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by

Paul Michael Doyno, Jr.

May 2013

FORMATIVE ASSESSMENT, MODIFICATION OF INSTRUCTION,
AND GRADE THREE STUDENT ACHIEVEMENT IN PREDOMINANTLY
ECONOMICALLY DISADVANTAGED HISPANIC SCHOOLS ON THE
SOUTH TEXAS BORDER

A Dissertation Presented to the
Faculty of the College of Education
University of Houston

In Partial Fulfillment
Of the Requirements for the Degree

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An Abstract
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Abstract

The purpose of this study is to evaluate the use of formative assessment, data collection and analysis, and focused instruction by comparing the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills* (TAKS), of third grade students receiving focused instruction as the result of formative assessment, data collection and analysis, with the reading achievement, as measured by the TAKS, of third grade students not receiving focused instruction as a result of formative assessment, data collection and analysis. A causal-comparative research design was used to test the hypotheses in this study. Due to barriers inherently present within the structures of public school districts, true randomization was, for all purposes, impractical. Campus demographics were primarily governed by geographic zoning and are reflective of demographic disparities. Therefore, this research design utilized a convenience sampling in order to select two assigned groups of participants. Two elementary school campuses of a south Texas school district will be selected, and all third grade students enrolled at each campus were assigned to respective groups. Group A were the third-grade classes at Campus A consisting of 45 students. Group B were the third-grade classes at Campus B consisting of 62 students. Using archival data obtained from a south Texas public school district, the study of both assigned groups used the data obtained from the initial benchmark for each campus. Campus A administered the *March 2003 Texas Assessment of Knowledge and Skills* release test for Reading at the beginning of the fall semester. Campus B administered the *March 2004 Texas Assessment of Knowledge and Skills* release test for Reading in the middle of the same fall semester. Both campuses used the scores of these state examinations as a baseline. Note that the initial

benchmark test used by Campus B was also used by Campus A as a formative assessment. Subsequently, the data for both campuses obtained from the mid-year District benchmark—the *April 2006 Texas Assessment of Knowledge and Skills* release test administered at the beginning of the spring semester—was used in the comparison as the test at the end of the period of study. Group A was administered a formative test within the interim period of study. Group B was not subjected to any tests within the interim. In this study, the data collected were analyzed using a single-group t-test on the pretest scores that indicated a significant difference in means. Therefore, an analysis of covariance (ANCOVA) in which the dependent variable was reading achievement was measured by a pretest and posttest.

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Chapter One

Introduction

Historically, education has been a political issue of primary concern because it provides politicians with a positive theme and projects images of empathy. Further, political expediency seems to be, in part, the motive behind the movement for state testing as a measure to achieve educational reformation as it requires little cost to taxpayers while it creates a public image of taking a tough stand on school reform (Spring, 2002,). Consequently, raising the learning standards that are achieved through the educational system is an important national priority. In recent years, governments world-wide have been more deliberate in making changes in the educational standards in pursuit of perceived higher achievement. Global initiatives to improve schools, from developing standards to enhancing programs for the external testing of students' performances, have all been in an effort to meet these goals. However, these initiatives for reform, in their totality, have failed to formulate effective educational policy (Black & Wiliam, 1998).

“As world-class education is the single most important factor in determining not just whether our kids can compete for the best jobs but whether America can out-compete countries around the world. America's business leaders understand that when it comes to education, we need to up our game. That's why we're working together to put an outstanding education within reach for every child.” (Obama, 2011, p. 1.).

As federal and state legislative mandates are passed and funding is tied to the directives given, educators now must address the individual needs of the students they service and ensure the students' ability to earn a passing score on the mandated formal assessments by prescribed times, regardless of socio-economic or geographical barriers,

or the presence of developmental or special needs (Bush, 2002). While the present governing legislation under *No Child Left Behind* has been praised for its accountability measures especially regarding minorities, and economically disadvantaged children, it has been derided by some as being too obsessively focused on test scores. As a result, President Barack Obama has begun to issue waivers from the mandates imposed by a 2014 deadline for success in mathematics and reading. (Rich, 2012). In addition, the Obama administration's effort to keep education in the political forefront includes funding initiatives like *Race to the Top*, and *Race To The Top: Early Challenge*, making billions of dollars available on a competitive basis to develop more rigorous standards and better assessments, to adopt better data systems, and to help teachers become more effective. (Record on Education, 2013)

Need for the Study

Paul Houston articulates in his statement on *Transforming the Federal Role in Education for the 21st Century: HR345—A Call for Consolidation and Targeting*, given before the Committee on Education and Welfare on March 29, 2001,

We distinguish assessment from testing in that assessment provides the information that teachers need to improve instruction and fill in gaps in student understanding and competence. Thus, assessment should be specifically based on state standards, provide regular feedback, and should provide both quantitative and qualitative information that informs teaching and curriculum. (Houston, 2001, p. 3).

Assessment, as the means to improve instruction, is at the forefront of the assessment-based curriculum movement as federal and state legislative mandates have designed educational systems in accordance with the prevailing premise as means to accountability. Throughout the implementation of the present educational system, the

Texas Education Agency (TEA) has begun to implement data collection measures and to require local education agencies to create their own databases or seek commercial services to assist teachers in collecting the requisite information to better assist in instructional strategies and meeting the needs of individual students. Upon the analysis of the collected data, teachers are expected to adjust their communication strategies and modes of instruction, identifying those that best facilitate learning for particular educational situations (ASCD, 1995). It is through this informed decision-making that teachers are able to refine their instructional delivery to better serve the specific needs of the students as indicated by the data analyzed. In recent years, formative assessment has received considerable attention. (Darling-Hammond & Pecheone, 2010). If utilized as feedback that is designed to improve learning it strengthens the role of the teacher in formative assessment by not only simply using feedback to promote content learning, but also by helping students understand the goal for which instruction is aimed. The teacher is able to assist students in developing cognitive skills and promote autonomous learning abilities. (Heritage, 2010).

Consequently, a need for the use of technology, in various forms, has emerged in order to collect, disaggregate, and analyze data in order to effectively identify weaknesses and strengths in instruction and understand the needs of individual learners. Accordingly, among the technological avenues available, the use of personal hand-held devices offers a possible cost-efficient answer to the ever pressing concern regarding collection and processing of the information required within the shortest time possible for effective usage and change in instruction (Trotter, 1999). Currently, research is limited in the use of personal hand-held devices in education. However, studies have shown that use of such

devices in education, particularly in assessment data-collection and analysis, in relation to collaborative, contextual and constructivist pedagogical application, has merit for further study; thus, creating new learning scenarios impossible without mobile technology (Patten et al., 2006). In addition, the ever-changing market has evolved exponentially, creating new avenues in which mobile applications may be available.

Statement of the Problem

In order for effective instructional modification and intervention to take place, teachers need immediate feedback on students' understanding of lessons being taught (Houston, 2001, p. 3). This study was conducted to further understand how teachers utilize such feedback, in the form of readily available, disaggregated, formative assessment data, to drive instruction; thus, affecting student academic performance. Therefore, the purpose of this study was to evaluate the use of formative assessment, data collection and analysis, and focused instruction by comparing the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills (TAKS)*, of third grade students receiving focused instruction as the result of formative assessment, data collection and analysis, with the reading achievement, as measured by the *TAKS*, of third grade students not receiving focused instruction as the result of formative assessment, data collection and analysis.

Purpose of the Study

The purpose of this study was to evaluate the use of formative assessment, data collection and analysis, and focused instruction by comparing the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills (TAKS)*, of third grade students receiving focused instruction as the result of formative assessment, data

collection and analysis, with the reading achievement, as measured by the *TAKS*, of third grade students not receiving focused instruction as a result of formative assessment, data collection and analysis.

Research Question

Inasmuch as the purpose of this study was to evaluate the use of formative assessment, data collection and analysis, and focused instruction by comparing the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills (TAKS)*, of third grade students receiving focused instruction as the result of formative assessment, data collection and analysis, with the reading achievement, as measured by the *TAKS*, of third grade students not receiving focused instruction as a result of formative assessment, data collection and analysis, the study answers the following research question:

Does the reading achievement, as measured by the *TAKS*, of third grade students who receive instruction as the result of formative assessment, data collection and analysis differ from the reading achievement, as measured by the *TAKS*, of third grade students who do not receive instruction as a result of formative assessment, data collection, and analysis?

Hypotheses

The research questions posed in the previous section of this study were the basis for the following null hypotheses:

There is no statistically significant difference between the reading scores of third grade students who received instruction as the result of formative assessment, data collection and analysis, and the reading scores of third grade students who did not

receive instruction as the result of formative assessment, data collection and analysis.

Because the literature is extensive on the formative use of disaggregated data and analysis for incorporation and adjustment of classroom instruction, the research does support the use of a directional research hypothesis in the study of the type described. Thus, this study tested the following directional research hypotheses:

There is a statistically significant favorable difference between the reading scores of third grade students who received instruction as the result of formative assessment, data collection and analysis, and the reading scores of third grade students who did not receive instruction as the result of formative assessment, data collection and analysis.

Definitions of Terms

Formative Assessment. *Formative assessment* is the process of appraising, judging and/or evaluating academic performance and subsequently adjusting instruction midstream to improve academic competence.

Focused Instruction. For the purposes of this study, the use of the term is used to describe modified instruction that targets specific skills and knowledge not yet mastered by individual students. It is delivered as an intervention, individually or in a homogeneously ability-grouped setting.

Personal Hand-held Devices. The term *personal hand-held devices* refers to miniature programmable computers that fit in the palm of an adult hand.

