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University of Nebraska at Omaha

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The Effectiveness of a School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative on the Achievement and Proficiency Categories of 8th-Grade Students with Varying Levels of Cognitive Skills

By

Tamara J. Williams

A Dissertation

Presented to the Faculty of

The Graduate College of the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Education

In Educational Administration

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2009

Supervisory Committee

Dr. John W. Hill, Chair

Dr. Kay A. Keiser

Dr. Neal F. Grandgenett

Dr. Larry L. Dlugosh

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ABSTRACT

THE EFFECTIVENESS OF A SCHOOL-WIDE DIFFERENTIATED HOME ROOM ACADEMIC EXTENSION RE-TEACHING INITIATIVE ON THE ACHIEVEMENT AND PROFICIENCY CATEGORIES OF 8TH-GRADE STUDENTS WITH VARYING LEVELS OF COGNITIVE SKILLS

Tamara J. Williams

University of Nebraska

Advisor: Dr. John W. Hill

The purpose of the study was to measure the effectiveness of a school-wide differentiated home room academic extension re-teaching initiative on the academic achievement and criterion-referenced assessment proficiency categories of 8th-grade students with varying levels of measured cognitive skills. Achievement measures were reading and math criterion-referenced assessment scores, core subject grades, and the reading and math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test subtest scores. At the conclusion of the research year 20 students moved into the highest measured criterion referenced reading test proficiency group (beyond proficient) and 33 students moved into the highest measured criterion referenced math test proficiency group (beyond proficient). Of equal importance for this study is that three students moved out of the lowest measured criterion

referenced reading and math group (below proficient). Overall, after implementation of the school-wide differentiated home room academic extension re-teaching initiative, students gained the minimum level of proficiency needed for AYP in addition to growth in the highest proficiency category. Student grades and achievement test scores are discussed for students with Test of Cognitive Skills scores in deciles 1 through 3 (group 1, n = 8), decile 4 (group 2, n = 7), decile 5 (group 3, n = 15), decile 6 (group 4, n = 11), decile 7 (group 5, n = 19), decile 8 (group 6, n = 29), decile 9 (group 7, n = 35), and decile 10 (group 8, n = 62).

ACKNOWLEDGEMENTS

Thank you to so many for the support, guidance, and care you have shown for me and my family in the process of completing this work. Albeit a cliché, it is true it takes a village to raise a child. I now also believe that it takes a village to help a working mom complete her dissertation. Thank you friends and family for your support.

First, thank you to the many UNO professors who have guided my professional development. I have learned so much from each of you. I thank Dr. John Hill, my chair, for his patience, wisdom, conversation, and counsel through the writing process. I have learned that work is not just about security and accomplishments, but an extension of personal joy. The late Dr. Leon Dappen will be forever remembered. From my first Introduction to Research class to my last seminar, his servant leadership was unmatched. His legacy continues to impact many today.

Second, my heart is filled with gratefulness to my husband, Alex, and our children Meg and Aden. Their compromise and patience with me through this process was endless. I look forward to more hours in the park and snuggled with books. Meg came into our family at the end of my masters and Aden at the start of my doctorate. Dr. Karen

Hayes is correct: going to school with little ones does make smart babies. I am excited to support your many future endeavors, Meg and Aden, as my parents have supported me.

Last, and very importantly, thank you to the innovative and collaborative staff at Beadle Middle School. Your vision, commitment, professionalism, and care make all things possible, including home room. Thank you for your hours of work to serve students. I am blessed to work near such people of integrity and talent. Thank you to Millard Public Schools for supporting this research.

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CHAPTER ONE

Introduction

Either for quality control or as a catalyst for shaping the reform debate, standardized norm-referenced assessment in public education is here to stay. Beginning with the Elementary and Secondary Education Act of 1965, A Nation at Risk in 1983, Goals 2000 in 1994, and most recently the federally mandated No Child Left Behind (NCLB) Act of 2001 all emphasized testing as a measuring stick to determine school and student progress. The NCLB legislation went so far as to directly tie federal funding to school progress as measured by standardized state assessments. Following Goals 2000, states developed standards-based outcomes, rigorous standards for all students, and assessments to measure student progress against these standards (Goertz & Duffy, 2003; National Governors' Association, 1996). Currently, all states have established state reporting systems. Nebraska's school accountability model, School-based Teacher-led Assessment and Reporting System (STARS), requires that each public school receive a Good, Very Good, or Exemplary rating on the percentage of students performing at grade level or proficient on reading and mathematics standards and the same ratings on the quality of the assessments they use to measure student

performance on standards (Dappen & Isernhagen, 2005; Dappen, Isernhagen, & Anderson, 2008; Isernhagen & Dappen, 2005). However, this criterion referenced assessment system will soon give way to a legislatively mandated statewide norm referenced testing program (Nebraska Department of Education, 2008). The Nebraska school district ratings and student performance results on reported assessments are published and made available to the public. Assessments reported to STARS are considered high stakes tests as these assessments determine district and school Adequate Yearly Progress (AYP) for NCLB. Both to garner stakeholder support and maintain AYP in order to be in compliance with NCLB, Nebraska school districts continue to improve assessment quality and results.

Focus on the Individual Student

Essential to the real success of NCLB and STARS, has been its emphasis on individual student performance as well as overall school and district performance. Cumulative individual data, then, accounts for school and district success. This is counter to previous state accountability models where a school could be highly rated by averaging overall student performance while still having significant achievement gaps. Instead of overall student performance, Nebraska has defined each of the following disaggregated

sub-groups as required to meet minimum STARS standards including: all students, students from low-income families as defined as eligible for free or reduced meal program, English language learners, students with disabilities, Asian/Pacific Islander, Black/Not Hispanic, Hispanic, Native American, and White/Not Hispanic. These subgroups are congruent with the federal No Child Left Behind mandates. The purpose of focusing on disaggregated outcomes is to close existing achievement gaps. By the 2013-2014 school year it is mandated that 95% of all students will be assessed and be performing at the proficient level of achievement on all state accountability tests (NCLB, 2002). A focus on individual student achievement and a minimum standard of curriculum mastery at the proficiency level is the hallmark of NCLB.

Understanding Student Brain Development

Current brain research in its own way supports the hoped for legislative claim that no child should be left behind in terms of making progress over time. This is particularly meaningful given our understanding of how variable and dynamic brain development really is compared to what was once thought (Bruer, 1999; Sowell, Thompson, Tessner, & Toga, 2001; Thompson et al., 2000). Brain development research suggests that an enriched and positive

learning environment can enhance the nature of adolescent neuronal connections fostering and supporting learning success (Ridley, 2003). There exists a neurobiological malleability between brain synapse and dendrite connectivity and an enriched experience (Restak, 2003; Schwartz & Begley, 2002). Schools control an enriched environment and enriched experiences for students in the school setting. Therefore, schools enhance the plasticity of brain development through enriched environments and positive learning experiences. Neuronal connectivity moves children on to increased learning capacity that supports the contention that no child should be left behind. There is, however, a limit to brain plasticity (Kolb, Gibb, & Robinson, 2003) that implies a learning cap does exist. This limit is different for every student and does not imply an absence of learning, only that significant skill development will occur with intense intervention.

Motivation, Tests, and Learning

The challenge of closing the achievement gap becomes increasingly difficult as students move into adolescence. In addition to intellectual ability, developmental characteristics of adolescents impact testing results and student testing experiences. Achievement can be affected by students' motivation (Wigfield, 1994). An individual's

motivation is defined by that person determining if he can succeed or not at a task and if he want to succeed or not at a task (Eccles, Midgley et al., 1993). High stakes validity assumes that students always try their best and want to succeed on the test. This assumption, unfortunately, may be unrealistic. Students may choose to show lack of effort when there exists a skill gap in order to protect individual self-esteem (Jones, Jones, & Hargrove, 2003; Paris, Lawton, Turner, & Roth, 1991). High stakes testing assumes students are motivated to test to the best of their ability. High-stakes testing decreases adolescent motivation to give genuine effort and increases resentment, anxiety, and cynicism (Paris et al., 1991). A survey of 233 middle school students showed that prior motivation and engagement were strong predictors of subsequent motivation and engagement (Ryan & Patrick, 2001). As students progress through school, it is, therefore, important to foster positive motivation and engagement regarding students academic and assessment performance in order to increase future performance success.

Questioning the High-stakes Test Format

Standardized tests reported for NCLB are increasingly paper and pencil, multiple-choice tests instead of

performance-based assessments (Parke, Lane, & Stone, 2006). Performance-based assessments have been shown to have positive consequences on classroom instruction and student learning (Borko, Wolf, Simone, & Uchiyama, 2003; Stecher, Barron, Kaganoff, & Goodwin, 1998; Stecher, Barron, Chun, & Ross, 2000). Paramount to an effective accountability system is alignment of assessments to curriculum standards. The pervasive amount of testing required by NCLB and state accountability systems has resulted in many once appropriately complex demonstrations of proficiency being relegated to multiple-choice tests (Lane, 2004; Parke et al., 2006). A multiple-choice test is not as robust or reflective of the curriculum as performance-based assessments (Jones et al., 2003; Medina & Riconscente, 2005; Yeh, 2001). Poor test quality in-and-of-itself will erode the ideals of assessment-driven legislation. Continuous evaluation of test validity and reliability is necessary to ensure the effectiveness of accountability models.

Expectations and Achievement

High academic achievement and high educational expectations are considered to be reciprocal (Bui, 2007). High expectations are typically interpreted in a high-stakes testing environment as minimum competency standards.

Standards are the curriculum outcomes that all proficient students must be able to demonstrate. Because curriculum is designed for the average learner, assessments based on standards are basic competency tests. Most state accountability models are designed to measure the number of individual students who scored at the level of proficiency on their state assessment, a minimum competency assessment. In this minimum-standards environment, students who score just below the minimum proficiency cut score, referred to as *bubble kids* most often receive targeted intervention to improve their test scores (Nelson, McGhee, Meno, & Slater, 2007). Students who are proficient or more do not receive intervention and participate in the regular or enriched curriculum. Students whose scores are at or above the proficiency level often do not receive additional intervention as well as students well below proficiency (Azzam, 2007; Nelson et al., 2007). Division of resources demands difficult and ethically troubling decisions such as these. High achieving students, those with test scores well beyond proficient who are also successfully completing their coursework may also go without the learning challenges they require. While the focus of NCLB is to promote high standards for all students, it should be noted that standards do not mean standardization. Students who

easily meet proficiency of the standards should be held to extremely high standards of continued growth and high achievement. In the current NCLB design, this high level growth is not measured. What gets measured gets done. No Child Left Behind (2002) has made significant improvements over previous accountability models by increasing targeted interventions in order to eliminate achievement gaps. One population not represented in this current educational reform is the highly achieving and talented student.

Purpose of the Study

The purpose of the study was to measure the effectiveness of a school-wide differentiated home room academic extension re-teaching initiative on the academic achievement and criterion-referenced assessment proficiency categories of 8th-grade students with varying levels of measured cognitive skills. Achievement measures were reading and math criterion-referenced assessment scores, core subject grades, and the reading and math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test subtest scores.

Research Questions

The following research questions were used to analyze reading and math Essential Learner Outcomes test scores for 8th-grade students with varying levels of cognitive skills.

Overarching Pretest-Posttest Essential Learner Outcomes Test Score Research Question #1: Do students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative lose, maintain or improve their pretest 8th-grade compared to their posttest 8th-grade grade Essential Learner Outcomes Reading Test score?

Sub-Question 1a. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1b. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1c. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1d. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1e. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1f. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1g. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1h. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Reading Test standard scores?

Overarching Pretest-Posttest Essential Learner Outcomes Test Score Research Question #2: Do students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative lose, maintain or improve their pretest 8th-grade compared to their posttest 8th-grade grade Essential Learner Outcomes Math Test score?

Sub-Question 2a. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2b. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2c. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2d. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2e. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2f. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2g. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2h. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade grade Essential Learner Outcomes Math Test standard scores?

Overarching Posttest-Posttest Essential Learner Outcomes Test Score Research Question #3: Do students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative have congruent or different posttest end of 8th-grade Essential Learner Outcomes Reading Test scores and Math Test scores?

Sub-Question 3a. Is there a significant difference between students end of 8th-grade Essential Learner Outcomes Reading Test scores whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from (*i*) a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range, (*ii*) a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range, (*iii*) a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range, (*iv*) a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range, (*v*) a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range, (*vi*) a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range, (*vii*) a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range, and

(*viii*) a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range?

Sub-Question 3b. Is there a significant difference between students end of 8th-grade Essential Learner Outcomes Math Test scores whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from (*i*) a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range, (*ii*) a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range, (*iii*) a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range, (*iv*) a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range, (*v*) a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range, (*vi*) a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range, (*vii*) a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range, and (*viii*) a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range?

Overarching Pretest-Posttest Essential Learner Outcomes Reading Test and Math Test Proficiency Category Change Research Question #4. Will students with varying

levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative lose, maintain, or improve their pretest 8th-grade Essential Learner Outcomes Reading Test and Math Test proficiency category (a) below proficient, (b) barely proficient, (c) proficient, and (d) beyond proficient proficiency category change compared to their posttest 8th-grade Essential Learner Outcomes Reading Test and Math Test proficiency category (a) below proficient, (b) barely proficient, (c) proficient, and (d) beyond proficient proficiency category change?

Sub-Question 4a. Is there a significant difference between students pretest beginning 8th-grade compared to posttest end of 8th-grade Essential Learner Outcomes Reading Test proficiency category (a) below proficient, (b) barely proficient, (c) proficient, and (d) beyond proficient frequencies change?

Sub-Question 4b. Is there a significant difference between students pretest beginning 8th-grade compared to posttest end of 8th-grade Essential Learner Outcomes Math Test proficiency category (a) below proficient, (b) barely proficient, (c) proficient, and (d) beyond proficient frequencies change?

The following research questions were used to analyze social studies, science, English, and math core subject mean grade score change for students with varying levels of cognitive skills.

Overarching Pretest-Posttest Core Subject Mean Grade Score Research Question #5: Do students with varying levels of cognitive skills whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from (*i*) a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range, (*ii*) a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range, (*iii*) a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range, (*iv*) a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range, (*v*) a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range, (*vi*) a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range, (*vii*) a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range, and (*viii*) a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range lose, maintain, or improve their pretest first trimester 8th-

grade (a) social studies, (b) science, (c) English, and (d) math core subject mean grade scores compared to their posttest third trimester 8th-grade grade (a) social studies, (b) science, (c) English, and (d) math core subject mean grade scores?

Overarching Posttest-Posttest Core Subject Mean Grade Score Research Question #6: Do students with varying levels of cognitive skills whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from (*i*) a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range, (*ii*) a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range, (*iii*) a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range, (*iv*) a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range, (*v*) a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range, (*vi*) a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range, (*vii*) a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range, and (*viii*) a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range have

congruent or different posttest third trimester 8th-grade (a) social studies, (b) science, (c) English, and (d) math core subject mean grade scores?

The following research questions were used to analyze reading and math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores for students with varying levels of cognitive skills.

Overarching Pretest-Posttest Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Score Research Question #7: Do students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative lose, maintain or improve their pretest 8th-grade compared to their posttest 8th-grade grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7a. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range pretest 8th-grade compared to their posttest 8th-grade grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7b. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7c. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7d. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7e. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7f. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7g. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7h. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Overarching Pretest-Posttest Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Score Research Question #8: Do students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative lose, maintain or improve their pretest 8th-grade compared to their posttest 8th-grade grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8a. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range pretest 8th-grade compared to their posttest 8th-grade

grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8b. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8c. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8d. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Math Terra Nova

Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8e. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8f. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8g. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Math Terra Nova

Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8h. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range pretest 8th-grade compared to their posttest 8th-grade grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Overarching Posttest-Posttest Reading and Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Score Research Question #9: Do students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative have congruent or different posttest end of 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Scores and end of 8th-grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Scores?

Sub-Question 9a. Is there a significant difference between students end of 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores whose Terra Nova Test of Cognitive Skills

percentile rank scores ranged from (*i*) a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range, (*ii*) a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range, (*iii*) a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range, (*iv*) a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range, (*v*) a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range, (*vi*) a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range, (*vii*) a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range, and (*viii*) a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range?

Sub-Question 9b. Is there a significant difference between students end of 8th-grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from (*i*) a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range, (*ii*) a low of the 30th percentile to a high of the 39th percentile falling

within the 4th-decile range, (*iii*) a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range, (*iv*) a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range, (*v*) a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range, (*vi*) a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range, (*vii*) a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range, and (*viii*) a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range?

Assumptions

This study has several strong features. All students in this study have been continuously enrolled from the beginning of the 8th-grade through the end of the 8th-grade in the research school and all participated in the school-wide differentiated home room academic extension re-reaching initiative. This intervention provided students with an additional 35-minutes every other day of intense focused differentiated instruction based on each student's measured ability level and academic needs. Furthermore, the cross-curricular lessons were designed to re-teach or

extend the district curriculum as measured by Essential Learner Outcomes Exams.

The research school district Essential Learner Outcomes Reading and Math Exams have test items and distracters developed in conjunction with highly qualified teachers and curriculum supervisors using the services of an outside the school district contracted professional test item writer. All Essential Learner Outcomes exams undergo a rigorous pre-pilot and pilot test to ensure item quality. Following pilot testing, separate groups of professional educators judge the assessment for curriculum alignment, test bias and sufficiency of items which accurately diagnose students with ability levels at the below proficient, barely proficient, proficient, and beyond proficient levels.

Cut scores for all ELO exams were established suing multiple methods to ensure accuracy. These methods include global rating (predicting current student performance at four levels of proficiency), the Angoff Method (item analysis), and teacher professional judgement (consensus for lower reading group placement) (Impara, Plake & Irwin, 2000). These processes are carried out under the direction of the Buros Center for Mental Measurements at the University of Nebraska.

As required by district policy, the research school has in place and uses a Pyramid of Interventions to ensure timely and appropriate re-teaching and remediation can be provided for all students who fail to score at the barely proficient level. All students who score below proficient have an Individual Learning Plan (ILP) that is based on a review of data that indicates specific areas of academic weakness based on test sub-scale scores and item analysis. All teachers in the research school have received training the (a) Robin Hunter Mastery Teaching Model (2004), based on the work of her mother, the late Madeline Hunter (1982) and (b) differentiation of instruction.

The research school's teacher-developed theme for the research year was, "Innovation and Collaboration to Improve Student Achievement." The school-wide differentiated home room academic extension re-reaching initiative is congruent to this theme. All teachers were involved in planning and delivering school-wide differentiated home room academic extension re-reaching initiative lessons. All students in the research school participated in school-wide differentiated home room academic extension re-reaching initiative activities.

Delimitations of the Study

The study findings, results and discussion will be delimited to the 8th-grade students of a suburban school district and school who were in attendance at the research school for the 2007-2008 school year and participated in the school-wide differentiated home room academic extension re-reaching initiative.

Limitations of the Study

This exploratory study will be confined to one grade level at one research school. Students whose Terra Nova Test of Cognitive Skills percentile rank scores that ranged from a low of the first percentile rank to a high of the ninety-ninth percentile rank. Using the test results from one suburban school may skew the statistical results and reduce the utility and generalizability of the findings. Furthermore, the dependent variables were limited to achievement only due to the low incidence of behavior infractions in the research school.

Definition of Terms

Barely proficient rating. Barely proficient rating is defined as an indicator of a student's performance level on a particular criterion referenced assessment based on an established cut score. A student with a barely proficient rating, scores within a range of scores just above the

lowest cut score on a multi-level proficiency scale. Students scoring in this range are perceived to have below average academic ability in the related curriculum area.

Below proficient rating. Below proficient rating is defined as an indicator of a student's performance level on a particular criterion referenced assessment based on an established cut score. A student with a below proficient rating, scores within a range of scores below the lowest cut score on a multi-level proficiency scale. Students scoring in this range are below to significantly below average academic ability in the related curriculum area.

Beyond proficient rating. Beyond proficient rating is defined as an indicator of a student's performance level on a particular criterion referenced assessment based on an established cut score. A student with a beyond proficient rating, scores within a range of scores above the highest cut score on a multi-level proficiency scale. Students scoring in this range are perceived to have above average academic ability in the related curriculum area.

Core academic subjects. Core academic subjects for students in the Millard Public School District and included as part of this study include: English, math, social studies, and science.

Criterion referenced test (CRT). Criterion referenced test is defined as a test in which the questions are written according to specific predetermined criteria such as an established academic curriculum in which students have received instruction prior to the administration of the test.

Cross-curricular. Content is taught with a conscious effort to apply knowledge to more than one academic discipline simultaneously (Jacobs, 1989).

Deciles. Deciles are bands of percentiles that are ten percentile ranks in width; each decile contains 10 percent of the norm group. The first decile contains percentile ranks from 0.1 to 9.9; the second decile contains percentile ranks from 10 to 19.9; the tenth decile contains percentile ranks from 90 to 99.9 (Salvia & Ysseldyke, 2004).

Differentiated instruction. Varied pace, level, or kind of instruction in response to individual learners' needs, styles, or interests (Heacox, 2002).

Essential learner outcomes exams. Essential learner outcomes exams are criterion-referenced tests given to all students in grades one through eleven in the Millard Public Schools in Omaha, Nebraska. The purpose of these assessments is to determine the level of proficiency that

students have achieved with the local curriculum that is aligned with state standards. Results of these tests are used to inform educators and parents of the progress of children, which includes required intervention for students below proficient performance. The results for students in certain grades are also used for No Child Left Behind requirements as well as for state reporting. The Millard Essential Learner Outcomes Exams are also high stakes graduation requirements.

Extension. Extension is defined in the research school as specific instructional support that is provided to a student who has obtained a rating of Beyond Proficient or Proficient on any of the district's Essential Learner Outcomes Exams. Extension activities focus on application of the skills measured on Essential Learner Outcomes Exams.

Core subject mean grade scores. Mean grade scores are based on a numerical scale where a grade of 1 equals the term outstanding, a numerical grade of 2 equals the term excellent, a numerical grade of 3 equals the term average, a numerical grade of 4 equals the term below average, and a numerical grade of 5 equals the term failing.

Home Room. Home Room is defined in the research school as one 35-minute class session convened every other day for all students in the research school. Activities during Home

Room are designed to re-teach or extend the district curriculum as measured by Essential Learner Outcomes Exams.

Individual learner plan. Individual learner plan is defined as a required prescribed plan of instruction in stated curriculum area for students who have failed to attain the established cutscore on the district criterion referenced assessment at any grade level in the Millard Public School district in the stated curriculum.

No Child Left Behind. Public Law 107-110, the No Child Left Behind Amendments to the Elementary and Secondary Education Act of 1964 were signed into law by President George W. Bush on January 8, 2002. This federal statute outlines definitive expectations of all schools in the United States in relation to student achievement and accountability.

Normal-curve equivalent. Normal-curve equivalents are standard scores with a mean equal to 100 and a standard deviation equal to 21.06.

Norm referenced achievement. Norm referenced achievement is determined by student performance on the math and reading subtests of the Terra Nova Achievement Test.

Norm referenced test (NRT). A Norm referenced test is defined as an assessment where student performance or

performances are compared to a larger group. Usually the larger or normative group is a nation sample representing a wide and diverse cross-section of students. Students, schools, districts, or even states are then compared or rank-ordered in relation to the normative group. The purpose of a norm-referenced test is to measure students achievement compared to others performance on the same measures.

Proficient rating. Proficient rating is defined as an indicator of a student's performance level on a particular criterion referenced assessment based on an established cut score. A student with a proficient rating, scores within a range of scores above the mid-range cut score on a mutli-level proficiency scale. Students scoring in this range are perceived to have average academic ability in the related curriculum area.

Re-teaching. Re-teaching is defined in the Millard Public School District as prescribed and specific instructional intervention that is provided to a student who has obtained a rating of Below Proficient on any of the district's Essential Learner Outcomes Exams. Re-teaching activities focus on specific enabling skills that students have failed to demonstrate master of on the district exam. Re-teaching activities encompass a variety of techniques,

programs and strategies beyond the regular instructional repertoire of a school.

Standard setting. Standard setting is defined as the psychometric process of determining the cut scores that divides a range of scores on a exam into various levels of proficiency. This process includes at least three and usually four simultaneously applied methods to ensure the validity of the cut scores.

Terra Nova Achievement Tests. The Terra Nova-Second Edition is a group-administered, multiple-skill battery that provides norm-referenced and objective-mastery scores (Salvia & Ysseldyke, 2004).

Terra Nova Test of Cognitive Skills, Second Edition (TCS/2). TCS/2 is a cognitive abilities test that measures skills and abilities that are important for academic success in Grades 2-12. It features scores for three critical cognitive factors: verbal, nonverbal, and memory (McGraw-Hill, 2008).

Significance of the Study

This study has the potential to contribute to research, practice, and policy. The study is of significant interest to building level leaders and decision makers of resource allocation.

Contribution to research. The results of this study will be communicated to the leadership and decision makers of school-wide accountability of student academic performance. Work on accountability models, differentiation, and adolescent development will provide decision makers critical research information about intervention appropriate for students at all levels of tested proficiency.

Contribution to practice. By federal policy, school districts are required to ensure proficient performance of all students by 2014. This has resulted in an imbalance of resource distribution. Most efforts and use of resources in a school are targeted at students performing just below proficient standards. This research study will explore the utility of a shared resources intervention for students with all cognitive levels to ensure both assessment and classroom success. The results of this study may inform building level leaders and decision makers about resource allocation based on assessment outcomes.

Contribution to policy. Local level policy will be impacted through this study. If the results show a positive impact on student achievement across all levels of cognitive skills, a discussion should be generated to consider district-wide implementation. The results of this

study will be presented for consideration to the Millard Public Schools Director of Planning and Evaluation. The Director of Planning and Evaluation is responsible for making recommendations to the board of education relative to assessment. Changes to middle school assessment re-teaching and extension initiatives will result from policy decisions at the board of education level.

