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Facilitating high school student success through READ 180: Analysis of program impact using measures of academic progress (MAP)

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ABSTRACT

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By

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M.A.T, Clemson University 2005
B.A., University of South Carolina 1985

Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
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ABSTRACT

In response to its failure to meet state mandated proficiency standards in reading and mathematics over the past three years, a rural, Title I high school (LS) in South Carolina purchased and implemented the commercially available literacy program READ 180 (R180) for the 2008-2009 academic year. While previous research reported by Scholastic, Incorporated (R180) had provided support for the use of R180 in improving literacy, these studies have been criticized recently for their lack of comparable control groups, experimenter bias and lack of data from other content areas such as mathematics. The purpose of this study was to determine the relative effectiveness of R180 in improving reading and math performance when compared with traditional high school English course instruction in a group of ninth grade students at LS. The theoretical framework for this study was based on Vygotsky's cognitive developmental theory which emphasizes the role of language in learning in all content areas. A group of below average reading ability students was assigned by LS to the R180 instructional class while a second group of average ability students was assigned to the traditional English course (TRAD). Both groups were pre and post tested in reading and math using the state-sponsored Measures of Academic Progress (MAP) standardized achievement test. Dependent samples t-tests and Analysis of Covariance were used to analyze the data. The results indicated statistically significant improvements in both math and reading scores for the TRAD group but not for the R180 group. This study has implications for positive social change in the form of independent, empirically-based data to both inform the administration of LS in future decision making regarding funding for the very costly R180 program as well as contributing to the overall database on R180's effectiveness.

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DEDICATION

I dedicate this paper to each member of my family: Mom and Dad, who were always understanding of my need for time; Jim and Cody, for their never-ending patience and love; and my sisters and brother, for their positive motivation. I could never have accomplished this without each of you behind me.

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CHAPTER 1:

INTRODUCTION TO THE STUDY

Background of the Study

Thought Language and Literacy

The importance of language in the development of human thinking and learning has been recognized from the earliest days of Psychology and can be traced back to seminal theorists in the area such as Vygotsky (1962), Luria (1976), and Whorf (1956), to name a few. In the 1930s Vygotsky, for example, theorized that early on in development the interplay between thought and language overlapped to the extent of becoming almost indistinguishable from each other. The conjecture was that with maturation comes the ability to use linguistics for both the creation of meaning and synthesizing of information within the individual—that is, so long as the child was exposed to a language rich environment (Vygotsky, 1962). Vygotsky concluded that "a concept is formed not through the interplay of associations, but through an intellectual operation in which all the elementary mental functions participate in a specific combination, and this particular operation is guided by the use of words" (Vygotsky, 1962, p. 81). The theory of chronological differentiation in cognitive generalization, formulated through his study of Piaget's observations stated that maturation of prior unconscious concepts had a profound effect on emerging conscious thought processes, and the ability to articulately verbalize thought was individualized by linguistic development. In other words, the developmental cognitive processes had a pyramid-like effect. First, basic information was formulated in the memory, and only after the information was processed, experimented with, and

accepted could an individual then move to the formulation of more complex concepts. The use of words in silent and of verbalized speech was thought of as specific and instrumental in all developmental areas cognition (Vygotsky, 1962).

Adolescent Literacy

If developmental cognition is relative to the level of linguistic skills gained through extrinsic exposure and maturation, then it is practical to assume that as a child progresses through school so, too, does that child's ability to reflect on and apply more highly complex cross curricular information. Therefore it seems relevant to reflect on theoretical associations between maturation and higher levels of language and thought due to recent studies signifying how high percentages of delayed literacy in adolescents have become a cross-curricular phenomenon (ACT College Readiness Report, 2005).

According to recent research, many adolescents and young adults are being left behind as far as their ability to compete in a world marketplace. "Approximately six million of the nations' secondary school students are reading well below grade level and over eleven percent of college students are in remedial coursework" (ACT, 2005, p. 1). Although advances in literacy research have noted that alphabetic, phonemic awareness, phonics, decoding, and fluency are crucial for effective communication, it is still not clear "what is known about beginning reading instruction as it applies to older students who fail to acquire the building blocks of reading" (Department of Education, 2002, p.3) and language.

Schools at Risk: No Child Left Behind Mandates

Each year schools that receive funding are issued an Annual Yearly Progress (AYP) score by the Department of Education (NCLB index 2005-2006). AYPs are typically measured using English language and mathematics test scores that reflect averages in grade level proficiency. Schools that do not meet AYP proficiency benchmarks for 3 consecutive years must offer school choice and Supplemental Educational Services (SES). If AYP is not met by Year 4 "Corrective Action and will be required to choose remediation tactics outlined by federal law" (South Carolina Department of Education, 2008). By the fifth year restructuring and corrective measures begin at the state level (NCLB, 2008).

The 2007 Annual Report Card (ARC) from the Title I rural high school in South Carolina where the study was conducted (to be referred to as the "Local School" or LS), indicated a failure to meet AYP for 4 consecutive years from 2003-2007, which places it in the "at risk" category meaning tougher teaching and administrative standards for methods and practices intended for the enhancement of cross curricular proficiency (SC Department of Education, 2008). The 2008 preliminary Annual Report Card (ARC) indicated that the high school experienced overall growth which changed its current growth status from at-risk to good meaning the school demonstrated growth on one or more standardized measures (SC Department of Education, 2009), yet still indicated a failure to meet AYP.

In response to this failure to meet AYP, the LS purchased and implemented a commercially available literacy program, READ 180, at one of its four middle schools

targeting students whose reading scores fell into the lower 25th percentile on the Measures of Academic Progress (MAP) English Language Arts (MAP ELA) test. The MAP is a test used across the country and provides standardized measures of student ability and progress in the areas of both reading and math. In the LS, MAPs testing is done in the fall and spring to track student development in these areas. In 2008 the district expanded READ 180 to target rising ninth grade students whose prior spring MAP ELA reading scores fell two to three grade levels below Grade eight.

Previous research conducted on READ 180 (as well as other similar, commercially available literacy programs) indicated the effectiveness of the program based on either comparative studies that used company sponsored pre and post test measures or indicators of progress based on these as compared to other program outcomes. To date no studies have been conducted by independent schools (consumers) using standardized measures such as MAP.

Chapter 2 will supply a more detailed discussion of adolescent literacy in at risk schools relative to cross curricular cognitive skill, testing proficiency, and state education standards as well as a detailed overview of the Scholastic READ 180 program.

Problem Statement

The specific problem addressed by this research was the relative effectiveness and efficacy of commercially available literacy interventions such as READ 180 on student achievement when compared with traditionally available instruction. The independent variable was the types of literacy/English instruction (traditional classroom-based high school English Language Arts instruction (TRAD) and R180, a Lexile-based reading

instruction system) while the dependent variables were the reading and math achievement scores as determined by the state administered Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP) exam. Programs like R180 have been purchased at great cost by school districts (which include the researcher's) with the hope of helping at-risk schools meet state and national performance standards. Research studies to date that have supported the effectiveness of R180 may be flawed, biased, or incomplete for one or more of several reasons: (a) inherent experimenter bias associated with companies conducting and reporting research data in support of their own product; (b) the relative inaccuracies occurring in company sponsored measurements of progress due to the impact of the statistical phenomenon regression toward the mean; (c) pre- and posttest designs that do not include comparable control (instructional) groups; (d) lack of evidence utilizing nationally recognized, standardized dependent measures of achievement (such as MAP); and (e) lack of evidence showing the impact of such programs on cross-curricular subject areas such as mathematics. Empirical data from this study was needed to: (a) assist the administration of the researcher's school district in future decisions regarding the funding of READ 180; (b) add to the limited research using measurements based on individual state education standards in order to determine the effectiveness of an intervention; (c) add to the limited research that has focused on the relationship between literacy interventions and math performance.

