias in assessments, offering alternative special education identification procedures, recommending and evaluating inclusion, measuring growth in secondary school programs and content areas, assessing English Language Learning Students, and predicting performance on high-stakes assessments (Deno, 2003). Deno, Reschly-Anderson, Lembke, Zorka, & Callender (2002), reported that in a variety of studies, correlations of .65-.85 have been obtained between CBM scores and high stakes assessments in the area of reading and math. In 2001, Good, Simmons, & Kame'enui, determined students who were able to read at least 40 words per minute on an R-CBM by the end of first grade were on target to becoming proficient readers, while students who read at least 110 words per minute at the start of third grade were likely to pass the Oregon state assessment.

In the state of Pennsylvania in 2006, Shapiro, Keller, Lutz, Santoro, and Hintze, conducted a study titled *Curriculum-Based Measures and Performance on State Assessment and Standardized Tests Reading and Math Performance in Pennsylvania."* Within the study participants were selected from two school districts in eastern Pennsylvania. District one was considered a moderate sized district with 14,442 students

with a mix of urban and suburban schools, while district two was considered to be a small suburban district with 6,851 students. In district one, the researchers collected normative samples in reading from 1,461 participants, and normative samples in math samples from 1,477 during the 2002-2003 school year. In district two, the normative sample of participants consisted of 782 students that were drawn as a stratified random sample across all elementary schools in the district. The sample was proportional to the number of students in each of the grade levels and in each of the elementary schools within the district. In both school districts students with IEPs, other than students with Gifted IEPs and Speech/Language IEPs were excluded from the study (Shapiro et al., 2006).

The researchers' goal was to determine whether CBM scores could predict performance on the state assessment. The measures that were used to conduct the study were the R-CBM, Math Computation CBM (M-Comp), Math Concept/Applications CBM (M-CAP), and the following standardized assessments: Pennsylvania System of School Assessment (PSSA; Pennsylvania Department of Education, 2002), SAT 9, MAT-8, Stanford Diagnostic Reading Test (Shapiro et al., 2006). All correlations between the R-CBM scores and the PSSA scores showed that correlations were statistically significant (< .001) for district one and district two. In district two for the fall assessment the correlations ranged between .62 and .69. The researcher reported that the hierarchical regression analysis showed the winter R-CBM to be the strongest predictor of performance on the PSSA (Shapiro et al., 2006). The researchers concluded that the results of the study indicated that R-CBM measures had a moderate to strong relationship with the PSSA measure. Results included that correlations were close to .70. These

outcomes were consistent for both third and fifth grades in both districts (Shapiro et al., 2006).

In "Using Oral Reading Rate to Predict Student Performance on Statewide Achievement Tests," Crawford, Tindal, and Stieber (2001) reported the results of a longitudinal study on a cohort of students over a two year period. The study generated data as students progressed from the second grade to the third grade, analyzing the relationship between students' rate of oral reading and their statewide achievement test scores for reading and math in the state of Oregon. The researchers used a non-graded developmental program where all students remained with the same teacher for both years. The participants represented six blended classrooms that consisted of second and third grade students. In the first year, seventy-seven second grade students participated, while in year two fifty-one of these students continued on in the study and participated both years (Crawford et al., 2001).

The researchers administered R-CBM once during each year of the study. Students participating were administered three passages during each testing session (Crawford et al., 2001). During March of the second year of the study, third grade students participated in the Oregon state assessments for reading and math, which are criterion-referenced assessments with multiple-choice and performance based tasks. Within the study the researchers examined the correlation between the scores on both measures within the second year when the students were in third grade. Scores obtained on Oral Reading Fluency (ORF), when the students were in second grade, were used to predict scores obtained on the statewide assessments during the second year of the study. The researchers then concluded by determining the relationship between the students'

second grade, and third grade reading rates, and their scores on the state achievement test using chi-square statistics (Crawford et al., 2001). The researchers calculated a Pearson correlation coefficient to determine the relationship between correct words per minute and statewide reading assessments, which yielded a correlation of .60. The researchers also determined that third grade students reading 119 words per minute or more would pass the statewide reading assessment (Crawford et al., 2001).

Summary

The various studies described above provided evidence that CBM scores are a valuable measure when trying to determine student success on state achievement assessments. While trying to prepare students for end of the year state assessments, educators should be informed periodically of student performance during the year. These studies indicated that CBMs may be a viable solution for determining in what areas students need further preparation.

Chapter Three

Methods

The purpose of this study was to identify whether there was a relationship between performances on the R-CBM and maze CBM and the reading portion of the Kansas state assessment for third grade students. The researcher also determined whether the relationship between performances on the R-CBM and maze CBM and the reading portion of the Kansas state assessment was affected by gender, ethnicity, and socioeconomic status of students. The methodology used to address the research is presented in this chapter. Chapter three is organized into eight sections: (a) research design, (b) population and sample, (c) sampling procedures, (d) instrumentation to include a section on measurement, validity and reliability, (e) data collection procedures, (f) data analysis and hypothesis testing, and (g) limitations.

Research Design

This quantitative study was a one year inferential research study examining whether there was a relationship between performances on the R-CBM scores and maze CBM and the reading portion of the Kansas state assessment. According to Lunenburg and Irby (2008) inferential research is used to determine the likelihood that results obtained from a sample are the same results that would have been obtained for the entire population. The researcher used two measures to represent the independent variable, the R-CBM and the maze CBM, while using the KSA in reading as the dependent variable. As stated by Gall, Gall, & Borg (2005), correlation research is "a type of quantitative investigation that seeks to discover the direction and degree of the relationship among variables through the use of correlation statistics" (p. 546).

Population and Sample

The sample used in this study included all third grade students from a Northeast Central Kansas school district who participated in all three assessments, the R-CBM, maze CBM, and the reading portion of the Kansas state assessment for the 2012-2013 school year. During the 2012-2013 school year, the district had 289 third grade students with varying ethnicities, with the smallest ethnic group being Pacific Islanders, and the largest ethnic group being white. Table 3 includes the ethnicity of the population chosen for the study, while Table 4 includes information on English Language Learners (ELL), Socioeconomic Status (SES) of students, academic status that includes if a child receives special education services, and gender for third grade students during the 2012-2013 school year.

Table 3

2012-2013 3rd Grade District Ethnicity Groups

Ethnicity	Frequency
African American	60
American Indian	2
Asian	3
Hispanic	25
Multiethnic	20
Pacific Islander	1
White	157

Note. Adapted from Kansas K-12 Reports, Kansas State Department of Education, 2014 http://online.ksde.org/k12/CountyStatics.aspx?org_no=D0453.

The table below contains information that represents the demographic groups, English Language Learners (ELL), Socioeconomic Status (SES), academic status, and gender, of third grade students in a Northeast Central Kansas school district for the 2012-2013 school year.