Organization of the Study

The literature review relevant to this study is presented in Chapter 2. Chapter 3 describes the research design, methodology, and procedures used to gather and analyze the data of the study. Chapter 4 reports the research results and Chapter 5 provides conclusions and a discussion of the research findings.

CHAPTER TWO

Review of Literature

Focus on Individual Student Achievement

Prior to NCLB, standardized tests were used for systematic reform, not focused on individual learners, but rather school or district achievement as a whole (Malen & Rice, 2004; McGhee & Nelson, 2005). Today the intent of NCLB is complex having as its cornerstone the legislation of educational outcomes and hoped for proficiency for all students by the year 2013-2014 (NCLB, 2002). The National Center on Educational Statistics identified 13 quality-school indicators from recent research related to student learning and none of the indicators included test scores (Mayer, Mullens, & Moore, 2000). Furthermore, the centerpiece of the NCLB legislation is required assessment in grades three through eleven with the assumption that testing in-and-of-itself will result in the elimination of achievement gaps and the attainment of proficiency levels for all students in math, reading, and science (NCLB, 2002). While all parents, teachers, administrators, educational leaders, and politicians want all students to learn and achieve at the highest levels it is important for parents, teachers, administrators, educational leaders, and politicians to be equally invested in individual students

continual academic improvement while placing emphasis on helping students work up to their highest ability levels (Lee, 2006; Nelson et al., 2007).

Middle school is a time of variable physical, intellectual, emotional, and social development (Gullotta, Adams, & Markstrom, 2000). Each student will experience extreme growth spurts in their physical, intellectual, emotional, and social development at different times during middle school. Early adolescents at the same age experience a wider range of individual differences than younger children (Eccles, Midgley et al., 1993; Eccles, Wigfield et al., 1993; Scales, 1991). Small early learning test differences and learning deficits during a student's elementary years, all too often ignored, are compounded by the time a student reaches middle school. Moreover, without targeted intervention, academic differences between students worsen through the years. Students with low test scores are often placed in a cycle of continual test preparation activities which takes them away from day-to-day regular classroom participation (Nelson et al., 2007). Academic gaps, then, in non-tested areas are further increased. Education is cumulative; prior experience determines current educational experience. The noble goal of proficiency for all students stated in NCLB for the year

2013-2014 does not account for the current status of achievement gaps and the many factors that contribute to these gaps with real students learning in real classrooms from real families.

Achievement gaps. For many years achievement gaps have been the basis for school reform all too often with mixed results (Spring, 1998). Even with NCLB legislation and required student assessments there are currently achievement gaps between economically disadvantaged students and economically advantaged students (Waber, Gerber, Turcois, Wagner, & Forbes, 2006), between racial minority students and racial majority students (Sternberg, 2006), between students with disabilities and students without disabilities (Munitz, 2008), and between students with limited English proficiency and students with English proficiency (Berlak, 2001; Fry, 2008). The reasons for achievement gaps are complex and mostly outside of the discipline of education (Berlak, 2001; Hamilton, Stecher, & Klein, 2002; Barton, 2006; Lee & Burkam, 2002; Thompson & Quinn, 2001). While NCLB legislation guarantees the elimination of achievement differences, in order to diminish the gaps, it is important to acknowledge the reason for such disparity. Schools have an obligation to decrease achievement gaps. However, even in the best

schools with the most dedicated teachers and administrators learning differences occur (Lee, 2006).

Economically disadvantaged and economically advantaged students. Studies have shown associations between socioeconomic status and academic achievement along with developmental factors (Howse, Lange, Farran, & Boyles, 2003; Lee & Burkam, 2002; Mezzacappa, 2004; Waber et al., 2006). Students of low socioeconomic status begin school with lower cognitive ability than economically advantaged peers (Lee & Burkam, 2002; Stipek & Ryan, 1997). An achievement gap exists between economically disadvantaged and economically advantaged students before public school begins. Student and school academic achievement when solely defined by high test scores are typically correlated with socioeconomic status and other variables over which schools have little control (Barton, 2003; Kohn, 2001).

The gap continues throughout school. Texas educators for some time have concluded that concern for higher test results has led to increased test preparation and test study activities that limit true classroom instruction and in this sense they have concluded that high-stakes tests have harmed educational quality and opportunities for economically disadvantaged and minority students (McNeil, 2000; McNeil & Valenzuela, 1999). Resources in low-

performing schools are spent on test preparation materials while that is not an area of spending for high-performing schools (Amrein & Berliner, 2002; Madaus, West, Harmon, Lomax, & Viator, 1992; McNeil, 2000; Wallace, 2002). Disparity between spending on basic versus enriched curriculum materials continues. This incongruence between educational experiences reinforces the achievement gap between economically disadvantaged and economically advantaged students where economically advantaged students spend little time on test preparation and more time participating in enriched learning activities.

Racial minority and racial majority students. Race and ethnicity are highly correlated with socioeconomic status (Lee & Burkham, 2002). African-Americans are twice as likely to live in poverty as non-blacks (Harford, 2007). The existence of achievement gaps between racial groups is complex but the most significant predictor of low achievement regardless of race is poverty (Barton, 2003). In a California study of achievement and race, more than half of white students were proficient in math and only about 1 in 4 African American students were proficient and 3 in every 10 Hispanic/Latino students were proficient (Munitz, 2008). African American students are 4.5 times more likely to attend schools ranked low in math and twice

as likely to attend schools ranked very low in reading (Berlak, 2001). Furthermore, nationally in 2005, 34 percent of white youths earned a college degree while only 17 percent of African American young people and 11 percent of Hispanic young people earned a college degree (Brady, Hout, Stiles, 2005). Achievement gaps between poorer racial majority and minority groups continue. Ethically and economically, schools are obligated to respond. Closing the poverty achievement gap over a 12-year period would add $980 billion to the annual gross domestic product (Munitz, 2008).

Students with disabilities and students without disabilities. It has been said that the current American classroom has become curriculum-centered instead of student-centered (Nielsen, Barry, & Staab, 2008). The concern for students with special needs is that individual differences and ability levels have been forgotten in our desire to have all children test well. The NCLB mandate fails to take into account the different ability levels of students. It is unrealistic for all students of different cognitive abilities to be proficient on all statewide assessments (Brimijoin, 2005; Carter et al., 2005). There are achievement gaps between students with disabilities and students without disabilities. For example about 3 of every

20 special education students met proficiency levels on California math exams (Munitz, 2008). For special needs learners it is necessary to match learning demands with appropriate support and realistic expectations to continue to engage students in their desire to learn and experience success (Mahn, 1999; Vygotsky, 1978). Students who continually experience failure in a system of high expectations for all students will eventually disengage.

Students with limited English proficiency and students with English proficiency. The achievement gaps between students with limited English proficiency and student with English proficiency are as complex as the definition of race and culture (Berlak, 2001; Fry, 2008). The racial categories that are used reflect social groupings and differences from one culture to another (Sternberg, Grigorenko, & Kidd, 2005). Cultures have distinctive definitions of intelligence and measure members of their culture and other cultures by this internal definition (Sternberg, 2007). However, most tests used to study intelligence and achievement are based on Western beliefs of intelligence and academic success (Sternberg, 2004). A typical bubble sheet norm referenced multiple-choice achievement test, often thought of as a static test, may put a student at a disadvantage dependent on background,

prior, and inert knowledge (Sternberg & Grigorenko, 2002). On the other hand when students are tested as they learn the skill, referred to as a dynamic test, cultural differences are reduced (Sternberg, 2007). When the SAT was augmented with creative and practical measures, the ethnic group differences decreased (Sternberg, 2006). This was also observed in advanced placement tests (Stemler, Grigorenko, Jarvin, & Sternberg, 2006), and the Graduate Management Admission Test (Hedlund, Wilt, Nebel, Ashford, & Sternberg, 2006). Most high-stakes tests used nationwide to satisfy the assessment demands of NCLB are multiple-choice static tests without creative or practical measures augmented (Parke et al., 2006). With the population of limited English proficiency students expected to increase rapidly it has never been more important to understand assessment procedures that allow every student to learn up to their greatest potential and have test scores that truly reflect their learning success (Fry, 2008).

Understanding Student Brain Development

Brain plasticity gives scientific support to what educators have long known: teenage brains continue to develop and refine learning, even throughout the middle school years. Synaptic and neuronal connections continue to grow, diminish, and strengthen throughout the adolescent

years (Bruer, 1999; Giedd et al., 1999; Huttenlocher & Dabholkar, 1997). That is, brains continue to change dramatically during the middle school years. This has direct implications to middle school teaching, learning, and assessment. However, because of the alterations of the brain during adolescence and the amount of information an adolescent brain absorbs, the teenage years have been noted to rival the terrible twos (Strauch, 2003). The balance between intense brain development and refined thinking is the essential challenge of middle school intellectual development. Educators can change brains--positive learning success strengthens positive learning neuronal and synaptic connections. Adolescent brains are able to input new information and refine thinking pathways (Jensen, 2008; Kilgard & Merzenich, 1998). There is a lifelong growth of synaptic connections (Willis, 2008) and acquisition of new skills allows for optimal acquisition of more skills (Nakkula & Toshalis, 2006).

Exuberance and pruning. Giedd's (1999) longitudinal study of brain imagining shows general patterns of childhood peaks of gray matter and adolescent decline. Brains are changing and refining during this time. Emotions and previous developmental experiences greatly impact adolescent brain development (Casey, Getz, & Galvan, 2008;

Casey, Jones, & Hare, 2008; Eigsti, et al., 2006). As opposed to simple linear patterns of change, studies of development and learning suggest that both progressive and regressive processes may differ regionally across the brain (Casey, Getz, et al., 2008; Casey, Jones, et al., 2008). Exuberance and synaptic pruning in the prefrontal cortex occurs during childhood and again at puberty while pruning also continues after puberty (Bourgeois, Goldman-Rakic, & Rakic, 1994; Huttenlocher, 1979; Woo, Pucak, Kye, Matus, & Lewis, 1997; Zecevic & Rakic, 2001). Magnetic resonance imaging studies have shown two periods of brain exuberance and pruning (Giedd et al., 1999; Sowell et al., 2001; Thompson et al., 2000). Pruning, or refinement of permanent neural connections, is impacted by the brain's input during this process (Strauch, 2003). Information received during pruning is refined to long-term memory. School experiences directly impact adolescent brain connections. Adolescents spend more hours in school than out of school, therefore, schools have an enormous opportunity to directly impact long-term learning during the adolescent and middle school years. While brain changes continue after adolescence as well (Sowell et al., 2001; Sowell et al., 2003), the time in middle school and high school is congruent to the noted exuberance and pruning time above.

Age-related differences. Whether the experience is referred to as age-dependent (Blakemore & Choudhury, 2006) or use-dependent (Hensch, 2004), the research continues to suggest that there are times when specific skill acquisition is either easier or harder than others (Hakuta, Bialystok, & Wiley, 2003; Luna, 2004; Qin et al., 2004). Age-related differences have been observed in memory tasks and response inhibition between pre-adolescents, adolescents, and adults (Adleman et al., 2002; Kwon, Reiss, Menon, 2002; Rubia et al., 2001). Children are not hard-wired at birth and adolescent brains are not complete. Brain development continues through many stages of a student's life (Sowell et., 2001; Sowell et al., 2003; Waber et al., 2006). Optimizing learning opportunities congruent to age-related skill acquisition stages will enhance learning.

Risk behaviors. As a group, adolescents are considered risk-takers (Gardner & Steinberg, 2005; Spear, 2000). A child's brain avoids risky behavior, an adult's brain engages in risky behavior when determined to have a positive effect, and the adolescent brain is in between these two stages and shows variable results regarding risky behavior (Galvan, Hare, Voss, Glover, & Casey, 2007). Adolescent cognition and behavior is variable due to

exuberance in synaptic development and the adolescent brain struggles between two stages of risk management (Strauch, 2003). Adolescents sometimes choose to exhibit risky behavior through poor academic and test performance (Gullotta et al., 1999). While schools communicate high expectations of high-stakes tests, student choice of risk behaviors may impact student performance.

Adolescent Motivation

While there are extreme differences between individual middle school students, there are notable similarities. Early adolescence, the time of middle school, is characterized by changing achievement beliefs and behaviors (Carnegie Council on Adolescent Development, 1995; Eccles & Wigfield, 2002; Eccles, Wigfield et al., 1993). Decreased effort toward achievement, doubt in individual ability to succeed at school work, and questioning the value of completing their school work are common, observable behaviors of young adolescents (Anderman & Maehr, 1994; Carnegie Council on Adolescent Development, 1995; Eccles & Midgley, 1990). Students' physical, intellectual, emotional, and social development will vary between peers throughout middle school, but most all middle school students will experience a level of disengagement with school (Eccles, Midgley et al., 1993; Gordon, 2006).

Success breeds success. Success in school has many consequences and often determines future opportunities. Early adolescents clearly associate school performance with possibilities for their future (Nakkula & Toshalis, 2006). It is unclear, however, if academic achievement determines student future schooling expectations or if student expectations determine a student's future academic achievement (Mau, 1995; Seginer & Vermulst, 2002). In either case it is thought that by the end of middle school the relationship between academic achievement and future success in school is established. Disengagement, or low motivation, and thus possibly low academic achievement during the middle school years, can have far reaching individual consequences. Students' motivation affects student performance in all achievement areas (Baker & Wigfield, 1999; Oldfather & Wigfield, 1996). Therefore, increased student motivation and engagement is a focus for school success in middle school. An engaged student attends school, participates fully in scholastic activities, is persistent in school work, and prioritizes school over other activities (O'Sullivan, 1996; Willingham, Pollack, & Lewis, 2002; Gordon, 2006). Conversely, a disengaged, or unmotivated student does not participate fully in scholastic activities and allows other activities to take

priority over school. Increased student motivation will likely foster success in school.

Middle school transition. Motivation, purpose of learning, content, and setting all affect the learning process. Learning is certainly more than a discrete set of accumulated skills. By middle school, adolescents have experienced many years of standardized, high-stakes testing. Previous performance is known by the student and impacts a student's perception of their academic ability. During the transition to middle school, students often show a decrease in drive for achievement and loss of intrinsic motivation (Eccles, Midgley et al., 1993). It is documented that older students are less motivated to excel on standardized tests than younger students (Paris et al., 1991). This dip in motivation is concurrent with generally lower academic motivation in middle school. Perhaps the incongruence between standardized test success and classroom grades (Willingham et al., 2002) yields a sense of inability to control achievement outcomes, and, thus, decreases student motivation. Low academic motivation is related to low self-perception of ability to produce desired results (Schunk, 1991). When students doubt their ability, they often are more likely to be unmotivated in all tasks. Students, who feel they control their

achievement outcomes, feel more competent and are more engaged than those who do not (Connell, 1985; Eccles & Wigfield, 2002). Not understanding the cause of success or failure diminishes student motivation (Eccles & Wigfield, 2002; Schunk, 1991). Either high or low marks in class and opposite standardized test scores may confuse students resulting in a perceived disconnect between how they view their day-to-day classroom performance and their standardized test outcomes. Therefore, a key to adolescent motivation is student perceived successful ability and control over their achievement outcomes.

Classroom environment. Early adolescents in middle school begin to desire autonomy and input into decision-making. Motivation declines in middle school due to more controlling environments than in elementary school and fewer opportunities in the classroom to make decisions (Eccles, Wigfield et al., 1993). Teachers are more controlling in their classroom than student-centered when they are pressured to increase student performance (Flink, Boggiano, & Barrett, 1990). Controlling environments are contrary to adolescent motivational needs. High-stakes testing has increased the focus of performance goals in classrooms. Middle school students' perception of a classroom focus on performance goals is negatively

correlated with students' perceived academic competence (Ames & Archer, 1988; Urdan, Midgley, & Anderman, 1998). High-performing middle schools provide students many opportunities to increase motivation and enable them to succeed academically (Balfanz & Mac Iver, 2000). When students perceive that the teacher promotes performance goals, students are less motivated to perform academically because of heightened self-consciousness and sensitivity (Ryan & Patrick, 2001). NCLB is designed to promote successful academic performance of each student, school, and system. The performance-orientation of classrooms twenty years ago is now magnified exponentially by impact on the entire educational system. The continued disconnect of adolescent needs, autonomy, and input, with the controlled environment often produced by high-stakes testing further defines the typical motivational dip in standardized test performance in early adolescence.

Student discouragement and high-stakes tests. A lack of effort, outwardly displayed by low motivation, may be an attempt by students who do not excel on tests to protect their own self-esteem (Jones et al., 2003; Paris et al., 1991). School is a social environment, full of peer comparison and competition. Students' primary strategy to maintain a sense of self-worth is to protect their

appearance of academic competence (Covington, 1992, 1998). With the intent to avoid personal effort and responsibility, middle school students have been found to be more likely to cheat, be nervous, not concentrate, and to guess than elementary students on standardized tests (Paris et al., 1991). High-stakes tests can place unsuccessful students in challenging social comparisons. In the current high-stakes testing environment, these comparisons are formalized by school and district results reported to the public.

Compound effect of testing. The cumulative effects of standardized testing on discouraged adolescents is often manifest in decreased motivation, not trying, and disdain of the testing process (Paris et al., 1991). Students become suspicious and cynical about tests. Low achievers more than high achievers become anxious about tests and too often prior motivation and engagement are strong predictors of subsequent poor motivation and engagement (Ryan & Patrick, 2001). Motivation and engagement are linked to academic achievement. By middle school, students have taken numerous large-scale, state, and district tests. While one might speculate that as students experience more standardized tests, they become better test-takers, the Paris (1991) study asserts a counter intuitive finding. As

students complete middle school, many have experienced consistent success or consistent failure on standardized tests (Nakkula & Toshalis, 2006). When students experience consistent failure they develop oppositional attitudes and avoidant behaviors towards performance goals (Gullotta et al., 1999; Mahn, 1999). These students are likely to deliberately perform low on an achievement test in order to not own responsibility of their failure (Covington, 1998; Jones et al., 2003). Less successful students feel powerless to control their success in school; tests confirm their low performance and continue to alienate students from the learning (Connell, 1985; Finn & Frone, 2004). A study of Texas teachers, after a clear high-stakes testing environment was established, found that many were frustrated when they had worked hard to increase low-performing students' self-concepts and experience academic growth, only to have that success eliminated by failure on the standardized state achievement test (Gordon & Reese, 1997). By middle school, struggling students have enough personal evidence of cumulative failure to begin to disengage. Conversely, successful students are motivated to achieve well on standardized tests.

Emotional results of high-stakes testing. Intellectual, emotional, and social development of students

defines education (Barrier-Ferreira, 2008; National Middle School Association, 2003; Palmer, 2007). The ideal middle school establishes a supportive school environment that cultivates self-esteem and achievement while responding to the developmental needs of each student (National Middle School Association, 2003; Styron & Nyman, 2008). However, the large focus on standards and testing has changed student perception of themselves in the education setting (Green, 2007). Adolescents do not want to be categorized or represented by progress indicators and percentile rankings.

For the students and teachers in failing or low-performing schools and classrooms, publication of test results locally, statewide, or nationally is not simply data to them but rather very personal information. Teachers feel direct or indirect pressure of standardized testing always (Barksdale-Ladd & Thomas, 2000; Perreault, 2000). The ranking of schools, classrooms, and students publicly contributes to teacher stress (McNeil, 2000). The public has mixed views of the emphasis on testing, 37% feel that there is too much emphasis on achievement testing in the public schools, 23% report not enough, and 34% report about right (Bushaw & Gallup, 2008).

Questioning the High-Stakes Test Format

While achievement testing and even performance testing is not new, the No Child Left Behind (NCLB) testing emphasis on student performance becoming attached to federal money and placement on a federal school in need of improvement list, unfortunately, is new. According to NCLB legislation all states had to have academic achievement standards in reading, math, and science and required testing of all students in grades 3 through 8 in math and reading with reasonable adaptations and accommodations for students with disabilities and English Language Learners by 2005-2006. By the 2007-2008 school year states were required to administer science assessments once during each of three grade spans: 3-5, 6-9, 10-12 (NCLB, 2002). By the year 2013-2014 states are required to insure that students will be proficient in reading, math, and science and schools will be expected to show student cohort growth in order to achieve Adequate Yearly Progress (AYP) (NCLB, 2002). By the early 2000s, nearly all states had some form of statewide assessment in reading and math (Goertz & Duffy, 2003). A central principle of NCLB is strong accountability for results.

Public response. The public response to standardized testing and No Child Left Behind is mixed. When asked

regarding the impact of NCLB on public schools in the community, 25% report that NCLB is helping performance of the local public schools, 22% report that is hurting, 34% report that is making no difference, and 19% don't know (Bushaw & Gallup, 2008). Testing has been defined to measure student achievement, as required by NCLB; provide information about the quality of schools; and hold students and educators accountable (Jones et al., 2003). The expectation of a statewide, standardized testing system to accomplish these goals is unfair and confusing. The split public response regarding the impact of NCLB demonstrates this confusion. It appears from the Gallup Poll that high-stakes tests are not currently informing the public clearly about the quality of schools. Take a hypothetical example of a headline stating "Lower Test Scores in City Schools." Spring (1998) explains this headline as having many politically charged possible explanations: lack of instruction in traditional moral values, result of low academic standards, low teacher salaries. A disconnect between results and explanation of results is a critical concern of the current accountability expectations. Mandating high-stakes testing and student proficiency for all by 2013-2014 will not provide information about the

quality of schools without a clearly communicated understanding of the word *proficient* and the word *all*.

What is in a number? Because a test score is numeric, it is assumed to have a degree of precision (Le & Klein, 2002). Popham (2008) explains that a first-step inference focuses on the degree to which students' raw scores accurately reflect their mastery of whatever is being tested. A first-step inference explores the validity of the raw score. A second-step inference is exploration of what caused the raw score to be what it is. The most recent Standards for Educational and Psychological Testing outline no parameters for second-step inferences (American Educational Researcher Association, American Psychological Association, & National Council on Measurement in Education, 1999). That is, there is no established standard practice for deciphering the why of each student's test score. Therefore, second-step inferences about students' test scores are conjecture and not necessarily a true indicator of improved learning of the targeted content (Koretz, 2002, 2003; Popham, 2008). As stakes increase, the meaning of student test scores and how they will be utilized becomes increasingly questionable (Nichols & Berliner, 2005).

Proficiency defined. As outlined in No Child Left Behind, each state is allowed to define "challenging State academic standards" and the "high-quality academic assessments, accountability system, teacher preparation and training, curriculum, and instructional materials" which are then aligned to the State standards (NCLB, 2002). In short, a state can choose their standards and assessments for NCLB. While the standards are congruent within a single state, the only national measure of school quality is still as vague today as prior to NCLB through the random-sample norm-referenced National Assessment of Educational Progress test (Winkler, Ballard, & Palmieri, 2008).

Cohort data. Cohort data is considered unstable due to the volatility in scores from year to year (Linn & Haug, 2002). It is, therefore, difficult to judge effectiveness of interventions due to the unpredictable annual changes in scores. No single test score can be a perfectly dependable indicator of student performance. Factors like differences in the particular sample of items that are asked, students' attentiveness that day, and differences in the way items are graded all affect variability in scores. High-stakes decisions about an individual should be based on factors other than the score on a single test (American Educational Researcher Association, American Psychological Association,

& National Council on Measurement in Education, 1999). A test score is an approximation of the measurement of learning (Porter, Linn, & Trimble, 1995; Smith & Fey, 2000). Errors in accountability systems do occur. An example was in New York City, several children attended summer school because of scoring errors that were made by the school's testing system (Smith & Fey, 2000). The correlation of student gain during the school year and total knowledge at the end of the year is low (Barton, 2006). A system that measures only total knowledge at the end of the year in cohorts, like NCLB, does not acknowledge significant growth for students.

Format of current high-stakes testing. Test format should match instructional goals. However, current test formats do not measure higher-order thinking skills, problem solving, and complex learning in the way that instructional goals are demonstrated in the classroom (Jones et al., 2003; Yeh, 2001). When students pass a standardized test, it often does not measure the skills of critical thinking, creativity, and collaboration with others that are necessary student skills (Jones et al., 2003; Medina & Riconscente, 2005; Yeh, 2001). This discrepancy defines a failing accountability system.

Although many educators believe that open-response formats measure higher-order thinking skills and problem solving better than multiple-choice tests, states overwhelmingly use multiple-choice tests for accountability (Hamilton et al., 2002). Maine and Kentucky, noted as high performing assessment states, used to do portfolio testing, but returned to multiple-choice tests because of costs (Jones et al., 2003). Because of the relatively low cost of multiple-choice tests, they are often the format used for mandatory, high-stakes testing (Hamilton et al., 2002; Linn, 2000; United States General Accounting Office, 1993). An over reliance on multiple-choice testing and a heavy reliance on test results can lead to schools focusing on rote learning and teaching to the test (Kohn, 2001; Lane, 2004). Assessment should be authentic, multidimensional, and longitudinal (Paris et al., 1991). The current No Child Left Behind Act requires an intense amount of testing which is often financially narrowed to several multiple-choice tests for students their entire public school career. Use of large-scale performance-based assessments has declined due to NCLB (Lane, 2004; Parke et al., 2006). While instructional goals and standards are often multidimensional and robust, most assessment systems in

NCLB utilize multiple-choice tests that are not, by design, as robust as the curriculum.