TANGO. The product name “*TANGO*” refers to the software produced by Texas-based Liberty Source, Incorporated that consists of answer-key templates that facilitate the collection of student answers in a variety of forms—multiple choice, short answer,

surveys, checklists, etcetera—and correlates all items tested to the Texas Essential Knowledge and Skills, Texas Assessment of Knowledge and Skills objectives, and key concepts by grade-level and level of cognitive skill as measured by Bloom's Taxonomy. The software affords the teacher complete autonomy over content and the lessons being taught and subsequently assessed.

Palm OS. The product name *Palm OS* refers to the operating system software utilized in personal hand-held devices produced by Palm, Incorporated.

Significance of the Study

The study offers insight into the solving of the problem of attaining the specific data that is reflective of the specific academic needs of each student in a time conducive to early intervention, as required to meet the prescribed standards by which the state assessment is based. Further, as legislative mandates require more concrete data of individual student performance in order to examine equity issues as well as overall student performance (Bush, 2002); this study provides some statistically valid answers for decision-makers to utilize when determining the frequency of collection of formative data, its analysis, and the subsequent refinement and modifications to instruction to be used. Data collection was facilitated using personal handheld devices in obtaining data for instructional decision-making during the time-period studied.

Organization of the Dissertation

The paper is written in five chapters. The first chapter consists of a general introduction to the research project which outlines the need for the study, the purpose for the study, the prevailing research questions and the corresponding hypotheses. It features a section on the definition of terms that are referenced in the project, as well as the

significance of the study.

Chapter Two contains a review of the literature pertaining to the research topic, the historical events by which this topic has emerged, and the theoretical underpinnings establishing the pedagogical trends examined in the study. This is followed by the third chapter in which the methodology used in the study is articulated, including the research design, sampling procedures, instrumentation, treatment, data collection and analysis procedures, and perceived limitations.

Chapter Four is a statement of the results, and Chapter Five consists of a discussion of the subsequent conclusions, interpretations and implications that the study reveals.

Chapter Two

Review Of The Literature

Introduction

The purpose of this study was to evaluate the use of formative assessment, data collection and analysis, and focused instruction by comparing the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills* (TAKS), of third grade students receiving focused instruction as the result of formative assessment, data collection and analysis, with the reading achievement, as measured by the TAKS of third grade students not receiving focused instruction as a result of formative assessment, data collection and analysis.

As both federal and state legislative mandates are passed and funding is tied to the directives given, assessment and accountability are seen as driving forces in attaining the requisite goals and in developing assessment systems to gauge student progress and support accountability (Herman, 1998). This chapter provides a discussion of standards based assessment in relation to the standards based education reform prescribed by *No Child Left Behind Act of 2001* (NCLB) (2002), and the subsequent demands for instructional changes and modifications, and the resultant need for possible uses of technology in meeting requirements.

Theoretical Background

On January 8, 2002 President of the United States George W. Bush signed the *No Child Left Behind Act of 2001*. This historic piece of legislation reauthorized and significantly expanded the *Elementary and Secondary Education Act*, first enacted in 1965. The *No Child Left Behind Act of 2001* and the accompanying funding increases

offer numerous opportunities to improve teaching and achievement of America's youth (Brown, 2002). The basic premise that governs the legislation is that through standards-based reform, every student can reach higher levels of achievement if certain criteria are met. Standards are based on some basic principals—challenging standards, clear communication of those standards, students' effort and time-on-task, and alignment of curriculum, instruction, and assessments. (Education Commission of the States, 2002a,).

Until the early 1990s, America's public schools had no clear standards for what every student who graduates should know and be able to do. Expectations varied from school to school and from teacher to teacher. These expectations were often too low to provide students with what they needed to succeed in postsecondary education and the workforce (Education Commission of the States, 2002b). These findings were exemplified in the historic *A Nation at Risk: The Imperative for Educational Reform*. Secretary of Education T.H. Bell created the National Commission on Excellence in Education on August 26, 1981. He directed it to examine the quality of education in the United States and to report to the Nation, with a deadline of eighteen months from its first meeting. Accordingly, this report contained practical recommendations for educational reform and fulfilled the Commission's duties under the terms of its charter.[*A Nation At Risk* (NAR), 1983] The report lambasted the state of America's schools and called for a myriad of much-needed reforms to correct the alarming direction that public education was seen to be headed. (Graham, 2013). Test scores were on the decline, low teaching salaries and inadequate teacher training programs were leading to a high turnover rate among educators, and other industrialized countries were gaining ground on the technological superiority of the United States. Further, *A Nation at Risk* found that an

“incoherent, outdated patchwork quilt’ of classroom learning had led to an increased number of students who were subjected to a “cafeteria style curriculum” that diluted the course material and allowed them to advance through their schooling with minimal effort. (Graham, 2013)

Assessing the quality of teaching and learning in our nation’s public and private schools, colleges, and universities, *A Nation At Risk* compared American schools and universities with those of other advanced nations, studied the relationship between college admissions requirements and student achievement in high school, assessed the degree to which major social and educational changes in the last quarter century had affected student achievement, and defined problems which had to be faced and overcome if the nation was to successfully to pursue the course of excellence in education (NAR, 1983).

It defined “excellence” to mean several related things. At the level of the individual learner, it meant performing on the boundary of individual ability in ways that test and push back personal limits, in school and in the workplace. Excellence characterized a school or college that set high expectations and goals for all learners, and then tried in every way possible to help students reach them. Excellence characterized a society that in every way possible helped its people reach their goals by adopting policies in support, for it would be prepared through the educational skills of its people to respond to the challenges of a rapidly changing world. It called on the nation’s people and its schools and colleges to be committed to achieving excellence in all these senses (NAR, 1983).

Further it held that all, regardless of race or class or economic status, were entitled

to a fair chance and to the resources for developing their individual powers of mind and spirit to the utmost. This meant that all students by virtue of their own efforts, and competently guided, could hope to attain the mature and informed decision-making abilities needed to secure gainful employment, and to manage their own lives, thereby serving not only their own interests but also the progress of society itself (NAR, 1983)

The report defined expectations in terms of the level of knowledge, abilities, and skills school and college graduates should possess. It also held that the time, hard work, behavior, self-discipline, and motivation were essential for high student achievement. The Commission had examined grades, which reflected the degree to which students demonstrated their mastery of subject matter; high school and college graduation requirements, which told students which subject were most important; the presence or absence of rigorous examinations requiring students to demonstrate their mastery of content and skill before for receiving a diploma or a degree; college admissions requirements, which reinforced high school standards; and the difficulty of the subject matter students confronted in their texts and assigned readings. Deficiencies were noted in the curricula and expectations of mastery. (NAR,1983)

Evidence presented to the Commission demonstrated three disturbing facts about the use that American schools and student use of time: (1) compared to other nations, American students spent much less time on school work; (2) time spent in the classroom and on homework was often used ineffectively; and (3) schools were not doing enough to help students develop either the study skills required to use time well or the willingness to spend more time on school work. Further, the Commission found that not enough of the academically able students were being attracted to teaching; that teacher preparation

programs needed substantial improvement; that the professional working life of teachers was on the whole unacceptable; and that a serious shortage of teachers existed in key fields. (NAR.1983) As such, the report concluded that declines in educational performance were in large part the result of disturbing inadequacies in the way the educational process itself was often conducted. The findings reflected four important aspects of the educational process: content, expectations, time, and instruction.

In the thirty years since the publication of *A Nation At Risk*, most school systems have taken major steps to meet the federal challenge to adopt more rigorous and measurable standards for learning. All states have adopted academic standards, and forty-five states including the District of Columbia, four territories, and the Department of Defense Education Agency have all embraced the Common Core State Standards to ensure that students have the necessary knowledge and skills for success in college and careers. Yet, many of the problems identified in 1983 remain unaddressed, and stagnate student achievement continue to challenge educators and administrators (Graham, 2013). Texas has chosen to retain its own academic standards, the Texas Essential Knowledge Skills, developed under the *Goals 2000: Educate America Act*.

Goals 2000: Educate America Act was signed into law on March 31, 1994. The Act provided resources to states and communities to ensure that all students reached their full potential. *Goals 2000* established a framework in which to identify world-class academic standards, to measure student progress, and to provide the support that students may need to meet the standards. It was the Clinton administration's answer to address the call for reformation by *A Nation At Risk*. The Act codified in law the six original education goals concerning school readiness, school completion, student academic

achievement, leadership in math and science, adult literacy, and safe and drug-free schools. It added two new goals encouraging teacher professional development and parental participation (Paris, 1994). A truly large umbrella, *The Goals 2000: Educate America Act* encompassed school-to-work transition and other school reform efforts. It was designed to fund systemic reform at the state and local levels and provided a framework within which to organize all state and federally funded education programs (Paris, 1994). The core of the Act was to provide grant programs to support state development and implementation of standards and assessments and school district implementation of standards-based reform. As such, states took advantage of the funding that became available; Texas being one of the largest and most visible users of Goals 2000 money. (New York State Education Department, 2006). Then Governor George W. Bush's state received over one hundred million dollars for *Academics 2000*, Texas' state program that funded the Texas Essential Knowledge and Skills (TEKS) and the Texas Assessment of Knowledge and Skills (TAKS), its aligned state assessment.

The reliance of Goals 2000 on state-by-state initiatives meant that its impact varied greatly from state to state. Given that the majority of funding had to be spent at the district level, there was not a great deal of money available for building state capacity to help under-resourced districts (Paris, 1994). Small districts did not have expertise in standards-based reform and therefore, could not provide the necessary technical assistance and guidance to campuses. Despite this, Goal 2000 provided the major source of funds to move forward with systemic reform efforts. State education agencies developed these reforms and took initiative to implement these efforts.