Table 4

2012-2013 3rd Grade Demographics

Demographic	*N*	*%*
ELL Status		
ELL	7	3
Not ELL	260	97
SES Status		
F/R	191	72
Full pay	76	28
Academic Status		
General Ed	209	79
SPED	58	21
Gender		
Male	150	56
Female	117	44

Note. ELL=English Language Learners; SES=Socioeconomic Status; F/R=Free and Reduced lunch; General Ed=General Education; SPED=Special Education, Adapted from Kansas K-12 Reports, Kansas State Department of Education, 2014 http://online.ksde.org/k12/CountyStatics.aspx?org_no=D0453.

During the 2012-2013 school year 289 third grade students were enrolled in the district. The above demographic data indicates that a large portion of third grade students participated in the free and reduced lunch program, but most did not receive special education services. The ELL population represents the smallest demographic group within the population.

Sampling Procedures

Sampling for this study was a combination of purposive and convenience. Lunenburg and Irby (2008) defined purposive sampling as "selecting a sample based on the researcher's experience or knowledge of the group to be sampled" (p. 175). Lunenburg and Irby (2008) also stated that convenience sampling is a sample that includes "whoever happens to be available" (p. 174). Third grade is the first year students are assessed with the Kansas state assessment, and all third grade students in the Northeast Central Kansas school district participate in the R-CBM and maze CBM benchmark assessments three times a year. The third grade students who participated in both the reading portion of the Kansas state assessment in the spring of 2013, and the R-CBM and maze CBM benchmarking for fall and winter of 2012 were selected for the study.

Instrumentation

Data from three instruments were used to answer the researcher's questions; the R-CBM, the maze CBM, and the reading portion of the Kansas state assessment. Each of the instruments follow specific testing protocols for administration. The data from the R-CBM and the maze CBM were the independent variables, while the reading portion of the Kansas state assessment was the dependent variable.

The R-CBM assessment is a formative assessment used to measure Oral Reading Fluency (ORF). This assessment contains a grade level reading passage students read aloud for one minute. The score is determined by taking the total number of words read per minute (WPM) and subtracting the total number of incorrect words read (Shinn & Shinn, 2002a). Words are counted incorrect if the student omits a word, mispronounces a

word, substitutes a word, or if the student uses more than three seconds to produce a word. For each R-CBM in each grade level, norm referenced scores are available. Each score falls within a percentile rank based upon the time of year the R-CBM is administered (Shinn, 2002).

The maze CBM is a multiple-choice cloze task reading passage used to measure reading comprehension. Each grade level reading passage has 150-400 words the student reads silently. The student receives a passage based on his or her grade level. Within the passage the first sentence is left intact. After each first sentence, every seventh word is replaced with three words in parentheses. One of these words is the correct word that completes the meaning of the sentence, and the other two words are distracters. The student has three minutes to complete as much of the passage as possible (Shinn & Shinn, 2002b). To determine a score, the total number of words circled is counted. The number of incorrect answers are then subtracted from the total number of words attempted (Shinn & Shinn, 2002b). For each maze CBM in each grade level, norm referenced scores are available. Each score falls within a percentile rank based upon the time of year the maze CBM is administered.

The Kansas state assessment is an assessment to measure students' performance on the Kansas Curricular Standards in Reading, Mathematics, Social Studies, Science, and Writing. Kansas students in grades 3-11 participate every year in this assessment. In the areas of reading the test format is multiple-choice, with one of the choices being the correct answer. Students are given grade level reading selections with questions where they are to select the best answer from four choices that are provided. Within the reading portion of the assessment, reading selections may be narrative, expository, technical, or

persuasive (Poggio et al., 2007). Administration of the Kansas state assessment is offered through two modes, paper and pencil or online using the Kansas Computerized Assessment system. Determination of the administration mode is left to the Local Education Agency (LEA) (Poggio et al., 2007). Within the Northeast Central Kansas school district in which the study was conducted, the method used to administer the Kansas state assessment was the Kansas Computerized Assessment System.

Measurement. Three variables were analyzed based on the research questions and hypotheses: the R-CBM scores, maze CBM scores, and the reading portion of the Kansas assessment scores. The R-CBM and the maze CBM scores served as the independent variables, while the scores for the reading portion of the Kansas state assessment was the dependent variable for the study. The R-CBM cut scores for third grade at the beginning of the 2012-2013 school year were as follows; 143 ninetieth percentile, 116 seventy fifth percentile, 87 fiftieth percentile, 59 twenty-fifth percentile, and 38 tenth percentile. The R-CBM cut scores for third grade in the middle of the 2012-2013 school year were as follows; 162 ninetieth percentile, 139 seventy-fifth percentile, 111 fiftieth percentile, 84 twenty-fifth percentile, and 56 tenth percentile (NCS Pearson, 2012b). The maze CBM cut scores for third grade at the beginning of the 2012-2013 school year were as follows; 22 ninetieth percentile, 17 seventy-fifth percentile, 13 fiftieth percentile, 8 twenty-fifth percentile, and 5 tenth percentile. The maze CBM cut scores for third grade in the middle of the 2012-2013 school year were as follows; 25 ninetieth percentile, 20 seventy-fifth percentile, 15 fiftieth percentile, 11 twenty-fifth percentile, and 7 tenth percentile (NCS Pearson, 2012b). The Kansas state assessment cut scores on each test were determined to classify students by performance, the scores

and classifications were as follows; 89-100 Exemplary, 80-88 Exceeds Standard, 67-69 Meets Standard, 55-66 Approaches Standard, and 0-54 Academic Warning (Poggio et al. 2006). The R-CBM and maze CBM use a set of national norms that reflect performance of the national student population on the CBMs to categorize student performance. These categories are based on percentile ranks; ninety-ninth, seventy-fifth, twenty-fifth, and tenth. Students who perform in the twenty-fifth percentile or higher are considered to be within the average range (Pearson, 2012b).

Validity. Gall, Gall, & Borg (2005) defined validity as the appropriateness, meaningfulness, and usefulness of specific inferences made from test scores. The authors (2005) further described test validity as the degree to which evidence and theory support test results. A test with a strong validity measures what it was created to measure.

In 1982 Deno, Mirkin, Chiang, and Lowery conducted the initial studies into the validity of CBMs. They determined five types of measurement for assessing reading performance (Shinn, 1989). These measures required students to:

1. Read aloud stories from their basal reader (passage reading).
2. Read aloud lists of words randomly selected from the pupil's basal reader (isolated word lists).
3. Read aloud words underlined in a story from his/her basal reader (reading in context).
4. Supply words that had been deleted from stories from their basal reader (Cloze comprehension procedure).
5. Give the meaning of words selected from the basal reader story (word meaning). (p. 32)

The measures were then correlated with published reading, criterion norm-referenced tests. These tests included the Stanford Diagnostic Reading Test, the Woodcock Reading Mastery Test, and the Reading Comprehension subtest from the Peabody Individual Achievement Test. Correlation coefficients ranged from .73 to .91 (Shinn, 1989).