Assessment drives instruction. Instructional goals, often referred to outcomes or standards in curriculum, determine teacher lesson design and classroom activities. When instructional goals and assessment criteria are congruent, the teaching and testing divide is seamless. In this sense, *teaching to the test* may be worthwhile because all classroom activities are congruent to the instructional goals that are congruent to the test. However, alignment of standards and assessment is not always achievable and may result in inappropriate classroom decisions, especially if there is a gap between robust standards and a narrow sample of these skills in an end-of-the-year high-stakes test.

Originally high-stakes tests were often minimum competency tests. Texas began its accountability system with the Texas Assessment of Basic Skills (TABS) and now has an assessment directly aligned with the Texas curriculum, Texas Assessment of Academic Skills (TAAS) (Nelson et al., 2007). As an accountability system, patterns in measurement of what students have learned and need to yet learn can be observed. In states with a long history of high-stakes tests, alignment of curriculum and testing is strong while states without a long history of

high-stakes testing typically do not have this alignment (Debray, Parson, & Avila, 2003; Watanabe, 2007). In 1996, a national summit of governors encouraged states to set rigorous standards for all students (National Governors' Association, 1996). Six years later only Massachusetts was judged as having developed strongly aligned standards and tests (Achieve, Inc., 2002). NCLB requires each state to have a single assessment system that measures common state standards. The political consensus building needed to meet these requirements is overwhelming.

Classroom results from high-stakes testing. Findings are mixed in response to high-stakes testing impacting teachers' instructional decisions in the classroom (Grant, 2000; Grant, 2001; Jones & Johnston, 2002; Rex & Nelson, 2004). No Child Left Behind requires testing in math, reading, and science for all students. A typical curriculum adjustment for subjects outside of math and reading is to include these areas in their subject. For example, a social studies teacher will teach the indicators and outcomes of the social studies curriculum while also teaching critical reading and comprehension skills in order to enhance student achievement in reading. Or perhaps a Family and Consumer Science teacher will continue to accomplish the FCS curriculum while also emphasizing the skills of that

grade level math test in measurement. Preparation of test-represented content is ethical behavior and improves student learning (Linn, 2000; Mehrens & Kaminski, 1989; Popham, 2001).

Teaching general test taking skills and encouragement of a good night's rest and breakfast do not affect test validity (Hamilton et al., 2002; Smith & Fey, 2000). However, teachers can all too easily become *testing coaches* (Sacks, 1999). Administering practice tests that mimic the content and format of the measured assessment and test-preparation as part of a daily routine are results of the pressure to succeed on current high-stakes tests (Nelson et al., 2007). These practices do affect test validity (Kulik, Kulik, & Bangert-Drowns, 1984; Smith & Fey, 2000) and are arguably unethical choices in the use of instructional time.

Test score inflation. In the Lake Wobegon Report, Cannell (1987) reported that all statewide test scores ranked above the national average. Any systematic goal of having all students perform above average is an equally, unattainable mathematical act. No Child Left Behind will hold schools accountable in 2013-2014 for 95% of students to be determined proficient at math, reading, and science. In other words, by the year 2013-2014, schools are expected

to guarantee above-average performance for all students. The phrase *all* and *above average* are not mathematically possible using a valid and reliable assessment system. Norm-referenced tests are tests whose results are distributed on the normal curve; half of the students do better than average, half of the students do worse than average. Even with valid and reliable norm-referenced tests, test scores usually rise due to a variety of factors and then sharply drop with a new form of the test (Linn, 2000; Linn, Graue, & Sanders, 1990). An annual, summative test is, at most, an approximation of the individual's student learning. Focused teaching to the test in a high-stakes accountability model contributes to this rise in norm-referenced test scores (Linn, 2000). After one year of experience with the test, teachers understand better both the content and format nuances and can adjust classroom preparation accordingly.

Inflation rates. Non-high-stakes tests may not experience the same rate of inflation of scores as high-stakes tests do. National Assessment of Educational Progress has been fairly consistent in performance while the Texas Assessment of Academic Skills increased test scores dramatically (Jones et al., 2003). Progress in International Reading Literacy Study was similar in 2007 as

it was in 2001, while reading assessment was simultaneously a focus of achievement for each district and state through No Child Left Behind in those same years (Bracey, 2008). Local reading results are not acceptable if they remain stable according to NCLB legislation. However, any accountability model that assumes linear improvement growth over extended periods of time, then, is questionable (Linn, 2000). While No Child Left Behind, high-stakes testing and accountability reform, has not impacted reading achievement, the elements of high expectations and sufficient resources in combination did produce significant gains nationally in math achievement (Lee, 2006). Capacity to improve performance in order to meet the expectations of high-stakes accountability models determines school, district, and state success (Hess, 1999; Malen & Rice, 2004; Mintrop, 2003). Both a balance of states holding teachers and schools accountable for student performance and accountability for states to provide adequate resources to improve learning opportunities is needed in realizing the goals of No Child Left Behind (Lee, 2006).

Expectations and Achievement

High academic achievement and high educational expectations are considered to be reciprocal (Bui, 2007). In the wake of NCLB, high expectations have come to be

defined by State standards and assessments aligned to these standards. In the 1990s, educators embraced the concept of *tests worth teaching to* (Hamilton et al., 2002). These tests are congruent to the rich curriculum standards and outcomes in each classroom. In creating a *test worth teaching to*, it is important that statewide accountability tests differentiate among higher and lower performing students (Hamilton et al., 2002). Unfortunately, even with improved assessments, high ability students are often being left behind. Tests cover the general curriculum, while high ability students operate at the extreme of the curriculum. NCLB mandates that all students are proficient at these standards by 2013-2014. By this simply stated mandate, the challenging academic standards also mandated by NCLB are undoubtedly too easy for many students. Including test items at this level is not needed for the purpose of a one-size-fits-all standards-based state accountability assessment. However, without fear of student failure and average proficient expectations, there is little motivation to yield resources of time and support to high ability learners. NCLB will continue to mask individual student differences.

Differentiated needs. There are differentiated needs for students that are not being met as posited in the NCLB

common standards accountability model. A student with high abilities is measured by a common proficiency standard in NCLB instead of fostering continued excellence (Gentry, 2006). Differentiated instruction ensures the academic needs of all students are being met through diverse delivery modes of instruction and varying levels of content (Heacox, 2002). The impact of high-stakes testing, though, has generally had a negative impact on the classroom content covered (Amrein & Berliner, 2002; Au, 2007; Clarke et al., 2002; Popham, 2001). In one study, at least 80% of teachers responded that they spent at least 20% of their total instructional time practicing for end of grade tests (Hamilton et al., 2002). Up to 100 hours of test preparation were reported in another high-stakes testing state and 1 – 4 weeks of class time in a different state were given to test preparation (Hamilton et al., 2002; Smith, 1994). Less hands-on and more skill and drill work is performed in classrooms as a result of statewide high-stakes testing (Barksdale-Ladd & Thomas, 2000; Gordon & Reese, 1997; McNeil, 2000). Classes that focus time on test preparation and drill and skill are not meeting the needs of high ability learners. High ability learners excel in learning environments that foster choice, an accelerated learning pace, and abstract, evaluative, and judgmental

thinking (Heacox, 2002). Common standards for all students through NCLB deepen the risk of leaving creativity out of the curriculum and losing the brightest students in the process (Nakkula & Toshalis, 2006). Gifted and high achieving students will not likely fail a standardized test aimed at the general curriculum for the general population. But, high ability students will not always demonstrate their highest talents and skills, either, on a standardized test aimed at the general curriculum for the general population.

Resource distribution. No Child Left Behind guarantees achievement gaps of failing students will diminish and all students will meet or exceed proficiency levels by 2013-2014. The law does not dictate a standard for maintaining high performance of high ability students. NCLB offers additional federal grant funding for innovative gifted and talented programs, but does not require performance of gifted and talented students to be reported separately as a measure of program success (NCLB, 2002). Without criteria for high ability students attached to law, resources are often directed at students who are most likely to boost AYP numbers (Azzam, 2007; Nelson et al., 2007). Bubble kids, according to Nelson, McGhee, Meno, and Slater (2007) are students most likely to receive additional resources as a

result of No Child Left Behind. These are students who are just barely or just below proficiency. These students receive the resources to help ensure that they do not fall below the proficiency cut or they are close enough that provided some additional resources, they may pass. Students who are extremely low or very likely to pass sometimes do not receive additional resources (Azzam, 2007; Nelson et al., 2007). Student ability at the highest extremes of the achievement distribution is not represented in most statewide tests (Gentry, 2006; Linn, 2000).

Resources that cite student support as a result of high-stakes testing outline programs designed for skill recovery, remedial programs, tutoring opportunities, and smaller class sizes for low-performing schools (Balfanz, Legters, & Jordan, 2004; Eccles, Wigfield et al., 1993; Goldhaber & Hannaway, 2001; Stecher et al., 2000; Stecher & Chun, 2001;). The mentioned student support is for low performing students, not high performing students. In Texas, classes like TAKS Math and TAKS English are offered to students who have not passed the TAAS (Nelson et al., 2007). These are less-rigorous classes than the regular courses and focused on test preparation instead of bridging preparation to college. While resource support for low-performing students and schools is clearly documented in

the literature, results of positive impacts to high ability student programming is not found (Gentry, 2006; Jolly & Kettler, 2003). In fact, a focus on low performing students through NCLB, has resulted in the elimination of some gifted programs, advanced classes, and enrichment programs in support of remedial programs (National Association for Gifted Children, 2005; Golden, 2004).

Narrow curriculum. Common standards for all students can only lead to a narrowing of the curriculum. Students, who perform at the extremes of the curriculum, may be left out. Instead of a diverse curriculum base, teachers in high-stakes testing environments focus their teaching on the subjects being tested to the detriment of non-tested subjects (Au, 2007; Jones & Johnston, 2004; Koretz, Mitchell, Barron, & Keith, 1996; Resnick & Resnick, 1992; Stecher & Borko, 2002). The type of scoring used on statewide writing tests determines the method of writing taught across all curriculum areas (Hillocks, 2002). If only one type of writing is testing at the state level, one type of writing is emphasized across the curriculum. What is tested is what is taught. In preparation for high-stakes tests, content is increasingly taught in discrete pieces aligned with high-stakes testing calendar and often only in the context of the test format (Au, 2007). In Texas, the

state curriculum is presented in two parts: foundation curriculum and enriched curriculum (Nelson et al., 2007). The enriched curriculum includes fine arts, health, PE, world languages, and technology application. What is now termed enriched was once standard. Curriculum focus is shifting to a narrow focus emphasizing tested skills (Amrein & Berliner, 2002; Barton, 2006; Clarke et al., 2002).

Under-challenged. NCLB mandates proficiency, not excellence for each student. With resources tied to seeking and maintaining proficiency for students, students who are high achievers and high ability are often left behind. Common results of NCLB for high ability students include curriculum being narrowed, an emphasis on test preparation which decreases curriculum enrichment, and resources being used for skill recovery instead of skill extension. Without challenge, high ability students do not continue to develop their potential (Gentry, 2006; Patrick, Gentry, & Owen, 2006). High ability students are at risk of underachieving and not realizing their potential if not challenged. The potential is far-reaching as these are the students who will be intellectual leaders of the future (Davidson, Davidson, & Vanderkam, 2004).

CHAPTER THREE

Methodology

Participants

Number of participants. The maximum accrual for this study was *N* = 186. The sample of participants was a naturally formed group of eighth grade students who participated in the school-wide differentiated home room academic extension re-reaching initiative whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 1st percentile to a high of the 29th percentile (*n* = 8), a low of the 30th percentile to a high of the 39th percentile (*n* = 7), a low of the 40th percentile to a high of the 49th percentile (*n* = 15), a low of the 50th percentile to a high of the 59th percentile (*n* = 11), a low of the 60th percentile to a high of the 69th percentile (*n* = 19), a low of the 70th percentile to a high of the 79th percentile (*n* = 29), a low of the 80th percentile to a high of the 89th percentile (*n* = 35), and a low of 90th percentile to a high of the 99th percentile (*n* = 62). All participants have been in the research school 7th-grade through 8th-grade.

Gender of participants. The gender of the participants was congruent with the enrollment patterns of the

participating school, where females represented 43% and males represented 57% of the total enrollment.

Age range of participants. The age range of participants was from 13 years to 14 years of age during the 8th-grade school year of study.

Racial and ethnic origin of participants. The racial and ethnic origin ratio was congruent with enrollment patterns in the participating school, where enrollment showed 92% White, not Hispanic; 2% Black, not Hispanic; 3% Hispanic; 3% Asian/Pacific Islanders; and less than 1% American Indian/Alaskan Native.

Inclusion criteria of participants. Eighth grade students who participated in this study attended the research school for their 7th-grade through 8th-grade school years, participated in the school-wide differentiated home room academic extension re-reaching initiative and completed all assessments. Students with Individual Educational Plans (IEP) verified to participate in all non-alternate curriculum assessments were included in this research because they participated in the school-wide differentiated home room academic extension re-reaching initiative and completed all non-alternate curriculum assessments in the regular classroom.

Method of participant identification. No individual identifiers were attached to the achievement data of the students selected for data analysis.

Description of Procedures

Research design. The pretest-posttest eight-group comparative survey study design is displayed in the following notation:

Group 1 X_1 0_1 X_2 0_2

Group 2 X_1 0_1 X_3 0_2

Group 3 X_1 0_1 X_4 0_2

Group 4 X_1 0_1 X_5 0_2

Group 5 X_1 0_1 X_6 0_2

Group 6 X_1 0_1 X_7 0_2

Group 7 X_1 0_1 X_8 0_2

Group 8 X_1 0_1 X_9 0_2

Group 1 = naturally formed group of 8th-grade students (n = 8) who also completed the 7th-grade in the research school

Group 2 = naturally formed group of 8th-grade students (n = 7) who also completed the 7th-grade in the research school

Group 3 = naturally formed group of 8th-grade students (n = 15) who also completed the 7th-grade in the research school

Group 4 = naturally formed group of 8th-grade students (n = 11) who also completed the 7th-grade in the research school

Group 5 = naturally formed group of 8th-grade students (*n* = 19) who also completed the 7th-grade in the research school

Group 6 = naturally formed group of 8th-grade students (*n* = 29) who also completed the 7th-grade in the research school

Group 7 = naturally formed group of 8th-grade students (*n* = 35) who also completed the 7th-grade in the research school

Group 8 = naturally formed group of 8th-grade students (*n* = 62) who also completed the 7th-grade in the research school

X_1 = 8th-grade student participation in a school-wide home room differentiated academic extension re-teaching initiative

X_2 = 8th-grade students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range

X_3 = 8th-grade students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range

X_4 = 8th-grade students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range

X_5 = 8th-grade students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range

X_6 = 8th-grade students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range

X_7 = 8th-grade students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range

X_8 = 8th-grade students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range

X_9 = 8th-grade students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range

O_1 = pretest beginning of 8th-grade Achievement as measured by: 1. Essential Leaner Outcomes Test scores for (a) reading and (b) math. 2. Essential Leaner Outcomes Test proficiency categories for (a) reading (*i*) below

proficient, (*ii*) barely proficient, (*iii*) proficient, and (*iv*) beyond proficient and (b) math (*i*) below proficient, (*ii*) barely proficient, (*iii*) proficient, and (*iv*) beyond proficient. 3. First trimester core mean subject grades for (a) social studies, (b) science, (c) English, and (d) math. 4. Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores for (a) reading and (b) math. O_2 = posttest end of 8th-grade Achievement as measured by: 1. Essential Leaner Outcomes Test scores for (a) reading and (b) math. 2. Essential Leaner Outcomes Test proficiency categories for (a) reading (*i*) below proficient, (*ii*) barely proficient, (*iii*) proficient, and (*iv*) beyond proficient and (b) math (*i*) below proficient, (*ii*) barely proficient, (*iii*) proficient, and (*iv*) beyond proficient. 3. Third trimester core mean subject grades for (a) social studies, (b) science, (c) English, and (d) math. 4. Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores for (a) reading and (b) math.

Purpose of the Study

The purpose of the study was to measure the effectiveness of a school-wide differentiated home room academic extension re-teaching initiative on the academic achievement and criterion-referenced assessment proficiency categories of 8th-grade students with varying levels of

measured cognitive skills. Achievement measures were reading and math criterion-referenced assessment scores, core subject grades, and the reading and math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test subtest scores.

Dependent Measures

Four dependent measures were used for academic achievement. The first of these will be 1. Essential Leaner Outcomes Test scores for (a) reading and (b) math; 2. Essential Leaner Outcomes Test proficiency categories for (a) reading (*i*) below proficient, (*ii*) barely proficient, (*iii*) proficient, and (*iv*) beyond proficient and (b) math (*i*) below proficient, (*ii*) barely proficient, (*iii*) proficient, and (*iv*) beyond proficient; 3. First trimester core subject grades for (a) social studies, (b) science, (c) English, and (d) math; 4. Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores for (a) reading and (b) math. This data will be collected retrospectively for students who completed 8th-grade independent variable initiative.

Implementation of the Constant, School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative

The constant for this study is the school-wide differentiated home room academic extension re-teaching

initiative provided to all students in the research school. Home room is defined in the research school as one 35-minute class session convened every other day for all students in the research school. Differentiated activities during home room are designed to re-teach or extend the district curriculum as measured by Essential Learner Outcomes Exams. Re-teaching is defined in the Millard Public School District as prescribed and specific instructional intervention that is provided to a student who has obtained a rating of Below Proficient on any of the district's Essential Learner Outcomes Exams. Re-teaching activities focus on specific enabling skills that students have failed to demonstrate master of on the district exam. Re-teaching activities encompass a variety of techniques, programs, and strategies beyond the regular instructional repertoire of a school. Extension is defined in the research school as specific instructional support that is provided to a student who has obtained a rating of Beyond Proficient or Proficient on any of the district's Essential Learner Outcomes Exams. Extension activities focus on application of the skills measured on Essential Learner Outcomes Exams.

Home room activities are flexibly grouped throughout the year dependent on the content covered. As content focus

changes, student home room rosters change. Grade-level teachers determine the roster groupings and home room activities. Dependent on the nature of the activities, some home room rosters are mixed-ability groups and some rosters reflect homogeneous student skills. Home room activities are designed by content-area teachers close to the time of delivery to ensure seamless connection to classroom learning. Home room activities are differentiated to meet all skill levels of student needs. An example is a homogeneous group of students scoring beyond proficient on the science ELO may compare and contrast different chemical reactions while a homogeneous group of students scoring below proficient on the same ELO may participate in activities directed to skill acquisition.

Research Questions and Data Analysis

The following research questions were used to analyze reading and math Essential Learner Outcomes test scores for students with varying levels of cognitive skills.

Overarching Pretest-Posttest Essential Learner Outcomes Test Score Research Question #1: Do students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative lose, maintain, or improve their

pretest 8th-grade compared to their posttest 8th-grade Essential Learner Outcomes Reading Test score?

Sub-Question 1a. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1b. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1c. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores

compared to posttest 8th-grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1d. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1e. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1f. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores

compared to posttest 8th-grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1g. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Reading Test standard scores?

Sub-Question 1h. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range pretest 8th-grade Essential Learner Outcomes Reading Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Reading Test standard scores?

Research Sub-questions #1a, 1b, 1c, 1d, 1e, 1f, 1g, and 1h were analyzed using dependent *t* tests to examine the significance of the difference between students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative pretest 8th-grade compared to their

posttest 8th-grade Essential Learner Outcomes Reading Test scores. Because multiple statistical tests were conducted, a one-tailed .01 alpha level was employed to help control for Type 1 errors. Means and standard deviations are displayed on tables.

Overarching Pretest-Posttest Essential Learner Outcomes Test Score Research Question #2: Do students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative lose, maintain or improve their pretest 8th-grade compared to their posttest 8th-grade Essential Learner Outcomes Math Test score?

Sub-Question 2a. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2b. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 30th percentile to a high of the 39th percentile

falling within the 4th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2c. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2d. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2e. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 60th percentile to a high of the 69th percentile

falling within the 7th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2f. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2g. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Math Test standard scores?

Sub-Question 2h. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 90th percentile to a high of the 99th percentile

falling within the 10th-decile range pretest 8th-grade Essential Learner Outcomes Math Test standard scores compared to posttest 8th-grade Essential Learner Outcomes Math Test standard scores?

Research Sub-questions #2a, 2b, 2c, 2d, 2e, 2f, 2g, and 2h were analyzed using dependent *t* tests to examine the significance of the difference between students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative pretest 8th-grade compared to their posttest 8th-grade Essential Learner Outcomes Math Test scores. Because multiple statistical tests were conducted, a one-tailed .01 alpha level was employed to help control for Type 1 errors. Means and standard deviations are displayed on tables.

Overarching Posttest-Posttest Essential Learner Outcomes Test Score Research Question #3: Do students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative have congruent or different posttest end of 8th-grade Essential Learner Outcomes Reading Test scores and Math Test scores?

Sub-Question 3a. Is there a significant difference between students end of 8th-grade Essential

Learner Outcomes Reading Test scores whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from (*i*) a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range, (*ii*) a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range, (*iii*) a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range, (*iv*) a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range, (*v*) a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range, (*vi*) a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range, (*vii*) a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range, and (*viii*) a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range?

Sub-Question 3b. Is there a significant difference between students end of 8th-grade Essential Learner Outcomes Math Test scores whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from (*i*) a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range, (*ii*) a low of the 30th percentile to a high of the 39th

percentile falling within the 4th-decile range, (*iii*) a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range, (*iv*) a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range, (*v*) a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range, (*vi*) a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range, (*vii*) a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range, and (*viii*) a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range?

Research Sub-Questions #3a and 3b were analyzed utilizing a single classification Analysis of Variance (ANOVA) to determine the main effect between students end of 8th-grade Essential Learner Outcomes Reading Test scores and Math Test scores. An *F* ratio was calculated and an alpha level of .05 was utilized to test the null hypothesis. Independent *t* tests were used for contrast analysis when a significant *F* ratio is observed.

Overarching Pretest-Posttest Essential Learner Outcomes Reading Test and Math Test Proficiency Category Change Research Question #4. Will students with varying levels of cognitive skills who participated in the school-

wide differentiated home room academic extension re-reaching initiative lose, maintain, or improve their pretest 8th-grade Essential Learner Outcomes Reading Test and Math Test proficiency category (a) below proficient, (b) barely proficient, (c) proficient, and (d) beyond proficient proficiency category change compared to their posttest 8th-grade Essential Learner Outcomes Reading Test and Math Test proficiency category (a) below proficient, (b) barely proficient, (c) proficient, and (d) beyond proficient proficiency category change?

Sub-Question 4a. Is there a significant difference between students pretest beginning 8th-grade compared to posttest end of 8th-grade Essential Learner Outcomes Reading Test proficiency category (a) below proficient, (b) barely proficient, (c) proficient, and (d) beyond proficient frequencies change?

Sub-Question 4b. Is there a significant difference between students pretest beginning 8th-grade compared to posttest end of 8th-grade Essential Learner Outcomes Math Test proficiency category (a) below proficient, (b) barely proficient, (c) proficient, and (d) beyond proficient frequencies change?

Research Sub-Questions #4a and 4b utilized a chi-square test of significance to compare observed proficiency

category (a) below proficient, (b) barely proficient, (c) proficient, and (d) beyond proficient change verses expected proficiency category change for students with varying levels of cognitive skills. Because multiple statistical tests were conducted, a .01 alpha level was employed to help control for Type 1 errors. Frequencies and percents are displayed in tables.

The following research questions were used to analyze social studies, science, English, and math core subject mean grade score change for students with varying levels of cognitive skills.

Overarching Pretest-Posttest Core Subject Mean Grade Score Research Question #5: Do students with varying levels of cognitive skills whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from (*i*) a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range, (*ii*) a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range, (*iii*) a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range, (*iv*) a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range, (*v*) a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile

range, (*vi*) a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range, (*vii*) a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range, and (*viii*) a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range lose, maintain, or improve their pretest first trimester 8th-grade (a) social studies, (b) science, (c) English, and (d) math core subject mean grade scores compared to their posttest third trimester 8th-grade grade (a) social studies, (b) science, (c) English, and (d) math core subject mean grade scores?

Research Questions #5 was analyzed using dependent *t* tests to examine the significance of the difference between students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative pretest first trimester 8th-grade compared to their posttest third trimester 8th-grade (a) social studies, (b) science, (c) English, and (d) math core subject mean grade scores. Because multiple statistical tests were conducted, a one-tailed .01 alpha level will be employed to help control for Type 1 errors. Means and standard deviations are displayed on tables.

Overarching Posttest-Posttest Core Subject Mean Grade Score Research Question #6: Do students with varying levels of cognitive skills whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from (*i*) a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range, (*ii*) a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range, (*iii*) a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range, (*iv*) a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range, (*v*) a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range, (*vi*) a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range, (*vii*) a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range, and (*viii*) a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range have congruent or different posttest third trimester 8th-grade (a) social studies, (b) science, (c) English, and (d) math core subject mean grade scores?

Research Questions #6 was analyzed using a single classification Analysis of Variance (ANOVA) to determine

the main effect between students core subjects (a) social studies, (b) science, (c) English, and (d) math grade scores. An *F* ratio was calculated and an alpha level of .05 was utilized to test the null hypothesis. Independent *t* tests were used for contrast analysis when a significant *F* ratio was observed.

The following research questions were used to analyze reading and math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores for students with varying levels of cognitive skills.

Overarching Pretest-Posttest Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Score Research Question #7: Do students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative lose, maintain, or improve their pretest 8th-grade compared to their posttest 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7a. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range

pretest 8th-grade compared to their posttest 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7b. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range pretest 8th-grade compared to their posttest 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7c. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range pretest 8th-grade compared to their posttest 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7d. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range pretest 8th-grade

compared to their posttest 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7e. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range pretest 8th-grade compared to their posttest 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7f. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range pretest 8th-grade compared to their posttest 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7g. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range pretest 8th-grade

compared to their posttest 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 7h. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range pretest 8th-grade compared to their posttest 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Research Sub-questions #7a, 7b, 7c, 7d, 7e, 7f, 7g, and 7h were analyzed using dependent *t* tests to examine the significance of the difference between students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative pretest 8th-grade compared to their posttest 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores. Because multiple statistical tests were conducted, a one-tailed .01 alpha level was employed to help control for Type 1 errors. Means and standard deviations are displayed on tables.