Purpose of the Study

The specific purpose of the research was to determine the relative efficacy of READ 180 (R180) using a quasi experimental design that used pre and posttest MAP

Lexile reading/ELA and math scores to compare students in R180 classrooms and students in traditional English language instruction (TRAD) at a local rural Title I high school (LS).

Research Questions and Hypotheses

The research questions for this study were:

1. Did students exposed to READ 180 (R180) instruction show a statistically significant change in their reading abilities as measured by the MAP reading/ELA pre and posttest differences?
2. Did students exposed to R180 instruction show a statistically significant change in their math abilities as measured by the MAP math pre and posttest differences?
3. Did students exposed to traditional English instruction (TRAD) show a statistically significant change in their reading abilities as measured by the MAP reading/ELA pre and posttest differences?
4. Did the students exposed to TRAD instruction show a statistically significant change in their math abilities as measured by MAP math pre and posttest differences?
5. Did the students exposed to R180 show a significantly greater improvement in MAP math scores than students exposed to TRAD?
6. Did the students exposed to R180 show a significantly greater improvement in MAP math scores than students exposed to TRAD?

The hypotheses for this study were:

H_0: There was no significant difference in the improvement of Lexile reading/ELA and math performance according to MAP RIT scores of R180 students over TRAD students.

H_a: There was a significant difference in the improvement of Lexile reading/ELA and math performance according to MAP RIT scores of R180 students over TRAD students.

Dependent sample *t* tests were conducted for each of the instructional groups (R180 and TRAD) on each of the dependent variables (MAP reading/ELA and MAP math) in answer to Research Questions 1 through 4. With respect to Research Questions 5 and 6, two separate one-way analysis of covariance (ANCOVA) were conducted to determine if the degree of growth or improvement on the MAP math and MAP reading/ELA measures was significantly different between TRAD and READ180. The pretest scores for MAP math and MAP reading/ELA were used as covariates in order to control for preexisting group differences and to minimize regression to the mean effects.

Theoretical Base

The (Vygotsky, 1934) socio-cultural theory of cognitive development was most concerned with the reprobating influences of language acquisition and cognitive development. Vygotsky stated that:

> There is every reason to suppose that the qualitative distinction between sensation and thought is the presence in the latter of a generalized reflection of realty, which is also the essence of word meaning, and consequently that meaning is an act of thought in the full sense of the term (Vygotsky, 1962 p. 5).

It was also a Vygotskian premise that speech and language acquisition act as the conductors for thought. It was theorized that during this time period speech

predetermined intellect as manifested thought because "(1) the child's sudden, active curiosity about words, (2) the resulting rapid, saccadic increases in his or her vocabulary" (Vygotsky, p. 43). Three variables were identified as responsible for the relationship between cognition and language development; the functional or socio-personal adaptation, the structural or "the extreme, elliptical economy of inner speech, changing the speech pattern almost beyond recognition" (Vygotsky, p. 45), and the genetic or physiological adaptation of the individual.

It was also theorized that throughout an individual's progressive movement both into and out of each stage or developmental experience, the emergence of a mature grasp of syntax and the mental operations relevant to verbal forms, semantics, and grammatical structures matured and therefore improved upon due to extrinsic exposure. Vygotsky envisioned cognition as both thought and language moreover as a duality of intertwined processes or as, "Two intersecting circles with both thought and speech colliding; thereby producing verbal thought" (Vygotsky, p. 47). In order to add validity to his hypotheses, series of experiments were designed to designate which linguistic processes, were involved in and held dominance in developmental cognition.

This age-relative and chronologically based phenomenon was considered to be the progression of associative skill based on the acquisition of linguistic skill. Conceptual chronological development of both the conscious and unconscious as linguistically expressed thought emerged and was based on the " Freudian 'unconscious' resulting from repression, which is late development, an effect of a relatively high differentiation of consciousness" (Vygotsky, 1962, p. 91). It was theorized that as a child matures, his

unconscious concepts, which were developed earlier, emerge as he becomes conscious of his thought processes, and his ability to articulately verbalize manifests itself long after his ability to cognitively process information. Tests on the relationship between an individual's chronological age and the ability to remember both progressive numerical and letter based problems provided the support for this theory of generalization.

If the theory of language and thought can be applied to that of a literacy intervention's capacity to impact reading proficiency, it would then seem that this advancement in cognition based on an individual's advanced level of linguistic ability could then be transferred to other areas of the curriculum such as mathematics. For example if after exposure to a literacy intervention a student's Lexile range was raised two grade levels then the ability to better comprehend the complexity of math problems should also be positively impacted , and would therefore lead to higher levels of proficiency in both reading and math when tested. The results of this study that used state education standards based assessments (MAP) to measure the effectiveness of a literacy intervention on both reading and math performance could be considered valuable to schools labeled at risk by NCLB and to the field of research focused on the relationship between linguistic ability and math performance.

Definition of Terms

AYP: Adequate Yearly Progress is defined by NCLB as the mean of a school's state and national raw scores and also the average growth index as compared to prior year's scores.

EOCEP: The End of Course Exam is a written summative assessment administered to South Carolina first year high school students after their completion of English I and a grade level mathematics course. The test results are a part of South Carolina high schools' AYP rating.

HSAP: The High School Assessment Program is a summative written test administered to South Carolina high school students in grades10 through 12. A passing score (level 2, 3 or 4) is required for receipt of a high school diploma. This test is a part of South Carolina high schools' AYP rating.

Lexile: The Lexile system is a range of standardized measurements indicating reading comprehension and vocabulary ability. The range is from 200-1700. A below beginning reading score would register below 170.

MAP: A computer driven formative assessment that is calibrated for question difficulty. The test is aligned with state standards and can be used as a predictor for future proficiency tests and also as a measure of content knowledge and its application through the RIT scaled system.

NCLB: A federal mandate implemented in 2002 that all students be proficient in both English language arts and mathematics by the year 2014. Flexibility is given to states as to their definition of proficiency and also what tests can be used as measurements for meeting AYP each year.

PACT: The Palmetto Achievement Challenge Test is a written assessment that is administered to students in grades three through eight that measures mathematical and English language proficiency. The test was a part of South Carolina elementary and

middle schools' AYP score, but has since been replaced with PASS, a weighted written communication proficiency assessment that tests for mathematics ability as well.

PSAT: The Pre Scholastic Aptitude Test is a written assessment given to students in ten through twelfth grade as a predictor of SAT outcomes and indicator of English language and mathematical proficiency for scholarship purposes. Scores range from 20 to 80.

Rasch Unit (RIT): The NWEA uses this measurement to indicate specific English and mathematical skills and concepts that are directly aligned to state standards according to the NCLB legislation. Computer driven Measures of Academic Progress (MAP). MAP can provide a dual longitudinal measurement system across grade levels by its provision of raw score data in conjunction with correlated RIT scaled scores, a psychometric mearurement based on the Rasch model that combines Thorndike's item response theory (1904) that is based on a "measurement of ability performed by ascertaining the level of success on a set of equally difficult items" (Linacres, 2000, p. 763) with an increasing scale of predictory responses to "indicate levels of a response on some variable such as academic achievement" (Rasch Analysis, 2008) in order to specify continuous and permanent individual language and mathematic progress across grade levels.

SAT: The Scholastic Aptitude Test is a written assessment of English language and mathematical proficiency. This test is a part of South Carolina high schools' AYP rating.