According to Poggio et al. (2006), validity is an important attribute that defines the quality of an assessment. For assessments that measure student learning, validity "refers to the appropriateness or correctness of inferences, decisions, or descriptions made from test results about what students know and can do, and is one of the fundamental considerations in developing and evaluating tests" (Poggio et al., 2006, p. 76). Additionally, these authors determined it would be important to collect evidence related to the degree to which the Kansas state assessment correlates with formative assessments. This evidence refers to criterion-related validity. Criterion validity supports inferences about current or future performance by demonstrating that test scores are related to other indicators or criteria (Poggio et al., 2006). Table 5 presents the evidence of the criterion-related validity for the Kansas state assessment in reading for third grade students.

Table 5

Formative Assessment Correlated With General Assessments: All Forms, Then Split By Forms For Third Grade Students

All Forms	P&P	Computer			
		A	B	C	D
r (*n*)	*r* (*n*)	*r* (*n*)	*r* (*n*)	*r* (*n*)	*r* (*n*)
.76 (2328)	.78 (324)	.76 (494)	.76 (515)	.76 (501)	.74 (494)

Note. P&P = Paper and Pencil; A = Computer Test A; B = Computer Test B; C = Computer Test C; D = Computer Test D. Adapted from Kansas assessments in reading and mathematics 2006 technical manual.

Reliability. Gall, Gall, and Borg (2005) discussed test reliability and how the multitude of factors, none of which can be completely controlled, make it virtually impossible to eliminate all error. With that in mind, statisticians have developed reliability standards that are deemed acceptable for reliability for the scientific community. One measure of reliability is Cronbach's alpha, which has a range of values from -1.00 to 1.00. The closer the numerical value is to one, the higher the positive correlation. Gall et al. (2005) indicated, "A measure is considered reliable for most research and practical purposes if its coefficient is .80 or higher, and in a Cronbach's alpha, a value of .70 or higher is usually sufficient" (p. 140).

Reliability estimates for CBM reading measures were determined using three methods. Reliability was obtained using test-retest intervals of one to ten weeks. Reliability coefficients ranged from .82 to .97 with most being above .90. Parallel form estimates were used, with scores from .84 to .96, again with most correlations above .90.

Finally, inter-rater agreement coefficients were found to be .99 (Shinn, 1989). These three measures show strong evidence to support the measurement's reliability.

Table 6 contains information about the alternate-form correlations by grade and benchmarking season. These scores range from .93 to .95, indicating strong evidence to support the measurement's reading reliability during the fall and winter benchmark periods (NCS Pearson Education, 2012b).

Table 6

Average Alternate-Form Reliability of Single R-CBM Probes by Grade and Season

N=1,000

	Single Probe	
Grade	Fall *r*	Winter *r*
1	.95	.95
2	.94	.94
3	.94	.93
4	.95	.94
5	.94	.94
6	.94	.93
7	.94	.93
8	.94	.93
Mean *r*	.94	.94

Note. Adapted from *Aimsweb Technical Manual* (p. 15), by NCS Pearson Education, Inc., 2012, Bloomington MN: NCS Pearson Education, Inc. Copyright 2012 by NCS Pearson Education.

Table seven NCS Pearson Education, Inc. 2012 reports the alternate-form reliability of the maze CBM over a four month period. These coefficients range from .68 to .78, indicating moderately strong evidence to support the measurement's ability.

Table 7

Between-Season Stability of Maze Scores by Grade

Grade	*N*	Reliability	SEM
2	13,420	.68	3.2
3	21,747	.70	3.8
4	24,881	.74	3.8
5	25,418	.78	3.9
6	11,690	.78	4.5
7	7,201	.76	4.5
8	6,095	.75	4.8

Note. Adapted from *Aimsweb Technical Manual* (p. 15), by NCS Pearson Education, Inc., 2012, Bloomington MN: NCS Pearson Education, Inc. Copyright 2012 by NCS Pearson Education.

Pearson (2012b) reported screening scores from the 2009-2010 school year that were analyzed to determine the alternate-form stability of reading maze raw scores over four months. In table seven Pearson (2012b) reported that the alternate-form reliability of the maze scores reliability is conservative due to the long period between administration sessions.

The data reported on the reliability of the three measures used in this study, R-CBM, maze CBM, and KSA, indicate there is moderately strong to strong evidence supporting the measurement's reliability. As stated earlier it is nearly impossible to eliminate all error in a measurement due to the number of factors to be controlled; however the coefficients for the R-CBM, maze CBM, and KSA fall into the acceptable range of .70 or higher.

For the reading portion of the Kansas state assessment the score reliability estimates were reported in the Kansas Assessments in Reading and Mathematics 2006

Technical Manual for the Kansas General Assessments Kansas Assessments of Multiple Measures (KAM) Kansas Alternate Assessments (KAA), using Cronbach's alpha coefficients. These coefficient values ranged from .88 to .94 across all grade levels in the area of reading (Poggio et al., 2006).

Data Collection Procedures

A formal proposal was submitted, and permission to proceed with the study was requested of the Institutional Review Board (IRB) of Baker University. The IRB form requesting this permission to study human subjects is included in Appendix A. Baker University granted the researcher permission to conduct the study (see Appendix B). Permission to utilize the scores from the R-CBM, maze CBM, and reading portion of the Kansas state assessment was provided by the Northeast Central Kansas School district represented in this study. A request was submitted to the Northeast Central School District's Interim Superintendent through email request (see Appendix C). Approval was granted by the Interim Superintendent of the Northeast Central School District (see Appendix B).

The data collection process involved accessing two electronic databases that store archival data. Aimsweb online is an online database developed by NCS Pearson Education, Inc. to store student performance data on CBM scores, while the Kansas State Department of Education (KSDE) compiles student performance data on state assessments and district population and demographics in an online database. See Table 8 for data collection periods.

Table 8

3rd Grade District Benchmark Assessment and State Assessment Data Collection Schedule

Assessment	Fall	Winter	Spring
R-CBM	X	X	
Maze CBM	X	X	
KSA			X

The table above represents the assessment administration schedule for the Northeast Central Kansas School District. The data collection periods represent the CBM benchmark assessments administered in the fall and winter of 2012, while the Kansas state assessment was administered in spring of 2013. The assessment schedule for the Northeast Central Kansas School District is reviewed annually with any changes made prior to the start of a new school year. The above assessment administration schedule was reviewed in the summer of 2012 prior to its approval.

Data Analysis and Hypothesis Testing

A quantitative methodology was used to examine the relationship between performances on the R-CBM and maze CBM and the reading portion of the Kansas state assessment. After the results were obtained for the 2012-2013 school year scores were entered into the Statistical Package of the Social Sciences (SPSS) software.

RQ 1. To what extent is there a relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment for third grade students?

H 1. There is a statistically significant relationship between performance on the R-CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students.

A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment for third grade students. A one sample *t* test was conducted to test for the statistical significance of the correlation coefficient. The level of significance was set at .05.

H 2. There is a statistically significant relationship between performance on the R-CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students.