In parallel with Goal 2000, President Clinton advanced proposals for

reauthorization and modification of the Elementary and Secondary Education Act (ESEA), now was called Improving America's Schools Act (IASA). The IASA law received widespread bipartisan support from both Republican and Democrats who liked the focus on standards. As part of systemic reform, both the ISAS and Goal 2000 required states to align their program assessments with clear subject-matter standards. The purpose was to create a valid framework for curriculum , assessment, teacher training, performance objectives, and financial accountability (New York State Education Department, 2006).

When Governor Bush campaigned for the presidency in the year 2000, one of the major issues of his platform was educational reform and testing as a means of accountability. (New York State Education Department, 2006). Though education was a key issue in the election campaign, it was a surprise to the Congress and the country that his first legislative proposal was the No Child Left Behind Act (NCLB), three days after President Bush's inauguration in January 2001 (New York State Education Department, 2006). NCLB was a very large legislative bill of some 1,100 pages, which carried forward Title I, the 21st Century School Act, bilingual education, Title II grant for innovation, a major reading program, and other programs with long existing under federal law. The signature provisions that were ultimately included in NCLB advanced the strategy, begun with Goals 2000, of federal support for improving achievement through standards, assessments, and specific requirements of accountability (New York State Education Department, 2006)

NCLB had, and the law still has, three elements to its formula. All students must be performing in reading, mathematics, and science at the "proficient" level by the year

2014; in each school each year, student adequate yearly progress must increase at such a rate that 100% proficiency would be met by 2014: and thirdly, the annual rate of progress applies not only to the aggregate student enrollment of a school, district, or state but also to disaggregated: groups of students according to income, race, gender, English language ability, and special education status. If any of the groups fell below expected progress rates, the entire school was, and is, considered failing and in need of improvement to be realized through presidential sanctions. Sanctions were outlined for schools and districts that fail to meet their state-defined adequate yearly progress (AYP). Examples included a two-year plan to turn around the school deemed as needing improvement; assurance that the local education agency provide the school with needed technical assistance as it develops and implements its improvement plan; and student options of transferring to another public school within the district—which may include a public charter school—that has not been identified as needing improvement. A third year of failing to achieve AYP ensured an offer of public-school choice to all students. In addition, students from low-income families were, and are, eligible to receive Title I-funded supplemental services, such as tutoring or remedial classes, from a state-approved provider, either public or private. Further, a school's failure to make adequate progress for a fourth year, the district must implement certain corrective actions to improve the school, such as replacing certain staff or implementing a new curriculum, while continuing to offer public-choice staff or implementing a new curriculum, while continuing to offer public-school choice and supplemental educational services for low-income students. If the school failed for a fifth year, the district must initiate plans for restructuring the school. This may include reopening the school as a charter school, replacing all or most of the

school staff, or turning over school operation either to the state or to a private company with a demonstrated record of effectiveness. (New York State Education Department, 2006)

The focus on standards addresses an earlier emphasis on minimum competency, similar to the reform movement in the 1970s and 1980s. Reformers sought to improve education by holding educators and students accountable for meeting high levels of academic achievement, using tests for high school graduation or grade-to-grade promotion. However, in contrast to today's reformers, who emphasize high, rigorous standards, the earlier group targeted only basic skills. Unlike the multileveled proficiency categories used in standards based assessments, minimum competency tests typically employed multiple choice items on a pass-fail basis. (Education Commission of the States, 2002a). Furthermore, instead of improving curriculum and enriching learning in preparation for the tests, the lack of resources in districts led teachers to narrow the curriculum and to teach to the test through rote learning and drill work (ASCD, 1995).

The NCLB adds a new facet to accountability. The law requires schools to show adequate yearly progress toward having all students reach proficiency in reading and mathematics by 2014. The results are based on testing students beginning in grade three. Moreover, to be deemed as making adequate gains, every demographic subgroup of a school's population must make progress toward proficiency. Consequently, a school must reach students of all racial and ethnic groups, as well as students with disabilities and those learning English. (Hoff, 2004). Further, the federal system does something that most state accountability measures do not do. It forces schools to ensure that students from diverse racial, ethnic, and socioeconomic backgrounds are making progress toward

achievement goals (Hoff, 2004, p. 23) by including the performances in the schools' *adequate yearly progress* rating. However, many states have not been able to meet the mandates, and are falling short. As a result, President Barack Obama has begun to issue waivers from the mandates imposed by a 2014 deadline for success in mathematics and reading. (Rich, 2012). Further, *Race to the Top* made four billion dollars available on a competitive basis to states that developed rigorous standards and better assessment; adopted better data systems to provide information about student progress; helped teacher and school leaders become more effective; and provided support for the rigorous interventions needed to turn around the lowest-performing school. Forty-six states and the District of Columbia submitted comprehensive reform plans to compete in the K-12 Race to the Top competition (Obama Administration Record on Education, 2013). Texas refused to participate.

According to Rod Paige, former United States Secretary of Education, in his February 27, 2004 article in the Washington Post, entitled *Focus on Children*, the National Assessment of Educational Progress showed that only one in six African Americans and one in five Hispanics were proficient in reading by the time they were high school seniors. While past National Assessment of Educational Progress results indicated that, over time, African American and Hispanic student made great strides in narrowing the breach that separated them from their white peers, progress seemed to have slowed since the mid 1980s (Education Week, 2004). In 2003, while thirty nine percent of white students scored at the proficient level or higher on the fourth grade reading examination portion of the National Assessment of Educational Progress, only twelve percent of African American students and fourteen percent of Hispanic students scored at

the proficiency level or above. Forty-two percent of white fourth grade students scored at the proficient level or above on the mathematics examination compared with ten percent of African American students and fifteen percent of Hispanic students (U. S. Department of Education, 2003). Yet, by 2011, according to *America's Report Card 2012*, seventy eight percent of white fourth graders scored at or above in basic reading, compared to forty eight percent African American, and fifty one percent of Hispanic students. The same report indicated that white fourth graders passing basic math were ninety-one percent, African Americans scored at sixty six percent, and Hispanic students scored seventy two percent (First Focus, 2012). Indicative of an antiquated educational system that falls short in providing equitable educational opportunities to the nation's youth, student achievement has therefore become the primary focus of reform, followed by the evolving needs of the economy and a changing society. (Paige, 2004). Again, the cornerstone of the public education system in the United States is the *Elementary and Secondary Education Act*, which was enacted in 1965, designed to eradicate inequities in public education, as part of the War on Poverty. However, the nation struggles in achieving this outcome for all children. While the nations' schools have experienced promising trends in student achievement, there persists a pervading disparity among students of color and socio-economic status (First Focus, 2012).

When explaining the differences between the reauthorization of the *Elementary and Secondary Education Act* through the *Improving America's Schools Act of 1994* and the *No Child Left Behind Act of 2001*, Paige articulated that the establishment of concrete expectations and enforcement of consequences for failure to meet federal mandates are the two primary discernable distinctions. Further, the former Secretary of Education

addressed the federal role in the establishment of standards based reform, contrary to criticism claiming violations of states' rights, by explaining,

...there is a compelling national interest in education, which is why the federal government is involved...to correct overt unfairness or inequality, starting with measures to enforce civil rights and dismantle segregation in the wake of the *Brown v. Board of Education* decision a half-century ago. (Paige, 2004, p. 4).

Standards-based reform purportedly raises expectations. By requiring all students to master challenging subject matter—and by providing the time and tools to do so—standards also enhance education equity. (Education Commission of the States, 2002b). The federal NCLB takes aim at the achievement gap. It requires states to disaggregate student achievement data by racial subgroups of students, including African American and Hispanic students, so that performance gains for all students can be monitored. The law also contains a host of accountability measures that penalize schools unable to show achievement gains by all subgroups of students. The hope is that these strict accountability measures will spur across-the-board gains in achievement (Education Week, 2004).

Evidence is growing, as research that tests the new standard based approach to education indicates that African American and Hispanic students in high accountability states tend to make greater improvements than whites (Carnoy, 2003). Further, conclusions reveal that state programs that put strong pressure on students and schools to raise test scores may be more helpful than harmful, noting improved scores on the *National Assessment of Educational Progress* of high standards states. In addition, research found little evidence that students repeated a grade or failed to graduate (Raymond, 2003).

The use of assessments to increase accountability and stimulate improvement is not unique to standards based reform. Yet, what makes standards based assessments different from their more traditional counterparts are: 1) close links to curriculum; 2) comparisons to accomplishments of achievement goals; and 3) inclusion of new forms of assessment. (Education Commission of the States, 2002a). It is in focusing on the requisite of standards based assessment that educators must utilize methods for data collection, disaggregation and analysis to align instructional practices for the individual students being taught. The basic premise behind standards based assessment is that it is based on the theoretical notion that assessments should reflect standards for student performance, and that these assessments should guide both instruction and assessment (Herman, 1998).

In the midst of the current attacks on standardized tests by the educational community, it may be helpful to recall the different functions of standardized and non-standardized tests. Tests are used for many reasons; and, if properly used, tests have an irrevocably positive effect on learning. Assessments are effective in determining the adequacy of a teacher's or a school's performance, in gaining students attention, and in creating an opportunity for further learning while preparing or taking the examination (Hirsch, 1999). Further, because accountability is at the heart of the mandated standards based assessments, feedback and self-adjustment play a crucial part in instructional practice, curriculum design, and student's academic performance (Wiggins, 1998). Once assessment is deemed educative, it is no longer separate from instruction; it is a major, essential, and integrated part of teaching and learning. An educative assessment system is designed to teach, to improve performance of both student and teacher, and to evoke the

implementation of exemplary pedagogy. It provides useful feedback to students, teachers, administrators, and policy makers, and guides decisions and practices in ensuring effective impacts on curriculum design, accountability in meeting desired goals, and indicators of valid and reliable assessment (Wiggins, 1998).