SRI: The Scholastic Reading Inventory is a part of the Read 180 series of Lexile based computerized assessments for measuring reading proficiency. The length of a student's exposure to the program is noted as a significant variable for each interim measurement.

Title I: The federal program provides funds allocated from "four statutory formulas" (US Department of Education, 2008) to schools located in districts with a high percentage of students from "census poverty estimates to help ensure that all children meet challenging state academic standards" (U.S. Department of Education, 2008, p. 1).

Assumptions

It was assumed that (a) students spent equal instructional time in both R180 and traditional classrooms; (b) both groups were MAP tested at equal time intervals; and (c) NWEA maintained year to year test validity by maintaining state standards throughout each consecutive year and by using statistical measurement models that provided a basis for student accessibility (Cronin , Hauser, Houser, Kingsbury, & Olson, 2005).

Limitations

The limitations of this study included (a) the inability to deal with intact groups which were archived; (b) because the researcher was not be able to assign groups to either R180 or TRAD classrooms (i.e., only pre-assigned, intact groups will be included), it is quasi-experimental in nature; (c) The research was conducted at the researcher's school and hence did not allow for comparisons with other school districts. (d)There was also no control over student maturation and differentiation factors between pre and post

test measures; and (e) there were no control over conditions of MAP testing, as well as no control of instructor deviation from curriculum in either TRAD or R180 classrooms.

Significance of the Study

It is important that literacy interventions be analyzed by third parties for their ability to impact reading performance. Also the analysis of any literacy intervention's impact on math performance would add to the limited research on this relationship. Any school currently using a reading intervention's reports of pre- and posttest measures as indicators of reading progress have a need to understand that reading progress should be measured by state standard aligned measures such as MAP. Because of the monetary concerns that go along with program implementation, and the sanctions involved with non compliance it is important to make at risk schools aware of the value of using state aligned measurements of progress as a comparative tool against company sponsored progress reports. Also it is important in research and education to provide new information that concerns the testing of literacy program impact on reading and mathematics progress.

Summary and Transition

There is a need for at-risk high schools that have repeatedly failed to meet AYP to implement effective interventions that will elevate reading and math skills to proficient levels not only because of NCLB legislation but due to the increasing numbers of high school students whose reading levels measure two to three grade levels below proficiency. The problem has effected cross curricular growth. This study analyzed the effectiveness of R180 using measurements that were aligned with individual state

education standards to determine the impact of READ 180 on reading and math proficiency. Scholastic's READ180 intervention was selected for analysis because it has been the "result of more than ten years of research by experts at Vanderbilt University" (Goin et al., 2008, p. 7), and the focus of more than three large scale studies: the Los Angeles Unified School District (LAUSD), the Department of Defense (DoD) Schools (2008), and four urban school districts, in collaboration with the Council on Greater City Schools (Policy Study Associates, 2002).

Chapter 2 will provide a review of adolescent literacy and the impact that below grade level reading skill has across the curriculum as it applies to Title I schools, AYP, proficiency standards, and the efficacy of the Scholastic READ 180 intervention. The validity of using state education aligned systems of measuring the effect of literacy programs will also be discussed. Chapter 3 will provide a detailed overview of the research design, methodology, and dependent variables used in the study followed by Chapter 4, the analysis of dependent sample t tests on MAP reading/ELA and MAP math measures, and two separate one way Analysis of Covariance (ANCOVA). Chapter 5 will conclude with a summary of the findings and recommendations for further research.

CHAPTER 2:

LITERATURE REVIEW

Introduction

The literature review has been organized to provide the reader with relevant research pertaining to the effects of below-grade-level literacy at the high school level on the cross curricular performance of adolescents, and will also analyze the relationship between literacy and math performance. The review will include research that indicates the impact of cyclical poverty on rural Title I schools (such as that of the researcher) that purchase literacy interventions such as READ 180 as a tool for meeting the proficiency benchmarks mandated by No Child Left Behind (NCLB; 2002). Measures of proficiency and the validity of various methods of assessment such as Measures of Academic Progress (MAP) and the National Assessment of Education Progress (NAEP) will be reviewed as well. The literature overview is divided into the following sections: (a) Adolescent Literacy which covers the far reaching effects of blow grade level literacy on students, schools, and the world marketplace; (b) The Impact of SES is highlighted as one of the principle causes of the delayed literacy phenomenon; (c) Title I schools, AYP, and the Inconsistency of Proficiency Across State Standards examines the vast differences that currently exist between state definitive benchmarks; (d) The Link between Literacy and Math details the limited research on this phenomenon as it applies to both below and proficiency adolescent literacy; (e) The Scholastic Read 180 Program is examined by literature that details the grounded and teacher led instruction and (f) Measures of Academic Progress (MAP) involves an overview of studies relative to the formative

assessments alignment with state education standards and its calibration of test questions. Title I schools and their struggles to meet Annual Yearly Progress (AYP) will be highlighted in an effort to describe the effects of rural poverty and below grade level literacy on the problems facing these schools.

The search for relevant literature included an expansive search through peer reviewed full-text articles from ERIC, Academic Search Premier, and PsycARTICLES databases from the Walden University Library. Other research included the use of classic texts, company sponsored research such as the SRI reading progress reports from READ 180, state and national governmental documents, executive summaries detailing the findings of MAP alignment studies, national summative results from NAEP, and comparative analyses of adolescent reading programs. Boolean terminology such as adolescent reading and delayed literacy, secondary education and adolescent literacy, delayed literacy and assessment, rural Title I schools and literacy, NCLB and Title I schools, proficiency and education standards, literacy and math, and secondary reading programs and literacy interventions not primary education was used to saturate the literature that provided research spanning from brain based studies of adolescent reading processes to validity tests of MAP when aligned to state education standards.

Adolescent Literacy

Current research on delayed and below grade level literacy has indicated that although elementary and middle grades students are demonstrating overall improvements in grade level literacy performance, at the high school level progression in cross curricular comprehension, analysis, and application remains stagnant . In other words

high school students are not progressing in their development of reading and writing skills as they once did in middle school. The National Joint Committee on Learning Disabilities (2008) compared middle grades and high school level test scores and it was found that a large number of US high school students had not demonstrated their readiness for either post secondary education or the workplace. It was apparent throughout the study that low levels of literacy were one of the factors that had affected low test scores. Correlation studies that compared high school reading levels to drop out rates between 2006 through 2008 pointed to the approximate six million student reading and language test scores that fell below grade level (Fisher & Ivey, 2006; Groff & Lake, 2008; Slavin et al., 2008) and to the over 3000 who dropped out on a daily basis (Joftus & Maddox-Dolan, 2006). Evaluations of standardized tests and best practices in literacy instruction reported that approximately 75% of high school students read below their respective state's definition of proficiency, and that a quarter of this group fell far below their grade level in reading ability (Houge, Geier & Peyton, 2008; Kemple et al. , 2008; Klecker & Pollock). Research on adolescents and their readiness for college leveled texts reported that high school students actually lost literacy momentum from the time following grades 8-12 (Clark, 2006; Hough, et al.; Kennedy, 2006), and upon graduation over 40% of these same students lacked the writing skills necessary for employment based standardized measures of basic skill (, National Inst. of Child Health and Human Development (NIH); National Inst. For Literacy; Deshler & Hock, 2006). Kennedy's (2006) discussion of the study, "Reading between the Lines: What the ACT Reveals about College Readiness in Reading" (2006) noted the nearly two thirds of 8 to

10th graders whose scores indicated college readiness, whereas the other grade levels were "actually losing momentum during high school" (Kennedy, 2006, p. 1). After a comparative analysis of reading and math scores from both middle and high school students, The ACT Executive Summary (2005) emphasized that "students are on track to being ready for college leveled reading in grade eight than are actually ready by the time they reach twelfth grade" (ACT College Readiness Executive Summary, 2005, p. 10).