Overarching Pretest-Posttest Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Score

Research Question #8: Do students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative lose, maintain, or improve their pretest 8th-grade compared to their posttest 8th-grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8a. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range pretest 8th-grade compared to their posttest 8th-grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8b. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range pretest 8th-grade compared to their posttest 8th-grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8c. Is there a significant difference between students whose Terra Nova Test of

Cognitive Skills percentile rank scores ranged from a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range pretest 8th-grade compared to their posttest 8th-grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8d. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range pretest 8th-grade compared to their posttest 8th-grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8e. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range pretest 8th-grade compared to their posttest 8th-grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8f. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range pretest 8th-grade

compared to their posttest 8th-grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8g. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range pretest 8th-grade compared to their posttest 8th-grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Sub-Question 8h. Is there a significant difference between students whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range pretest 8th-grade compared to their posttest 8th-grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores?

Research Sub-questions #8a, 8b, 8c, 8d, 8e, 8f, 8g, and 8h were analyzed using dependent *t* tests to examine the significance of the difference between students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative pretest 8th-grade compared to their posttest 8th-grade grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores. Because

multiple statistical tests were conducted, a one-tailed .01 alpha level will be employed to help control for Type 1 errors. Means and standard deviations are displayed on tables.

Overarching Posttest-Posttest Reading and Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Score Research Question #9: Do students with varying levels of cognitive skills who participated in the school-wide differentiated home room academic extension re-reaching initiative have congruent or different posttest end of 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Scores and end of 8th-grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Scores?

Sub-Question 9a. Is there a significant difference between students end of 8th-grade Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from (*i*) a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range, (*ii*) a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range, (*iii*) a low of the 40th percentile to a high of the 49th percentile falling within

the 5th-decile range, (*iv*) a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range, (*v*) a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range, (*vi*) a low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range, (*vii*) a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range, and (*viii*) a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range?

Sub-Question 9b. Is there a significant difference between students end of 8th-grade Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores whose Terra Nova Test of Cognitive Skills percentile rank scores ranged from (*i*) a low of the 1st percentile to a high of the 29th percentile falling within the 1st-decile to the 3rd-decile range, (*ii*) a low of the 30th percentile to a high of the 39th percentile falling within the 4th-decile range, (*iii*) a low of the 40th percentile to a high of the 49th percentile falling within the 5th-decile range, (*iv*) a low of the 50th percentile to a high of the 59th percentile falling within the 6th-decile range, (*v*) a low of the 60th percentile to a high of the 69th percentile falling within the 7th-decile range, (*vi*) a

low of the 70th percentile to a high of the 79th percentile falling within the 8th-decile range, (*vii*) a low of the 80th percentile to a high of the 89th percentile falling within the 9th-decile range, and (*viii*) a low of the 90th percentile to a high of the 99th percentile falling within the 10th-decile range?

Research Sub-Questions #9a and 9b were analyzed utilized a single classification Analysis of Variance (ANOVA) to determine the main effect between students Terra Nova Normal Curve Equivalent Norm Referenced Achievement Reading Test scores and Math Test scores. An *F* ratio was calculated and an alpha level of .05 was utilized to test the null hypothesis. Independent *t* tests were used for contrast analysis if a significant *F* ratio is observed.

Data Collection Procedures

All study achievement norm-referenced, criterion-referenced, cut scores, and core subject grades for data were retrospectively, archival, and routinely collected school information. Permission from the appropriate school research personnel was received. A naturally formed sample of 186 students was obtained to include achievement data. Non-coded numbers were used to display individual de-identified achievement data. Aggregated group data, descriptive statistics, and inferential statistical

analysis were utilized and reported with means and standard deviations on tables.

Performance site. The research was conducted in the public school setting through normal educational practices. The study procedures did not interfere in any way with the normal educational practices of the public school and did not involve coercion or discomfort of any kind. All data was analyzed in the office of the primary investigator, at Beadle Middle School, 18201 Jefferson Street, Omaha, Nebraska, 68135. Data was stored on secure databases and will serve for statistical analysis in the office of the primary researcher and the dissertation chair. Data and computer disks were kept in locked file cabinets. No individual identifiers were attached to the data.

Institutional Review Board (IRB) for the Protection of Human Subjects Approval Category. The exemption category for this study is category 1 45CFR46.101 (b). The research was conducted in the public school setting through normal educational practices. The study procedures did not interfere in anyway with the normal educational practices of the public school and did not involve coercion or discomfort of any kind. Permission from the appropriate school and district personnel has been obtained. A letter

of support from the school district is located in the Appendix.

CHAPTER FOUR

Results

The purpose of the study was to measure the effectiveness of a school-wide differentiated home room academic extension re-teaching initiative on the academic achievement and criterion-referenced assessment proficiency categories of 8th-grade students with varying levels of measured cognitive skills. Achievement measures were reading and math criterion-referenced assessment scores, core subject grades, and the reading and math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test subtest scores.

All study achievement norm-referenced, criterion-referenced, cut scores, and core subject grades for data were retrospectively, archival, and routinely collected school information. Permission from the appropriate school research personnel was received. A naturally formed sample of 186 students was obtained to include achievement data. Non-coded numbers were used to display individual de-identified achievement data. Aggregated group data, descriptive statistics, and inferential statistical analysis were utilized and reported with means and standard deviations on tables.

Table 1 displays demographic information of 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles. Table 1 displays the number of students in each measured cognitive deciles group, gender, and special education status information. Students were assigned groups determined by measured cognitive deciles. Group 1 included students who performed in the first, second, and third cognitive deciles. Group 2 included students who performed in the fourth cognitive decile. Group 3 included students who performed in the fifth cognitive decile. Group 4 included students who performed in the sixth cognitive decile. Group 5 included students who performed in the seventh cognitive decile. Group 6 included students who performed in the eighth cognitive decile. Group 7 included students who performed in the ninth cognitive decile. Group 8 included students who performed in the tenth cognitive decile. For ease of reference all tabled data refers to students by the aforementioned group numbers rather than their decile group, for example Group 1 refers to students with measured first, second, and third deciles cognitive skills.

Research Question #1

Table 2 displays the Essential Learner Outcomes Reading Test scores converted to standard score means and standard deviations for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles.

Research question #1a. The first hypothesis was tested using the dependent *t* test. Essential Learner Outcomes pretest-posttest Reading Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 3. As seen in Table 3 the null hypothesis was not rejected in the direction of pretest-posttest test score improvement for Group 1. The Essential Learner Outcomes Reading pretest standard score for Group 1 (M = 107.50, SD = 9.32) compared to the Essential Learner Outcomes Reading posttest standard score (M = 110.13, SD = 6.94) was not statistically significantly different, $t(7) = 1.64$, $p = .07$ (one-tailed), $d = .32$.

Research question #1b. The first hypothesis was tested using the dependent *t* test. Essential Learner Outcomes pretest-posttest Reading Test standard scores comparison for 8th-grade students who completed the school-wide

differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 3. As seen in Table 3 the null hypothesis was not rejected in the direction of pretest-posttest test score decline for Group 2. The Essential Learner Outcomes Reading pretest standard score for Group 2 (M = 107.57, SD = 7.55) compared to the Essential Learner Outcomes Reading posttest standard score (M = 104.14, SD = 10.06) was not statistically significantly different, $t(6) = -1.02$, p = .17 (one-tailed), d = .39.

Research question #1c. The first hypothesis was tested using the dependent t test. Essential Learner Outcomes pretest-posttest Reading Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 3. As seen in Table 3 the null hypothesis was not rejected in the direction of pretest-posttest test score improvement for Group 3. The Essential Learner Outcomes Reading pretest standard score for Group 3 (M = 109.67, SD = 7.76) compared to the Essential Learner Outcomes Reading posttest standard score (M = 109.93, SD = 6.39) was not statistically significantly different, $t(14) = 0.13$, p = .45 (one-tailed), d = .04.

Research question #1d. The first hypothesis was tested using the dependent *t* test. Essential Learner Outcomes pretest-posttest Reading Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 3. As seen in Table 3 the null hypothesis was not rejected in the direction of pretest-posttest test score decline for Group 4. The Essential Learner Outcomes Reading pretest standard score for Group 4 (M = 115.45, SD = 4.16) compared to the Essential Learner Outcomes Reading posttest standard score (M = 114.00, SD = 4.88) was not statistically significantly different, $t(10) = -1.07$, p = .16 (one-tailed), d = .32.

Research question #1e. The first hypothesis was tested using the dependent *t* test. Essential Learner Outcomes pretest-posttest Reading Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 3. As seen in Table 3 the null hypothesis was rejected in the direction of pretest-posttest test score decline for Group 5. The Essential Learner Outcomes Reading pretest standard score for Group 5 (M = 117.84, SD = 3.04)

compared to the Essential Learner Outcomes Reading posttest standard score (M = 115.26, SD = 3.75) was statistically significantly different, $t(18) = -2.84$, p = .01 (one-tailed), d = .76.

Research question #1f. The first hypothesis was tested using the dependent t test. Essential Learner Outcomes pretest-posttest Reading Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 3. As seen in Table 3 the null hypothesis was rejected in the direction of pretest-posttest test score decline for Group 6. The Essential Learner Outcomes Reading pretest standard score for Group 6 (M = 118.00, SD = 2.38) compared to the Essential Learner Outcomes Reading posttest standard score (M = 116.69, SD = 2.88) was statistically significantly different, $t(28) = -2.34$, p = .01 (one-tailed), d = .50.

Research question #1g. The first hypothesis was tested using the dependent t test. Essential Learner Outcomes pretest-posttest Reading Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in

Table 3. As seen in Table 3 the null hypothesis was rejected in the direction of pretest-posttest test score decline for Group 7. The Essential Learner Outcomes Reading pretest standard score for Group 7 (M = 119.91, SD = 2.98) compared to the Essential Learner Outcomes Reading posttest standard score (M = 118.63, SD = 3.51) was statistically significantly different, $t(34) = -1.91$, $p = .03$ (one-tailed), $d = .39$.

Research question #1h. The first hypothesis was tested using the dependent t test. Essential Learner Outcomes pretest-posttest Reading Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 3. As seen in Table 3 the null hypothesis was rejected in the direction of pretest-posttest test score decline for Group 8. The Essential Learner Outcomes Reading pretest standard score for Group 8 (M = 120.77, SD = 4.18) compared to the Essential Learner Outcomes Reading posttest standard score (M = 119.32, SD = 3.27) was statistically significantly different, $t(61) = -2.94$, $p = .002$ (one-tailed), $d = .39$.

Overall, pretest-posttest results indicated that following the year long school-wide differentiated home

room academic extension re-teaching initiative Groups 1 and 3 reading scores were measured in the direction of improvement. However, Groups 2, 4, 5, 6, 7, and 8 reading scores were measured in the direction of decline. Comparing student measured cognitive decile groups Essential Learner Outcomes posttest reading test standard scores with derived achievement scores puts their performance in perspective. For Group 1 a posttest reading mean standard score of 110.13 is congruent with a Percentile Rank of 75, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 2 a posttest reading mean standard score of 104.14 is congruent with a Percentile Rank of 61, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 3 a posttest reading mean standard score of 109.93 is congruent with a Percentile Rank of 73, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 4 a posttest reading mean standard score of 114.00 is congruent with a Percentile Rank of 83, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 5 a posttest reading mean standard score of 115.00 is

congruent with a Percentile Rank of 84, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 6 a posttest reading mean standard score of 116.69 is congruent with a Percentile Rank of 86, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 7 a posttest reading mean standard score of 118.63 is congruent with a Percentile Rank of 88, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 8 a posttest reading mean standard score of 119.32 is congruent with a Percentile Rank of 90, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average.

Research Question #2

Table 4 displays the Essential Learner Outcomes Math Test scores converted to standard score means and standard deviations for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles.

Research question #2a. The second hypothesis was tested using the dependent *t* test. Essential Learner Outcomes pretest-posttest Math Test standard scores

comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 5. As seen in Table 5 the null hypothesis was rejected in the direction of pretest-posttest test score improvement for Group 1. The Essential Learner Outcomes Math pretest standard score for Group 1 (M = 105.50, SD = 6.32) compared to the Essential Learner Outcomes Math posttest standard score (M = 107.38, SD = 6.50) was statistically significantly different, $t(7) = 1.97$, $p = .04$ (one-tailed), $d = .29$.

Research question #2b. The second hypothesis was tested using the dependent t test. Essential Learner Outcomes pretest-posttest Math Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 5. As seen in Table 5 the null hypothesis was rejected in the direction of pretest-posttest test score decline for Group 2. The Essential Learner Outcomes Math pretest standard score for Group 2 (M = 106.00, SD = 7.55) compared to the Essential Learner Outcomes Math posttest standard score (M = 103.57, SD = 7.74) was statistically significantly different, $t(6) =$

-2.07, *p* = .04 (one-tailed), *d* = .32.

Research question #2c. The second hypothesis was tested using the dependent *t* test. Essential Learner Outcomes pretest-posttest Math Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 5. As seen in Table 5 the null hypothesis was not rejected in the direction of pretest-posttest test score improvement for Group 3. The Essential Learner Outcomes Math pretest standard score for Group 3 (*M* = 107.67, *SD* = 6.77) compared to the Essential Learner Outcomes Math posttest standard score (*M* = 108.00, *SD* = 8.03) was not statistically significantly different, *t*(14) = 0.24, *p* = .41 (one-tailed), *d* = .04.

Research question #2d. The second hypothesis was tested using the dependent *t* test. Essential Learner Outcomes pretest-posttest Math Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 5. As seen in Table 5 the null hypothesis was not rejected in the direction of pretest-posttest test score decline for Group 4. The Essential

Learner Outcomes Math pretest standard score for Group 4 (*M* = 114.09, *SD* = 4.50) compared to the Essential Learner Outcomes Math posttest standard score (*M* = 113.82, *SD* = 6.90) was not statistically significantly different, *t*(10) = -0.18, *p* = .43 (one-tailed), *d* = .05.

Research question #2e. The second hypothesis was tested using the dependent *t* test. Essential Learner Outcomes pretest-posttest Math Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 5. As seen in Table 5 the null hypothesis was not rejected in the direction of pretest-posttest test score decline for Group 5. The Essential Learner Outcomes Math pretest standard score for Group 5 (*M* = 115.89, *SD* = 4.37) compared to the Essential Learner Outcomes Math posttest standard score (*M* = 115.84, *SD* = 4.83) was not statistically significantly different, *t*(18) = -0.06, *p* = .48 (one-tailed), *d* = .01.

Research question #2f. The second hypothesis was tested using the dependent *t* test. Essential Learner Outcomes pretest-posttest Math Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-

teaching initiative by measured cognitive deciles were displayed in Table 5. As seen in Table 5 the null hypothesis was not rejected in the direction of pretest-posttest test score decline for Group 6. The Essential Learner Outcomes Math pretest standard score for Group 6 (M = 116.45, SD = 5.21) compared to the Essential Learner Outcomes Math posttest standard score (M = 115.52, SD = 4.46) was not statistically significantly different, $t(28) = -1.29$, $p = .10$ (one-tailed), $d = .19$.

Research question #2g. The second hypothesis was tested using the dependent t test. Essential Learner Outcomes pretest-posttest Math Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 5. As seen in Table 5 the null hypothesis was not rejected in the direction of pretest-posttest test score decline for Group 7. The Essential Learner Outcomes Math pretest standard score for Group 7 (M = 118.83, SD = 3.68) compared to the Essential Learner Outcomes Math posttest standard score (M = 118.74, SD = 4.18) was not statistically significantly different, $t(34) = -0.18$, $p = .43$ (one-tailed), $d = .02$.

Research question #2h. The second hypothesis was tested using the dependent *t* test. Essential Learner Outcomes pretest-posttest Math Test standard scores comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 5. As seen in Table 5 the null hypothesis was rejected in the direction of pretest-posttest test score improvement for Group 8. The Essential Learner Outcomes Math pretest standard score for Group 8 (M = 119.65, SD = 3.47) compared to the Essential Learner Outcomes Math posttest standard score (M = 120.47, SD = 4.35) was statistically significantly different, $t(61) = 2.04$, $p = .02$ (one-tailed), $d = .21$.

Overall, pretest-posttest results indicated that following the yearlong school-wide differentiated home room academic extension re-teaching initiative Groups 1, 3, and 8 math scores were measured in the direction of improvement. However, Groups 2, 4, 5, 6, and 7 math scores were measured in the direction of decline. Comparing student measured cognitive decile groups Essential Learner Outcomes posttest Math Test standard scores with derived achievement scores puts their performance in perspective. For Group 1 a posttest math mean standard score of 107.38

is congruent with a Percentile Rank of 68, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 2 a posttest math mean standard score of 103.57 is congruent with a Percentile Rank of 58, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 3 a posttest math mean standard score of 108.00 is congruent with a Percentile Rank of 70, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 4 a posttest math mean standard score of 113.82 is congruent with a Percentile Rank of 81, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 5 a posttest math mean standard score of 115.84 is congruent with a Percentile Rank of 84, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 6 a posttest math mean standard score of 115.52 is congruent with a Percentile Rank of 84, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 7 a posttest math mean standard score of 118.74 is

congruent with a Percentile Rank of 88, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 8 a posttest math mean standard score of 120.47 is congruent with a Percentile Rank of 91, a Stanine Score of 8 (the middle stanine of the above average range), and an achievement qualitative description of Above Average.

Research Question #3

Research question #3a. The third hypothesis was tested using a single classification Analysis of Variance (ANOVA) to determine the main effect between students end of 8th-grade Essential Learner Outcomes Reading Test converted standard scores. Measured cognitive decile groups Essential Learner Outcomes Reading posttest standard scores were displayed in Table 6. As seen in Table 6 the null hypothesis was rejected. The Essential Learner Outcomes Reading posttest converted standard score for Group 1 (M = 105.50, SD = 6.32), Group 2 (M = 104.14, SD = 10.06), Group 3 (M = 109.93, SD = 6.39), Group 4 (M = 114.00, SD = 4.88), Group 5 (M = 115.26, SD = 3.75), Group 6 (M = 116.69, SD = 2.88), Group 7 (M = 118.63, SD = 3.51), and Group 8 (M = 119.32, SD = 3.27) were different and the main effect of overall Essential Learner Outcomes Reading posttest converted standard scores was statistically significant,

($F(7, 178) = 21.41$, $p < .0001$). *Post hoc* contrast analyses were conducted and displayed in Table 7. As seen in Table 7 the null hypothesis was rejected for the following independent *t* test comparisons: G1 v G5, G1 v G6, G1 v G7, G1 v G8, G2 v G4, G2 v G5, G2 v G6, G2 v G7, G2 v G8, G3 v G4, G3 v G5, G3 v G6, G3 v G7, G3 v G8, G4 v G6, G4 v G7, G4 v G8, G5 v G7, G5 v G8, G6 v G7, and G6 v G8. As seen in Table 7 the null hypothesis was not rejected for the following independent *t* test comparisons: G1 v G2, G1 v G3, G1 v G4, G2 v G3, G4 v G5, G5 v G6, and G7 v G8.

Overall, higher numbered decile groups had higher mean posttest scores compared to lower numbered decile groups with the exception of G1 v G2 and G1 v G3. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 7 and mean reading standard scores displayed in Table 6 where 15 standard score points (1 SD) separates the lowest reading standard score yielded by G2 (104.14) compared to the highest standard score yielded by G8 (119.32). As a result the largest mean differences observed in Table 7 were for the G2 v G5 (11.12), G2 v G6 (12.55), G2 v G7 (14.49) and G2 v G8 (15.18) comparisons.

Research question #3b. The third hypothesis was tested using a single classification Analysis of Variance (ANOVA)

to determine the main effect between students end of 8th-grade Essential Learner Outcomes Math Test converted standard scores. Measured cognitive decile groups Essential Learner Outcomes Math posttest standard scores were displayed in Table 8. As seen in Table 8 the null hypothesis was rejected. The Essential Learner Outcomes Math posttest converted standard score for Group 1 (M = 107.63, SD = 6.50), Group 2 (M = 103.57, SD = 7.74), Group 3 (M = 108.00, SD = 8.03), Group 4 (M = 113.82, SD = 6.90), Group 5 (M = 115.84, SD = 4.83), Group 6 (M = 115.52, SD = 4.46), Group 7 (M = 118.74, SD = 4.18), and Group 8 (M = 120.47, SD = 4.35) were different and the main effect of overall Essential Learner Outcomes Math posttest converted standard scores was statistically significant, (F(7, 178) = 22.33, p < .0001). *Post hoc* contrast analyses were conducted and displayed in Table 9. As seen in Table 9 the null hypothesis was rejected for the following independent t test comparisons: G1 v G4, G1 v G5, G1 v G6, G1 v G7, G1 v G8, G2 v G4, G2 v G5, G2 v G6, G2 v G7, G2 v G8, G3 v G4, G3 v G5, G3 v G6, G3 v G7, G3 v G8, G4 v G7, G4 v G8, G5 v G7, G5 v G8, G6 v G7, G6 v G8, and G7 v G8. As seen in Table 9 the null hypothesis was not rejected for the following independent t test comparisons: G1 v G2, G1 v G3, G2 v G3, G4 v G5, G4 v G6, and G5 v G6.

Overall, higher numbered decile groups had higher mean posttest scores compared to lower numbered decile groups with the exception of G1 v G2 and G5 v G6. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 9 and mean math standard scores displayed in Table 8 where 17 standard score points (1 SD+) separates the lowest math standard score yielded by G2 (103.57) compared to the highest standard score yielded by G8 (120.47). As a result the largest mean differences observed in Table 9 were for the G2 v G4 (10.25), G2 v G5 (12.27), G2 v G6 (11.95), G2 v G7 (15.17) and G2 v G8 (16.90) comparisons. Other comparisons also yielded large (approaching 15 standard score points or 1 SD) comparisons including G1 v G7 (11.36), G1 v G8 (13.09), G3 v G7 (10.74), and G3 v G8 (12.47).

Research Question #4

Research question #4a. A comparison of observed pretest-posttest Essential Learner Outcomes Reading Test proficiency category frequency change is found in Table 10. The fourth hypothesis was tested using chi-square (X^2). The result of X^2 displayed in Table 10 was statistically significantly different ($X^2(3, N = 186) = 15.54, p < .01$) therefore the null hypothesis was rejected. Inspecting our frequency and percent findings in Table 10 we find that the

number of students scoring beyond proficient in the posttest (83, 57%) was greater than the number of students scoring beyond proficient in the pretest (63, 43%). The number of students scoring proficient in the posttest (70, 41%) was less than the number of students scoring proficient in the pretest (102, 59%). The number of students scoring barely proficient in the posttest (25, 71%) was greater than the number of students scoring barely proficient in the pretest (10, 29%). The number of students scoring below proficient in the posttest (8, 42%) was less than the number of students scoring barely proficient in the pretest (11, 58%).

Overall, posttest proficiency category frequencies indicate a 20 student increase in the beyond proficiency category. That is to say 20 students posttest Essential Learner Outcomes Reading Test standard scores results were strong enough to move them to this highest overall proficiency category. Of equal importance 3 students at the time of posttest Essential Learner Outcomes Reading Test standard scores results were strong enough to move them out of the lowest (below proficient) overall proficiency category. The increase in the number of students at posttest in the barely proficient category may represent increased movement into this category by student with both

increasing (from below proficient) and decreasing (from proficient) reading skills. The decrease in the number of students at posttest in the proficient category may represent increased movement from this category to the beyond proficient category by students with increasing reading skills. Given the decrease at posttest in the number of students observed in the below proficient category and the increase at posttest in the number of students observed in the beyond proficient category it may be said that the school-wide differentiated home room academic extension re-teaching initiative resulted in improved reading outcomes for the participating 8th-grade students.

Research question #4b. A comparison of observed pretest-posttest Essential Learner Outcomes Math Test proficiency category frequency change is found in Table 11. The fourth hypothesis was tested using chi-square (X^2). The result of X^2 displayed in Table 11 was statistically significantly different ($X^2(3, N = 186) = 17.36, p = < .001$) so the null hypothesis was rejected. Inspecting our frequency and percent findings in Table 11 we find that the number of students scoring beyond proficient in the posttest (85, 62%) were much greater than the number of students scoring beyond proficient in the pretest (52,

38%). The number of students scoring proficient in the posttest (77, 40%) was less than the number of students scoring proficient in the pretest (114, 60%). The number of students scoring barely proficient in the posttest (19, 61%) was greater than the number of students scoring barely proficient in the pretest (12, 39%). The number of students scoring below proficient in the posttest (5, 38%) was less than the number of students scoring barely proficient in the pretest (8, 62%).

Overall, posttest proficiency category frequencies indicate a 33 student increase in the beyond proficiency category. That is to say 33 students posttest Essential Learner Outcomes Math Test standard scores results were strong enough to move them to this highest overall proficiency category. Of equal importance 3 students at the time of posttest Essential Learner Outcomes Math Test standard scores results were strong enough to move them out of the lowest (below proficient) overall proficiency category. The increase in the number of students at posttest in the barely proficient category may represent increased movement into this category by student with both increasing (from below proficient) and decreasing (from proficient) math skills. The decrease in the number of students at posttest in the proficient category may

represent increased movement from this category to the beyond proficient category by students with increasing math skills. Given the decrease at posttest in the number of students observed in the below proficient category and the increase at posttest in the number of students observed in the beyond proficient category it may be said that the school-wide differentiated home room academic extension re-teaching initiative resulted in improved math outcomes for the participating 8th-grade students.