A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment for third grade students. A one sample *t* test was conducted to test for the statistical significance of the correlation coefficient. The level of significance was set at .05.

RQ 2. To what extent is the relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment affected by gender? To test the hypotheses that addressed this research question the sample was disaggregated by gender into two samples.

H 3. The relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment is affected by gender.

For females, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For males, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 2. The two sample correlations were compared. The level of significance was set at .05.

H 4. The relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment is affected by gender.

For females, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For males, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third

grade students. A Fischer's z test was conducted to address RQ 2. The two sample correlations were compared. The level of significance was set at .05.

RQ 3. To what extent is the relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment affected by ethnicity? To test the hypotheses that addressed this research question the sample was disaggregated by ethnicity into two samples.

H 5. The relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment is affected by ethnicity.

For students classified as non-minority, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students classified as minority students, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 3. The two sample correlations were compared. The level of significance was set at .05.

H 6. The relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment is affected by ethnicity.

For students classified as non-minority, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students classified as minority students, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conduct to address RQ 3. The two sample correlations were compared. The level of significance was set at .05.

RQ 4. To what extent is the relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment affected by socioeconomic status? To test the hypotheses that addressed this research question the sample was disaggregated by socioeconomic status into two samples.

H 7. The relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment is affected by socioeconomic status.

For students who did not participate in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students who participated in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and

direction of the relationship between performance on the R-CBM which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 4. The two sample correlations were compared. The level of significance was set at .05.

H 8. The relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment is affected by socioeconomic status.

For students who did not participate in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students who participated in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's Z test was conducted to address RQ 4. The two sample correlations were compared. The level of significance was set at .05.

RQ 5. To what extent is there a relationship between performance on the maze CBM and performance on the reading portion of the Kansas state assessment?

H 9. There is a statistically significant relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment.

A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A one sample *t* test was conducted to test for the statistical significance of the correlation coefficient. The level of significance was set at .05.

H 10. There is a statistically significant relationship between performance on the maze CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment.

A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A one sample *t* test was conducted to test for the statistical significance of the correlation coefficient. The level of significance was set at .05.

RQ 6. To what extent is the relationship between performance on the maze CBM and performance on the reading portion of the Kansas state assessment affected by gender? To test the hypotheses that addressed this research question the sample was disaggregated by gender into two samples.

H 11. The relationship between performance on the maze CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment is affected by gender.

For females, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For males, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's Z test was conducted to address RQ 6. The two sample correlations were compared. The level of significance was set at .05.

H 12. The relationship between performance on the maze CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment is affected by gender.

For females, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For males, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's Z test was conducted to address RQ 6. The two sample correlations were compared. The level of significance was set at .05.

RQ 7. To what extent is the relationship of performance on the maze CBM and the performance on the reading portion of the Kansas state affected by ethnicity? To test

the hypotheses that addressed this research question the sample was disaggregated by gender into two samples.

H 13. The relationship between performance on the maze CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment is affected by ethnicity.

For students who are classified as non-minority, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students who are classified as minority students, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 7. The two sample correlations were compared. The level of significance was set at .05.

H 14. The relationship between performance on the maze CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment is affected by ethnicity.

For students who are classified as non-minority, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students who are classified as minority students a Pearson product moment

correlation was calculated to index the strength and direction of the relationship between the maze CBM, which is administered in the middle of the school year, and the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 7. The two sample correlations were compared. The level of significance was set at .05.

RQ 8. To what extent is the relationship of performance on the maze CBM and the performance on the reading portion of the Kansas state assessment affected by socioeconomic status? To test the hypotheses that addressed this research question the sample was disaggregated by socioeconomic status into two samples.

H 15. The relationship between performance on the maze CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment is affected by socioeconomic status.

For students who did not participate in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students who participated in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. Fischer's z test was conducted to address RQ 8. The two sample correlations were compared. The level of significance was set at .05.

H 16. The relationship between performance on the maze CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment is affected by socioeconomic status.

For students who did not participate in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students who participated in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 8. The two sample correlations were compared. The level of significance was set at .05.

Limitations

The limitations of a study are the "factors that may have an effect on the interpretation of the findings or on the generalizability of the results" (Lunenburg & Irby, 2008, p. 133). Limitations are not under the control of the researcher. Conclusions from this study could be affected by the following limitations:

1. Student effort put forth on the R-CBM.
2. Student effort put forth on the maze CBM.
3. Student effort put forth on the Kansas state assessment.
4. Student attendance on administration dates for the R-CBM.

5. Student attendance on administration dates for the maze CBM
6. Student attendance on administration dates for the Kansas state assessment.

Summary

This chapter reviewed the purpose of the study, the research design, population and sample, sampling procedures, instrumentation, data collection procedures, and presented research questions and hypotheses. The research design utilized the correlation coefficient to determine the relationship between R-CBM scores and the maze CBM scores, with the scores from the reading portion of the Kansas state assessment. The participants in the study were third grade students from the 2012-2013 school year in a northeast central Kansas school district. Three instruments were used in the study, the R-CBM assessment, the maze CBM assessment, and the reading portion of the Kansas state assessment. Finally, the reliability and validity for these instruments were presented, as were the data collection procedures and data analysis. The results of the data analysis are presented in chapter four.

Chapter Four

Results

This chapter includes information on the descriptive statistics for the sample and the results of the hypothesis test. The purpose of this research was to determine what relationship, if any, existed between the R-CBM, the maze CBM, and the reading portion of the Kansas state assessment. Further research was conducted to determine if specific demographics, such as gender, ethnicity, and socioeconomic status, impacted the relationship between the three variables, R-CBM, maze CBM, and the reading portion of the Kansas state assessment. Chapter four presents the results of the data analysis for the hypotheses associated with each of the research questions in the study.

Descriptive Statistics

Third grade students in a northeast central Kansas school district who participated in the R-CBM and maze CBM in the fall and winter administration times, and the reading portion of the Kansas state assessment during the 2012-2013 school year, comprised the sample for this study. The sample consisted of 268 third grade students, 190 who participated in the study. Seventy-eight student's data were discarded due to incomplete data. The sample was further disaggregated into the targeted demographic groups: gender, ethnicity, and socioeconomic status. See Table 9 for the sample represented in this study.

Table 9

2012-2013 District 3rd Grade Study Participants

Demographic		*N*	*%*
Gender			
	Female	86	45
	Male	104	55
Ethnicity			
	Non-minority	106	58
	Minority	78	42
SES			
	F/R	136	72
	Full pay	54	28

Note. SES=Socioeconomic Status; F/R=Free and Reduced lunch, Adapted from Kansas K-12 Reports, Kansas State Department of Education, 2014 http://online.ksde.org/k12/CountyStatics.aspx?org_no=D0453.

Eighty-six (45%) of the participants were female, while one hundred four (55%) of the participants were male. One hundred six (58%) participants were considered non-minority, while seventy-eight (42%) participants were considered minority. Finally, one hundred thirty-six (72%) participants participated in a free and reduced lunch program, while twenty-eight (28%) participants did not participate in a free and reduced lunch program.