As at risk students advance through high school so too does their need for a more highly developed vocabulary, word recognition, and decoding system inclusive of grade level proficiency in both phonemics and fluency. These aforementioned reading skills or the lack thereof effect the level at which on or above grade level literature, mathematics, and science language can be comprehended by the student. (Sandak, Mencl, Frost, & Pugh, 2004). When students who read below grade level enter high school they are faced with tasks that require the comprehension, analysis, and translation of text book and supplementary material sometimes two to three grade levels above their current grade status. Assessments of this same literature require the development of abstract concepts in the form of critical essays in English as well as the development of analogies and solutions to complex problems in math and science.

In essence below grade level readers are placed in classrooms where the reading material is typically four or more grade levels above their reading comprehension skill. Studies in best practices in literacy instruction and curriculum have found that as time passes the performance gap increases between students on and below grade level literacy

status. “Students are unable to meet the demands of required courses in the content areas in high school and their resulting failure leads to discouragement and disengagement in school” (Deshler & Hock, 2006. pp. 3-4). According to studies (Caldwell & Leslie, 2003, p. 1081; Mastropier, Scruggs, & Graetz, 2003; Clark, 2006) that aligned secondary reading ability with grade leveled text books found that struggling adolescent readers face as their major source of instruction, higher than grade level texts that “ do not present material in a reader friendly fashion, but instead contain densely worded paragraphs that include an overwhelming number of facts and details with insufficient explanation”(Mastropier et al., p. 101), and such reading skills are rarely either taught or reinforced by the secondary curriculum so high schools have found themselves struggling to advance this “bottleneck of poor readers” (Clark, 2006, p. 66).

ACT (2005) reading and math test results indicated that only half of all high school students tested were proficient in college leveled comprehension and analysis and 8th and 10th graders were more prepared for college leveled comprehension than were those in12th grade cohorts (ACT, 2006, p.1; Joftus & Maddos-Doland, 2003). These results were supported by norm referenced 2007 National Assessment of Educational Progress (NAEP) test data that demonstrated 70% of 8th graders tested “could not describe the purpose of a practical passage and support their views with examples and details” (Douglas, 2008, p. 180). Klecker and Pollock (2004) in their study that analyzed reading scores from local and national tests suggested the best indicator of the inability of high school students to keep pace with the growing complexity of standardized text is illustrated by the test results of the 2002 *Kentucky Core Content Tests* (KCCT) where a

record 71.25 percent of students scored below the state defined proficiency mark in grade level reading progress (Klecker & Pollock, 2004, p. 149). Yet in light of the growing percentage of high school students whose literacy skills are either delayed ,which negatively affects the schools ability to comply with national, state and local proficiency standards, NCLB mandates that schools receiving funding under the legislation maintain "a concrete goal of having 100% of students meeting standards by 2014" (Cronin, 2005, p. 6). Although their backgrounds differentiate below grade level readers do share some commonalities and the research is clear that one of the main extrinsic causes found to impact the progression of literacy from elementary to high school is the time exposure in low socio-economic (SES) environments.

Impact of SES

Although the principles underlying adolescent literacy skills and the complexities surrounding its development and continued enhancement to levels of proficiency are complicated and multifaceted ranging from extrinsically based syntactical and semantic deficits to physiological disabilities (Sandak et al., 2005), "socioeconomic status (SES) differences in children's reading and educational outcomes are ubiquitous, stubbornly persistent, and well documented" (Aikens & Barbarin, 2008, p. 215) and exists as one of the fixed negative influences on linguistic progression (Goin, 2004, p. 124). Children reared in lower SES conditions generally are limited in their exposure to language-rich stimuli (Balfan, 2004, p. 1), and therefore stand a higher risk for academic failure. The United States Department of Health and The Human Services Rural Families Data Center (2006) reported that "counties with persistent poverty are overwhelmingly rural" as well,

and students who are from low SES minority groups were found to be far more likely to fall into the category of "at risk" (Kennedy, 2006; Grace, Shores, Zaslow, Brown, Aufseeser, & Bell, 2006). Deshler and Hock (2006) found that low SES impacts decoding skills that are not sufficient enough to deal with higher levels of subject matter and its comprehension, thus creating a performance gap. It was found that over time this difference that exists becomes larger. Existing gaps were found to exacerbate in later grades where the academic growth of at-risk students plateaus (Deshler & Hock; Houge, Geier, & Peygon). It was also found that as students move through school economically disadvantaged ones acquire language skills more slowly and exhibit delayed letter recognition and phonological sensitivity, which places them "at risk for reading difficulties" (Aikens & Barbarin, 2008, p. 215).

Comparative studies of income groups reported that the gap between low and high SES and reading ability continues to increase as rapidly as the progression in school, and can be "compounded by low quality environments" (Aikens & Barbarin, p. 215). Other studies of low income children from rural backgrounds reported that a rural environment can also limit a student's exposure to culturally rich activities and experiences that act to compound the impact of poverty on literacy development (Balfaz, 2004, p.1). An impact study (Balfanz, Legters,& Jordan, 2004) on early reading and math interventions of at risk groups of children found that "cities that educate primarily high poverty students typically have performance levels equal to those in developing countries" (Balfanz et al., p. 1). The analysis of achievement information the students from high poverty backgrounds performed significantly below national averages and fell

“ dramatically short of the performance benchmarks increasingly employed to measure academic success” (Balfanze et al., p. 10). As far back as the year 1998 the NAEP reported that 68% of our nation’s poorest students in the fourth grade failed to attain basic levels of literacy (Hassesbring & Goin, p. 123).

A longitudinal mixed methods analysis of a large cohort of early childhood to kindergarten aged children from 1,277 public and private classrooms (Aikens & Barbarin, 2008) concluded that the influence of family, neighborhood, and school factors affected the low income status relative to the significance of one over the other relative to reading development. A combination of interviews, observations, assessments, and surveys indicated that the family stress and book investment, school involvement, and center of care prior to kindergarten had the strongest impact on reading up to the spring of kindergarten, but fell behind school and neighborhood immediately after which is considered the period when the most rapid reading growth takes place (Aikens & Barbarin, p. 248). School surroundings and neighborhood environments were found to be continuous influences on reading levels where the reading gap between the most poor and affluent continued to expand throughout the school years.

A history of familial reading achievement, cognition, and efficacy were also found to have a significant impact on single word reading skills, comprehension, spelling, and orthographic processing as well as the self efficacy concerning reading ability (Conlon, Zimmer-Gembeck,Creed, & Tucker, 2006, p. 11). Another significant factor found in reading delay and underachievement in students from low SES backgrounds was their tendency for mobility more so than students from higher SES backgrounds (Smith,

Fein, & Pain, 2008). Mobility was found to affect the number of texts a child was accustomed to reading, and also the lack of school uniformity was found to influence the level at which a child's reading developed. Personal perceptions of reading skill were also found to have a direct impact on its manifestation effecting early epistemological perceptions that became even more grounded as the child moved through school (Smith, 2005) "By grade four perceptions of reading difficulty and its competence were significantly related to reading achievement and, in grade 5 attitudes towards reading also became significantly related to reading achievements" (Conlon, Zimmer-Gembneck, Creed & Tucker, 2006, p. 15). The impact of community, neighborhood, and poor housing on proficiency test scores (Woolley, Grogan-Kaylor, Gilster, Karb, Grant, Reischl, & Alaimo, 2008) was examined by utilizing the 2000 census, community surveys, and standardized test data. The results indicated that "increased levels of neighborhood bonding, social capital, and lower levels of poor physical conditions were predictive of higher student scores on achievement in math and reading" (Woolley et al, p. 133).