According to Paul Black and Dylan Wiliam in *Inside the Black Box: Raising Standards Through Classroom Assessment* (1998), firm evidence shows that formative assessment is an essential component in raising the standards of achievement. Further, as raising the standards of learning in education remains a national priority, national, state, and district standards, targeting student performance on external test measures has become the basis for policy making. Four key themes have emerged from research on formative assessment. First, formative work involves new ways to enhance feedback between teacher and student; ways requiring new modes of pedagogy and significant changes in classroom practice. Second, underlying assumptions about what constitutes effective learning—namely, active participation by student. Third, for assessment to function formatively the results must be used to adjust teaching and learning. Fourth, the ways that assessment can motivate and affect students' self esteem and engage in self-assessment deserve careful attention. (Dylan & Wiliam, 2012) However, learning is driven by what teachers and students do in the classroom. The general term *assessment* is used to refer to activities undertaken by teachers to attain feedback to modify instruction. Such assessment becomes formative assessment when the evidence is actually used to adapt the teaching to the students' needs. (Black and Dylan, 1998). It is important to recognize that formative assessment works. Ample evidence from research indicates that when the formative assessment process is used, students learn better. Formative

assessment is simply a planned process wherein teachers, or their students, use assessment evidence of student learning to decide whether or not to make changes to current instructional or learning practices. Teachers discover the need to adjust instruction. Students learn what they need to alter in order to learn what is being taught. It is not a surprise that formative assessment works well. (Popham, 2013)

Frequent evidence for progress towards goals and standards identifies the need for instructional change; but, fails to fully inform instruction.. Assessment needs to be both of the learning and for the learning (Burns, 2008). Having been characterized as data collected prior to instruction, formative evaluation contrasts the concept of summative evaluation which holds that it occurs after instruction. (Salvia et al., 2007). The essential attributes of formative assessment is that data are used to identify student needs and instruction is planned accordingly (William, 2006). Hence, it is the use of the data that makes evaluation formative in its collection prior and during instruction; and only becomes formative if the data are used to modify instruction (Burns, 2008). Further, while definitions of formative assessment avail from the experts in the field, there are common elements among the lot. (Gallagher & Worth, 2008) Commonalities include a systematic, a continuous process used during instruction, the evaluation of learning while it is developing, an integration in teaching and learning, an active involvement of teacher and student, feedback to adjust instruction and close learning gaps, an inclusion of self and peer assessment; and an informative support during the learning process. (Heritage, 2010). Conversely, formative assessment is not a single event or assessment instrument, but an ongoing process that allows teachers to evaluate learning after teaching. (Clark, 2011) In an effort to narrow the differences in achievement between white, black, and

Hispanic students, schools have begun examining achievement-gap trends through the active use of data and the disaggregation of the data to attain a better perspective of the academic performance of each subgroup. (Viadero & Johnston, 2000). Findings from the literature suggest that formative assessment, when planned and implemented systematically, in a continuous manner, can provide feedback during the learning process to identify student strengths and weaknesses, and the gaps in the learning. Formative assessment has been shown to improve student achievement for all groups, especially struggling learners. Regardless of the type of formative assessment practice used, it should be aligned with a state's comprehensive assessment system, and should be one approach among many to improve student achievement. (Southeast Comprehensive Center, 2012) Additionally, the use of test data, as well as other data, has increased to several times a month, and in some cases, several times a week in order to understand students' skills gaps. These data are linked to instructional strategies, and corrective measures are made in order to better serve the student populace (Viadero, 2004). Advocates of continuous assessment stress that assessment is ongoing and is based on observations of student performances. Periodic examinations are one way of assessing pupils and are only a 'snapshot of the pupil'. Continuous assessment is like having many 'snapshots' of the pupil. Continuous assessments and examinations contribute to the evaluation of a child's learning. (Improving Educational Quality Project, 2004). This premise leads many to take a behaviorist approach to assessment—to gain as many "snapshots" as possible in preparing students to meet state standards.

Noted behaviorist B. F. Skinner discovered that different schedules of reinforcement would yield different rates of behavior, establishing the basic principles of

his life's work. When he compared periodic access to food to continuous (once a minute) access to food, he observed that rats systemically behaved differently. During the continuous reinforcement, the rats' behavior slowed down, only to become more active towards the end of the minute interval. Nonetheless, behavior remained constant and stable when subjected to periodic reinforcement (Demorest, 2005). Skinner contended that learning is said to take place because the reinforcement is pleasant, satisfying, tension reducing, and so on. If the rate of responding is first raised to a high point by reinforcement and reinforcement is then withheld, the response is observed to occur less and less frequently thereafter. A state is built up which suppresses the behavior. Rate of responding is simply increased by one operation and decreased by another (Skinner, 1950). The fact of the matter is that there are no simple answers. In the study of periodic reinforcement, Skinner found that the fact that intermittent reinforcement produces higher incidents of extinction—behavior no longer following the reinforcement—than continuous reinforcement is a difficulty for those who expect a simple relation between number of reinforcement and numbers of responses in extinction. One result of periodic reinforcement is that emotional changes adapt out. Under periodic reinforcement many responses are made without reinforcement. Periodic reinforcement is not, however, a simple solution. If reinforcement is done on a regular schedule, the organism soon forms discrimination; thus, not responding just after reinforcement since it correlates subsequent reinforcements. (Skinner, 1950). Taking these studies as lead in governing the frequency of examinations as a means to provide the stimulus for learning, determining the extent of reinforcement (assessment in this case) then is necessary for desired results. As increased emphasis is placed upon the use of assessment as a driving

force for instructional design, the challenges of accountability become purposeful and manageable. Assessment becomes a catalyst for implementation and development of better student learning opportunities and learning environments (Washor, 2004).

Standards-based assessment as the means to improve instruction has been prevalent in Texas throughout the implementation of the present educational system. The state has begun to implement data collection measures and to require local education agencies to create their own databases or seek commercial services to assist teachers in collecting the requisite information to better assist in instructional strategies and meeting the needs of individual students. Formative assessment helps students master curricular goals. Teachers sharpen their instructional skills through its use. With a nation adopting the common core standards, or with Texas introducing the State of Texas Assessment for Academic Readiness (STARR) as a replacement for the Texas Assessment of Knowledge and Skills (TAKS), formative assessment seems a viable tool to help teachers achieve professional goals. Teachers can focus on sharpening their instructional skills by emphasizing more potent instruction on the skills and knowledge measured by the tests. Teachers who are adept at carrying out the formative assessment process, therefore will be better positioned to deal with the adoptions of new standards or assessment changes and federally initiated teacher-evaluation programs tying student performance or growth to teacher performance ratings. (Popham, 2013) One area in which student achievement is measured is the area of Reading. Data gathered as a part of the National Assessment of Educational Progress (NAEP) describe the learning conditions in American schools that relate positively to reading achievement include large amounts of reading done in and out of the classroom, a minimizing of workbook activities, more discussions that emphasize

higher-order thinking with opportunities for connecting reading and writing through a variety of texts and with home support (Carbo & Kapinus, 1995, p.76)

Summary

As standards based assessments measure the effectiveness of instruction at meeting requisite standards by formatively defining progress, using the data for improving instruction, individualizing instruction to all students, and ensuring equitable chances for academic success (Education Commission of the States, 2002a), the collection, analysis, and modification of instruction are key in increasing student achievement and progress.

Consequently, Chapter Three discusses the methodology used to conduct the study which compares use of formative assessment, data collection and analysis, and focused instruction on the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills*, of third grade students to the reading achievement of third grade students not receiving focused instruction as the result of formative assessment, data collection and analysis, as measured by the *Texas Assessment of Knowledge and Skills*. This chapter articulates the study's research design, participants, instrumentation, treatment, data collection and data analysis procedures. It also considers the anticipated inherent limitations of the study.

Chapter Three

Methodology

Introduction

Inasmuch as the purpose of this study was to evaluate the reading achievement of third grade students, as measured by the *Texas Assessment of Knowledge and Skill (TAKS)*, who received focused instruction based on formative assessment data by comparing the reading achievement of third grade students receiving focused instruction as the result of formative assessment, data collection and analysis, with the reading achievement, as measured by the *TAKS*, of third grade students not receiving focused instruction as a result of formative assessment, data collection and analysis, the study answers the following research question:

Does the reading achievement, as measured by the *TAKS*, of third grade students who receive instruction as the result of formative assessment, data collection and analysis differ from the reading achievement, as measured by the *TAKS*, of third grade students who do not receive instruction as a result of formative assessment, data collection, and analysis?

This chapter, Chapter 3, describes the methodology utilized in the course of conducting the study. It presents descriptions of the research design, participants, instrumentation, treatment, and data collection procedures.