Hypothesis Testing

The results of the hypothesis testing to address the eight research questions used to guide this study are discussed in this section. Each of the research questions are followed by the corresponding hypothesis statement(s). The method used to test each

hypothesis is described along with the results of each test. The significance level of .05 was utilized for all the statistical analyses.

RQ 1. To what extent is there a relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment?

H 1. There is a statistically significant relationship between performance on the R-CBM, which is administered at the beginning of the school year, and the reading portion of the Kansas state assessment for third grade students.

A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment for third grade students. A one sample *t* test was conducted to test for the statistical significance of the correlation coefficient. The correlation coefficient (r = .620) provided evidence for a moderately strong positive relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment for third grade students. The results of the one sample *t* test indicated a statistically significant relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the Kansas state assessment for third grade students, df = 188, p = .000.

H 2. There is a statistically significant relationship between performance on the R-CBM, which is administered in the middle of the school year, and the reading portion of the Kansas state assessment for third grade students.

A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment for third grade students. A one sample *t* test was conducted to test for the statistical significance of the correlation coefficient. The level of significance was set at .05. The correlation coefficient ($r = .627$) provided evidence for a moderately strong positive relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment for third grade students. The results of the one sample *t* test indicated a statistically significant relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the Kansas state assessment for third grade students, $df = 188$, $p = .000$.

RQ 2. To what extent is the relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment affected by gender? To test the hypotheses that addressed this research question the sample was disaggregated by gender into two samples.

H 3. The relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment is affected by gender.

For females, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For males, a Pearson product

moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 2. The two sample correlations were compared. The level of significance was set at .05. The correlation coefficient (r = .644) provided evidence for a moderately strong positive relationship between the performance on R-CBM, which was administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade female students. The correlation coefficient (r =.594) provided evidence for a moderately strong positive relationship between the performance on R-CBM, which was administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade male students. The results of the Fisher's z test for two correlations indicated no difference between the two values, z = .548, p *=.584*. The correlation for third grade female students was not different from the correlation for third grade male students.

H 4. The relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment is affected by gender.

For females, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For males, a Pearson product moment correlation was calculated to index the strength and direction of the relationship

between performance on the R-CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 2. The two sample correlations were compared. The level of significance was set at .05. The correlation coefficient (r = .651) provided evidence for a moderately strong positive relationship between the performance on R-CBM, which was administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade female students. The correlation coefficient (r = .604) provided evidence for a moderately strong positive relationship between the performance on R-CBM, which was administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade male students. The results of the Fisher's z test for two correlations indicated no difference between the two values, z = .524, p = .600. The correlation for females was not different from the correlation for third grade male students.

RQ 3. To what extent is the relationship between performance on the R-CBM and the reading portion of the Kansas state assessment affected by ethnicity? To test the hypotheses that addressed this research question the sample was disaggregated by ethnicity into two samples.

H 5. The relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment is affected by ethnicity.

For students classified as non-minority, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between

performance on the R-CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students classified as minority students, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 3. The two sample correlations were compared. The level of significance was set at .05. The correlation coefficient (r = .625) provided evidence for a moderately strong positive relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment for third grade students classified as non-minority. The correlation coefficient (r = .653) provided evidence for a moderately strong positive relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment for third grade students classified as minority. The results of the Fisher's z test for two correlations indicated no difference between the two values, z = -0.316, p = .752. The correlation for non-minority students was not different from the correlation for third grade minority students.

H 6. The relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment is affected by ethnicity.

For students classified as non-minority, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between

performance on the R-CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students classified as minority students, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conduct to address RQ 3. The two sample correlations were compared. The level of significance was set at .05. The correlation coefficient (r = .625) provided evidence for a moderately strong positive relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment for third grade students classified as non-minority. The correlation coefficient (r = .696) provided evidence for a moderately strong positive relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment for third grade students classified as minority. The results of the Fisher's z test for two correlations indicated no difference between the two values, z = .844, p = .399. The correlation for non-minority students was not different from the correlation for third grade minority students.

RQ 4. To what extent is the relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment affected by socioeconomic status? To test the hypotheses that addressed this research question the sample was disaggregated by socioeconomic status into two samples.

H 7. The relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment is affected by socioeconomic status.

For students who did not participate in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students who participated in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 4. The two sample correlations were compared. The level of significance was set at .05. The correlation coefficient (r = .507) provided evidence for a moderately strong positive relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment for third grade students who did not participate in a free or reduced lunch program. The correlation coefficient (r = .611) provided evidence for a moderately strong positive relationship between performance on the R-CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment for third grade students who participated in a free or reduced lunch program. The results of the Fisher's z test for two correlations indicated no difference between the two values, z = .922, p = .357. The correlation for students who did not participate in a free or reduced

lunch program was not different from the correlation for third grade students who participated in a free or reduced lunch program.

H 8. The relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment is affected by socioeconomic status.

For students who did not participate in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students who participated in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the R-CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 4. The two sample correlations were compared. The level of significance was set at .05. The correlation coefficient (r = .513) provided evidence for a moderately strong positive relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment for third grade students who did not participate in a free or reduced lunch program. The correlation coefficient (r = .617) provided evidence for a moderately strong positive relationship between performance on the R-CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment for third grade students who participated in a free or reduced lunch program. The results of the

Fisher's z test for two correlations indicated no difference between the two values, z = .931, p = .352. The correlation for students who did not participate in a free or reduced lunch program was not different from the correlation for third grade students who participated in a free or reduced lunch program.

RQ 5. To what extent is there a relationship between performance on the maze CBM and performance on the reading portion of the Kansas state assessment?

H 9. There is a statistically significant relationship between performance on the maze CBM, which is administered at the beginning of the school year, and the reading portion of the Kansas state assessment for third grade students.

A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A one sample *t* test was conducted to test for the statistical significance of the correlation coefficient. The level of significance was set at .05. The correlation coefficient (r = .528) provided evidence for a moderately strong positive relationship between performance on the maze CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment. The results of the one sample *t* test indicated a statistically significant relationship between performance on the maze CBM, which is administered at the beginning of the year, and performance on the Kansas state assessment for third grade students, df = 188, p = .000.

H 10. There is a statistically significant relationship between performance on the maze CBM, which is administered in the middle of the school year, and the reading portion of the Kansas state assessment for third grade students.

A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A one sample *t* test was conducted to test for the statistical significance of the correlation coefficient. The level of significance was set at .05. The correlation coefficient ($r = .533$) provided evidence for a moderately strong positive relationship between performance on the maze CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment. The results of the one sample *t* test indicated a statistically significant relationship between performance on the maze CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment for third grade students, $df = 188$, $p = .000$.

RQ 6. To what extent is the relationship between performance on the maze CBM and the reading portion of the Kansas state assessment affected by gender? To test the hypotheses that addressed this research question the sample was disaggregated by gender into two samples.