Research Question #5

The fifth hypothesis was tested using the dependent *t* test. Measured cognitive decile groups first trimester social studies core subject mean grade scores and standard deviations compared to third trimester social studies core subject mean grade scores and standard deviations were displayed in Table 12. Measured cognitive decile groups first trimester science core subject mean grade scores and standard deviations compared to third trimester science core subject mean grade scores and standard deviations were displayed in Table 14. Measured cognitive decile groups first trimester English core subject mean grade scores and standard deviations compared to third trimester English core subject mean grade scores and standard deviations were displayed in Table 16. Measured cognitive decile groups

first trimester math core subject mean grade scores and standard deviations compared to third trimester math core subject mean grade scores and standard deviations were displayed in Table 18.

Research question #5a. As seen in Table 13 the null hypothesis testing social studies performance was not rejected for four measured cognitive deciles groups in the direction of third trimester grade score decline and was rejected for four measured cognitive deciles groups in the direction of third trimester grade score decline. The social studies core subject first trimester mean grade scores for Group 1 (M = 1.88, SD = .64) compared to the social studies core subject third trimester mean grade scores (M = 2.00, SD = 0.53) was not statistically significantly different, $t(7) = 0.55$, p = .30 (one-tailed), d = .20. The social studies core subject first trimester mean grade scores for Group 2 (M = 2.43, SD = 1.40) compared to the social studies core subject third trimester mean grade scores (M = 3.14, SD = 1.35) was statistically significantly different, $t(6) = 1.99$, p = .05 (one-tailed), d = .51. The social studies core subject first trimester mean grade scores for Group 3 (M = 2.47, SD = 1.06) compared to the social studies core subject third trimester mean grade scores (M = 2.93, SD = 1.16) was statistically

significantly different, $t(14) = 2.43$, $p = .01$ (one-tailed), $d = .41$. The social studies core subject first trimester mean grade scores for Group 4 ($M = 1.55$, $SD = 0.82$) compared to the social studies core subject third trimester mean grade scores ($M = 2.18$, $SD = 1.17$) was statistically significantly different, $t(10) = 4.18$, $p = .001$ (one-tailed), $d = .63$. The social studies core subject first trimester mean grade scores for Group 5 ($M = 1.79$, $SD = 0.85$) compared to the social studies core subject third trimester mean grade scores ($M = 2.00$, $SD = 1.00$) was not statistically significantly different, $t(18) = 1.00$, $p = .17$ (one-tailed), $d = .23$. The social studies core subject first trimester mean grade scores for Group 6 ($M = 1.72$, $SD = 0.88$) compared to the social studies core subject third trimester mean grade scores ($M = 1.76$, $SD = 0.87$) was not statistically significantly different, $t(28) = 0.21$, $p = .42$ (one-tailed), $d = .05$. The social studies core subject first trimester mean grade scores for Group 7 ($M = 1.31$, $SD = 0.58$) compared to the social studies core subject third trimester mean grade scores ($M = 1.43$, $SD = 0.78$) was not statistically significantly different, $t(34) = 1.28$, $p = .11$ (one-tailed), $d = .18$. The social studies core subject first trimester mean grade scores for Group 8 ($M = 1.23$, $SD = 0.56$) compared to the social studies core subject third

trimester mean grade scores (M = 1.34, SD = 0.77) was statistically significantly different, $t(61) = 1.72$, p = .04 (one-tailed), d = .16.

Overall, first trimester-third trimester results indicated that following the year long school-wide differentiated home room academic extension re-teaching initiative no Groups were measured in the direction of social studies grade sores improvement. All Groups 1, 2, 3, 4, 5, 6, 7, and 8 social studies grade scores were measured in the direction of decline. Comparing student third trimester social studies grade scores with school grade score nomenclature puts their performance in perspective. For Group 1 a third trimester social studies mean grade score of 2.00 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 2 a third trimester social studies mean grade score of 3.14 is typically referred to as falling in the below average range associated with a letter grade of D+. For Group 3 a third trimester social studies mean grade score of 2.93 is typically referred to as falling in the average range associated with a letter grade of C. For Group 4 a third trimester social studies mean grade score of 2.18 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 5 a third

trimester social studies mean grade score of 2.00 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 6 a third trimester social studies mean grade score of 1.76 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 7 a third trimester social studies mean grade score of 1.43 is typically referred to as falling in the excellent range associated with a letter grade of B+. For Group 8 a third trimester social studies mean grade score of 1.34 is typically referred to as falling in the excellent range associated with a letter grade of B+.

Research question #5b. As seen in Table 15 the null hypothesis testing science performance was not rejected for all measured cognitive deciles groups in the direction of third trimester grade score improvement. The science core subject first trimester mean grade scores for Group 1 (M = 2.38, SD = .74) compared to the science core subject third trimester mean grade scores (M = 2.13, SD = .99) was not statistically significantly different, $t(7) = -0.68$, p = .26 (one-tailed), d = .29. The science core subject first trimester mean grade scores for Group 2 (M = 2.43, SD = .53) compared to the science core subject third trimester mean grade scores (M = 2.71, SD = .49) was not

statistically significantly different, $t(6) = 1.00$, $p = .18$ (one-tailed), $d = .55$. The science core subject first trimester mean grade scores for Group 3 ($M = 2.67$, $SD = 1.05$) compared to the science core subject third trimester mean grade scores ($M = 2.60$, $SD = 1.06$) was not statistically significantly different, $t(14) = -0.56$, $p = .29$ (one-tailed), $d = .07$. The science core subject first trimester mean grade scores for Group 4 ($M = 2.36$, $SD = 0.92$) compared to the science core subject third trimester mean grade scores ($M = 2.18$, $SD = 1.17$) was not statistically significantly different, $t(10) = -1.00$, $p = .17$ (one-tailed), $d = .17$. The science core subject first trimester mean grade scores for Group 5 ($M = 2.05$, $SD = .78$) compared to the science core subject third trimester mean grade scores ($M = 2.00$, $SD = 1.00$) was not statistically significantly different, $t(18) = -0.25$, $p = .40$ (one-tailed), $d = .06$. The science core subject first trimester mean grade scores for Group 6 ($M = 1.90$, $SD = .77$) compared to the science core subject third trimester mean grade scores ($M = 1.76$, $SD = .91$) was not statistically significantly different, $t(28) = -1.07$, $p = .15$ (one-tailed), $d = .17$. The science core subject first trimester mean grade scores for Group 7 ($M = 1.37$, $SD = .55$) compared to the science core subject third trimester

mean grade scores (M = 1.26, SD = .44) was not statistically significantly different, $t(34) = -1.44$, p = .08 (one-tailed), d = .22. The science core subject first trimester mean grade scores for Group 8 (M = 1.24, SD = .59) compared to the science core subject third trimester mean grade scores (M = 1.18, SD = .46) was not statistically significantly different, $t(61) = -1.07$, p = .14 (one-tailed), d = .11.

Overall, first trimester-third trimester results indicated that following the year long school-wide differentiated home room academic extension re-teaching initiative all Groups were measured in the direction of social studies grade sores improvement. Comparing student third trimester science grade scores with school grade score nomenclature puts their performance in perspective. For Group 1 a third trimester science mean grade score of 2.13 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 2 a third trimester science mean grade score of 2.71 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 3 a third trimester science mean grade score of 2.60 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 4 a third trimester science

mean grade score of 2.18 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 5 a third trimester science mean grade score of 2.00 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 6 a third trimester science mean grade score of 1.76 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 7 a third trimester science mean grade score of 1.26 is typically referred to as falling in the excellent range associated with a letter grade of B+. For Group 8 a third trimester science mean grade score of 1.18 is typically referred to as falling in the excellent range associated with a letter grade of B+.

Research question #5c. As seen in Table 17 the null hypothesis testing English performance was not rejected for five measured cognitive deciles groups in the direction of third trimester grade score decline, was not rejected for one measured cognitive decile group in the direction of third trimester grade score improvement, was not rejected for one measured cognitive decile group with no change in third trimester grade score, and was rejected for one measured cognitive decile group in the direction of third trimester grade score improvement. The English core subject

first trimester mean grade scores for Group 1 (M = 2.38, SD = .52) compared to the English core subject third trimester mean grade scores (M = 2.38, SD = .74) was not statistically significantly different, $t(7) = 0.00$, p = .50 (one-tailed), d = .00. The English core subject first trimester mean grade scores for Group 2 (M = 2.43, SD = .53) compared to the English core subject third trimester mean grade scores (M = 2.86, SD = 1.07) was not statistically significantly different, $t(6) = 0.89$, p = .20 (one-tailed), d = .54. The English core subject first trimester mean grade scores for Group 3 (M = 2.73, SD = 1.16) compared to the English core subject third trimester mean grade scores (M = 3.00, SD = 1.31) was not statistically significantly different, $t(14) = 1.00$, p = .17 (one-tailed), d = .22. The English core subject first trimester mean grade scores for Group 4 (M = 2.09, SD = 1.04) compared to the English core subject third trimester mean grade scores (M = 1.91, SD = .94) was not statistically significantly different, $t(10) = -0.80$, p = .22 (one-tailed), d = .18. The English core subject first trimester mean grade scores for Group 5 (M = 1.89, SD = .74) compared to the English core subject third trimester mean grade scores (M = 2.11, SD = .66) was not statistically significantly different, $t(18) = 1.07$, p =

.15 (one-tailed), *d* = .31. The English core subject first trimester mean grade scores for Group 6 (*M* = 1.79, *SD* = .73) compared to the English core subject third trimester mean grade scores (*M* = 1.86, *SD* = .92) was not statistically significantly different, *t*(28) = 0.40, *p* = .35 (one-tailed), *d* = .08. The English core subject first trimester mean grade scores for Group 7 (*M* = 1.49, *SD* = .61) compared to the English core subject third trimester mean grade scores (*M* = 1.31, *SD* = .47) was statistically significantly different, *t*(34) = -2.65, *p* = .006 (one-tailed), *d* = .33. The English core subject first trimester mean grade scores for Group 8 (*M* = 1.44, *SD* = .67) compared to the English core subject third trimester mean grade scores (*M* = 1.39, *SD* = .69) was not statistically significantly different, *t*(61) = -0.62, *p* = .27 (one-tailed), *d* = .07.

Overall, first trimester-third trimester results indicated that following the year long school-wide differentiated home room academic extension re-teaching initiative one Group was measured in the direction of English grade scores improvement, Group 7. Six Groups 2, 3, 4, 5, 6, and 8 English grade scores were measured in the direction of decline. One Group 1 English grade scores were measured with no change. Comparing student third trimester

English grade scores with school grade score nomenclature puts their performance in perspective. For Group 1 a third trimester English mean grade score of 2.38 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 2 a third trimester English mean grade score of 2.86 is typically referred to as falling in the average range associated with a letter grade of C. For Group 3 a third trimester English mean grade score of 3.00 is typically referred to as falling in the average range associated with a letter grade of C. For Group 4 a third trimester English mean grade score of 1.91 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 5 a third trimester English mean grade score of 2.11 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 6 a third trimester English mean grade score of 1.86 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 7 a third trimester English mean grade score of 1.31 is typically referred to as falling in the excellent range associated with a letter grade of B+. For Group 8 a third trimester English mean grade score of 1.39 is typically referred to as falling in the excellent range associated with a letter grade of B+.

Research question #5d. As seen in Table 19 the null hypothesis testing math performance was not rejected for one measured cognitive deciles groups in the direction of third trimester grade score decline and was rejected for seven measured cognitive deciles groups in the direction of third trimester grade score decline. The math core subject first trimester mean grade scores for Group 1 (M = 2.75, SD = .71) compared to the math core subject third trimester mean grade scores (M = 3.25, SD = 1.16) was statistically significantly different, $t(7) = 1.87$, p = .05 (one-tailed), d = .53. The math core subject first trimester mean grade scores for Group 2 (M = 2.86, SD = .90) compared to the math core subject third trimester mean grade scores (M = 3.43, SD = 1.13) was not statistically significantly different, $t(6) = 1.55$, p = .09 (one-tailed), d = .56. The math core subject first trimester mean grade scores for Group 3 (M = 2.60, SD = .83) compared to the math core subject third trimester mean grade scores (M = 3.13, SD = 1.25) was statistically significantly different, $t(14) = 2.26$, p = .02 (one-tailed), d = .51. The math core subject first trimester mean grade scores for Group 4 (M = 2.55, SD = 1.21) compared to the math core subject third trimester mean grade scores (M = 3.00, SD = 1.61) was statistically significantly different, $t(10) = 1.84$, p = .05 (one-

tailed), d = .32. The math core subject first trimester mean grade scores for Group 5 (M = 2.00, SD = .75) compared to the math core subject third trimester mean grade scores (M = 2.47, SD = 1.17) was statistically significantly different, $t(18) = 2.45$, p = .01 (one-tailed), d = .49. The math core subject first trimester mean grade scores for Group 6 (M = 2.10, SD = .94) compared to the math core subject third trimester mean grade scores (M = 2.45, SD = .99) was statistically significantly different, $t(28) = 1.98$, p = .03 (one-tailed), d = .36. The math core subject first trimester mean grade scores for Group 7 (M = 1.66, SD = .64) compared to the math core subject third trimester mean grade scores (M = 1.97, SD = .98) was statistically significantly different, $t(34) = 2.45$, p = .01 (one-tailed), d = .38. The math core subject first trimester mean grade scores for Group 8 (M = 1.52, SD = .62) compared to the math core subject third trimester mean grade scores (M = 1.76, SD = .82) was statistically significantly different, $t(61) = 2.66$, p = .005 (one-tailed), d = .33.

Overall, first trimester-third trimester results indicated that following the year long school-wide differentiated home room academic extension re-teaching initiative no Groups were measured in the direction of math grade sores improvement. All Groups 1, 2, 3, 4, 5, 6, 7,

and 8 math grade scores were measured in the direction of decline. Comparing student third trimester math grade scores with school grade score nomenclature puts their performance in perspective. For Group 1 a third trimester math mean grade score of 3.25 is typically referred to as falling in the below average range associated with a letter grade of D+. For Group 2 a third trimester math mean grade score of 3.43 is typically referred to as falling in the below average range associated with a letter grade of D+. For Group 3 a third trimester math mean grade score of 3.13 is typically referred to as falling in the below average range associated with a letter grade of D+. For Group 4 a third trimester math mean grade score of 3.00 is typically referred to as falling in the average range associated with a letter grade of C. For Group 5 a third trimester math mean grade score of 2.47 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 6 a third trimester math mean grade score of 2.45 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 7 a third trimester math mean grade score of 1.97 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 8 a third trimester math mean grade score of 1.76 is typically referred to as

falling in the excellent range associated with a letter grade of B.

Research Question #6

The sixth hypothesis was tested using a single classification Analysis of Variance (ANOVA) to determine the main effect between students' third trimester core subject mean grade scores for social studies, science, English, and math.

Research question #6a. Measured cognitive decile groups core subject social studies third trimester mean grade scores were displayed in Table 20. As seen in Table 20 the null hypothesis was rejected. The core subject social studies third trimester mean grade scores for Group 1 (M = 2.00, SD = .53), Group 2 (M = 3.14, SD = 1.35), Group 3 (M = 2.93, SD = 1.16), Group 4 (M = 2.18, SD = 1.17), Group 5 (M = 2.00, SD = 1.00), Group 6 (M = 1.76, SD = .87), Group 7 (M = 1.43, SD = .78), and Group 8 (M = 1.34, SD = .77) were different and the main effect of overall core subject social studies third trimester mean grade scores was statistically significant, (F(7, 178) = 9.44, p < .0001). *Post hoc* contrast analyses were conducted and displayed in Table 21. As seen in Table 21 the null hypothesis was rejected for the following independent t test comparisons: G1 v G2, G1 v G3, G1 v G7, G1 v G8, G2 v

G5, G2 v G6, G2 v G7, G2 v G8, G3 v G4, G3 v G5, G3 v G6, G3 v G7, G3 v G8, G4 v G7, G4 v G8, G5 v G7, G5 v G8, and G6 v G8. As seen in Table 21 the null hypothesis was not rejected for the following independent *t* test comparisons: G1 v G4, G1 v G5, G1 v G6, G2 v G3, G2 v G4, G4 v G5, G4 v G6, G5 v G6, G6 v G7, and G7 v G8.

Overall, higher numbered decile groups had higher social studies third trimester mean grade scores compared to lower numbered decile groups with the exception of G1 v G2, G1 v G3, and G1 v G4. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 21 third trimester social studies mean grade scores displayed in Table 20 where 1.80 grade score points separates the lowest social studies mean grade scores yielded by G2 (3.14; D+) compared to the highest social studies mean grade scores yielded by G8 (1.34; B+). As a result the largest mean differences observed in Table 21 were for the G2 v G5 (1.14), G2 v G6 (1.38), G2 v G7 (1.71), G2 v G8 (1.80), G3 v G6 (1.17), G3 v G7 (1.50), G3 v G8 (1.59), and G1 v G2 (1.14) comparisons. The data displayed in Table 20 indicates one group (G2) at the below average grade level, two groups (G3 and G4) at the average grade level, and five groups (G1, G5, G6, G7, and G8) at the excellent grade level.

Research question #6b. Measured cognitive decile groups core subject science third trimester mean grade scores were displayed in Table 22. As seen in Table 22 the null hypothesis was rejected. The core subject science third trimester mean grade scores for Group 1 (M = 2.13, SD = .99), Group 2 (M = 2.71, SD = .49), Group 3 (M = 2.60, SD = 1.06), Group 4 (M = 2.18, SD = 1.17), Group 5 (M = 2.00, SD = 1.00), Group 6 (M = 1.76, SD = .91), Group 7 (M = 1.26, SD = .44), and Group 8 (M = 1.18, SD = .46) were different and the main effect of overall core subject science third trimester mean grade scores was statistically significant, ($F(7, 178) = 12.45$, $p < .0001$). *Post hoc* contrast analyses were conducted and displayed in Table 23. As seen in Table 23 the null hypothesis was rejected for the following independent t test comparisons: G1 v G7, G1 v G8, G2 v G5, G2 v G6, G2 v G7, G2 v G8, G3 v G5, G3 v G6, G3 v G7, G3 v G8, G4 v G7, G4 v G8, G5 v G7, G5 v G8, G6 v G7, and G6 v G8. As seen in Table 23 the null hypothesis was not rejected for the following independent t test comparisons: G1 v G2, G1 v G3, G1 v G4, G1 v G5, G1 v G6, G2 v G3, G2 v G4, G3 v G4, G4 v G5, G4 v G6, G5 v G6, and G7 v G8.

Overall, higher numbered decile groups had higher science third trimester mean grade scores compared to lower

numbered decile groups with the exception of G1 v G2, G1 v G3, and G1 v G4. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 23 third trimester science mean grade scores displayed in Table 22 where 1.53 grade score points separates the lowest science mean grade scores yielded by G2 (2.71; C) compared to the highest science mean grade scores yielded by G8 (1.18; B+). As a result the largest mean differences observed in Table 23 were for the G2 v G7 (1.45), G2 v G8 (1.53), G3 v G7 (1.34), G3 v G8 (1.42), and G4 v G8 (1.00) comparisons. The data displayed in Table 22 indicates four groups (G1, G2, G3, and G4) at the average grade level and four groups (G5, G6, G7, and G8) at the excellent grade level.

Research question #6c. Measured cognitive decile groups core subject English third trimester mean grade scores were displayed in Table 24. As seen in Table 24 the null hypothesis was rejected. The core subject English third trimester mean grade scores for Group 1 (M = 2.38, SD = .74), Group 2 (M = 2.86, SD = 1.07), Group 3 (M = 3.00, SD = 1.31), Group 4 (M = 1.91, SD = .94), Group 5 (M = 2.11, SD = .66), Group 6 (M = 1.86, SD = .92), Group 7 (M = 1.31, SD = .47), and Group 8 (M = 1.39, SD = .69) were different and the main effect of overall core subject

English third trimester mean grade scores was statistically significant, ($F(7, 178) = 12.09$, $p < .0001$). *Post hoc* contrast analyses were conducted and displayed in Table 25. As seen in Table 25 the null hypothesis was rejected for the following independent *t* test comparisons: G1 v G7, G1 v G8, G2 v G4, G2 v G5, G2 v G6, G2 v G7, G2 v G8, G3 v G4, G3 v G5, G3 v G6, G3 v G7, G3 v G8, G4 v G7, G4 v G8, G5 v 7, G5 v G8, G6 v G7, and G6 v G8. As seen in Table 25 the null hypothesis was not rejected for the following independent *t* test comparisons:G1 v G2, G1 v G3, G1 v G4, G1 v G5, G1 v G6, G2 v G3, G4 v G5, G4 v G6, G5 v G6, and G7 v G8.

Overall, higher numbered decile groups had higher English third trimester mean grade scores compared to lower numbered decile groups with the exception of G1 v G2, G1 v G3, G2 v G3, G4 v G5, and G7 v G8. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 25 third trimester English mean grade scores displayed in Table 24 where 1.69 grade score points separates the lowest English mean grade scores yielded by G3 (3.00; C) compared to the highest social studies mean grade scores yielded by G7 (1.31; B+). As a result the largest mean differences observed in Table 25 were for the G1 v G7 (1.07), G2 v G6 (1.00), G2 v G7

(1.55), G2 v G8 (1.57), G3 v G6 (1.14), G3 v G7 (1.69), and G3 v G8 (1.61) comparisons. The data displayed in Table 24 indicates four groups (G1, G2, G3, and G5) at the average grade level and four groups (G4, G6, G7, and G8) at the excellent grade level.

Research question #6d. Measured cognitive decile groups core subject math third trimester mean grade scores were displayed in Table 26. As seen in Table 26 the null hypothesis was rejected. The core subject math third trimester mean grade scores for Group 1 (M = 3.25, SD = 1.16), Group 2 (M = 3.43, SD = 1.13), Group 3 (M = 3.13, SD = 1.25), Group 4 (M = 3.00, SD = 1.61), Group 5 (M = 2.47, SD = 1.17), Group 6 (M = 2.45, SD = .99), Group 7 (M = 1.97, SD = .98), and Group 8 (M = 1.76, SD = .82) were different and the main effect of overall core subject math third trimester mean grade scores was statistically significant, ($F(7, 178) = 7.33$, $p < .0001$). *Post hoc* contrast analyses were conducted and displayed in Table 27. As seen in Table 27 the null hypothesis was rejected for the following independent t test comparisons: G1 v G6, G1 v G7, G1 v G8, G2 v G5, G2 v G6, G2 v G7, G2 v G8, G3 v G6, G3 v G7, G3 v G8, G4 v G7, G4 v G8, G5 v G7, G5 v G8, G6 v G7 and G6 v G8. As seen in Table 27 the null hypothesis was not rejected for the following independent t test

comparisons: G1 v G2, G1 v G3, G1 v G4, G1 v G5, G2 v G3, G2 v G4, G3 v G4, G3 v G5, G4 v G5, G4 v G6, G5 v G6, and G7 v G8.

Overall, higher numbered decile groups had higher math third trimester mean grade scores compared to lower numbered decile groups with the exception of G1 v G2. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 27 third trimester math mean grade scores displayed in Table 26 where 1.67 grade score points separates the lowest math mean grade scores yielded by G2 (3.43; D+) compared to the highest math mean grade scores yielded by G8 (1.76; B). As a result the largest mean differences observed in Table 27 were for the G1 v G7 (1.28), G1 v G8 (1.49), G2 v G7 (1.46), G2 v G8 (1.67), G3 v G7 (1.16), G3 v G8 (1.37), G4 v G7 (1.03), and G4 v G8 (1.24) comparisons. The data displayed in Table 26 indicates three groups (G1, G2, and G3) at the below average grade level, three groups (G4, G5, and G6) at the average grade level, and two groups (G7 and G8) at the excellent grade level.

Research Question #7

Table 28 displays the Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores means and standard deviations for 8th-grade students who

completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles.

Research question #7a. The seventh hypothesis was tested using the dependent *t* test. Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 29. As seen in Table 29 the null hypothesis was not rejected in the direction of pretest-posttest test score improvement for Group 1. The Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 1 (M = 39.63, SD = 17.04) compared to the posttest score (M = 41.25, SD = 13.33) was not statistically significantly different, $t(7) = 0.34$, $p = .37$ (one-tailed), $d = .11$.

Research question #7b. The seventh hypothesis was tested using the dependent *t* test. Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 29. As seen in

Table 29 the null hypothesis was rejected in the direction of pretest-posttest test score improvement for Group 2. The Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 2 (M = 43.00, SD = 17.34) compared to the posttest score (M = 53.86, SD = 17.06) was statistically significantly different, $t(6)$ = 2.35, p = .03 (one-tailed), d = .63.

Research question #7c. The seventh hypothesis was tested using the dependent t test. Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 29. As seen in Table 29 the null hypothesis was not rejected in the direction of pretest-posttest test score decline for Group 3. The Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 3 (M = 49.73, SD = 10.69) compared to the posttest score (M = 45.87, SD = 16.08) was not statistically significantly different, $t(14)$ = -1.07, p = .15 (one-tailed), d = .29.

Research question #7d. The seventh hypothesis was tested using the dependent t test. Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test

scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 29. As seen in Table 29 the null hypothesis was not rejected in the direction of pretest-posttest test score decline for Group 4. The Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 4 (M = 61.82, SD = 15.47) compared to the posttest score (M = 56.55, SD = 14.80) was not statistically significantly different, $t(10) = -1.71$, $p = .06$ (one-tailed), $d = .35$.