Research Design

A causal-comparative research design was used to test the hypotheses in this study. Due to barriers inherently present within the structures of public school districts, true randomization was, for all purposes, impractical. Campus demographics were

primarily governed by geographic zoning and were reflective of demographic disparities, illustrated in Table 1 below: (Academic Excellence Indicator System, 2006)

Table 1

Demographics

Ethnic Distribution	State Of Texas	District in Deep South Texas	Campus A	Campus B
African American	14.7%	0	0	0
Hispanic	45.3%	99.6%	99.5%	100%
White	36.5%	.1%	0	0
Asian/ Pacific Islander	3.1%	.3%	.5%	0
Economic Disadvantaged	55.6%	90.1%	82.9%	99.8%
Limited English	15.8%	54.0%	65.1%	85.7%
At Risk	48.7%	67.9%	70.5%	89.4%
Student Population		9,723	421	498

Therefore, this research design required the use of a convenience sampling in order to select two assigned groups of participants. Two elementary school campuses of a south Texas school district were selected, and all third grade students enrolled at each campus were assigned to respective groups. Table 2 illustrates in similarities and differences between the two campuses selected. Please note that Campus A received an Exemplary Rating in 2007, and Campus B received a Recognized Rating. (Academic Excellence Indicator System, 2006; Academic Excellence Indicator System, 2007).

Table 2

Demographics

Criterion	Campus A	Campus B	District
Population	421	498	9723
African American	0	0	0
Hispanic	99.5%	100%	99.6%
White	0	0	.1%
Asian/ Pacific Islander	.5%	0	.3%
TEA Rating 2006	Recognized	Recognized	Academic Acceptable
TEA Rating 2007	Exemplary	Recognized	Recognized
Setting	Rural-Town	Rural-County	Rural

All 45 third-grade students enrolled in Campus A were identified as Group A. Group B consisted of the 62 third-grade students enrolled at Campus B. Using archival data obtained from a south Texas public school district, the study of both assigned groups used the data as follows: Campus A administration and faculty administered the *March 2003 Texas Assessment of Knowledge and Skills* released test for Reading on September 9, 2006. Campus B administration and faculty administered the *March 2004 Texas Assessment of Knowledge and Skills* released test for Reading on October 30, 2006. Both campuses used the scores from these state examinations as a baseline. Note that the test administered October 30, 2006 by Campus B administration and faculty was also used by the administration and faculty of Campus A as a formative assessment. Subsequently, the data for both campuses obtained from the mid-year District benchmark—the *April 2006*

Texas Assessment of Knowledge and Skills released test administered on January 24, 2007—was used in the comparison as the test at the end of the period of study. Group A was administered a formative test within the interim period of study. Group B was not subjected to any more tests beyond the benchmark within the interim. The paradigm for this research design was as follows:

$$\begin{array}{ccccc} \text{Oa}_0 & \text{X} & \text{Oa}_1 & \text{X} & \text{Oa}_2 \\ \hline & & \text{Ob}_0 & \text{X} & \text{Ob}_1 \end{array}$$

In this study, the dependent variable was reading achievement (O) as measured by the *Texas Assessment of Knowledge and Skills*. The treatment, or independent variable, was the use of formative assessment in modified, prescribed, and focused instruction (X).

Participants

Participants in the study were third-grade students enrolled in a south Texas public school district with a student population of 9,909 students [Academic Excellence Indicator System (AEIS), 2007]. The district's demographic data reflect a populace of 93.3% low socio-economic classification, 98.6% Hispanic origin, and 55.0% Limited English Proficiency, as illustrated in Figure 1 on the next page (AEIS, 2007). Two elementary school campuses with a similar demographic make-up reflecting the demographics of the district's general population, and who consistently technologically attained assessment data, were selected and assigned to Group A and Group B, respectively. Further, both campuses were representative of similar socio-economic, ethnic, and cultural traits, and had previously earned a "Recognized" status based on AEIS standards for the 2005=2006 school year.

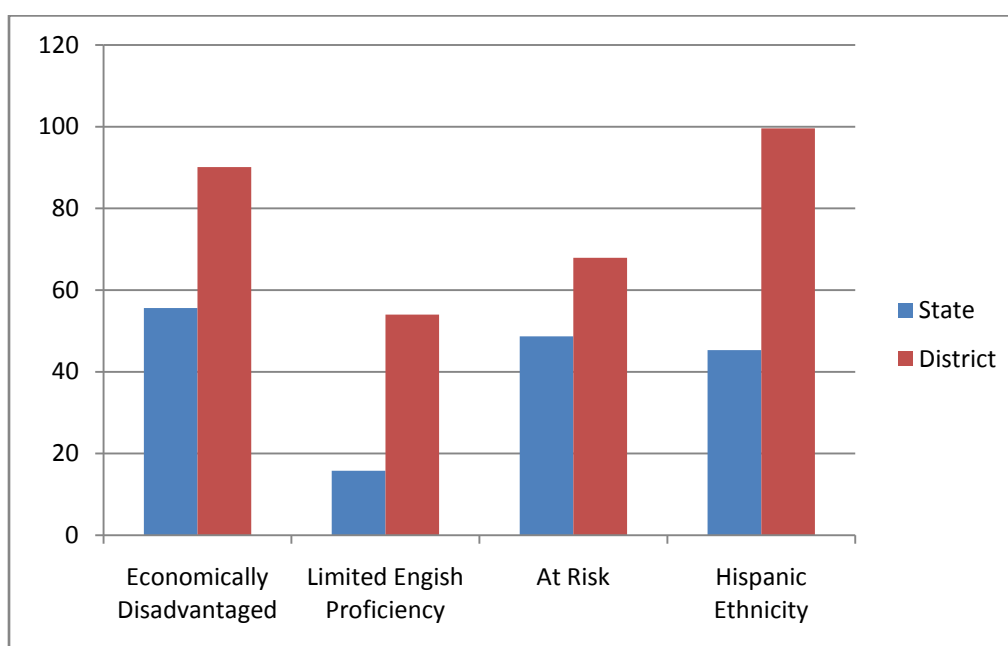


Figure 1. Demographic Illustration for State and District.

Campus A served 45 third grade students, whose demographics reflected a 99.5% Hispanic population, of which 82.9.7% were economically disadvantaged and 65.1% were identified as Limited English Proficient. Campus B served 62 third grade students whose demographics reflected a 100% Hispanic population, of which 99.8% were economically disadvantaged and 85.7% were classified as Limited English Proficient. (Academic Excellence Indicator System, 2006). Figure 2, on the following page, illustrates the similarities and differences between the two campuses. Both campuses are classified as Title I schools, and as such, served their students with the same intervention programs, free breakfast and lunch programs and had the same financial resources for deployment of the district curriculum and initiatives. In addition, both campuses had a highly-qualified instructional staff as prescribed by *No Child Left Behind*, with the majority of teachers having over ten years experience and a strong knowledge-base with regards to the implementation of the district curriculum and intervention programs.

Lastly, all students were administered assessments in their respective language—English or Spanish.

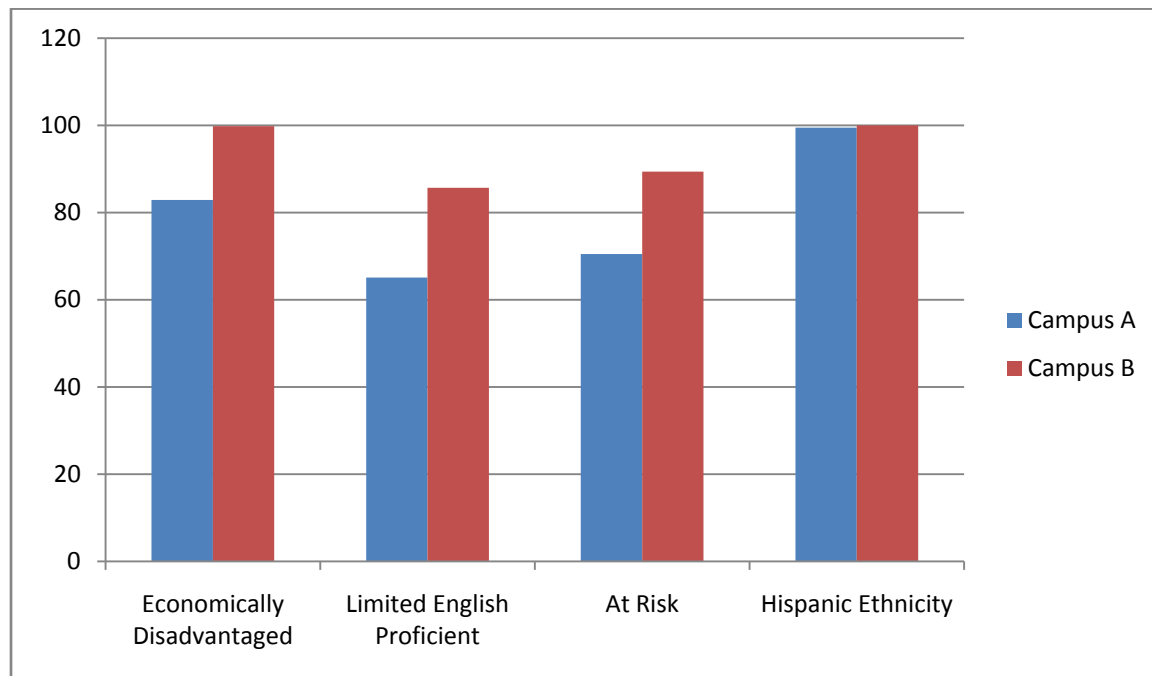


Figure 2. Demographic Illustration for Campus A and Campus B.

Instrumentation

The dependent variable, student reading achievement, was measured by the *Texas Assessment of Knowledge and Skills*. The *Texas Assessment of Knowledge and Skills* was a state mandated, standardized test in Texas whose purpose was to measure the academic skills of primary and secondary school students with respect to the state curriculum, the *Texas Essential Knowledge and Skills*, being taught at the respective grade levels. At the third grade level, the *Texas Assessment of Knowledge and Skills* measured student achievement in the areas of reading and mathematics. The *Texas Assessment of Knowledge and Skills* is a viable measurement of what was being taught, and as *TANGO*, software used by the hand-held devices used in data collection, directly links the

objectives of the *Texas Assessment of Knowledge and Skills* and the expectations of the *Texas Essential Knowledge and Skills* to lessons being taught, its use was an effective tool for data collection and management for use in the delivery of the state curriculum in classroom instruction.