H 11. The relationship between performance on the maze CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment is affected by gender.

For females, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For males, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 6. The two sample correlations were compared. The level of significance was set at .05. The correlation coefficient (r = .582) provided evidence for a moderately strong positive relationship between the performance on maze CBM, which was administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade female students. The correlation coefficient (r = .479) provided evidence for a moderately strong positive relationship between the performance on maze CBM, which was administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade male students. The results of the Fisher's z test for two correlations indicated no difference between the two values, z = .971, p = .332. The correlation for third grade female students was not different from the correlation for third grade male students.

H 12. The relationship between performance on the maze CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment is affected by gender.

For females, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For males, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 6. The two sample correlations were compared. The level of significance was set at .05. The correlation coefficient (r = .589) provided evidence for a moderately strong positive relationship between the performance on maze CBM, which was administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade female students. The correlation coefficient (r = .48) provided evidence for a moderately strong positive relationship between the performance on maze CBM, which was administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade male students. The results of the Fisher's z test for two correlations indicated no difference between the two values, z = 1.034, p = .301. The correlation for third grade female students was not different from the correlation for third grade male students.

RQ 7. To what extent is the relationship between performance on the maze CBM and performance on the reading portion of the Kansas state assessment affected by ethnicity? To test the hypotheses that addressed this research question the sample was disaggregated by ethnicity into two samples.

H 13. The relationship between performance on the maze CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment is affected by ethnicity.

For students who are classified as non-minority, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students who are classified as minority students, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 7. The two sample correlations were compared. The level of significance was set at .05. The correlation coefficient (r = .524) provided evidence for a moderately strong positive relationship between performance on the maze CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment for third grade students classified as non-minority. The correlation coefficient (r = .573) provided evidence for a moderately strong positive relationship between performance on the maze CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment for third grade students classified as minority. The results of the Fisher's z test for two correlations indicated no difference between the two values, z = -0.468, p = .639. The correlation for non-minority students was not different from the correlation for third grade minority students.

H 14. The relationship between performance on the maze CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment is affected by ethnicity.

For students who are classified as non-minority, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students who are classified as minority students a Pearson product moment correlation was calculated to index the strength and direction of the relationship between the maze CBM, which is administered in the middle of the school year, and the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 7. The two sample correlations were compared. The level of significance was set at .05. The correlation coefficient (r = .518) provided evidence for a moderately strong positive relationship between performance on the maze CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment for third grade students classified as non-minority. The correlation coefficient (r = .568) provided evidence for a moderately strong positive relationship between performance on the maze CBM, which is administered in the middle of the year, and performance on the reading portion of the reading portion of the Kansas state assessment for third grade students classified as minority. The results of the Fisher's z test for two correlations indicated no difference between the two values, z = -0.474, p = .636. The correlation for non-minority students was not different from the correlation for third grade minority students.

RQ 8. To what extent is the relationship of performance on the maze CBM and performance on the reading portion of the Kansas state assessment affected by socioeconomic status? To test the hypotheses that addressed this research question the sample was disaggregated by socioeconomic status into two samples.

H 15. The relationship between performance on the maze CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment is affected by socioeconomic status.

For students who did not participate in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students who participated in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered at the beginning of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 8. The two sample correlations were compared. The level of significance was set at .05. The correlation coefficient (r = .269) provided evidence for a weak positive relationship between performance on the maze CBM, which is administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment for third grade students who did not participate in a free or reduced lunch program. The correlation coefficient (r = .566) provided evidence for a moderately strong positive relationship between performance on the maze CBM, which is

administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment for third grade students who participated in a free or reduced lunch program. The results of the Fisher's z test for two correlations indicated a statistically significant difference between the two values, $z = 2.221$, $p = .026$. The correlation for students who did not participate in a free or reduced lunch program was weaker than the correlation for third grade students who participated in a free or reduced lunch program.

H 16. The relationship between performance on the maze CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment is affected by socioeconomic status.

For students who did not participate in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. For students who participated in a free or reduced lunch program, a Pearson product moment correlation was calculated to index the strength and direction of the relationship between performance on the maze CBM, which is administered in the middle of the school year, and performance on the reading portion of the Kansas state assessment for third grade students. A Fischer's z test was conducted to address RQ 8. The two sample correlations were compared. The level of significance was set at .05. The correlation coefficient ($r = .442$) provided evidence for a moderately strong positive relationship between performance on the maze CBM, which is administered in the middle of the year, and performance on the reading portion of the

Kansas state assessment for third grade students who did not participate in a free or reduced lunch program. The correlation coefficient (r = .549) provided evidence for a moderately strong positive relationship between performance on the maze CBM, which is administered in the middle of the year, and performance on the reading portion of the Kansas state assessment for third grade students who participated in a free or reduced lunch program. The results of the Fisher's z test for two correlations indicated no difference between the two values, z = .864, p = .388. The correlation for students who did not participate in a free or reduced lunch program was not different from the correlation for third grade students who participated in a free or reduced lunch program.

Summary

Chapter four contains a report of the findings in this study. Descriptive statistics were utilized to determine what relationship existed between the R-CBM, the maze CBM, and the reading portion of the Kansas state assessment. Further research was conducted to determine if specific demographics such as, gender, ethnicity, and socioeconomic status, impacted the relationship between the three variables, R-CBM, maze CBM, and the reading portion of the Kansas state assessment. The findings determined that there was a moderately strong positive relationship between the performance on R-CBM, maze CBM, and the reading portion of the Kansas state assessment for third grade students. Further findings indicated that demographics did not impact a majority of the results. Chapter five contains the findings related to the literature, implications for action, and recommendations for future research, and conclusions.

Chapter Five

Interpretation and Recommendations

Included in this chapter is the study summary, the major findings, the findings related to the literature, conclusions, and concluding remarks. Within these sections is the study overview and the researcher's interpretations of the findings, and recommendations for future research.

Study Summary

This study looked at the relationship between reading CBMs and the reading portion of the Kansas state assessment. The purpose in the research was to determine if formative assessments such as CBMs were a viable tool for educators to use throughout the year in instructional decision making prior to the end of the year state assessment. When educators have frequent student performance the data provides information needed to assist struggling learners as well as advanced learners.

Overview of the problem. As accountability for student performance has increased through the administration of summative state assessments, school districts have adopted formative assessments to provide ongoing data on student performance. Ongoing formative assessments allow educators to determine their instructional focus to meet student academic needs before a summative state assessment. Without the use of ongoing assessment throughout a school year, educators only have state assessment data to provide feedback. State assessment data is not disseminated to school districts until students have progressed to the next grade level. This does not allow educators to re-teach or remediate unlearned skills within the school year it was originally taught.