Research question #7e. The seventh hypothesis was tested using the dependent t test. Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 29. As seen in Table 29 the null hypothesis was not rejected in the direction of pretest-posttest test score improvement for Group 5. The The Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 5 (M = 62.11, SD = 10.11) compared to the posttest score (M =

64.05, *SD* = 10.43) was not statistically significantly different, *t*(18) = 0.77, *p* = .22 (one-tailed), *d* = .19.

Research question #7f. The seventh hypothesis was tested using the dependent *t* test. Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 29. As seen in Table 29 the null hypothesis was not rejected in the direction of pretest-posttest test score decline for Group 6. The Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 6 (*M* = 65.62, *SD* = 11.81) compared to the posttest score (*M* = 63.17, *SD* = 9.46) was not statistically significantly different, *t*(28) = -0.92, *p* = .18 (one-tailed), *d* = .23.

Research question #7g. The seventh hypothesis was tested using the dependent *t* test. Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 29. As seen in Table 29 the null hypothesis was not rejected in the

direction of pretest-posttest test score decline for Group 7. The Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 7 (M = 71.97, SD = 12.34) compared to the posttest score (M = 71.40, SD = 10.34) was not statistically significantly different, $t(34) = -0.29$, $p = .39$ (one-tailed), $d = .05$.

Research question #7h. The seventh hypothesis was tested using the dependent t test. Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 29. As seen in Table 29 the null hypothesis was not rejected in the direction of pretest-posttest test score improvement for Group 8. The Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 8 (M = 74.37, SD = 14.78) compared to the posttest score (M = 75.77, SD = 11.72) was not statistically significantly different, $t(61) = 0.84$, $p = .20$ (one-tailed), $d = .11$.

Overall, pretest-posttest results indicated that following the year long school-wide differentiated home room academic extension re-teaching initiative Groups 1, 2, 5, and 8 Reading Terra Nova Normal Curve Equivalent Norm

Referenced Achievement Test scores were measured in the direction of improvement. However, Groups 3, 4, 6, and 7 Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores were measured in the direction of decline. Comparing student measured cognitive decile groups Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test posttest scores with derived achievement scores puts their performance in perspective. For Group 1 a posttest Reading Terra Nova mean NCE score of 41.25 is congruent with a Percentile Rank of 34, a Stanine Score of 4 (the lower stanine of the average range), and an achievement qualitative description of Average. For Group 2 a posttest Reading Terra Nova mean NCE score of 53.86 is congruent with a Percentile Rank of 55, a Stanine Score of 5 (the middle stanine of the average range), and an achievement qualitative description of Average. For Group 3 a posttest Reading Terra Nova mean NCE score of 45.87 is congruent with a Percentile Rank of 39, a Stanine Score of 4 (the lower stanine of the average range), and an achievement qualitative description of Average. For Group 4 a posttest Reading Terra Nova mean NCE score of 56.55 is congruent with a Percentile Rank of 73, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 5

a posttest Reading Terra Nova mean NCE score of 64.05 is congruent with a Percentile Rank of 75, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 6 a posttest Reading Terra Nova mean NCE score of 63.17 is congruent with a Percentile Rank of 73, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 7 a posttest Reading Terra Nova mean NCE score of 71.40 is congruent with a Percentile Rank of 84, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 8 a posttest Reading Terra Nova mean NCE score of 75.77 is congruent with a Percentile Rank of 88, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average.

Research Question #8

Table 30 displays the Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison means and standard deviations for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles.

Research question #8a. The eighth hypothesis was tested using the dependent *t* test. Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 31. As seen in Table 31 the null hypothesis was rejected in the direction of pretest-posttest test score improvement for Group 1. The Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 1 (M = 40.75, SD = 13.46) compared to the posttest score (M = 46.38, SD = 12.16) was statistically significantly different, $t(7) = 2.46$, $p = .02$ (one-tailed), $d = .44$.

Research question #8b. The eighth hypothesis was tested using the dependent *t* test. Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 31. As seen in Table 31 the null hypothesis was not rejected in the direction of pretest-posttest test score improvement for Group 2. The Math Terra Nova Normal Curve Equivalent Norm Referenced

Achievement Test pretest score for Group 2 (M = 43.00, SD = 16.92) compared to the posttest score (M = 48.43, SD = 11.91) was not statistically significantly different, $t(6) = 1.18$, p = .14 (one-tailed), d = .38.

Research question #8c. The eighth hypothesis was tested using the dependent t test. Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 31. As seen in Table 31 the null hypothesis was not rejected in the direction of pretest-posttest test score improvement for Group 3. The Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 3 (M = 48.00, SD = 8.35) compared to the posttest score (M = 51.67, SD = 10.91) was not statistically significantly different, $t(14) = 1.14$, p = .14 (one-tailed), d = .38.

Research question #8d. The eighth hypothesis was tested using the dependent t test. Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive

deciles were displayed in Table 31. As seen in Table 31 the null hypothesis was not rejected in the direction of pretest-posttest test score no change for Group 4. The Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 4 (M = 57.91, SD = 9.91) compared to the posttest score (M = 57.91, SD = 12.19) was not statistically significantly different, $t(10) = 0.00$, p = .50 (one-tailed), d = .00.

Research question #8e. The eighth hypothesis was tested using the dependent t test. Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 31. As seen in Table 31 the null hypothesis was not rejected in the direction of pretest-posttest test score improvement for Group 5. The Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 5 (M = 64.89, SD = 10.45) compared to the posttest score (M = 65.68, SD = 10.84) was not statistically significantly different, $t(18) = 0.39$, p = .35 (one-tailed), d = .07.

Research question #8f. The eighth hypothesis was tested using the dependent t test. Math Terra Nova Normal

Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 31. As seen in Table 31 the null hypothesis was not rejected in the direction of pretest-posttest test score improvement for Group 6. The Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 6 (M = 65.28, SD = 10.77) compared to the posttest score (M = 66.10, SD = 14.87) was not statistically significantly different, $t(28) = 0.36$, p = .36 (one-tailed), d = .06.

Research question #8g. The eighth hypothesis was tested using the dependent t test. Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 31. As seen in Table 31 the null hypothesis was not rejected in the direction of pretest-posttest test score improvement for Group 7. The Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 7 (M = 72.69, SD = 10.90) compared to the posttest score (M = 72.97, SD =

12.01) was not statistically significantly different, $t(34) = 0.18$, $p = .43$ (one-tailed), $d = .02$.

Research question #8h. The eighth hypothesis was tested using the dependent *t* test. Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores pretest-posttest comparison for 8th-grade students who completed the school-wide differentiated home room academic extension re-teaching initiative by measured cognitive deciles were displayed in Table 31. As seen in Table 31 the null hypothesis was not rejected in the direction of pretest-posttest test score improvement for Group 8. The Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test pretest score for Group 8 ($M = 79.35$, $SD = 12.25$) compared to the posttest score ($M = 80.48$, $SD = 11.94$) was not statistically significantly different, $t(61) = 0.86$, $p = .20$ (one-tailed), $d = .09$.

Overall, pretest-posttest results indicated that following the year long school-wide differentiated home room academic extension re-teaching initiative Groups 1, 2, 3, 5, 6, 7, and 8 Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores were measured in the direction of improvement. Group 4 showed no change in Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores. Comparing student measured

cognitive decile groups Terra Nova posttest math NCE scores with derived achievement scores puts their performance in perspective. For Group 1 a posttest Math Terra Nova mean NCE score of 46.38 is congruent with a Percentile Rank of 42, a Stanine Score of 5 (the middle stanine of the average range), and an achievement qualitative description of Average. For Group 2 a posttest Math Terra Nova mean NCE score of 48.43 is congruent with a Percentile Rank of 47, a Stanine Score of 5 (the middle stanine of the average range), and an achievement qualitative description of Average. For Group 3 a posttest Math Terra Nova mean NCE score of 51.67 is congruent with a Percentile Rank of 53, a Stanine Score of 5 (the middle stanine of the average range), and an achievement qualitative description of Average. For Group 4 a posttest Math Terra Nova mean NCE score of 57.91 is congruent with a Percentile Rank of 63, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 5 a posttest Math Terra Nova mean NCE score of 65.68 is congruent with a Percentile Rank of 75, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 6 a posttest Math Terra Nova mean NCE score of 66.10 is congruent with a Percentile Rank of 77, a

Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 7 a posttest Math Terra Nova mean NCE score of 72.97 is congruent with a Percentile Rank of 84, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 8 a posttest Math Terra Nova mean NCE score of 80.48 is congruent with a Percentile Rank of 92, a Stanine Score of 8 (the middle stanine of the above average range), and an achievement qualitative description of Above Average.

Research Question #9

The ninth hypothesis was tested using a single classification Analysis of Variance (ANOVA) to determine the main effect between students' posttest Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Score means.

Research question #9a. Measured cognitive decile groups posttest Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test means scores were displayed in Table 32. As seen in Table 32 the null hypothesis was rejected. The posttest Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean scores for Group 1 (M = 41.25, SD = 13.33), Group 2 (M

= 53.86, *SD* = 17.06), Group 3 (*M* = 45.87, *SD* = 16.08), Group 4 (*M* = 56.55, *SD* = 14.80), Group 5 (*M* = 64.05, *SD* = 10.43), Group 6 (*M* = 63.17, *SD* = 9.46), Group 7 (*M* = 71.40, *SD* = 10.34), and Group 8 (*M* = 75.77, *SD* = 11.72) were different and the main effect of overall posttest Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean scores was statistically significant, ($F(7, 178) = 20.36$, $p < .0001$). *Post hoc* contrast analyses were conducted and displayed in Table 33. As seen in Table 33 the null hypothesis was rejected for the following independent *t* test comparisons: G1 v G4, G1 v G5, G1 v G6, G1 v G7, G1 v G8, G2 v G4, G2 v G5, G2 v G6, G2 v G7, G2 v G8, G3 v G4, G3 v G5, G3 v G6, G3 v G7, G3 v G8, G4 v G6, G4 v G7, G4 v G8, G5 v G7, G5 v G8, G6 v G7, G6 v G8, and G7 v G8. As seen in Table 33 the null hypothesis was not rejected for the following independent *t* test comparisons: G1 v G2, G1 v G3, G2 v G3, G4 v G5, and G5 v G6.

Overall, higher numbered decile groups had higher mean posttest Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores compared to lower numbered decile groups with the exception of G2 v G3 and G5 v G6. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 33 posttest Reading Terra Nova Normal Curve Equivalent Norm Referenced

Achievement Test mean scores displayed in Table 32 where 34.52 mean score points separates the lowest posttest Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean score yielded by G1 (41.25) compared to the highest posttest Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean score yielded by G8 (75.77). As a result the largest mean differences observed in Table 33 were for the G1 v G5 (22.80), G1 v G6 (21.92), G1 v G7 (30.15), G1 v G8 (34.52), G2 v G8 (21.91), G3 v G7 (25.52), and G3 v G8 (29.90) comparisons.

Research question #9b. Measured cognitive decile groups posttest Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean scores were displayed in Table 34. As seen in Table 34 the null hypothesis was rejected. The posttest Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean scores for Group 1 (M = 46.38, SD = 12.16), Group 2 (M = 48.43, SD = 11.91), Group 3 (M = 51.67, SD = 10.91), Group 4 (M = 57.91, SD = 12.19), Group 5 (M = 65.68, SD = 10.84), Group 6 (M = 66.10, SD = 14.87), Group 7 (M = 72.97, SD = 12.01), and Group 8 (M = 80.48, SD = 11.94) were different and the main effect of overall posttest Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean

scores was statistically significant, ($F(7, 178) = 20.85$, $p < .0001$). *Post hoc* contrast analyses were conducted and displayed in Table 35. As seen in Table 35 the null hypothesis was rejected for the following independent *t* test comparisons: G1 v G4, G1 v G5, G1 v G6, G1 v G7, G1 v G8, G2 v G5, G2 v G6, G2 v G7, G2 v G8, G3 v G5, G3 v G6, G3 v G7, G3 v G8, G4 v G5, G4 v G7, G4 v G8, G5 v G7, G5 v G8, G6 v G7, G6 v G8, and G7 v G8. As seen in Table 35 the null hypothesis was not rejected for the following independent *t* test comparisons: G1 v G2, G1 v G3, G2 v G3, G2 v G4, G3 v G4, G4 v G6, and G5 v G6.

Overall, higher numbered decile groups had higher mean posttest Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores compared to lower numbered decile groups. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 35 posttest Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean scores displayed in Table 34 where 34.10 mean score points separates the lowest posttest Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean score yielded by G1 (46.38) compared to the highest posttest Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean score yielded by G8 (80.48). As a

result the largest mean differences observed in Table 35 were for the G1 v G7 (26.59), G1 v G8 (34.10), G2 v G7 (24.54), G2 v G8 (32.05), and G4 v G8 (22.57) comparisons.

Table 1

Demographic Information of 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles (a, b)	Students	Demographic Information			
		Gender		Special Education	
	n	Male	Female	Male	Female
Group 1	8	5	3	2	1
Group 2	7	5	2	1	1
Group 3	15	9	6	2	1
Group 4	11	5	6	1	1
Group 5	19	14	5	2	0
Group 6	29	15	14	1	0
Group 7	35	19	16	1	0
Group 8	62	34	28	0	1

(a) Note: All students were in attendance in the research school for the 7th-grade and 8th-grade school years.
(b) Note: Group 1 = 1st, 2nd, 3rd cognitive deciles; Group 2 = 4th cognitive decile; Group 3 = 5th cognitive decile; Group 4 = 6th cognitive decile; Group 5 = 7th cognitive decile; Group 6 = 8th cognitive decile; Group 7 = 9th cognitive decile; Group 8 = 10th cognitive decile.

Table 2

Essential Learner Outcomes Reading Test Scores Converted to Standard Score Means and Standard Deviations for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles (a)	Students	Essential Learner Outcomes Reading Test			
		Pretest		Posttest	
	n	*M*	*SD*	*M*	*SD*
Group 1	8	107.50	9.32	110.13	6.94
Group 2	7	107.57	7.55	104.14	10.06
Group 3	15	109.67	7.76	109.93	6.39
Group 4	11	115.45	4.16	114.00	4.88
Group 5	19	117.84	3.04	115.26	3.75
Group 6	29	118.00	2.38	116.69	2.88
Group 7	35	119.91	2.98	118.63	3.51
Group 8	62	120.77	4.18	119.32	3.27

(a) Note: All students were in attendance in the research school for the 7th-grade and 8th-grade school years.

Table 3

Essential Learner Outcomes Pretest-Posttest Reading Test Standard Scores Comparison for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles	*n*	$\bar{D}$	*t* (a)	*d*	*p*
Group 1	8	2.63	1.64	.32	.07 *ns.*
Group 2	7	3.43	-1.02	.39	.17 *ns.*
Group 3	15	0.26	0.13	.04	.45 *ns.*
Group 4	11	1.45	-1.07	.32	.16 *ns.*
Group 5	19	2.58	-2.84	.76	.01 *sig.*
Group 6	29	1.31	-2.34	.50	.01 *sig.*
Group 7	35	1.28	-1.91	.39	.03 *sig.*
Group 8	62	1.45	-2.94	.39	.002 *sig.*

(a) Note: Negative *t* result is in the direction of lower mean posttest scores.

Table 4

Essential Learner Outcome Math Test Scores Converted to Standard Score Means and Standard Deviations for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

		Essential Learner Outcomes Math Test			
	Students	Pretest		Posttest	
Measured Cognitive Deciles (a)	*n*	*M*	*SD*	*M*	*SD*
Group 1	8	105.50	6.32	107.38	6.50
Group 2	7	106.00	7.55	103.57	7.74
Group 3	15	107.67	6.77	108.00	8.03
Group 4	11	114.09	4.50	113.82	6.90
Group 5	19	115.89	4.37	115.84	4.83
Group 6	29	116.45	5.21	115.52	4.46
Group 7	35	118.83	3.68	118.74	4.18
Group 8	62	119.65	3.47	120.47	4.35

(a) Note: All students were in attendance in the research school for the 7th-grade and 8th-grade school years.

Table 5

Essential Learner Outcomes Pretest-Posttest Math Test Standard Scores Comparison for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles	*n*	$\bar{D}$	*t* (a)	*d*	*p*
Group 1	8	1.88	1.97	.29	.04 *sig.*
Group 2	7	2.34	-2.07	.32	.04 *sig.*
Group 3	15	0.33	0.24	.04	.41 *ns.*
Group 4	11	0.27	-0.18	.05	.43 *ns.*
Group 5	19	0.05	-0.06	.01	.48 *ns.*
Group 6	29	0.93	-1.29	.19	.10 *ns.*
Group 7	35	0.09	-0.18	.02	.43 *ns.*
Group 8	62	0.82	2.04	.21	.02 *sig.*

(a) Note: Negative *t* result is in the direction of lower mean posttest scores.

Table 6

Results of Analysis of Variance for Essential Learner Outcomes Converted Reading Standard Scores for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Source of Variation	Sum of Squares	Mean Square	*df*	*F*	
Between Groups	2786.72	398.10	7	21.41	(a)
Within Groups	3310.28	18.60	178		

Posttest Reading Mean Scores

	Mean	*SD*	
$\overline{G1}$	110.13	(6.94)	(b)
$\overline{G2}$	104.14	(10.06)	
$\overline{G3}$	109.93	(6.39)	
$\overline{G4}$	114.00	(4.88)	
$\overline{G5}$	115.26	(3.75)	
$\overline{G6}$	116.69	(2.88)	
$\overline{G7}$	118.63	(3.51)	
$\overline{G8}$	119.32	(3.27)	

(a) Note: *sig.* < .0001.

(b) Note: *post hoc* results displayed in Table 7

Table 7

Posttest-Posttest Essential Learner Outcomes Converted Reading Scores Contrast Analysis Comparisons

Decile Groups	$\bar{D}$	*t* (a)	*d*	*p*	
G1 v G2	5.99	-1.36	.70	.10	*ns.*
G1 v G3	0.20	-0.07	.03	.47	*ns.*
G1 v G4	3.87	1.43	.66	.08	*ns.*
G1 v G5	5.13	2.51	.96	.01	*sig.*
G1 v G6	6.56	4.08	1.34	.0001	*sig.*
G1 v G7	8.50	5.06	1.63	< .0001	*sig.*
G1 v G8	9.19	6.42	1.80	< .0001	*sig.*
G2 v G3	5.79	1.65	.70	.06	*ns.*
G2 v G4	9.86	2.85	1.32	.006	*sig.*
G2 v G5	11.12	4.20	1.61	.0002	*sig.*
G2 v G6	12.55	6.00	1.94	< .0001	*sig.*
G2 v G7	14.49	6.91	2.14	< .0001	*sig.*
G2 v G8	15.18	8.78	2.28	< .0001	*sig.*
G3 v G4	4.07	1.76	.72	.05	*sig.*
G3 v G5	5.33	3.04	1.05	.002	*sig.*
G3 v G6	6.76	4.86	1.46	< .0001	*sig.*
G3 v G7	8.70	6.21	1.76	< .0001	*sig.*
G3 v G8	9.39	8.08	1.94	< .0001	*sig.*
G4 v G5	1.26	0.80	.29	.22	*ns.*
G4 v G6	2.69	2.16	.69	.02	*sig.*
G4 v G7	4.63	3.47	1.10	.0006	*sig.*
G4 v G8	5.32	4.59	1.31	< .0001	*sig.*
G5 v G6	1.14	1.49	.43	.07	ns.
G5 v G7	3.37	2.38	.61	.01	*sig.*
G5 v G8	4.06	3.71	.86	.0002	*sig.*
G6 v G7	1.94	2.38	.61	.01	*sig.*
G6 v G8	2.63	3.71	.86	.0002	*sig.*
G7 v G8	0.69	0.98	.20	.17	*ns.*

(a) Note: Negative *t* result is in the direction of lower numbered group with a higher mean posttest score.

Table 8

Results of Analysis of Variance for Essential Learner Outcomes Converted Math Standard Scores for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Source of Variation	Sum of Squares	Mean Square	*df*	*F*	
Between Groups	4180.03	597.15	7	22.33	(a)
Within Groups	4759.12	26.74	178		

Posttest Math Mean Scores

	Mean	*SD*	
$\overline{G1}$	107.63	(6.50)	(b)
$\overline{G2}$	103.57	(7.74)	
$\overline{G3}$	108.00	(8.03)	
$\overline{G4}$	113.82	(6.90)	
$\overline{G5}$	115.84	(4.83)	
$\overline{G6}$	115.52	(4.46)	
$\overline{G7}$	118.74	(4.18)	
$\overline{G8}$	120.47	(4.35)	

(a) Note: *sig.* < .0001.

(b) Note: *post hoc* results displayed in Table 9.

Table 9

Posttest-Posttest Essential Learner Outcomes Converted Math Scores Contrast Analysis Comparisons

Decile Groups	$\bar{D}$	*t* (a)	*d*	*p*	
G1 v G2	3.81	-1.03	.53	.10	*ns.*
G1 v G3	0.62	0.19	.09	.43	*ns.*
G1 v G4	6.44	2.06	.96	.03	*sig.*
G1 v G5	8.46	3.75	1.49	.0005	*sig.*
G1 v G6	8.14	4.13	1.49	.0001	*sig.*
G1 v G7	11.36	6.22	2.13	< .0001	*sig.*
G1 v G8	13.09	7.55	2.41	< .0001	*sig.*
G2 v G3	4.43	1.22	.56	.12	*ns.*
G2 v G4	10.25	2.93	1.40	.005	*sig.*
G2 v G5	12.27	4.87	1.95	< .0001	*sig.*
G2 v G6	11.95	5.46	1.96	< .0001	*sig.*
G2 v G7	15.17	7.50	2.54	< .0001	*sig.*
G2 v G8	16.90	8.92	2.80	< .0001	*sig.*
G3 v G4	5.82	1.93	.78	.03	*sig.*
G3 v G5	7.84	3.53	1.22	.0006	*sig.*
G3 v G6	7.52	4.01	1.20	.0001	*sig.*
G3 v G7	10.74	6.23	1.76	< .0001	*sig.*
G3 v G8	12.47	8.28	2.02	< .0001	*sig.*
G4 v G5	2.02	0.94	.34	.18	*ns.*
G4 v G6	1.70	0.92	.30	.18	*ns.*
G4 v G7	4.92	2.89	.89	.003	*sig.*
G4 v G8	6.65	4.24	1.18	< .0001	*sig.*
G5 v G6	0.32	-0.24	.07	.41	*ns.*
G5 v G7	2.90	2.30	.64	.01	*sig.*
G5 v G8	4.63	3.95	1.01	< .0001	*sig.*
G6 v G7	3.22	2.98	.75	.002	*sig.*
G6 v G8	4.95	5.02	1.13	< .0001	*sig.*
G7 v G8	1.73	1.90	.41	.03	*sig.*

(a) Note: Negative *t* result is in the direction of lower numbered group with a higher mean posttest score.

Table 10

Analysis of Observed Pretest-Posttest Essential Learner Outcomes Reading Test Proficiency Category Frequency Change for All 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative

	Reading Test Proficiency Categories								
	Below Proficient		Barely Proficient		Proficient		Beyond Proficient		X^2
Reading	N	%	N	%	N	%	N	%	
Pretest	11	(58)	10	(29)	102	(59)	63	(43)	
Posttest	8	(42)	25	(71)	70	(41)	83	(57)	
Total	19	(100)	35	(100)	172	(100)	146	(100)	
									X^2 = 15.54*

*p < .01 for Observed verses Expected Cell Frequencies with df = 3.

Table 11

Analysis of Observed Pretest-Posttest Essential Learner Outcomes Math Test Proficiency Category Frequency Change for All 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative

	Math Test Proficiency Categories								
	Below Proficient		Barely Proficient		Proficient		Beyond Proficient		X^2
Math	N	%	N	%	N	%	N	%	
Pretest	8	(62)	12	(39)	114	(60)	52	(38)	
Posttest	5	(38)	19	(61)	77	(40)	85	(62)	
Total	13	(100)	31	(100)	191	(100)	137	(100)	
									X^2 = 17.36**

*p < .001 for Observed verses Expected Cell Frequencies with df = 3.

Table 12

First Trimester and Third Trimester Social Studies Core Subject Mean Grade Scores for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles (a)	Students	Social Studies Core Subject Mean Grade Scores			
		1st-Trimester		3rd-Trimester	
	n	*M*	*SD*	*M*	*SD*
Group 1	8	1.88	.64	2.00	.53
Group 2	7	2.43	1.40	3.14	1.35
Group 3	15	2.47	1.06	2.93	1.16
Group 4	11	1.55	.82	2.18	1.17
Group 5	19	1.79	.85	2.00	1.00
Group 6	29	1.72	.88	1.76	.87
Group 7	35	1.31	.58	1.43	.78
Group 8	62	1.23	.56	1.34	.77

(a) Note: All students were in attendance in the research school for the 7th-grade and 8th-grade school years.

Table 13

First Trimester and Third Trimester Social Studies Core Subject Mean Grade Scores Comparison for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles	Social Studies Core Subject Mean Grade Scores			
	n	$\bar{D}$	*t* (a)	*d*	*p*
Group 1	8	0.12	0.55	.20	.30 *ns.*
Group 2	7	0.71	1.99	.51	.05 *sig.*
Group 3	15	0.46	2.43	.41	.01 *sig.*
Group 4	11	0.63	4.18	.63	.001 *sig.*
Group 5	19	0.21	1.00	.23	.17 *ns.*
Group 6	29	0.04	0.21	.05	.42 *ns.*
Group 7	35	0.12	1.28	.18	.11 *ns.*
Group 8	62	0.11	1.72	.16	.04 *sig.*

(a) Note: Negative *t* result is in the direction of 3rd-trimester mean grade score improvement.