Texas educators play a vital role in the test development process. Committees, representative of the state geographically, ethnically, by gender, and by type and size of school district, are formed to review the state mandated curriculum to develop appropriate assessment objectives per grade levels and subject test (Texas Education Agency, 2004). Careful scrutiny is in place to ensure alignment to the *Texas Essential Knowledge and Skills* and the characteristics of effective instruction. When ready, prototype test items are piloted in volunteer classrooms whereby data is gathered for committees to develop guidelines for assessing each objective tested (Texas Education Agency, 2004). Professional item writers then utilize the guidelines and develop test items based on the objectives. Item review committees review the items to judge appropriateness of content and difficulty and to eliminate potential bias. Field tests are conducted and data are analyzed for reliability, validity, and possible bias by data review committees of Texas educators that are statisticians. A final blueprint is developed. All field test items and data are entered into a computerized item bank from which the tests are built to be equivalent in difficulty from one administration to the next (Texas Education Agency, 2004).

The overall test reliability, as reported in the Texas Education Agency website is provided by internal consistency measures, particularly by the Kuder-Richardson Formula 20 index for tests involving dichotomously scored items, and on the stratified

coefficient alpha for tests involving a mixture of dichotomous and polytomous items (Texas Education Agency, 2004,). Kuder-Richardson formulas are the most common forms of analysis for estimating a test's internal consistency. Although the Kuder-Richardson 21 is a simplified, easily calculated approximation of the formula Kuder-Richardson 20, both formulas usually yield a lower reliability coefficient than those that would be obtained by other reliability measures. (Gall, 1996. 198). For the third grade Reading *Texas Assessment of Knowledge and Skills*, the stratified alpha is .892 and for the third grade Mathematics test it is .874 (Texas Education Agency, 2004, Appendix 7). Generally, reliability for research purposes is indicated with measures of .80 or higher (Gall, 1996, p. 196).

When examining reliability with regards to the demographic Hispanic sub-group being studied, the stratified alpha for Hispanic third graders is .89 for reading and .87 for mathematics. For the purposes of this study, the reliability of the *Texas Assessment of Knowledge and Skills* is sufficient to warrant its use as an effective measure of student achievement as prescribed by the Texas legislature as well as *No Child Left Behind*.

When examining validity, standards-referenced assessments, such as the *Texas Assessment of Knowledge and Skills*, are based on an extensive definition of the content they assess. Test validity is therefore content based and tied directly to the statewide curriculum. The process of development previously described is that which the Texas Education Agency relies heavily upon as its evidence regarding the content validity of constructed *Texas Assessment of Knowledge and Skills* tests (Texas Education Agency, 2004, p.108).

In examining the mastery levels of the content by the third grade assessment, 89%

of the total of Texas students tested showed mastery of the reading standards in March of 2003. Further, 84% of the Hispanic students, 83% of students from socio-economically disadvantaged homes, and 79% of Limited Proficient Students showed mastery of the Reading standards in March of 2003 (Texas Education Agency, 2004, Appendix 7). Similar evidence in the area of mathematics have been examined and deemed supportive of content validity of the assessments. Thus, the *Texas Assessment of Knowledge and Skills* relies upon this primary evidence for its content validity with regards to sub-populations (Texas Education Agency, 2004, p. 109).

The dependent variable, reading achievement, was measured when Campus A administered the *March 2003 Texas Assessment of Knowledge and Skills* released test for Reading on September 9, 2006. Campus B administered the *March 2004 Texas Assessment of Knowledge and Skills* released test for Reading on October 30, 2006. Both campuses used the scores from these state examinations as baseline data for their respective campus. Note, as previously stated, the test administered October 30, 2006 by Campus B administration and faculty was also used by the administration and faculty of Campus A as a formative assessment. Subsequently, the data for both campuses obtained from the mid-year District benchmark—the *April 2006 Texas Assessment of Knowledge and Skills* released test administered on January 24, 2007—was used in the comparison as the test at the end of the period of study. Additionally, the group populations were obtain at the state designated snapshot date of October 27, 2006. For purposes of this study only complete scores (both pre-test and post-test) were used. Since this area of Texas is a highly economically disadvantaged one, there often may be mobility factors within a campus and as such Campus A used the scores of 37 of the original 45 students

tested, and Campus B accounted for the scores of 61 of the 62 original students.

Fidelity of Treatment

The treatment in the study consists of the utilization of personal handheld devices by Group A, in the administration of all the assessments. Students completed the assessments traditionally and subsequently transposed their answers into the personal handheld devices through the use of *TANGO* software. The assessments were facilitated by the use of *TANGO*, which scored students responses, collected achievement data, disaggregated and analyzed the data, suggested areas of remediation, and allowed for a variety of reports for students, parents, teachers, and administrators. All assessments were directly linked to the *Texas Assessment of Knowledge and Skills* objectives and the *Texas Essential Knowledge and Skills* being taught. Furthermore, each test item was correlated to the level of *Bloom's Taxonomy of Cognitive Skills*. Teachers received immediate feedback on instruction through student performance as reflected in the reports generated by *TANGO* software. Instructional decisions were then made accordingly, addressing the students' individual needs. Instructional decisions or practices were made as a result of accessibility to the information attained through the utilization of *TANGO*. A more detailed description of the instructional modifications, district protocol, and the features of *TANGO* is found in Appendix A of this dissertation.

Likewise, Campus B was afforded the use of *Palm Pilots* for *TANGO* software for assessment; however, the personal devices were only used during both benchmark administrations, without an interim formative assessment. Curriculum in place within the school district was the same for both the groups with all district initiatives. The only variable was the administration of a formative assessment for Campus A as measured by

the *Texas Assessment of Knowledge and Skills*, and the subsequent data collection and analysis of the administration.

Data Collection Procedures

Data for both Group A and Group B were gathered through the use of *TANGO* software and the use of the *Palm Pilots*. Campus A administered the *March 2003 Texas Assessment of Knowledge and Skills* released test for Reading on September 9, 2006. Campus B administered the *March 2004 Texas Assessment of Knowledge and Skills* released test for Reading on October 30, 2006. Both campuses used the scores of these state examinations as a baseline. The initial benchmark test used by Campus B was also used by Campus A as a formative assessment. Subsequently, the data for both campuses obtained from the mid-year District benchmark—the *April 2006 Texas Assessment of Knowledge and Skills* released test administered on January 24, 2007—were used in the comparison as the test at the end of the period of study. The administration strictly adhered to the processes prescribed by the state of Texas in the administration of the *Texas Assessment of Knowledge and Skills*, which ensured fidelity in the administration. The following figure is a timeline that articulates data collection:

September 9, 2006		October 30, 2006		January 24, 2007
Campus A	Modified Instruction	Campus A	Modified Instruction	Campus A
		Campus B	Modified Instruction	Campus B

Figure 3. Data Collection Timeline

Data Analysis Procedures

The data collected using the procedures described in the previous section was analyzed using a *t*-test for paired samples to test the primary directional research hypotheses (reading achievement) in this study. A *t*-test for paired samples was used because it reduces the effects of initial group differences in a causal-comparative design by compensating adjustments to the means of the two groups. (Gall, Gall, & Borg, 2003, p. 403). The ninety-five percent confidence level ($p < .05$) was used as the criterion level for determining statistical significance. Cohen's *d* was used to determine effect size ($\delta = 0.33$); and thus, determining educational meaningfulness. (Becker, 2001).

A Binomial test was used to test the secondary directional research hypotheses (passing rate) in this study. A Binomial test was used because it allows the testing of two independent variables; in this case, the pass/fail rate of third grade students and instruction as a result of frequent reading assessment, data collection and analysis of third grade students. The ninety-five percent confidence level ($p < .05$) was also used as the criterion level for determining statistical significance. Cohen's *d* was the criterion ($\delta = .033$) for educational meaningfulness (Becker, 2001).

Limitations of the Study

Inherent limitations must be considered in the course of any study which might limit the validity and generalizations of the findings. The first limitation of this study deals with the participants of the study. As the design does not allow for pretesting or randomization of the comparison groups, the main threat to the internal validity of the study is the possibility that group differences were preexisting rather than to the treatment effect. Differences that may have been preexisting stem from the demographic

differences of Limited English Proficiency and At-Risk factors. A t-test for paired samples was used because it reduced the effects of initial group differences by equating to the means of the two groups. However, using a single-group t-test on the pretest scores indicated a significant difference in means. Therefore, an analysis of covariance (ANCOVA) in which the dependent variable was reading achievement as measured by a pretest and posttest was subsequently used. The ninety-five percent confidence level ($p < .05$) was used as the criterion level for determining statistical significance. The criterion for educational meaningfulness was one third of one standard deviation ($\delta = 0.33$). Therefore, these statistical techniques were used in the analysis of the data, as the underlying assumptions were met.

The study has another limitation with respect to measurement selection of the *Texas Assessment of Knowledge and Skills*, as the Kuder-Richardson formula 20 was used in the determination of reliability. Richardson formulas usually yield lower reliability coefficients than others that would be obtained by alternative methods of calculating reliability (Gall, Gall, & Borg, 2003). Nonetheless, as *TANGO* correlates standards, in this case the *Texas Essential Knowledge and Skills*, to the assessment of instruction, the most effective measure of students' success with respect to the mastery of the *Texas Essential Knowledge and Skills* was the *Texas Assessment of Knowledge and Skills*.