Purpose statement and research questions. The purpose of the study was to determine if there was a relationship between student performance on R-CBMs and maze CBMs and student performance on the reading portion of the Kansas state assessment in reading for third grade students. Student scores from the fall and winter administration of the R-CBM and maze CBM were used to determine a relationship to the reading portion of the Kansas state assessment for third grade students. The researcher also determined if the relationships between performance on R-CBM, maze CBM, and the reading portion of the Kansas state assessment was affected by gender, ethnicity, and socioeconomic status. In order to investigate the relationship of performance of R-CBM, maze CBM, and the reading portion of the Kansas state assessment for third grade students, eight research questions were developed to guide the study: (1) To what extent is there a relationship between performance on the R-CBM and the reading portion of the Kansas state assessment for third grade students? (2) To what extent is the relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment affected by gender? (3) To what extent is the relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment affected by ethnicity? (4) To what extent is the relationship between performance on the R-CBM and performance on the reading portion of the Kansas state assessment affected by socioeconomic status? (5) To what extent is there a relationship between performance on the maze CBM and performance on the reading portion of the Kansas state assessment for third grade students? (6) To what extent is the relationship between performance on the maze CBM and performance on the

reading portion of the Kansas state assessment affected by gender? (7) To what extent is the relationship between performance on the maze CBM and performance on the reading portion of the Kansas state assessment affect by ethnicity? (8) To what extent is the relationship between performance on the maze CBM and the reading portion of the Kansas state assessment affected by socioeconomic status?

Review of the methodology. Data analyzed in this quantitative study was collected by a Northeast Central Kansas school district over one school year, from August 2012 to May 2013. The setting for the study was a suburban school district in Northeast Central Kansas, with a population of 3,866 students. The scores of students who were assessed using the R-CBM, maze CBM, and the reading portion of the Kansas state assessment were used to calculate correlation coefficients to measure the strength and direction of the relationship between the variables. A *t* test was used to test the significance of each of the correlations, while the Fisher's z transform was used to test for differences between correlations based on the various demographics (gender, ethnicity, and socioeconomic status).

Major findings

The results of the study indicated a statistically significant relationship between performances on the R-CBM and maze CBM, which was administered at the beginning and in the middle of the year, and the reading portion of the Kansas state assessment, for research question one and research question four. The results of the study indicated a moderately strong positive relationship for the research questions addressing the demographics of gender, ethnicity, and socioeconomic status for all research question excluding research question eight. The results of research question eight indicated a

weak positive relationship between performance on the maze CBM, which was administered at the beginning of the year, and performance on the reading portion of the Kansas state assessment, for third grade students who did not participate in a free or reduced lunch program. However, the results indicated a moderately strong positive relationship between performance on the maze CBM, which was administered in the middle of the year, and performance on the reading portion of the Kansas state assessment, for third grade students who did not participate in a free or reduced lunch program. Therefore, the researcher concluded that there is a moderately strong relationship between performance on the R-CBM and maze CBM and performance on the reading portion of the Kansas state assessment for third grade students regardless of student demographics.

Findings Related to the Literature

This section provides a discussion of the findings as they relate to the literature presented in chapter two, which in this study is centered on the relationship between R-CBM, maze CBM, and state assessments. Findings related to the literature include information from Deno, Reschly-Anderson, Lembke, Zorka, and Callender, Shapiro, Keller, Lutz, Santoro, and Hintze, and Crawford, Tindal, and Stieber.

Deno et al. (2002) reported correlation findings of .65-.85 for CBMs and high stakes assessment. These findings suggest that there is a strong positive relationship between CBMs and high stakes assessments. Similar findings were discovered within this study with a correlation of .62 for the R-CBM.

Shapiro et al. (2006) found correlation ranges for the R-CBM and PSSA between .62-.69. Correlation ranges for the R-CBM and reading portion of the Kansas state

assessment were similar to correlation ranges of .51-.69. Shapiro et al (2006) also reported that the R-CBM administered in the middle of the year to be the strongest predictor of performance on the PSSA. They concluded that the R-CBM had a moderate to strong relationship with the PSSA.

In "Using Oral Reading Rate to Predict Student Performance on Statewide Achievement Tests," (2001) Crawford, Tindal, and Stieber reported the correlation findings between R-CBM and the Oregon state assessment for reading were .60. In the current study results indicated that the correlation between R-CBM and the reading portion of the Kansas state assessment ranged from .62-.69. In both studies correlations were considered to have a moderately strong positive relationship.

According to the information included in the review of literature and the findings of this study, CBMs have a moderately strong to strong positive relationship to state assessments. Each of the studies reviewed yielded similar results to the current study, which provides further research about the effectiveness of the use for CBMs. Therefore, the use of CBMs to determine success on high-stakes state assessments is a viable option for school districts.

Conclusions

The final section of this chapter includes a discussion on how the results of the present study might be applied to current and future practices in educational assessment. Further suggestions are included for ways in which future research might extend the results of the present study. Lastly, this chapter ends with concluding remarks.

Implications for action. The present study provides educational leaders, specifically those working in the state of Kansas, with information regarding the

relationship between CBMs as formative assessments and the summative Kansas state assessment in reading. It was determined within this study that there was a moderately strong relationship between performance on R-CBM and maze CBM and performance on the Kansas state assessment in reading for third grade students. Educational leaders can use the results of this study, along with the review of literature to make decisions regarding the use of CBMs as a formative assessment, which will assist in predicting performance on state assessments in reading.

Although educators provide instruction around the standards to prepare students for a summative state assessment, there is a need for feedback prior to the state assessment about student performance. The use of formative assessments to inform educators about student performance should provide the information needed to prepare students prior to the administration of a state assessment. With the use of formative assessments educators will be able to use this information to assist struggling learners as well as advanced learners. When educators have student data that indicate a student is struggling, it allows the educator to develop a plan for remediation or re-teaching of a skill prior to advancing to the next skill. This is also true for advanced learners. When educators have student data that indicate a student has exceeded learner expectations, it allows the educator to provide advanced learning opportunities and enrichment to those students.

Recommendations for future research. Although this study focused on a school district in Northeast Central Kansas, additional research should be conducted to evaluate the effectiveness of CBMs as they relate to other state achievement assessments. Below are three recommendations for future research.

As the field of public education transitions to the Common Core Standards, this study should be extended to determining the relationship between CBMs and state assessments that are generated to measure the Common Core Standards. In the state of Kansas school districts will be expected to participate in a state assessment that measures the Common Core Standards starting with the 2014-2015 school year. Additional research will be needed to determine whether there is a relationship between performances on CBMs and an assessment that measures the Common Core Standards.

This study was focused on the area of reading for third grade students; however, CBMs and state assessments measure other skill areas outside of reading. CBMs can also be used to measure student performance in the areas of math and written expression. Additional research should be conducted to determine the relationship between these additional skill areas and state assessments.

Finally, additional research into other formative assessments should be conducted. Although this study focused on the use of CBMs, other formative assessments may provide information regarding student performance on state assessments. This additional research would allow educational leaders to determine which formative assessments would meet the needs of sound instructional decision-making. This research would allow educators to improve student outcomes on state achievement tests.