Cognitive deficiencies relative to the reading process which may interfere with phonological, orthographic and rapid visual processing were also found to impact word identification, spelling, and comprehension proficiency in addition to negative environmental influences (Sandack, Mencl, Frost, & Pugh, 2004; Conlon et al., p.33). McCall, Hauser, Cronin, Kingsbury, and Houser (2006) analyzed the achievement gap between school districts housed in high poverty regions verses those in more wealthy district. The Northwest Evaluation Association (NWEA) assessment was used in the

study to conduct a "continuous, cross-grade measurement scale" (McCall et al., p.1). Achievement gaps were found between Euro-Americans and both African and Hispanic Americans even in schools with more even levels of poverty, and those students in low poverty versus more wealthy school districts experienced less growth. African American students experienced less growth than either group, particularly in mathematics. Overall students in high poverty districts experienced less growth and achievement, but were also impacted in areas of performance range across the curriculum (McCall et al., p. 2). Yet as far as performance measures on high stakes tests, word decoding and semantic skills were not analyzed and may have been overlooked due to students' SES backgrounds that may have provided a unique local vocabulary. Conclusions from the study included statements regarding the local language as influencing the testing outcomes. It was included that "discourse structures, and world knowledge that are discrepant from the materials they encounter in school thus most current screening measures seem best able to identify students at risk for failure due to a demonstration of low reading skills" (Synder, Caccamise, & Wise, 2005, p. 36). Low SES effects educational performance across the curriculum placing students at risk for perpetual failure as well as the at risk Title I schools that are charged with driving below grade level learners toward proficiency. In essence the environment drives the language which affects the level of learning which in turn impacts overall student and school progress.

The Inconsistency of Proficiency across State Standards

The term Title I refer to schools where over 40% of the population lives in poverty. Many of these schools operate under the same type cyclical pattern of below

proficiency performance mentioned above. Title I schools may also designate "targeted assistance programs" (US Department of Education Title I Part A Program, 2008) for students whose standardized test scores do not meet state definitions of proficiency or who are considered too at risk for failure due to classroom performance. Title I schools at risk for restructuring due to consistent non compliance with local, state, and national measures of proficiency. Many of these schools turn to the implementation of literacy and math interventions in order to gain the growth margins necessary to meet AYP goals, a complicated measurement of school successes or failures that include testing, attendance, graduation, demographics, etc. Under No Child Left Behind, each state is given the freedom to determine the means by which levels of proficiency will be met and measured. In other words the types of assessments and levels of proficiency benchmarks differentiate greatly between states. According to Carey (2006) in a report outlining the abilities of states to "inflate their educational progress under NCLB, states are largely free to define the terms of their own educational success" (Carey, 2006, p.1). In a comparative study of differences among national English and literature standards (Stotsky, 2008) found that in approximately half of the states the study of literature was not an educational requirement and, "few offered illustrative titles, authors, literary periods, and literary traditions as indices of reading growth and literary quality or examples of milestones in the history of the English language" (Stotsky, p. 13).

Schools are either sanctioned or funded by the results of each Annual Yearly Progress (AYP) report that is issued. This document represents the mean of each applied state and national test plus the yearly growth index, a measure of the percentage of

students meeting the current proficiency benchmark (Cronin, Dahlin, Atkins, & Kingsbury, 2008; South Carolina Department of Education, 2008; Lissitz, & Hua Wei, 2008, p. 46) as compared to scores from two years prior in accordance with NCLB mandates of measurements. There are wide variations between state definitions of proficiency measures of grade level ability and skills inclusive of the advanced category (Cronin et al., 2008; Heck, 2006, pp.668-9; McCall, Kingsbury, & Olson, 2004, p. 3; Manzo, 2007, p. 171; Bramley, 2005, p. 251; Bracey, 2008). Studies aligning state standardized test measures with the needs of students identified with learning disabilities have indicated that AYP benchmarks have been based on measures of overall student population performance and other student subgroups (Georgia Department of Education, 2003; NCLB index, 2008) or those students who qualify for an individualized educational program (IEP) or English instruction for speakers of other languages (ESOL) instructional adaptations (Gamble-Risley, 2006, pp 38-40; Menken, 2006, p. 523; NCLB, 2008; NCLB Sanctions for Title I Schools, 2008).

There are wide variations between state definitions of proficiency ranging from the 6^{th} to the 77^{th} percentile (Cronin et al., 2008, p. 3) based on a 1-100 scale. An analysis of Title I schools and state standards based testing for the US Department of Education (Westat, 2007) indicated that "states sometimes make changes to the state assessments used to determine AYP from one year to the next. These changes can range from changing the proficiency levels to implementing a new program" (Westat, p. 4). Analyses of cut scores and NAEP levels revealed that Virginia selected extremely high cut scores for the 21 state tests that were analyzed (Bracey, 2008, p. 37) which indicated

that states' application of proficiency status had become convoluted. It was suggested that the problem existed because NCLB (2002) mandated that all students reach proficiency by 2014 yet "permitted each state to define what proficiency is" (Bracey, 2008, p. 39). A longitudinal study compared cut scores across grade levels 3-8 (Lissitz & Wei, 2007) using the Maryland School Assessment (MSA) of the criterion referenced (CRT) and norm referenced (NRT) tests over a three year period. It was found that the process of setting cut scores independently by grade level led to assessment measurements that were not "set with a consistent level of rigor across grades" (Lissitz & Wei, p. 46). The research team proposed a concept of "vertical moderation in standard setting to achieve across grade consistency which is achieved by maintaining a consistent across grade trend line on the percentages of students assigned to the targeted categories across grades with consistency defined as non-changing" (Lissitz, & Wei, 2006, p. 46).

A similar study (Heck, 2006) compared the proficiency scores between cross sectional states longitudinally over four years using 123 elementary schools. Research findings led to recommendations that cautioned against categorical placement decisions based solely on cut scores because "students with higher previous academic skills had an easier time reaching subsequent benchmarks than students with weaker skill levels" (Heck, 2006, p. 668). It was suggested that individual progress toward success or the meeting of NCLB benchmarks may be neglected because of the significance of differing cut scores. The study offered alternative methods for monitoring and measuring individual growth such as the use of the National Assessment of Educational Progress (NAEP), formative assessments such as Measure of Academic Progress (MAP),

classroom observation, and differentiated assessment based on student learning (Heck, 2006)

The National Assessment of Educational Progress (NAEP) has been used in numerous proficiency studies because of its large scale sampling capacity and NWEA's Measure of Academic Progress (MAP) for its "rock steady scale" (Cronin, Hauser, Kingsbury & Olson, 2005, p. 3) to measure the differences in cut scores between 26 states. The five states of Colorado, Massachusetts, Wisconsin, North Dakota, and California (Cronin et al.) were used to represent the range of proficiency cut scores in the US which were then correlated with NWEA Measures of Academic Progress (MAP) reading questions that were based on one particular reading skill, the ability to distinguish fact from opinion. Questions were matched in difficulty to the selected states' cut scores for students in grade 4. There was a 24 point difference between Colorado's definitions of proficiency 187 as compared to Massachusetts' 211. Wisconsin's 191, North Dakota's 199, and California's 204 fell between these margins. The study suggested that "Colorado has two standards: an easier standard for NCLB and a harder standard for internal state use" (Cronin et al., p. 15). The greatest disparity between the definitions of proficiency was found between the reading and mathematics scores in grade 8 across all states that indicated "nearly twice as many students would pass reading than would math" (Cronin et. al., p. 20). South Carolina's definition of a proficient score fell at the 77th percentile, one of the highest when compared to the 26 state samples. MAP scores were aligned with the Palmetto Achievement Challenge Test (Cronin & McCall, 2004) in a comparison study between South Carolina's cut scores for mathematics across 26 states.