Summary

In this chapter, Chapter Three, the methodology which was used to conduct the study was discussed. The quantitative methodology evaluates the use of technology in formative assessment, data collection and analysis, and focused instruction by comparing

the reading achievement of third grade students as measured by the *Texas Assessment of Knowledge and Skills*. This chapter articulated the study's research design, participants, instrumentation, treatment, data collection and data analysis procedures, along with the consideration of the anticipated inherent limitations of the study.

Chapter Four

Results

Inasmuch as the purpose of this study was to compare the reading achievement of third grade students, as measured by the *Texas Assessment of Knowledge and Skills*, who received focused instruction based on formative assessment data with the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills*, of third grade students not receiving focused instruction as a result of formative assessment, data collection and analysis, the study addresses the following research question:

Does the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills*, of third grade students who receive instruction as the result of formative assessment, data collection and analysis differ from the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills*, of third grade students who do not receive instruction as a result of formative assessment, data collection, and analysis? Accordingly, this chapter describes the findings obtained during the course of conducting the study.

The data collected using the procedures described in the previous section of this paper were analyzed using a single-group t-test on the pretest scores that indicated a significant difference in means. Therefore, an analysis of covariance (ANCOVA) in which the dependent variable was reading achievement as measured by a pretest and posttest. The ninety-five percent confidence level ($p < .05$) was used as the criterion level for determining statistical significance. The criterion for educational meaningfulness was one third of one standard deviation ($\delta = 0.33$). Table 3 illustrates the results of the statistical analysis of the study.

Table 3

Results of the Statistical Analysis

Independent Sample T Test							
Pretest	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig	t	df	Sig.	Mean diff.	SE diff.
Equal variances assumed	3.830	.053	3.735	96	.000	13.195	3.533
Equal variances not assumed			3.998	91.366	.000	13.195	3.301
Analysis of Covariance							
Source	Sum of Squares	df	Mean Squares		F		p
Corrected Model	5.038	2	2.519		23.282		<.0004
Group	.094	1	.094		.866		0.354
Pre	3.876	1	3.876		35.822		0.0004
Error	10.278	95	0.108				
Means							
Group	N	Pretest		Posttest			δ
		Mean	SD	Mean	SD		
Group A	37	82.70	13.968	84.89	13.517		0.574
Group B	61	69.51	18.517	75.15	16.046		
Total	98	74.49	18.051	78.83	15.799		

As shown, the analysis of covariance yielded an F-ratio of 23.282 that was statistically significant ($p < 0.0004$) and an effect size ($\delta = 0.576$) that was educationally significant. These results indicate that although the posttest mean for the experimental group was higher than the pretest mean for the Group A (experimental) and the posttest mean of the Group B (control) was higher than the pretest mean of Group B, the difference was statistically significant enough to indicate that the difference in reading achievement was not by chance. Therefore, the research hypothesis was accepted. The reading achievement for third grade students who received instruction modified using formative assessment, was statistically significantly higher than the reading achievement of third grade students who received instruction without the use of formative assessment for instructional modification. Further, inasmuch as the obtained effect size ($\delta = 0.576$) was more than one third of one standard deviation, it can also be argued that the difference favoring students who received instruction with modifications using formative instruction was educationally significant. Further, it should be noted that due to the violation of homogeneity, all results must be interpreted with caution. That is to say that the results are specific to the two groups studied, and may not necessarily be applicable to all groups in general. The results are specific to these specific schools and may indicate that availability of disaggregated data and instructional modification, alone, may not have been enough to effect reading achievement. However, the statistical significance of the findings may warrant further study into the application of formative assessment practices with other At-risk, predominantly Hispanic, students from economically disadvantaged homes.

Summary

Chapter Four presented the results of this study which compares the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills(TAKS)*, of third grade students who receive instruction as the result of formative assessment, data collection and analysis and the reading achievement, as measured by the *TAKS*, of third grade students who did not receive instruction as a result of formative assessment, data collection, and analysis. Through an analysis of covariance, the data indicated that there was a statistically significant difference in the reading achievement between the groups; and there was an educationally significant difference between the groups.

In as much as the study addressed the following research question: Does the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills(TAKS)*, of third grade students who receive instruction as the result of formative assessment, data collection and analysis differ from the reading achievement, as measured by the *TAKS*, of third grade students who do not receive instruction as a result of formative assessment, data collection, and analysis? Accordingly, the following chapter, Chapter Five, discusses possible conclusions, interpretations and implications of the findings obtained during the course of conducting the study.

Chapter Five

Discussion Of Findings

Inasmuch as the purpose of this study was to evaluate the reading achievement of third grade students, as measured by the *Texas Assessment of Knowledge and Skills (TAKS)*, who received focused instruction based on formative assessment data by comparing the reading achievement of third grade students receiving focused instruction as the result of formative assessment, data collection and analysis , with the reading achievement, as measured by the *TAKS* of third grade students not receiving focused instruction as a result of formative assessment, data collection and analysis, the study addressed the following research question:

Does the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills (TAKS)*, of third grade students who receive instruction as the result of formative assessment, data collection and analysis differ from the reading achievement, as measured by the *TAKS* of third grade students who do not receive instruction as a result of formative assessment, data collection, and analysis? The following discusses the possible conclusions, interpretations, and implications of the study.

Conclusions

As discussed in Chapter Four, the results of the study which compares the use formative assessment, data collection and analysis, and subsequent instructional modification in the classroom, described the resultant effects on reading achievement of third grade students. Through an analysis of covariance, the data indicated that there was a statistical significant difference in the reading achievement between the group A and the

group B, Group A being the group using formative assessment for instructional modification; and that there was an educationally significant difference between the groups. Therefore, the results of the study suggest that students may benefit from instruction that utilizes formative assessment as a means for instructional design. However, due to the violation of the assumption of homogeneity of variance, these results have to be interpreted with caution. The results are specific to these specific schools and may indicate that availability of disaggregated data and instructional modification, alone, may not have been enough to effect reading achievement. Simply, the fact that the study uses archival data in a public school setting, inherently cannot account for the possibilities of private tutoring or other extrinsic factors that may have affected the results.

It should be noted that Campus A and Campus B were considered recognized campuses by the Texas Education Agency in 2006. However, in 2007, Campus A achieved an exemplary rating by the Texas Education Agency. The modification of instruction occurring twice within the study period was the only distinction between Campus A and Campus B. Further, although there was a difference in the academic levels of the two groups at the onset, there is a statistically significant positive difference, as well as an educationally significant difference between the groups.

Interpretations

As legislative mandates require more concrete data of individual student performance in order to examine equity issues as well as overall student performance (Bush, 2002); this study provides some statistically significant answers for decision-makers to utilize when designing assessment schedules and selecting methods for data collection and management. The basic premise behind standards based assessment is that

it is based on the theoretical notion that assessments should reflect standards for student performance, and that these assessments should guide both instruction and assessment (Herman, 1998). Yet, if the conclusions of this study reflect that formative assessment indeed statistically effects reading achievement, the availability of readily accessible data may influence or affect instructional modification; yet, the answer may lie in what specific data assists in the guiding of instructional decisions and changes.

Because accountability is at the heart of the mandated standards based assessments, feedback and self-adjustment must play a crucial part in instructional practice, curriculum design, and student's academic performance (Wiggins, 1998). However, the study may be indicative of a prevailing assumption that educators have the knowledge-base and willingness to make the immediate changes and adjustments to their instruction upon receipt of the immediate feedback provided. Further study of the use of the information attained by *TANGO*, or other technological tools, by teachers with respect to the immediate influence on classroom instruction may be warranted. Please note that *TANGO* is now utilizing mobile application software for use with iPad or iPod devices, as the personal handheld devices that were used during the period, are now obsolete.

It is in focusing on the requisite of standards based assessment that educators must utilize methods for data collection, disaggregation and analysis to align instructional practices for the individual students being taught (Education Commission of the States, 2002a). In this study, the schools use *TANGO*, a program that seemingly facilitates for educators the data collection, disaggregation and analysis for the alignment of instructional practices necessary. However, the apparent expediency in the availability of the data may not have significantly influenced instructional changes any sooner. Therein

lays a case for further study.

Implications

The implications of the study lie in the decisions school administrators face in the advent of accountability and the mandates of *No Child Left Behind*. Before school districts consider investment in the new technology or areas of professional development, further study of its use in the utilization of data in the adjustment of instructional practice may be warranted.

Federal initiatives are heightening and expanding the need for formative assessment practices in American classrooms (Davidson & Frohbeiter, 2011). Within the research, findings are including policy implications for the need to adopt formative assessment practices within school systems for students and teachers. Extensive research findings are prevalent regarding formative assessment and its connection to student achievement. Learning Point Associates (LPA), in their December 2009 paper referenced Benjamin Bloom, research pioneer of formative assessment, and his work in addressing the variance in student achievement by the differentiation of instruction and assessment. Bloom's mastery learning concept and its supporting research incorporated feedback after assessments to direct individual and group learning needs. The process of differentiated instruction, followed by formative assessment, throughout the unit showed evidence of academic gains and improved learning attitudes. (LPA, 2009).