Concluding remarks. The findings of this study provided evidence that performances R-CBM and maze CBM have a moderately strong relationship to performance on the reading portion of the Kansas state assessment. The use of formative assessments to provide ongoing information on student performance is a valuable practice to consider when measuring student progress throughout the instructional

process. The findings of the study revealed that there is a moderately strong positive relationship between performances on the R-CBM and maze CBM to performance on the reading portion of the Kansas state assessment. This will provide educators information on student performance prior to the administration of a state summative state assessment.

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Appendices

Appendix A: School District Approval

Cathy,

We would be happy to work with you to complete your research. Please let us know how we can be of further assistance.

Professionally,

Bret Church
Interim Superintendent

-----Original Message-----
From: Redelberger, Cathy
Sent: Thursday, May 29, 2014 6:29 PM
To: Church, Bret
Subject: research study

I have been advised to request permission from the Leavenworth School District to use student R-CBM data, Maze CBM data, and Kansas State Reading Assessment data for my dissertation research. This data will be used to determine if the R-CBM data and Maze CBM data can predict success on the Kansas State Reading Assessment for 3rd grade students. Currently I am awaiting approval from the IRB committee and will be happy to submit this as soon as it is granted.

Thank you,
Cathy L. Redelberger
Director Special Education

Appendix B: Baker University IRB Approval

BAKER UNIVERSITY

Date:_____

SCHOOL OF EDUCATION
GRADUATE DEPARTMENT

IRB PROTOCOL NUMBER _____
(IRB USE ONLY)

IRB REQUEST

Proposal for Research
Submitted to the Baker University Institutional Review Board

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

Department(s) **School of Education Graduate Department**

Name	Signature	
1. Dr. James Robins	_____,	Major Advisor
2. Margaret Waterman	_____,	Research Analyst
3. Dr. Russ KoKoruda		University Committee Member
4. Dr. Sally Morgan-Smith		External Committee Member

Principal Investigator: Cathy L. Redelberger
Phone: 816-781-6074
Email: cathyredelberger@sbcglobal.net
Mailing address: 8514 NE 109th Terrace, Kansas City, MO 64157

Faculty sponsor:
Phone:
Email:
Expected Category of Review: X Exempt ____Expedited ____Full

II: Protocol Title
Predicting State Assessment Scores From Curriculum Based Measurements

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Summary
The following summary must accompany the proposal. Be specific about exactly what participants will experience, and about the protections that have been included to safeguard participants from harm. Careful attention to the following may help facilitate the review process:

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

The purpose of the study includes researching the relationship between Curriculum-Based Measurements (CBM) and state assessments for third grade students in a Northeast Central Kansas School District. The researcher will be using the data provided by student performance on the CBMs to predict performance on state assessments. CBMs are formative assessments designed to be administered several times throughout the year to determine a student's progress during the instructional process.

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

There will be no manipulation or condition included in this study.

What measures or observations will be taken in the study?

The research will use third grade student data from three measures, R-CBM, maze CBM, and the Kansas State Assessment. The R-CBM is a formative assessment which measures reading fluency. The maze CBM is another formative assessment which measures reading comprehension. The researcher will use student data from the reading portion of the Kansas State Assessment, which is a summative measure that assesses reading levels.

If any questionnaire or other instruments are used, provide a brief description and attach a copy.

No other questionnaire or other instrument will be used.

Will the subjects encounter the risk of psychological, social, physical, or legal risk?

Subjects in this study will not encounter any psychological, physical, or legal risk.

If so, please describe the nature of the risk and any measures designed to mitigate that risk.

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

No, subjects will not be deceived or misled.

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

There will not be a request for information that is considered personal or sensitive.

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

No, subjects will not be presented with materials that might be considered offensive, degrading, or threatening.

Approximately how much time will be demanded of each subject?

The researcher will not demand any time of the subjects. All time to complete the assessments are a component of the school district's assessment plan and would be implemented regardless of the study.

Who will be the subjects in this study?

Subjects in this study are third grade students who attended a Northeast Central Kansas School District during the 2012-2013 school year.

How will they be solicited or contacted?

Students will not be contacted. A request for permission to conduct research will be made to a Northeast Central Kansas School District.

Provide an outline or script of the information which will be provided to subjects prior to their volunteering to participate. Include a copy of any written solicitation as well as an outline of any oral solicitation.

Subjects will not be solicited for participation.

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

Subjects will not be solicited for participation. Subject participation in the R-CBM, maze CBM, and Kansas State Assessment are included in the District's Assessment Plan. There will be no inducements offered for subject participation.

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

Subjects will not be solicited for participation

Will any aspect of the data be made a part of any permanent record that can be identified with the subject?

No, aspect of the data will be made a part of any permanent record that would be identified with the student.

If so, please explain the necessity.

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

The fact that a subject did or did not participate in a specific experiment or study will not be made a part of the student's permanent record.

If so, explain.

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

To ensure confidentiality each subject will be assigned a number to replace any identifying information; this number will correspond with their assessment results. Once each subject's CBM results and state assessment results have been matched with his/her

number all subject names with results will be destroyed. While numbers are being assigned all data will be stored electronically.

Where will it be stored? How long will it be stored? What will be done with it after the study is completed?

Student data will be stored electronically until August 30, 2014. After the study is completed all electronic data will be deleted.

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

There are not risks involved with the study.

Will any data from files or archival data be used?

Data from electronic archival files will be used.

If so, please describe.

CBM scores are stored in a database managed by Pearson Education Group, while state assessment scores are stored in a database managed by the Kansas Department of Education.

BAKER UNIVERSITY
Own Confidence

August 4, 2014

Dear Cathy Redelberger and Dr. Robins,

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

Please be aware of the following:

1. At designated intervals (usually annually) until the project is completed, a Project Status Report must be returned to the IRB.
2. Any significant change in the research protocol as described should be reviewed by this Committee prior to altering the project.
3. Notify the OIR about any new investigators not named in original application.
4. Any injury to a subject because of the research procedure must be reported to the IRB Chair or representative immediately.
5. When signed consent documents are required, the primary investigator must retain the signed consent documents for at least three years past completion of the research activity. If you use a signed consent form, provide a copy of the consent form to subjects at the time of consent.
6. If this is a funded project, keep a copy of this approval letter with your proposal/grant
file.
7. If the results of the research are used to prepare papers for publication or oral presentation at professional conferences, manuscripts or abstracts must be submitted to OIR.

Please inform Office of Institutional Research (OIR) or myself when this project is terminated or completed. As noted above, you must also provide OIR with an annual status report and receive approval for maintaining your status. If your project receives funding which requests an annual update approval, you must request this from the IRB one month prior to the annual update. Thanks for your cooperation. If you have any questions, please contact me.

Sincerely,

Chris Todden EdD
Chair, Baker University IRB

Baker University IRB
Committee Vemeda Edwards
EdD Sara Crump PhD
Molly Anderson
Scott Crenshaw