It was found that South Carolina surpassed the overall state median score by 25-38 points. The study also noted that South Carolina's proficiency scores had lowered between the years of 2002-2006, and that the math cut scores were higher than reading across all grades. However reading and math assessments in grade eight were found to be more challenging when compared across grade levels 3-8 (Cronin et al., p. 181). South Carolina's definition of proficiency for reading in grades one through three ranked between the 43rd and 71st percentile. Results indicated that "gains may be illusionary and problems may be nonexistent or at least misstated and the testing infrastructure that school reform is based on is unreliable at best" (Cronin et al., p. 3). It was suggested that standards should be backward mapped to reflect real world knowledge and tethered from high school to kindergarten (Cronin et al., p. 184).

The NCLB legislation (2002) mandates that a school's AYP benchmark reflect the percentage of school age students who have performed at a level of proficiency or better (NCLB, 2008). Schools are required to test between 90 and 95 percent of their enrolled students, but the legislation offers states flexibility in their establishment of proficiency definitions and the corresponding cut scores as well as the ability to design tests that measure specified breakpoints between ability levels.

AYP was analyzed (McCall, Kingsbury, & Olson, 2004) for its ability to provide a complete picture of a school's performance based on the criteria of either meeting or not meeting the AYP goal by comparing grade level cross sectional test scores from the Northwest Evaluation Association's Growth Research Database of Measures of Academic Progress (MAP) math and MAP reading test scores from 2002 through 2003.

MAP test scores were distributed and correlated with proficiency cut scores across 22 states. For example the state of Indiana's cut score for 5th grade math was equal to a 216 MAP scale score and so on until each MAP test measurement was correlated to state standards and related cut scores (McCall et al., p. 10). Raw growth was computed by the difference between the 2003 and 2002 scores.

Results indicated that even though schools demonstrated significant growth over a period of time they were likely to fall below the AYP benchmark due to the measurement's inability to more accurately illustrate overall growth. AYP as a summative evaluation was viewed as more of a "snapshot view of student results cross sectional percent meeting a standard at a single point in time" (McCall, et al., p. 19). The study suggests that the AYP benchmark measurements do not give attention to those students falling far below or above the proficiency goal and therefore forces schools to focus on those students that fall just below the proficiency mark which leaves fewer resources for the gifted and talented to work at full capacity.

A large scale longitudinal study (Cronin, Kingsbury, McCall, &Bowe, 2005) measured the impact of NCLB on student achievement and growth utilizing the NWEA MAP test because of its ability to give "cross sectional and cohort achievement on a uniform scale with standards that approximate those of each state" (Cronin et al. ,p. 7). Reading assessment data was acquired from a sample of 320,000 students in grades 3-8 from large cross sections of US school districts in 23 states that had common scale scores from the NAEP that was measured between years 2001-2002 until 2003-2004. Mathematics data was acquired from a sample of 334,000 student assessments from

grades 3-8 in 22 states. All assessment data came from NWEA's pre and post MAP tests and were correlated with RIT scale scores for a comparison of individual student growth. Students who did not have a fall and spring score were not included in the sample.

The study contained both longitudinal and cross sectional analysis of year to year achievement differences and growth which were compared before and after NCLB using univariate and multivariate statistical analysis of change with implementation as a variable. Effect sizes were also calculated if found to be appropriate. Results indicated that between years 2001-2003 mathematics scores showed a weighted difference of .76 RIT points across all grades weighed more heavily for fifth grade due to its larger sample size. Math results indicated that students entering a grade in 2003 had overall higher scores than those in 2001 prior to NCLB. The greatest gains in reading growth were in the 8^{th} grade with RIT scores ranging from .85 in 2001-2002 to .95 in 2003-2004 (effect sizes were .12 and 1.4) which led to the conclusion that NCLB mandates for standards based instruction has had a positive effect on both level of achievement and longitudinal growth (Cronin, et al., 2005).

The study noted that the states of Florida, Georgia, Illinois, Indiana, Maryland and Ohio are currently participating in a NCLB sponsored pilot study called "Differentiated Accountability" which will aggregate scores according to subgroup differentiation such as ethnic minorities and "students with disabilities" (Cronin, et al., p. 2). Other curriculum changes could come in the form of mandated school grouping and special programs designed to "help chronically underperforming school devise their improvement plans" (Cronin, et al., p. 5).

South Carolina Title I schools have been impacted by state to state inconsistencies in measures of proficiency that have been compounded by rural poverty so interventions such READ 180 have been implemented to bridge the gap between student achievement and AYP compliance (SC Department of Education, 2008).

Link between Literacy and Math

The barriers to cross curricular progress have prompted a few studies that focused on the link between literacy development and progress in mathematics problem solving and science (Fuchs & Fuchs, 2002; Kerry, Swee-Fong, Ee-Lynn, & Zee-Ying, 2004; Martiniello, 2008; Mastropieri et al., 2006; Minna, 2008; Pape, 2004; Powell, 2004; Swanson, Jerman, & Zheng, 2008;Tuohimaa, Piia, Anuola, & Nurmi, 2008; Wise et al., 2008). Fuchs & Fuchs (2002) found in a comparison study between students with identified disabilities in math and those with both math and reading disabilities that "difficulty in reading seems to impact other types of academic achievement as well" (LD Online), but in a correlation study of 2005 SAT reading and math scores (Kronholtz, 2005) overall math scores were raised by four points whereas critical reading scores fell by more than two scaled points. Both middle grade level math and reading (Powell, 2004) were found to be impacted by levels of adult literacy in a correlation study that tested the relationship between ACTAAP, demographic, and literacy variables "when eighth grade math and language arts scores from the 2003 ACTAAP test were compared to 1990 adult literacy rates, they showed parallel trends" (Powell, 2004, p. 17) with slightly higher levels of significance for the reading variable. According to the National Center for Learning Disabilities (1999), both math and reading share perceptual and

spatial commonalities due to their heavy use of numbers, punctuation, signals and letters. The Swanson, Jerman, Zheng (2008) and Kerry, See-Fong, Ee-Lynn, and Zee-Ying (2004) studies attributed disabilities in both math and literacy to the delayed development of working memory (WM) as support for the "notion that growth in WM is an important predictor of children's problem solving beyond the contribution of reading, calculation skills and individual differences in phonological processing inhibition and speed" (Swanson, et al., p. 343). Other studies involving the testing of the relationship between reading comprehension and mathematical problem solving ability indicated that the enhancement of technical reading skill increased mathematical problem solving skills (Vilenius-Tuohnimaa, Daisa, & Nurmi, 2008, p. 409), and as word problem difficulty progressed through school, English language learners (ELL) faced more difficulty than non ELL learners (Martiniello, 2008, p. 333).