Formative assessment merges with cognitive and sociocultural theories of learning in a number of ways. First from a cognitive perspective, formative assessment enables teachers and students to consistently work where learning takes place. In formative assessment, teachers are in a continuous process of evidence gathering and

interpretation so as to structure learning that builds on maturing functions. Teachers need to lead the learning, not retrospectively react to it. (Vygotsky, 1978). Second, from a social perspective, formative assessment takes in account the interaction and joint collective action in the learning process. Assessment is not unidirectional, but involves both teacher and student reciprocally. Finally, formative assessment takes place within a community of practice. Participants assume roles, goals, and norms for interaction that are intended to support learning (Duran, 2010). Teachers and their students assume roles of partners in the learning process. The practices through which success is achieved by students and teachers are gathering and interpreting evidence and providing and using feedback. The community norms are mutual, support trust, respect, and collaboration. (Heritage, 2010).

Technology plays a critical role for teachers' day-to-day management of non-instructional activities, including data management, lesson preparation, and communication. (O'Dwyer, 2004). However, the present study indicates that affording the time-saving devices needed for the above activities may be one of, but not the only, answer. Further, the study does suggest that school districts, especially in the current economic climate, may need to invest in cost effective ways of collecting data. When assessing budget allocations, district administrators may well need to place an emphasis in providing the technological advantages that are available for educators to facilitate learning. However, while educators become more familiar, and hence, more dependent on technology to ease the demands being placed upon them, school districts must also be cognizant of providing professional development in the fundamental premises behind the standards-based, and subsequent assessment-based, movement. Unless educators are able

to intrinsically adjust and adapt to the instructional needs of their students as indicated by the assessments they administer, timely access to the disaggregated data which is designed to assist them and drive instruction may be useless.

Once assessment is deemed educative, it is no longer separate from instruction; it is a major, essential, and integrated part of teaching and learning (Wiggins, 1998). An educative assessment system is designed to teach, to improve performance of both student and teacher, and to evoke the implementation of exemplary pedagogy. The state of Texas has currently questioned the efficacy of too many assessments. The Texas legislature has recently deemed there only be five examinations given to high school students, ending the requisite 15 end-of-course exams currently in place. On March 26, 2013, the Texas House and Senate passed the measure and has it sent it for the Governor's signature, to be signed before June 17, 2013. The decision comes after a lengthy legislative session where education issues were debated extensively. (Texas Legislature Online, 2013)

Holding true in debate, and as this study indicates, instruction is the key to student achievement. Ultimately, student academic achievement lies in the effectiveness of instruction. The implications of this study may reside in its findings that indicate readily accessible data does not necessarily drive or effect instructional changes at the same frequency.

Further study is necessary in determining factors that may inhibit implementation of curricular changes, or in determining if simple availability of the data and subsequent instructional adjustments has any effect on the rate of academic attainment by third grade students. The implications of this study may also indicate further investigation as to the

expediency of data-access and subsequent curricular changes with respect to the students' rate of achievement.

Summary

Inasmuch as the study addressed the following research question: Does the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills*, of third grade students who receive instruction as the result of formative assessment, data collection and analysis differ from the reading achievement, as measured by the *Texas Assessment of Knowledge and Skills*, of third grade students who do not receive instruction as a result of formative assessment, data collection, and analysis?, the data indicated that there was a statistical significant difference in the reading achievement between the control group (Group B) and the experimental group (Group A); and there was an educationally significant difference between the groups. However, the study does give rise to further investigation of the implications on the effective and timely use of readily accessible data by educators to adapt to the instructional demands of their students as indicated by the assessments given, as well as the rate by which students achieve while adjusting to possible instructional changes.

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Appendix A

Modification Of Instruction

Campus Level Instruction

Inasmuch that instruction as a result of data collection and analysis was modified, redirected, and specifically targeted toward the students' specific academic needs as indicated by TANGO software, the modification of the instruction was systematic and prescribed in accordance with the district protocol in place at each school. The following is a typical description of the modification of overall instruction in the individual classrooms at both Campus A and Campus B.

All elementary schools adopted and adhered to the requisites of the Texas Reading First Initiative and accordingly reserved the first ninety minutes of the day as non-interrupted instructional time where by the correlates of the program—Tiers I, II, and III. The core curriculum focusing on the five elements of reading was known as Tier I, intervention consisting of an additional thirty minutes of instruction of specific areas of weakness as identified by the Texas Primary Reading Inventory was known as Tier II, and Tier III intervention was the stage that prescribed an additional thirty minutes. The Texas Reading First Initiative encompassed scientifically research-based program elements at each Tier as approved by the Texas Education Agency.

In addition to the above, upon the formative assessment and subsequent data collection and analysis using TANGO software, Campus A and Campus B required of every teacher, plans of action whereby every teacher utilized the various data reports generated by TANGO to identify each student's strengths and weaknesses in achieving the required knowledge and skills articulated by the Texas Assessment of Knowledge and Skills (TAKS), Texas Essential Knowledge and Skills (TEKS) and Bloom's Taxonomy of Cognitive Skills. Once identified, students were homogeneously grouped by ability

into four groups—high, upper middle, lower middle, and lower. The lower middle groups of students were known as the “bubble kids” and were serviced by Reading intervention teachers as well as the regular classroom teacher. Furthermore, the lower performing students were targeted with instruction from special education teacher, if students’ qualified, dyslexia teachers and computer laboratory teachers on a one-to-one basis as applicable. Teachers also taught in teams, dividing up the groups for more effective, and specific whole group instruction periods. Instructional intervals were forty five minutes long, and adjustments were made to the master schedule of classes to accommodate the times, with the exception of physical education classes and computer laboratory classes. Note that the computer laboratory classes at both campuses utilized Success Maker by Pearson. Instruction was specific and prescribed, focusing on skills and/or objectives needing to be mastered. Instructional styles were varied, addressing multiple intelligences when appropriate; and reading skills were reinforced throughout the day when covering the content subjects. Administration was diligent at both campuses to ensure a systemic approach to reading instructional reinforcement throughout each campus, assuring implementation at all grade levels.

Upon the completion of the instructional day, students needing further instruction participated in extended day tutorials. After providing students a snack through the District’s nutritional program, students would be instructed for an additional hour and fifteen minutes, three times a week. This was a total of three hours and forty-five minutes a week in extra instructional time. This tutoring instruction was provided at both Campus A and Campus B beginning in the first week of November of that year. No other known tutoring service was provided at either campus.

It should be noted that the use of the term, “focused instruction” throughout this paper is a description of the above process and is not in reference to any specific model or program.

District Intervention Protocol

The south Texas border district in which this study takes place provided academic support for the elementary campuses in the form of intervention teachers and scientifically research-based computer programs such as Success Maker by Pearson Learning and Creative Education Institute program available in the regular computer and dyslexia laboratories, respectively. Furthermore, the district participated in the Texas Reading First Initiative, and as a result, implemented the program according to the grant requirements. The Texas Reading First Initiative included grades Kindergarten through third grade. To assist in the data collection and analysis as required by the Texas Reading First Initiative, the district purchase licenses for the use of TANGO software to be utilized for the Texas Primary Reading Inventory/Tejas Lee requisites, as well as licenses for grades three through twelve for use in the collection of data of student performance in mastering the Texas Essential Knowledge and Skills and Texas Assessment of Knowledge and Skills objectives. TANGO also provided for data disaggregation and analysis. The district uniformly also provided the extended day tutoring program utilized by both Campus A and Campus B beginning in November of that year.

Inasmuch that the district provided the above resources for all campuses, it also established an intervention protocol to be followed by each campus upon the attainment and use of data of student performance. It was as follows. Each campus in the district

provided a campus plan of action whereby a brief, generalized description of instructional grouping, scheduling, and intervention intervals were outlined. Additionally, groups were identified by ability reflecting mastery of benchmark tests. Patterns among the students' scores, with respect to areas of mastery were identified and addressed in the plan of action, as well as any further outside training for teachers or students. Note that neither Campus A nor Campus B requested additional training for teachers or students. Scientifically research-based curriculum resources, time intervals and specific skills to be taught weekly were all articulated, and submitted for the district approval. Again, Campus A and Campus B utilized the same scientifically research-based curriculum resources, time intervals, and addressed the individual reading skills necessary for mastery. The district then provided intervention monitoring by the Director of Elementary Education on a weekly basis. Any questions or suggestions were directed to the campus principal and handled accordingly.

Tango Software

TANGO software was, and is, a product developed by Texas-based Liberty Source, Incorporated, a subsidiary of Liberty Solutions, Incorporated that is specifically designed for educators' use in administration of assessments, data collection and analysis, and for rapid decision making in addressing curriculum, instruction, and intervention concerns (Liberty Source, 2013). The product name "*TANGO*" referred to the software that consists of answer-key templates that facilitate the collection of student answers in a variety of forms—multiple choice, short answer, surveys, checklists, etcetera—and correlates all items tested to the Texas Essential Knowledge and Skills, Texas Assessment of Knowledge and Skills objectives, and key concepts by grade-level

and level of cognitive skill as measured by Bloom's Taxonomy of Cognitive Skills. The software afforded the teacher complete autonomy over content and the lessons being taught and subsequently assessed. During the study, TANGO used the Palm OS system to retrieve data. However, as of this dissertation, TANGO now utilizes iPOD and iPad applications, while still servicing those customers who are still using Palm personal handled devices (Liberty Source, 2013).

Reports generated through TANGO offered teachers and administrators immediate feedback to student academic performance on assessments. Data were disaggregated to better analyze students' weaknesses and strengths, and to customize instruction that would address students' needs. Specific skills were identified and indications were given for remediation and re-teaching. TANGO grouped the data in teacher-selected ranges, allowing teachers to create their homogeneous ability groups by objective and/or skills taught. This allowed flexibility in the grouping and a more prescribed instructional plan.