Table 14

First Trimester and Third Trimester Science Core Subject Mean Grade Scores for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles (a)	Students	Science Core Subject Mean Grade Scores			
		1st-Trimester		3rd-Trimester	
	n	*M*	*SD*	*M*	*SD*
Group 1	8	2.38	.74	2.13	.99
Group 2	7	2.43	.53	2.71	.49
Group 3	15	2.67	1.05	2.60	1.06
Group 4	11	2.36	.92	2.18	1.17
Group 5	19	2.05	.78	2.00	1.00
Group 6	29	1.90	.77	1.76	.91
Group 7	35	1.37	.55	1.26	.44
Group 8	62	1.24	.59	1.18	.46

(a) Note: All students were in attendance in the research school for the 7th-grade and 8th-grade school years.

Table 15

First Trimester and Third Trimester Science Core Subject Mean Grade Scores Comparison for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles	*n*	Science Core Subject Mean Grade Scores			
		$\bar{D}$	*t* (a)	*d*	*p*
Group 1	8	0.25	-0.68	.29	.26 *ns.*
Group 2	7	0.28	1.00	.55	.18 *ns.*
Group 3	15	0.07	-0.56	.07	.29 *ns.*
Group 4	11	0.18	-1.00	.17	.17 *ns.*
Group 5	19	0.05	-0.25	.06	.40 *ns.*
Group 6	29	0.14	-1.07	.17	.15 *ns.*
Group 7	35	0.11	-1.44	.22	.08 *ns.*
Group 8	62	0.06	-1.07	.11	.14 *ns.*

(a) Note: Negative *t* result is in the direction of 3rd-trimester mean grade score improvement.

Table 16

First Trimester and Third Trimester English Core Subject Mean Grade Scores for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles (a)	Students	English Core Subject Mean Grade Scores			
		1st-Trimester		3rd-Trimester	
	n	*M*	*SD*	*M*	*SD*
Group 1	8	2.38	.52	2.38	.74
Group 2	7	2.43	.53	2.86	1.07
Group 3	15	2.73	1.16	3.00	1.31
Group 4	11	2.09	1.04	1.91	.94
Group 5	19	1.89	.74	2.11	.66
Group 6	29	1.79	.73	1.86	.92
Group 7	35	1.49	.61	1.31	.47
Group 8	62	1.44	.67	1.39	.69

(a) Note: All students were in attendance in the research school for the 7th-grade and 8th-grade school years.

Table 17

First Trimester and Third Trimester English Core Subject Mean Grade Scores Comparison for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles	*n*	English Core Subject Mean Grade Scores			
		$\bar{D}$	*t* (a)	*d*	*p*
Group 1	8	0.00	0.00	.00	.50 *ns.*
Group 2	7	0.43	0.89	.54	.20 *ns.*
Group 3	15	0.27	1.00	.22	.17 *ns.*
Group 4	11	0.18	-0.80	.18	.22 *ns.*
Group 5	19	0.22	1.07	.31	.15 *ns.*
Group 6	29	0.07	0.40	.08	.35 *ns.*
Group 7	35	0.18	-2.65	.33	.006 *sig.*
Group 8	62	0.05	-0.62	.07	.27 *ns.*

(a) Note: Negative *t* result is in the direction of 3rd-trimester mean grade score improvement.

Table 18

First Trimester and Third Trimester Math Core Subject Mean Grade Scores for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles (a)	Students	Math Core Subject Mean Grade Scores			
		1st-Trimester		3rd-Trimester	
	n	*M*	*SD*	*M*	*SD*
Group 1	8	2.75	.71	3.25	1.16
Group 2	7	2.86	.90	3.43	1.13
Group 3	15	2.60	.83	3.13	1.25
Group 4	11	2.55	1.21	3.00	1.61
Group 5	19	2.00	.75	2.47	1.17
Group 6	29	2.10	.94	2.45	.99
Group 7	35	1.66	.64	1.97	.98
Group 8	62	1.52	.62	1.76	.82

(a) Note: All students were in attendance in the research school for the 7th-grade and 8th-grade school years.

Table 19

First Trimester and Third Trimester Math Core Subject Mean Grade Scores Comparison for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles		Math Core Subject Mean Grade Scores			
	n	$\bar{D}$	*t* (a)	*d*	*p*
Group 1	8	0.50	1.87	.53	.05 *sig.*
Group 2	7	0.57	1.55	.56	.09 *ns.*
Group 3	15	0.53	2.26	.51	.02 *sig.*
Group 4	11	0.45	1.84	.32	.05 *sig.*
Group 5	19	0.47	2.45	.49	.01 sig.
Group 6	29	0.35	1.98	.36	.03 *sig.*
Group 7	35	0.31	2.45	.38	.01 *sig.*
Group 8	62	0.24	2.66	.33	.005 *sig.*

(a) Note: Negative *t* result is in the direction of 3rd-trimester mean grade score improvement.

Table 20

Results of Analysis of Variance for Core Subject Social Studies Third Trimester Mean Grade Scores for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Source of Variation	Sum of Squares	Mean Square	*df*	*F*
Between Groups	52.40	7.49	7	9.44 (a)
Within Groups	141.20	0.79	178	

Third Trimester Social Studies Mean Grade Scores

	Mean	*SD*	
$\overline{G1}$	2.00	(.53)	(b)
$\overline{G2}$	3.14	(1.35)	
$\overline{G3}$	2.93	(1.16)	
$\overline{G4}$	2.18	(1.17)	
$\overline{G5}$	2.00	(1.00)	
$\overline{G6}$	1.76	(.87)	
$\overline{G7}$	1.43	(.78)	
$\overline{G8}$	1.34	(.77)	

(a) Note: *sig.* < .0001.

(b) Note: *post hoc* results displayed in Table 21.

Table 21

Posttest-Posttest Core Subject Social Studies Third Trimester Mean Grade Score Contrast Analysis Comparisons

Decile Groups	$\bar{D}$	*t* (a)	*d*	*p*	
G1 v G2	1.14	-2.22	1.21	.02	*sig.*
G1 v G3	0.93	-2.14	1.09	.02	*sig.*
G1 v G4	0.18	-0.41	.21	.34	*ns.*
G1 v G5	0.00	0.00	.00	.50	*ns.*
G1 v G6	0.24	0.74	.34	.23	*ns.*
G1 v G7	0.57	1.97	.86	.03	*sig.*
G1 v G8	0.66	2.36	1.01	.01	*sig.*
G2 v G3	0.21	0.38	.17	.36	*ns.*
G2 v G4	0.96	1.61	.76	.06	*ns.*
G2 v G5	1.14	2.36	.97	.01	*sig.*
G2 v G6	1.38	3.38	1.24	.0009	*sig.*
G2 v G7	1.71	4.67	1.61	< .0001	*sig.*
G2 v G8	1.80	5.42	1.70	< .0001	*sig.*
G3 v G4	0.75	1.63	.64	.05	*sig.*
G3 v G5	0.93	2.52	.86	.01	*sig.*
G3 v G6	1.17	3.77	1.15	.0002	*sig.*
G3 v G7	1.50	5.37	1.54	< .0001	*sig.*
G3 v G8	1.59	6.48	1.65	< .0001	*sig.*
G4 v G5	0.18	0.45	.17	.33	*ns.*
G4 v G6	0.42	1.25	.41	.11	*ns.*
G4 v G7	0.75	2.47	.77	.009	*sig.*
G4 v G8	0.84	3.09	.87	.001	*sig.*
G5 v G6	0.24	0.88	.26	.19	*ns.*
G5 v G7	0.57	2.33	.64	.01	*sig.*
G5 v G8	0.66	3.05	.75	.001	*sig.*
G6 v G7	0.33	1.60	.40	.06	*ns.*
G6 v G8	0.42	2.33	.51	.01	*sig.*
G7 v G8	0.09	0.55	.12	.29	*ns.*

(a) Note: Negative *t* result indicates lower numbered decile group has a better third trimester mean grade score than the higher numbered decile comparison group.

Table 22

Results of Analysis of Variance for Core Subject Science Trimester Three Mean Grade Score for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Source of Variation	Sum of Squares	Mean Square	*df*	*F*	
Between Groups	48.28	6.90	7	12.45	(a)
Within Groups	98.58	0.55	178		

Third Trimester Science Mean Grade Scores

	Mean	*SD*	
$\overline{G1}$	2.13	(.99)	(b)
$\overline{G2}$	2.71	(.49)	
$\overline{G3}$	2.60	(1.06)	
$\overline{G4}$	2.18	(1.17)	
$\overline{G5}$	2.00	(1.00)	
$\overline{G6}$	1.76	(.91)	
$\overline{G7}$	1.26	(.44)	
$\overline{G8}$	1.18	(.46)	

(a) Note: *sig.* < .0001.

(b) Note: *post hoc* results displayed in Table 23.

Table 23

Posttest-Posttest Core Subject Science Third Trimester Mean Grade Score Contrast Analysis Comparisons

Decile Groups	$\bar{D}$	*t* (a)	*d*	*p*	
G1 v G2	0.58	-1.42	.78	.09	*ns.*
G1 v G3	0.47	-1.05	.46	.15	*ns.*
G1 v G4	0.05	-0.11	.05	.46	*ns.*
G1 v G5	0.13	0.30	.13	.38	*ns.*
G1 v G6	0.37	0.99	.39	.16	*ns.*
G1 v G7	0.87	3.85	1.21	.0002	*sig.*
G1 v G8	0.95	4.66	1.31	< .0001	*sig.*
G2 v G3	0.11	0.27	.14	.39	*ns.*
G2 v G4	0.53	1.13	.64	.14	*ns.*
G2 v G5	0.71	1.80	.95	.04	*sig.*
G2 v G6	0.95	2.66	1.36	.01	*sig.*
G2 v G7	1.45	7.81	3.09	< .0001	*sig.*
G2 v G8	1.53	8.29	3.23	< .0001	*sig.*
G3 v G4	0.42	0.95	.38	.17	*ns.*
G3 v G5	0.60	1.70	.58	.05	*sig.*
G3 v G6	0.84	2.75	.86	.004	*sig.*
G3 v G7	1.34	6.39	1.79	< .0001	*sig.*
G3 v G8	1.42	8.00	1.88	< .0001	*sig.*
G4 v G5	0.18	0.45	.17	.33	*ns.*
G4 v G6	0.42	1.21	.40	.12	*ns.*
G4 v G7	0.92	3.94	1.14	.0001	*sig.*
G4 v G8	1.00	5.01	1.23	< .0001	*sig.*
G5 v G6	0.24	0.86	.25	.20	*ns.*
G5 v G7	0.74	3.78	1.02	.0002	*sig.*
G5 v G8	0.82	5.00	1.12	< .0001	*sig.*
G6 v G7	0.50	2.87	.74	.003	*sig.*
G6 v G8	0.58	4.04	.85	< .0001	*sig.*
G7 v G8	0.08	0.83	.18	.21	*ns.*

(a) Note: Negative *t* result indicates lower numbered decile group has a better third trimester mean grade score than the higher numbered decile comparison group.

Table 24

Results of Analysis of Variance for Core Subject English Trimester Three Mean Grade Score for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Source of Variation	Sum of Squares	Mean Square	*df*	*F*	
Between Groups	52.83	7.55	7	12.09	(a)
Within Groups	111.13	0.62	178		

Third Trimester English Mean Grade Scores

	Mean	*SD*	
$\overline{G1}$	2.38	(.74)	(b)
$\overline{G2}$	2.86	(1.07)	
$\overline{G3}$	3.00	(1.31)	
$\overline{G4}$	1.91	(.94)	
$\overline{G5}$	2.11	(.66)	
$\overline{G6}$	1.86	(.92)	
$\overline{G7}$	1.31	(.47)	
$\overline{G8}$	1.39	(.69)	

(a) Note: *sig.* < .0001.

(b) Note: *post hoc* results displayed in Table 25.

Table 25

Posttest-Posttest Core Subject English Third Trimester Mean Grade Score Contrast Analysis Comparisons

Decile Groups	$\bar{D}$	*t* (a)	*d*	*p*	
G1 v G2	0.48	-1.03	.53	.16	*ns.*
G1 v G3	0.62	-1.24	.61	.11	*ns.*
G1 v G4	0.47	1.16	.56	.13	*ns.*
G1 v G5	0.27	0.94	.39	.18	*ns.*
G1 v G6	0.52	1.45	.63	.08	*ns.*
G1 v G7	1.07	5.13	1.77	< .0001	*sig.*
G1 v G8	0.99	3.80	1.39	.0002	sig.
G2 v G3	0.14	-0.25	.12	.40	*ns.*
G2 v G4	0.95	1.98	.94	.03	*sig.*
G2 v G5	0.75	2.18	.87	.02	*sig.*
G2 v G6	1.00	2.50	1.01	.009	*sig.*
G2 v G7	1.55	6.21	2.02	< .0001	*sig.*
G2 v G8	1.47	5.06	1.68	< .0001	*sig.*
G3 v G4	1.09	2.15	.90	.02	*sig.*
G3 v G5	0.89	2.35	.83	.01	*sig.*
G3 v G6	1.14	3.08	.95	.002	*sig.*
G3 v G7	1.69	6.34	1.80	< .0001	*sig.*
G3 v G8	1.61	6.24	1.53	< .0001	*sig.*
G4 v G5	0.20	-0.67	.25	.25	*ns.*
G4 v G6	0.05	0.14	.05	.44	*ns.*
G4 v G7	0.60	2.81	.85	.004	*sig.*
G4 v G8	0.52	2.19	.64	.02	*sig.*
G5 v G6	0.25	1.00	.32	.16	*ns.*
G5 v G7	0.80	5.11	1.42	< .0001	*sig.*
G5 v G8	0.72	4.03	1.07	< .0001	*sig.*
G6 v G7	0.55	3.09	.79	.002	*sig.*
G6 v G8	0.47	2.76	.59	.004	*sig.*
G7 v G8	0.08	-0.56	.14	.29	*ns.*

(a) Note: Negative *t* result indicates lower numbered decile group has a better third trimester mean grade score than the higher numbered decile comparison group.

Table 26

Results of Analysis of Variance for Core Subject Math Trimester Three Mean Grade Score for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Source of Variation	Sum of Squares	Mean Square	*df*	*F*	
Between Groups	55.12	7.87	7	7.33	(a)
Within Groups	191.20	1.07	178		

Third Trimester Math Mean Grade Scores

	Mean	*SD*	
$\overline{G1}$	3.25	(1.16)	(b)
$\overline{G2}$	3.43	(1.13)	
$\overline{G3}$	3.13	(1.25)	
$\overline{G4}$	3.00	(1.61)	
$\overline{G5}$	2.47	(1.17)	
$\overline{G6}$	2.45	(.99)	
$\overline{G7}$	1.97	(.98)	
$\overline{G8}$	1.76	(.82)	

(a) Note: *sig.* < .0001.

(b) Note: *post hoc* results displayed in Table 27.

Table 27

Posttest-Posttest Core Subject Math Third Trimester Mean Grade Score Contrast Analysis Comparisons

Decile Groups	$\bar{D}$	*t* (a)	*d*	*p*	
G1 v G2	0.18	-0.30	.16	.38	*ns.*
G1 v G3	0.12	0.22	.10	.41	*ns.*
G1 v G4	0.25	0.37	.18	.36	*ns.*
G1 v G5	0.78	1.57	.67	.06	*ns.*
G1 v G6	0.80	1.96	.74	.03	*sig.*
G1 v G7	1.28	3.21	1.19	.001	*sig.*
G1 v G8	1.49	4.59	1.50	< .0001	*sig.*
G2 v G3	0.30	0.53	.25	.30	*ns.*
G2 v G4	0.43	0.61	.31	.28	*ns.*
G2 v G5	0.96	1.86	.83	.04	*sig.*
G2 v G6	0.98	2.30	.92	.01	*sig.*
G2 v G7	1.46	3.49	1.38	.0006	*sig.*
G2 v G8	1.67	4.89	1.70	< .0001	*sig.*
G3 v G4	0.13	0.24	.09	.41	*ns.*
G3 v G5	0.66	1.58	.55	.06	*ns.*
G3 v G6	0.68	2.00	.61	.03	*sig.*
G3 v G7	1.16	3.53	1.04	.0005	*sig.*
G3 v G8	1.37	5.21	1.32	< .0001	*sig.*
G4 v G5	0.53	1.03	.38	.16	*ns.*
G4 v G6	0.55	1.32	.42	.10	*ns.*
G4 v G7	1.03	2.57	.79	.007	*sig.*
G4 v G8	1.24	3.90	1.02	.0001	*sig.*
G5 v G6	0.02	0.08	.02	.47	*ns.*
G5 v G7	0.50	1.67	.46	.05	*sig.*
G5 v G8	0.71	2.98	.71	.002	*sig.*
G6 v G7	0.48	1.93	.49	.03	*sig.*
G6 v G8	0.69	3.50	.76	.0004	*sig.*
G7 v G8	0.21	1.14	.23	.13	*ns.*

(a) Note: Negative *t* result indicates lower numbered decile group has a better third trimester mean grade score than the higher numbered decile comparison group.

Table 28

Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Scores for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

		Terra Nova Reading NCE Scores			
	Students	Pretest		Posttest	
Measured Cognitive Deciles (a)	*n*	*M*	*SD*	*M*	*SD*
Group 1	8	39.63	17.04	41.25	13.33
Group 2	7	43.00	17.34	53.86	17.06
Group 3	15	49.73	10.69	45.87	16.08
Group 4	11	61.82	15.47	56.55	14.80
Group 5	19	62.11	10.11	64.05	10.43
Group 6	29	65.62	11.81	63.17	9.46
Group 7	35	71.97	12.34	71.40	10.34
Group 8	62	74.37	14.78	75.77	11.72

(a) Note: All students were in attendance in the research school for the 7th-grade and 8th-grade school years.

Table 29

Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Pretest-Posttest Scores Comparison for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles	Terra Nova Reading NCE Scores				
	n	$\bar{D}$	*t* (a)	*d*	*p*
Group 1	8	1.62	0.34	.11	.37 *ns.*
Group 2	7	10.86	2.35	.63	.03 *sig.*
Group 3	15	3.86	-1.07	.29	.15 *ns.*
Group 4	11	5.27	-1.71	.35	.06 *ns.*
Group 5	19	1.94	0.77	.19	.22 *ns.*
Group 6	29	2.45	-0.92	.23	.18 *ns.*
Group 7	35	0.57	-0.29	.05	.39 *ns.*
Group 8	62	1.40	0.84	.11	.20 *ns.*

(a) Note: Negative *t* result is in the direction of lower mean posttest scores.

Table 30

Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Scores for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles (a)	Students	Terra Nova Math NCE Scores			
		Pretest		Posttest	
	n	*M*	*SD*	*M*	*SD*
Group 1	8	40.75	13.46	46.38	12.16
Group 2	7	43.00	16.92	48.43	11.91
Group 3	15	48.00	8.35	51.67	10.91
Group 4	11	57.91	9.91	57.91	12.19
Group 5	19	64.89	10.45	65.68	10.84
Group 6	29	65.28	10.77	66.10	14.87
Group 7	35	72.69	10.90	72.97	12.01
Group 8	62	79.35	12.25	80.48	11.94

(a) Note: All students were in attendance in the research school for the 7th-grade and 8th-grade school years.

Table 31

Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test Pretest-Posttest Scores Comparison for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Measured Cognitive Deciles		Terra Nova Math NCE Scores			
	n	$\bar{D}$	*t*	*d*	*p*
Group 1	8	5.63	2.46	.44	.02 *sig.*
Group 2	7	5.43	1.18	.38	.14 *ns.*
Group 3	15	3.67	1.14	.38	.14 *ns.*
Group 4	11	0.00	0.00	.00	.50 *ns.*
Group 5	19	0.79	0.39	.07	.35 *ns.*
Group 6	29	0.82	0.36	.06	.36 *ns.*
Group 7	35	0.28	0.18	.02	.43 *ns.*
Group 8	62	1.13	0.86	.09	.20 *ns.*

Table 32

Results of Analysis of Variance for Reading Terra Nova Normal Curve Equivalent Scores for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Source of Variation	Sum of Squares	Mean Square	*df*	*F*	
Between Groups	20242.95	2891.85	7	20.36	(a)
Within Groups	25283.14	142.04	178		

Posttest Terra Nova Reading Mean Scores

	Mean	*SD*	
$\overline{G1}$	41.25	(13.33)	(b)
$\overline{G2}$	53.86	(17.06)	
$\overline{G3}$	45.87	(16.08)	
$\overline{G4}$	56.55	(14.80)	
$\overline{G5}$	64.05	(10.43)	
$\overline{G6}$	63.17	(9.46)	
$\overline{G7}$	71.40	(10.34)	
$\overline{G8}$	75.77	(11.72)	

(a) Note: *sig.* < .0001.

(b) Note: *post hoc* results displayed in Table 33.

Table 33

Posttest-Posttest Reading Terra Nova Normal Curve Equivalent Scores Contrast Analysis Comparisons

Decile Groups	$\bar{D}$	*t* (a)	*d*	*p*	
G1 v G2	12.61	1.61	.83	.07	*ns.*
G1 v G3	4.62	0.69	.31	.25	*ns.*
G1 v G4	15.30	2.32	1.09	.02	*sig.*
G1 v G5	22.80	4.78	1.92	< .0001	*sig.*
G1 v G6	21.92	5.30	1.92	< .0001	*sig.*
G1 v G7	30.15	7.05	2.55	< .0001	*sig.*
G1 v G8	34.52	7.72	2.76	< .0001	*sig.*
G2 v G3	7.99	-1.07	.48	.15	*ns.*
G2 v G4	2.69	0.35	.17	.36	*sig.*
G2 v G5	10.19	1.86	.74	.04	*sig.*
G2 v G6	9.31	1.98	.70	.03	*sig.*
G2 v G7	17.54	3.65	1.28	.0004	*sig.*
G2 v G8	21.91	4.47	1.52	< .0001	*sig.*
G3 v G4	10.68	1.73	.69	.05	*sig.*
G3 v G5	18.18	3.99	1.37	.0001	*sig.*
G3 v G6	17.30	4.50	1.35	< .0001	*sig.*
G3 v G7	25.53	6.73	1.93	< .0001	*sig.*
G3 v G8	29.90	8.22	2.15	< .0001	*sig.*
G4 v G5	7.50	1.63	.59	.06	*ns.*
G4 v G6	6.62	1.68	.55	.05	*sig.*
G4 v G7	14.85	3.73	1.18	.0003	*sig.*
G4 v G8	19.22	4.82	1.45	< .0001	*sig.*
G5 v G6	0.88	-0.30	.09	.38	*ns.*
G5 v G7	7.35	2.49	.71	.008	*sig.*
G5 v G8	11.72	3.91	1.06	< .0001	*sig.*
G6 v G7	8.23	3.29	.83	.0008	*sig.*
G6 v G8	12.60	5.06	1.19	< .0001	*sig.*
G7 v G8	4.37	1.84	.40	.03	*sig.*

(a) Note: Negative *t* result indicates lower numbered decile group has a better posttest NCE mean score than the higher numbered decile comparison group.

Table 34

Results of Analysis of Variance for Math Terra Nova Normal Curve Equivalent Scores for 8th-Grade Students Who Completed the School-Wide Differentiated Home Room Academic Extension Re-Teaching Initiative by Measured Cognitive Deciles

Source of Variation	Sum of Squares	Mean Square	*df*	*F*	
Between Groups	22097.87	3156.84	7	20.85	(a)
Within Groups	26951.08	151.41	178		

Posttest Terra Nova Math Mean Scores

	Mean	*SD*	
$\overline{G1}$	46.38	(12.16)	(b)
$\overline{G2}$	48.43	(11.91)	
$\overline{G3}$	51.67	(10.91)	
$\overline{G4}$	57.91	(12.19)	
$\overline{G5}$	65.68	(10.84)	
$\overline{G6}$	66.10	(14.87)	
$\overline{G7}$	72.97	(12.01)	
$\overline{G8}$	80.48	(11.94)	

(a) Note: *sig.* < .0001.

(b) Note: *post hoc* results displayed in Table 35.

Table 35

Posttest-Posttest Math Terra Nova Normal Curve Equivalent Scores Contrast Analysis Comparisons

Decile Groups	$\bar{D}$	*t* (a)	*d*	*p*	
G1 v G2	2.05	0.33	.17	.37	*ns.*
G1 v G3	5.29	1.07	.46	.15	*ns.*
G1 v G4	11.53	2.04	.95	.03	*sig.*
G1 v G5	19.30	4.08	1.68	.0002	*sig.*
G1 v G6	19.72	3.44	1.46	.0008	*sig.*
G1 v G7	26.59	5.64	2.20	< .0001	*sig.*
G1 v G8	34.10	7.59	2.83	< .0001	*sig.*
G2 v G3	3.24	0.63	.28	.27	*ns.*
G2 v G4	9.48	1.62	.79	.06	*ns.*
G2 v G5	17.25	3.51	1.52	.0009	*sig.*
G2 v G6	17.64	2.92	1.32	.003	*sig.*
G2 v G7	24.54	4.94	2.05	< .0001	*sig.*
G2 v G8	32.05	6.73	2.69	< .0001	*sig.*
G3 v G4	6.24	1.37	.54	.09	*ns.*
G3 v G5	14.01	3.73	1.29	.0004	*sig.*
G3 v G6	14.43	3.32	1.12	.0009	*sig.*
G3 v G7	21.30	5.90	1.86	< .0001	*sig.*
G3 v G8	28.81	8.52	2.52	< .0001	*sig.*
G4 v G5	7.77	1.81	.67	.04	*sig.*
G4 v G6	8.19	1.63	.61	.06	*ns.*
G4 v G7	15.06	3.62	1.24	.0004	*sig.*
G4 v G8	22.57	5.76	1.87	< .0001	*sig.*
G5 v G6	0.42	0.11	.03	.46	*ns.*
G5 v G7	7.29	2.20	.64	.02	*sig.*
G5 v G8	14.80	4.82	1.30	< .0001	*sig.*
G6 v G7	6.87	2.04	.51	.02	*sig.*
G6 v G8	14.38	4.94	1.07	< .0001	*sig.*
G7 v G8	7.51	2.97	.63	.002	*sig.*

(a) Note: Negative *t* result indicates lower numbered decile group has a better posttest NCE mean score than the higher numbered decile comparison group.