Kyttala (2008) investigated high school students between ages 15-16 that struggled with mathematics in order to test the theory that delays in visual-spatial working memory would impact both reading and mathematics outcomes. Results indicated that "the group with deficits in math had less capacity for storing passive visual simultaneous information, while the group with difficulties both in math and reading had deficits in both storing (passive visual and visual-spatial information" (Kyttala, p. 273). But Wise, Pae, Wolfe, Sevcik, Morris, Lovett, and Wolf (2008) noted that "limited research has examined the skills of children with a reading disability (RD) and children with RD and a mathematics disability (MD) and even less in the phonological awareness and rapid automatized naming" (Wise et al., p. 125). Therefore since the implementation

of NCLB (2002) it has been a priority for school districts to initiate remedial interventions that aid in the development, enhancement, and retention of applicable cross curricular language skills. Company sponsored programs such as READ 180 are marketed to at risk schools because of their claims to rapidly advance reading levels, but in order to qualify for federal funding a reading program must provide instruction in phonemic awareness, phonics, fluency, vocabulary, and comprehension (Davidson, 2002, p. 1; National Reading Panel, 2000; NCLB, 2002).

Commercially Available Interventions

In order to the meet the growing need for the advancement of adolescent literacy in schools that struggle against a tide of NCLB administrative and financial mandates commercially available reading interventions are marketed as solutions to this problem. For example Scholastic READ 180® and America's Choice Ramp Up Literacy® offer constructivists best practices that include the use of computer aided word identification and direct instruction comprehension strategies. Common learning theories are that multiple grade level text exposure will lead to accelerated growth in comprehension skill. Whereas programs such as Language®, and Fast ForWord® offer a phonemic based approach to adolescent reading involving computer based studies in word meaning and associative sounding, syllabication, and syntax. These are among the multitudinous products on the market. Each claimed to aid in the advancement of adolescent literacy and test scores.

The school under study chose to use READ 180 due to its specificity that READ 180 went beyond the canned approach to literacy by offering a more direct instructional

practice of the teaching of reading. The following information will detail the READ 180 program from its origin to its day to day operation as well as the studies that have tested its efficacy against other programs and by comparisons of its company sponsored reading progress reports.

The Origin of the READ 180 Instructional Model.

The READ 180 90 minute cyclical model began as a collaborative effort between Janet Allen's "literacy workshop" and Ted Hasselbring's Peabody Learning Lab's "interactive software system" (Daley, 1999) and was adopted by the Orange County Literacy Project (OCLP). "The concept of anchored instruction or the introduction of situational learning from different constructs of nonfiction to promote engagement and interest was first introduced by the Peabody Literacy Lab" (Goin & Hasselbring, 2008, p. 133). Control and experimental group pre and post test measures of the impact of the Peabody Learning Lab on reading test scores indicated that "auditory vocabulary, literal comprehension, inferential comprehension and total reading comprehension" (Goin & Hasselbring, p.140) were significantly impacted by a 30 minute per day 180 day exposure.

The Peabody Learning Lab software became the prototype for Scholastic's Read 180 because it was tested extensively in the Orange County schools between the years 1993-1999 (Jarret & Evans, 2007, p. 2) because of its ability to allow the student a determinant number of miscues before self correcting, and also functioned to assess the number of miss-cues. For example if a reader miss-pronounced or chose a word or segment incorrectly twice, the software would prompt the student with a similar leveled

question and may have returned to the former at a later time. Another key element is the software developed by The Cognition and Technology Group at Vanderbilt (CGTV)due to its "anchored instruction model of learning" (CGTV,1992, p.2)) which is "similar to case-based learning, although the stories presented are meant to be explored and discussed rather than simply read or watched" (CGTV, p. 2). In a two year longitudinal study (Daley, 1999) of the OCLP's impact on reading outcomes the mean post test score results from those students exposed to the program "rose from a level of 4.0 to 4.5 on vocabulary and from a grade level of 2.6 to 3.6 on reading comprehension. Grade point averages for the same group of students rose from a mean of .00 in 1994 to 2.3 in 1996" (Daley, 1999, p. 1).

The Actual Commercial Structuring of READ 180 began. In 1999 Scholastic Inc. partnered with the Orange County Literacy Project in Florida (1995-97) and the Cognition and Technology group at Vanderbilt University (1987-1989) to develop and market the READ 180® program for grades 4-12. The company based the reading software package on Ted Hasselbring's Peabody project research and the instructional components on Janet Allen's, Orange County Literacy Project of Florida model. Janet Allen is most noted for her work with literacy challenges at the middle school level and also designing reading intervention programs that address specific areas of comprehension deficits (Scholastic READ 180, 2008).

READ 180 for Adolescent Readers

Stage C was developed for high school readers grades 9-12 most of whom after testing, typically were assessed below the 25th percentile in reading comprehension and

its other formal applications. "All stages are based on the same 90 minute instructional model that focuses on enhancing skills in phonemic awareness, phonics, fluency, vocabulary, text comprehension, spelling, and writing" (Jarrett & Evans, 2007, p. 3) where a three daily rotation between the computerized grounded instruction, extended independent reading, and guided comprehension instruction takes place within the classroom. According to the Florida Center for Reading Research (2008) READ 180 was designed to activate the readers during a 4-6 week instructional period. Wood (2006) noted that researchers have pointed out that "there are large gaps in our understanding of how fluency and comprehension influence each other" (Wood, 2006, p. 87).

The program was designed to enhance Lexile driven vocabulary and word analysis strategies that include "specific comprehension strategies that are explicitly taught" (Florida Center for Reading Research, 2008, p.1) by using guided instruction and differentiated reading assignments based on the readers' current Lexile levels. After each of the three groups of no more than seven students have completed the computerized, sustained silent reading, and small group comprehension assessments, the instructor conducts a ten minute review and preview wrap up session.

Read 180 Computer Based Instruction

There are four specific zones to the software component: the Reading, Spelling, Word Study, and Success Zones (Read 180 Core Technology Overview, 2005, p. 1). The Reading, Spelling and Word Zones expose students to brief narrated videos that direct independent word study to encourage fluency (Reading Recovery, 2008), vocabulary building, and comprehension by using grounded audio-led instruction for miss-cues that

create word associative scenarios. In the words of the READ 180 product literature, "The Reading Zone is where scaffold instruction begins. Phonics, fluency, vocabulary, and comprehension are the key skills developed and practiced" (Scholastic Read 180 Program Overview: Product Tour, 2008, p. 1) within the instructional cycle.

The computer also generates Scholastic Reading Inventory (SRI) daily and weekly assessments that reflect "comprehension, vocabulary development, fluency, phonics, word and spelling skill development, along with SRI reading and multiple choice quizzes relative to familiar passages" (Kocanda, 2008, p.2) based on the students grounded instructional component. Lora Kocanda, Program Coordinator for the Home School District 33C in Illinois, stated the following after having instructed and observed the Read 180 program:

> In the Success Zone, students apply strategies to compare modified versions of passages, choose the version that has no discrepancies from the original, read and apply comprehension and vocabulary strategies in order to select the correct missing word, and make a final recording that aims at fluency (Kocanda, 2008).

The Read 180 Instructional Variable

The pedagogy of READ 180 is based on a reading philosophy where comprehension is thought best achieved by a repetition of textual exposure leveled by differentiated Lexile leveled texts. In order to add further information concerning the instructional variable in the READ 180 program it is important to emphasize that each school that purchases the program is charged with both the hiring and consistent monitoring as well as the training of the reading teachers. Some problems associated with this element of the program are the inconsistencies in adherence to the READ 180

instructional model. Studies concerning program efficacy and instructional adherence are offered as examples of complications that can interfere with program goals.