CHAPTER FIVE

Conclusions and Discussion

Purpose of the Study

The purpose of the study was to measure the effectiveness of a school-wide differentiated home room academic extension re-teaching initiative on the academic achievement and criterion-referenced assessment proficiency categories of 8th-grade students with varying levels of measured cognitive skills. Achievement measures were reading and math criterion-referenced assessment scores, core subject grades, and the reading and math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test subtest scores.

All study achievement norm-referenced, criterion-referenced, cut scores, and core subject grades for data were retrospectively, archival, and routinely collected school information. Permission from the appropriate school research personnel was received. A naturally formed sample of 186 students was obtained to include achievement data. Non-coded numbers were used to display individual de-identified achievement data. Aggregated group data, descriptive statistics, and inferential statistical analysis were utilized and reported with means and standard deviations on tables.

This chapter contains the conclusions and discussion of the findings from this research effort. The chapter begins with the conclusions reached from calculating the data. The next section contains a discussion of those conclusions. The discussion includes an assessment of the significance of those findings. The discussion also includes recommendations for future research.

Conclusions

The following conclusions were drawn from the study for each of the nine research questions.

Research Question #1

Overall, Essential Learner Outcomes Reading Test pretest-posttest results indicated that following the year long school-wide differentiated home room academic extension re-teaching initiative, Groups 1 and 3 reading scores were measured in the direction of improvement. However, Groups 2, 4, 5, 6, 7, and 8 reading scores were measured in the direction of decline. Comparing student measured cognitive decile groups Essential Learner Outcomes posttest reading test standard scores with derived achievement scores puts their performance in perspective. For Group 1 a posttest reading mean standard score of 110.13 is congruent with a Percentile Rank of 75, a Stanine Score of 6 (the upper stanine of the average range), and an

achievement qualitative description of Average. For Group 2 a posttest reading mean standard score of 104.14 is congruent with a Percentile Rank of 61, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 3 a posttest reading mean standard score of 109.93 is congruent with a Percentile Rank of 73, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 4 a posttest reading mean standard score of 114.00 is congruent with a Percentile Rank of 83, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 5 a posttest reading mean standard score of 115.00 is congruent with a Percentile Rank of 84, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 6 a posttest reading mean standard score of 116.69 is congruent with a Percentile Rank of 86, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 7 a posttest reading mean standard score of 118.63 is congruent with a Percentile Rank of 88, a Stanine Score of 7 (the lower stanine of the above average range), and an

achievement qualitative description of Above Average. For Group 8 a posttest reading mean standard score of 119.32 is congruent with a Percentile Rank of 90, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average.

Research Question #2

Overall, Essential Learner Outcomes Math Test pretest-posttest results indicated that following the yearlong school-wide differentiated home room academic extension re-teaching initiative, Groups 1, 3, and 8 math scores were measured in the direction of improvement. However, Groups 2, 4, 5, 6, and 7 math scores were measured in the direction of decline. Comparing student measured cognitive decile groups Essential Learner Outcomes posttest Math Test standard scores with derived achievement scores puts their performance in perspective. For Group 1 a posttest math mean standard score of 107.38 is congruent with a Percentile Rank of 68, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 2 a posttest math mean standard score of 103.57 is congruent with a Percentile Rank of 58, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 3 a posttest

math mean standard score of 108.00 is congruent with a Percentile Rank of 70, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 4 a posttest math mean standard score of 113.82 is congruent with a Percentile Rank of 81, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 5 a posttest math mean standard score of 115.84 is congruent with a Percentile Rank of 84, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 6 a posttest math mean standard score of 115.52 is congruent with a Percentile Rank of 84, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 7 a posttest math mean standard score of 118.74 is congruent with a Percentile Rank of 88, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 8 a posttest math mean standard score of 120.47 is congruent with a Percentile Rank of 91, a Stanine Score of 8 (the middle stanine of the above average range), and an achievement qualitative description of Above Average.

Research Question #3

Overall, higher numbered decile groups had higher mean Essential Learner Outcomes Reading posttest scores compared to lower numbered decile groups with the exception of G1 v G2 and G1 v G3. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 7 and mean reading standard scores displayed in Table 6 where 15 standard score points (1 SD) separates the lowest reading standard score yielded by G2 (104.14) compared to the highest standard score yielded by G8 (119.32). As a result the largest mean differences observed in Table 7 were for the G2 v G5 (11.12), G2 v G6 (12.55), G2 v G7 (14.49) and G2 v G8 (15.18) comparisons.

Overall, higher numbered decile groups had higher mean Essential Learner Outcomes Math posttest scores compared to lower numbered decile groups with the exception of G1 v G2 and G5 v G6. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 9 and mean math standard scores displayed in Table 8 where 17 standard score points (1 SD+) separates the lowest math standard score yielded by G2 (103.57) compared to the highest standard score yielded by G8 (120.47). As a result the largest mean differences observed in Table 9 were for the G2 v G4 (10.25), G2 v G5 (12.27), G2 v G6 (11.95), G2 v

G7 (15.17) and G2 v G8 (16.90) comparisons. Other comparisons also yielded large (approaching 15 standard score points or 1 SD) comparisons including G1 v G7 (11.36), G1 v G8 (13.09), G3 v G7 (10.74), and G3 v G8 (12.47).

Research Question #4

Overall, Essential Learner Outcomes Reading posttest proficiency category frequencies indicate a 20 student increase in the beyond proficiency category. That is to say 20 students posttest Essential Learner Outcomes Reading Test standard scores results were strong enough to move them to this highest overall proficiency category. Of equal importance 3 students at the time of posttest Essential Learner Outcomes Reading Test standard scores results were strong enough to move them out of the lowest (below proficient) overall proficiency category. The increase in the number of students at posttest in the barely proficient category may represent increased movement into this category by student with both increasing (from below proficient) and decreasing (from proficient) reading skills. The decrease in the number of students at posttest in the proficient category may represent increased movement from this category to the beyond proficient category by students with increasing reading skills. Given the decrease

at posttest in the number of students observed in the below proficient category and the increase at posttest in the number of students observed in the beyond proficient category it may be said that the school-wide differentiated home room academic extension re-teaching initiative resulted in improved reading outcomes for the participating 8th-grade students.

Overall, Essential Learner Outcomes Math posttest proficiency category frequencies indicate a 33 student increase in the beyond proficiency category. That is to say 33 students posttest Essential Learner Outcomes Math Test standard scores results were strong enough to move them to this highest overall proficiency category. Of equal importance 3 students at the time of posttest Essential Learner Outcomes Math Test standard scores results were strong enough to move them out of the lowest (below proficient) overall proficiency category. The increase in the number of students at posttest in the barely proficient category may represent increased movement into this category by student with both increasing (from below proficient) and decreasing (from proficient) math skills. The decrease in the number of students at posttest in the proficient category may represent increased movement from this category to the beyond proficient category by students

with increasing math skills. Given the decrease at posttest in the number of students observed in the below proficient category and the increase at posttest in the number of students observed in the beyond proficient category it may be said that the school-wide differentiated home room academic extension re-teaching initiative resulted in improved math outcomes for the participating 8th-grade students.

Research Question #5

Overall, first trimester-third trimester results indicated that following the year long school-wide differentiated home room academic extension re-teaching initiative no Groups were measured in the direction of social studies grade scores improvement. All Groups 1, 2, 3, 4, 5, 6, 7, and 8 social studies grade scores were measured in the direction of decline. Comparing student third trimester social studies grade scores with school grade score nomenclature puts their performance in perspective. For Group 1 a third trimester social studies mean grade score of 2.00 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 2 a third trimester social studies mean grade score of 3.14 is typically referred to as falling in the below average range associated with a letter

grade of D+. For Group 3 a third trimester social studies mean grade score of 2.93 is typically referred to as falling in the average range associated with a letter grade of C. For Group 4 a third trimester social studies mean grade score of 2.18 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 5 a third trimester social studies mean grade score of 2.00 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 6 a third trimester social studies mean grade score of 1.76 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 7 a third trimester social studies mean grade score of 1.43 is typically referred to as falling in the excellent range associated with a letter grade of B+. For Group 8 a third trimester social studies mean grade score of 1.34 is typically referred to as falling in the excellent range associated with a letter grade of B+.

Overall, first trimester-third trimester results indicated that following the year long school-wide differentiated home room academic extension re-teaching initiative all Groups were measured in the direction of science grade scores improvement. Comparing student third trimester science grade scores with school grade score

nomenclature puts their performance in perspective. For Group 1 a third trimester science mean grade score of 2.13 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 2 a third trimester science mean grade score of 2.71 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 3 a third trimester science mean grade score of 2.60 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 4 a third trimester science mean grade score of 2.18 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 5 a third trimester science mean grade score of 2.00 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 6 a third trimester science mean grade score of 1.76 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 7 a third trimester science mean grade score of 1.26 is typically referred to as falling in the excellent range associated with a letter grade of B+. For Group 8 a third trimester science mean grade score of 1.18 is typically referred to as falling in the excellent range associated with a letter grade of B+.

Overall, first trimester-third trimester results indicated that following the year long school-wide differentiated home room academic extension re-teaching initiative one Group was measured in the direction of English grade scores improvement, Group 7. Six Groups 2, 3, 4, 5, 6, and 8 English grade scores were measured in the direction of decline. One Group, 1, English grade scores were measured with no change. Comparing student third trimester English grade scores with school grade score nomenclature puts their performance in perspective. For Group 1 a third trimester English mean grade score of 2.38 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 2 a third trimester English mean grade score of 2.86 is typically referred to as falling in the average range associated with a letter grade of C. For Group 3 a third trimester English mean grade score of 3.00 is typically referred to as falling in the average range associated with a letter grade of C. For Group 4 a third trimester English mean grade score of 1.91 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 5 a third trimester English mean grade score of 2.11 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 6 a third

trimester English mean grade score of 1.86 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 7 a third trimester English mean grade score of 1.31 is typically referred to as falling in the excellent range associated with a letter grade of B+. For Group 8 a third trimester English mean grade score of 1.39 is typically referred to as falling in the excellent range associated with a letter grade of B+.

Overall, first trimester-third trimester results indicated that following the year long school-wide differentiated home room academic extension re-teaching initiative no Groups were measured in the direction of math grade scores improvement. All Groups 1, 2, 3, 4, 5, 6, 7, and 8 math grade scores were measured in the direction of decline. Comparing student third trimester math grade scores with school grade score nomenclature puts their performance in perspective. For Group 1 a third trimester math mean grade score of 3.25 is typically referred to as falling in the below average range associated with a letter grade of D+. For Group 2 a third trimester math mean grade score of 3.43 is typically referred to as falling in the below average range associated with a letter grade of D+. For Group 3 a third trimester math mean grade score of 3.13 is typically referred to as falling in the below average

range associated with a letter grade of D+. For Group 4 a third trimester math mean grade score of 3.00 is typically referred to as falling in the average range associated with a letter grade of C. For Group 5 a third trimester math mean grade score of 2.47 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 6 a third trimester math mean grade score of 2.45 is typically referred to as falling in the average range associated with a letter grade of C+. For Group 7 a third trimester math mean grade score of 1.97 is typically referred to as falling in the excellent range associated with a letter grade of B. For Group 8 a third trimester math mean grade score of 1.76 is typically referred to as falling in the excellent range associated with a letter grade of B.

Research Question #6

Overall, higher numbered decile groups had higher social studies third trimester mean grade scores compared to lower numbered decile groups with the exception of G1 v G2, G1 v G3, and G1 v G4. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 21 third trimester social studies mean grade scores displayed in Table 20 where 1.80 grade score points separates the lowest social studies mean grade scores

yielded by G2 (3.14; D+) compared to the highest social studies mean grade scores yielded by G8 (1.34; B+). As a result the largest mean differences observed in Table 21 were for the G2 v G5 (1.14), G2 v G6 (1.38), G2 v G7 (1.71), G2 v G8 (1.80), G3 v G6 (1.17), G3 v G7 (1.50), G3 v G8 (1.59), and G1 v G2 (1.14) comparisons. The data displayed in Table 20 indicates one group (G2) at the below average grade level, two groups (G3 and G4) at the average grade level, and five groups (G1, G5, G6, G7, and G8) at the excellent grade level.

Overall, higher numbered decile groups had higher science third trimester mean grade scores compared to lower numbered decile groups with the exception of G1 v G2, G1 v G3, and G1 v G4. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 23 third trimester science mean grade scores displayed in Table 22 where 1.53 grade score points separates the lowest science mean grade scores yielded by G2 (2.71; C) compared to the highest science mean grade scores yielded by G8 (1.18; B+). As a result the largest mean differences observed in Table 23 were for the G2 v G7 (1.45), G2 v G8 (1.53), G3 v G7 (1.34), G3 v G8 (1.42), and G4 v G8 (1.00) comparisons. The data displayed in Table 22 indicates four groups (G1, G2, G3, and G4) at the average grade level and

four groups (G5, G6, G7, and G8) at the excellent grade level.

Overall, higher numbered decile groups had higher English third trimester mean grade scores compared to lower numbered decile groups with the exception of G1 v G2, G1 v G3, G2 v G3, G4 v G5, and G7 v G8. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 25 third trimester English mean grade scores displayed in Table 24 where 1.69 grade score points separates the lowest English mean grade scores yielded by G3 (3.00; C) compared to the highest social studies mean grade scores yielded by G7 (1.31; B+). As a result the largest mean differences observed in Table 25 were for the G1 v G7 (1.07), G2 v G6 (1.00), G2 v G7 (1.55), G2 v G8 (1.57), G3 v G6 (1.14), G3 v G7 (1.69), and G3 v G8 (1.61) comparisons. The data displayed in Table 24 indicates four groups (G1, G2, G3, and G5) at the average grade level and four groups (G4, G6, G7, and G8) at the excellent grade level.

Overall, higher numbered decile groups had higher math third trimester mean grade scores compared to lower numbered decile groups with the exception of G1 v G2. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 27 third trimester

math mean grade scores displayed in Table 26 where 1.67 grade score points separates the lowest math mean grade scores yielded by G2 (3.43; D+) compared to the highest math mean grade scores yielded by G8 (1.76; B). As a result the largest mean differences observed in Table 27 were for the G1 v G7 (1.28), G1 v G8 (1.49), G2 v G7 (1.46), G2 v G8 (1.67), G3 v G7 (1.16), G3 v G8 (1.37), G4 v G7 (1.03), and G4 v G8 (1.24) comparisons. The data displayed in Table 26 indicates three groups (G1, G2, and G3) at the below average grade level, three groups (G4, G5, and G6) at the average grade level, and two groups (G7 and G8) at the excellent grade level.

Research Question #7

Overall, pretest-posttest results indicated that following the year long school-wide differentiated home room academic extension re-teaching initiative Groups 1, 2, 5, and 8 Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores were measured in the direction of improvement. However, Groups 3, 4, 6, and 7 Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores were measured in the direction of decline. Comparing student measured cognitive decile groups Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test posttest scores with derived achievement

scores puts their performance in perspective. For Group 1 a posttest Reading Terra Nova mean NCE score of 41.25 is congruent with a Percentile Rank of 34, a Stanine Score of 4 (the lower stanine of the average range), and an achievement qualitative description of Average. For Group 2 a posttest Reading Terra Nova mean NCE score of 53.86 is congruent with a Percentile Rank of 55, a Stanine Score of 5 (the middle stanine of the average range), and an achievement qualitative description of Average. For Group 3 a posttest Reading Terra Nova mean NCE score of 45.87 is congruent with a Percentile Rank of 39, a Stanine Score of 4 (the lower stanine of the average range), and an achievement qualitative description of Average. For Group 4 a posttest Reading Terra Nova mean NCE score of 56.55 is congruent with a Percentile Rank of 73, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 5 a posttest Reading Terra Nova mean NCE score of 64.05 is congruent with a Percentile Rank of 75, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 6 a posttest Reading Terra Nova mean NCE score of 63.17 is congruent with a Percentile Rank of 73, a Stanine Score of 6 (the upper stanine of the average range), and an

achievement qualitative description of Average. For Group 7 a posttest Reading Terra Nova mean NCE score of 71.40 is congruent with a Percentile Rank of 84, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 8 a posttest Reading Terra Nova mean NCE score of 75.77 is congruent with a Percentile Rank of 88, a Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average.

Research Question #8

Overall, pretest-posttest results indicated that following the year long school-wide differentiated home room academic extension re-teaching initiative Groups 1, 2, 3, 5, 6, 7, and 8 Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores were measured in the direction of improvement. Group 4 showed no change in Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores. Comparing student measured cognitive decile groups Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test posttest scores with derived achievement scores puts their performance in perspective. For Group 1 a posttest Math Terra Nova mean NCE score of 46.38 is congruent with a Percentile Rank of

42, a Stanine Score of 5 (the middle stanine of the average range), and an achievement qualitative description of Average. For Group 2 a posttest Math Terra Nova mean NCE score of 48.43 is congruent with a Percentile Rank of 47, a Stanine Score of 5 (the middle stanine of the average range), and an achievement qualitative description of Average. For Group 3 a posttest Math Terra Nova mean NCE score of 51.67 is congruent with a Percentile Rank of 53, a Stanine Score of 5 (the middle stanine of the average range), and an achievement qualitative description of Average. For Group 4 a posttest Math Terra Nova mean NCE score of 57.91 is congruent with a Percentile Rank of 63, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 5 a posttest Math Terra Nova mean NCE score of 65.68 is congruent with a Percentile Rank of 75, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 6 a posttest Math Terra Nova mean NCE score of 66.10 is congruent with a Percentile Rank of 77, a Stanine Score of 6 (the upper stanine of the average range), and an achievement qualitative description of Average. For Group 7 a posttest Math Terra Nova mean NCE score of 72.97 is congruent with a Percentile Rank of 84, a

Stanine Score of 7 (the lower stanine of the above average range), and an achievement qualitative description of Above Average. For Group 8 a posttest Math Terra Nova mean NCE score of 80.48 is congruent with a Percentile Rank of 92, a Stanine Score of 8 (the middle stanine of the above average range), and an achievement qualitative description of Above Average.

Research Question #9

Overall, higher numbered decile groups had higher mean posttest Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores compared to lower numbered decile groups with the exception of G2 v G3 and G5 v G6. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 33 posttest Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean scores displayed in Table 32 where 34.52 mean score points separates the lowest posttest Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean score yielded by G1 (41.25) compared to the highest posttest Reading Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean score yielded by G8 (75.77). As a result the largest mean differences observed in Table 33 were for the G1 v G5 (22.80), G1 v G6 (21.92), G1 v G7 (30.15), G1 v G8 (34.52),

G2 v G8 (21.91), G3 v G7 (25.52), and G3 v G8 (29.90) comparisons.

Overall, higher numbered decile groups had higher mean posttest Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test scores compared to lower numbered decile groups. The significant ANOVA variance observed is explained in the robust mean differences noted in Table 35 posttest Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean scores displayed in Table 34 where 34.10 mean score points separates the lowest posttest Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean score yielded by G1 (46.38) compared to the highest posttest Math Terra Nova Normal Curve Equivalent Norm Referenced Achievement Test mean score yielded by G8 (80.48). As a result the largest mean differences observed in Table 35 were for the G1 v G7 (26.59), G1 v G8 (34.10), G2 v G7 (24.54), G2 v G8 (32.05), and G4 v G8 (22.57) comparisons.

Discussion

This study was conducted to determine the effectiveness of a school-wide differentiated home room academic extension re-teaching initiative on the academic achievement and criterion-referenced assessment proficiency categories of 8th-grade students with varying levels of

measured cognitive skills. The research school is a high-performing school with over half of the research population scoring in the 9th and 10th measured cognitive deciles.

Achievement for both high and low performing students. The most impressive data to note in this study is that 20 students moved into the highest measured Essential Learner Outcomes Reading Test proficiency group (beyond proficient) and 33 students moved into the highest measured Essential Learner Outcomes Math Test proficiency group (beyond proficient) at the conclusion of the research year. Effort towards achievement is a common concern for young adolescents (Anderman & Maehr, 1994; Carnegie Council on Adolescent Development, 1995; Eccles & Midgley, 1990). In middle school, when students have changing achievement beliefs and behaviors (Carnegie Council on Adolescent Development, 1995; Eccles & Wigfield, 2002; Eccles, Wigfield, et al., 1993), significant positive improvement in achievement is noteworthy. No Child Left Behind legislation has as its goal improving achievement gaps of failing students in a belief that they will meet or exceed proficiency levels by 2013-2014. The law, however, is silent on required achievement levels for high ability students. The differentiated lessons provided for all students in the school-wide differentiated home room

academic extension re-teaching initiative resulted in growth for many students, including high ability students. A growth of performance at the highest level of proficiency for 20 students in reading and 33 students in math indicates effectiveness of the school-wide differentiated home room academic extension re-teaching initiative.

Of equal importance for this study is that three students moved out of the lowest measured Essential Learner Outcomes Reading Test proficiency group (below proficient) and three students moved out of the lowest measured Essential Learner Outcomes Math Test proficiency group (below proficient). Nationwide, resources of time, money, and personnel are often directed at the students most likely to benefit from intervention and programs that will in the near term boost Adequate Yearly Progress (AYP) (Azzam, 2007; Nelson et al., 2007). In this study after implementation of the school-wide differentiated home room academic extension re-teaching initiative, students gained the minimum level of proficiency needed for AYP in addition to growth in the highest proficiency category, as noted earlier.

Cognitive skill decile group ELO performance. Higher decile groups in this study had higher Essential Learner Outcomes Reading and Math Test scores than lower decile

groups. However, students in group 1 unexpectedly out-performed their grade peers in group 2 in ELO math and unexpectedly out-performed their grade peers in groups 2 and 3 in ELO reading.

Group 1, was seven students whose Test of Cognitive Skills measured in the first, second, or third decile. The typical pattern of low achievement predicting low achievement (Covington, 1998; Jones et al., 2003) was not observed in this particular group. Continued cohort research is needed to observe if this pattern is sustainable for this group or not. Perhaps those students in group 1 whose Test of Cognitive Skills were measured in the 1st-decile, 2nd-decile, and 3rd-decile under performed on the Test of Cognitive Skills resulting in an underestimation of their true cognitive abilities as a predictor of their achievement. What is important is that the students of this lowest group responded in a very positive way to the school-wide differentiated home room academic extension re-teaching initiative suggest program continuation.

Students with the strongest academic skills and highest measured cognitive test results, groups 5 through 8, experienced significant pretest-posttest ELO reading test score declines and except for group 8 the highest

group this same pattern of test score decline, albeit not significant, was also observed for pretest-posttest ELO math test scores. While it may be predicted that students in this study with the highest measured cognitive test results will continue to achieve and succeed in high school and beyond in their postsecondary educational opportunities this study found them as they are, that is 8th-graders who may take their studies seriously one day only to forget an assignment another day, want to be a physician one day only to want to be a professional skateboarder another day. Taken as a big picture the posttest reading and math ELO test scores while lower than at pretest still reflect above average achievement. It is also important to remember that students cannot fake better and if they achieved at higher levels it is almost certain that they have the true skills required to continue achieving at a high level.

Home room success. Two key components of the school-wide differentiated home room academic extension re-teaching initiative is year-long duration and cross-curricular references. The teacher-created learning activities were reinforced throughout the year and congruent to the content objectives on district created Essential Learner Outcomes Tests, but were not narrow test-prep cramming exercises. None of the activities were

practice tests or drill problems similar to the ELO required assessments since these types of practices do affect test validity (Kulik, Kulik, & Bangert-Drowns, 1984; Smith & Fey, 2000) and are arguably unethical. Many lessons incorporated cross-curricular references such as math measurement in a Family and Consumer Science home room lesson. Also, teachers teaching out of their content area brought unique perspectives to the experience. For example, at the end of the research year, one teacher commented, "I enjoy seeing students out of my regular classroom setting and doing math, science, and reading together. It was hard at first, but now I like it." A continued challenge for the school-wide differentiated home room academic extension re-teaching initiative success will be to continue to define the purpose of the initiative, build coherence, and create and share knowledge in the growth of the initiative in order to cultivate commitment to the initiative (Fullan, 2004).

The contemporary focus on standards and testing has changed student perceptions of themselves in the education setting as learners who do not wish to be defined by a test score (Green, 2007). Furthermore, teachers feel the direct or indirect pressure of standardized testing (Perreault, 2000; Barksdale-Ladd & Thomas, 2000). Continued research is

needed to explore the result of the school-wide differentiated home room academic extension re-teaching initiative on student perception of themselves and teacher response to the initiative.

Grades and standardized tests. Classroom grades are a measure of what students do. Standardized tests are a measure of what students know. There is often incongruence between these two (Willingham et al., 2002) that can be confusing for students, parents, and teachers alike. In this study, for example, 62 students performed at a stanine level equivalent to the middle stanine of the above average range on the posttest Essential Learner Outcomes Math Test while these same 62 students had only a classroom average of a letter grade B. Also, 156 students performed at a stanine level equivalent to the lower stanine of the above average range on the posttest Essential Learner Outcomes Reading Test while earning between a C and B+. The study of congruency between classroom grades and standardized test scores is an area of further study for this research school.

Finally, it may be said that the results of this study indicate that a school-wide differentiated home room academic extension re-teaching initiative model warrants

research replication in other neighboring middle schools and in neighborhoods with economic and racial diversity.

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APPENDIX A

Please contact author for information regarding the school district study approval letter.