The READ 180 program provides books that "run the gamut from non-fiction to contemporary young adult to classics, all chosen with the intent of generating feelings of success" (Jarrett & Evans, p. 2), and the last ten minutes are spent in whole group wrap-up sessions. If a student chooses a book below his Lexile level, the instructor is directed by the READ180 training manual to advance the reader to a longer word count book over the next 4-6 week period and to note the goal in the student's overall reading assessment program (Read 180, 2008). A READ 180 instructor, Penny posted her reflections on the instructional process through her team web page and stated that "the toughest aspect to the program is the independent reading component. Obviously our kids don't like to read and the fact that the teacher is tied down to a small group makes it difficult to get them on task" (Teacher.net, 2008, p.1) as a means of communicating some of her teaching experiences. The comprehension elements of instruction are the "hallmark" (Florida Center for Reading Research, 2008). Comparison/contrast, story sequencing, structural elements of the plot, story summarizing, are all taught in detail "explicitly, systematically, and intensively" (Florida Center for Reading Research, 2008, p. 3).

READ 180 Evaluation Studies

Evaluation based studies of READ 180 have noted the inability to match the 90 minute instructional cycle as one of the difficulties in designing valid control group studies "In these cases instruction time was convoluted with the effects of the program itself" (Slavin, 2003, p. 295). Pearson and White conducted an impact study (2004) in

the Fairfax county schools where instructional implementation of the READ 180 cycle was scaled according to the instructor's adherence to the manual. With average changes of 106 L from exposure to full implementation classrooms to only 68 L from those students who participated in classes with limited or minimal implementation it was considered obvious that teacher implementation was a large part of the READ180 success process (Pearson & White, p. 14). Extended exposure to the program was also found to impact test scores. The Council of Great City Schools in New York study (2002) indicated that "each year of additional participation was associated with gains of approximately six scale-score points on SDRT4" (Pearson & White, 2004, p. 39). DoD schools scores across the nation increased from 39.9 NCEs to 47.3 a difference of 7.5 NCEs (Policy Studies Associates, 2002, pp. 3-4). The more significant increases were made by readers performing at the lowest Lexile levels. Pearson & White (2004) analyzed the Lexile-driven Scholastic Reading Inventory (SRI) test results from the READ 180 data base, but neglected to use dated SRI data, a control sample, or alternative measuring devices all of which were noted to have compromised the validity of the study's findings. A study of READ 180 and its impact on reading changes (Haslam, White, & Klinge, 2006) conducted matched pairs pre and post test measurements of the Texas Assessment of Knowledge and Skills (TAKS) scores and the SRI READ 180 Lexile scale scores, and results indicated that "the Read 180 students gained more than the matched nonparticipants on the 2005 TAKS Reading Test (Haslam et al., p.4). Instructor divergence from the READ 180 "ideal instructional model" (Goin, Hasselbring, & McAfee, 2008) affected the program's impact on the Terra Nova reading

and language arts test. It was found that the instructional component was a significant variable in relation to the program's impact on reading scores (Goin et al., 2008, p. 9).

According to a study on READ 180 and assistive technology (Hasselbring & Baush, 2006), the intervention strived to break students out of the cycle of reading failure (Hasselbring & Baush, p. 6) through a rigorous combination of a variety of reading practices based on fluency, vocabulary and phonemic awareness. A research synthesis of reading interventions (Slavin et al., 2008) indicated the same type of rigorous literacy instruction once relegated to elementary classrooms is now being pushed for in both middle and high schools across the curriculum due to AYP accountability. As mentioned earlier, other reasons for the remedial program push, particularly in high school, is the discrepancy between reading levels and classroom textbooks (Kinder, Bursuck, & Epstein, 1992; Mastropieri, Scuggs, & Graetz, 2006).

Follow up studies utilizing both observation and instructor surveys on the impact of instruction on READ180 outcomes have indicated that implementation of the instruction manual is key to the program's success (Haslam, White, & Klinge, 2006, pp.10-13), but there has been little in the way of research where both state and national formative and summative assessments have been used to evaluate a literacy intervention's impact on reading, language, and math scores.

READ 180 Impact Evaluation

Scholastic, publisher of READ 180® in cooperation with Interactive, Inc., Policy Studies Associates of Washington, DC (Admon, Papa Lewis, & Zvoch, 2002) conducted a special education study that used North Western Evaluation Association (NWEA) pre

and post test Measures of Academic Progress (MAP) scores from the Council of Greater City Schools in New York State by an analysis of the relationship between higher MAP scores and exposure to READ 180 program. The results indicated that "the greatest gains were made by students who were in the READ 180 program for an average of 16 weeks" (Interactive, 2002, p. 54).

READ 180 uses the Scholastic Reading Inventory (SRI) system to both test and report each students reading progress throughout the 15-16 week cycle, regression effects and the use of standards aligned measures of progress may not have been accounted for in the reports.

Measures of Academic Progress

The North West Evaluation Association (NWEA) has sponsored over 17 correlation studies between the NWEA Rasch Unit (RIT) scales and state standards based assessments such as the Pennsylvania System of School Assessment (PSSA, 2004), the Maine Educational Assessment (MEA,), and the Washington Assessment of Student Learning (WASL) as well as the Palmetto Achievement Challenge Test (PACT) for grades 3-8 and the High School Assessment Program (HSAP) for grades 10-12 in South Carolina (Cronin, 2004). Cronin (2004) analyzed the alignment of MAP RIT scale scores with state education standards and proficiency cut scores on standardized tests in order to provide information relevant to the use of MAP as a predictor of grade level proficiency, and in the planning of differentiated instruction based on proficiency goals. Yet there remain an insufficient number of studies utilizing MAP reading Lexile or RIT scale

scores to evaluate the permanent and continuous impact of intervention programs such as Read 180 on specific standards based language or math skills.

The Rasch Unit Measurement (RIT) Scaled Scores

England's National Curriculum (NC) assessment's definition of proficiency and its corresponding cut scores in light of test accessibility changes yearly was examined (Bramley, 2005) and psychometric measurements were implemented to evaluate the capability of a test to determine proficiency by utilizing latent trait theory in the comparison to the dependent characteristics or categories such as ability or belief structure by applying them to a standard measurement or benchmark "as an indicator of a pupil's position on an abstract or latent trait" (Bramley, 2005, p. 253). The Rasch Latent Trait Measurement Model (1960) measured the probability of individual proficiency as a difference between the test item difficulty and the test takers ability to answer the question correctly (Courvoisier, Nussbeck, Eid, Geiser, & Cole, 2008; Engelhard, 1984; Schumacker & Fluke, 1991; Synder, Caccamise, & Wise, 2005). Bramley equated the model to a simplistic form of the Item Response Theory Model (IRT) and expressed the formula's strength as its test design to vary question difficulty individually according to the individual's ability to answer each one. "So if the test is held constant, a pupil with more ability (i.e. at a higher location on the latent trait) will be expected to gain more marks than a pupil with less ability" (Bramley, 2005, p. 253). Standard location on the latent trait remained constant, but did correspond to differing raw scores where the questions are calibrated for item difficulty.

It was concluded that standards are subjective and should only be made applicable to the "particular community of users who make educational decisions based on testing outcomes" (Bramley, 2005, p. 256), that using statistical measures for changing cut score ranges upon changes in accessibility may not be deemed necessary due to the old test's measurement of a "dimension of reading or writing fluency" (Bramely, 2005, p. 256), and that the new test could have removed these particular dimensions, yet questions were raised as to whether the test administrators may have had the capacity to decide on the existence or absence of the aforementioned testing elements and their corresponding cut score. It was also concluded that "if literacy is completely uncorrelated with science ability then making a test easier in terms of its literacy is effectively changing what the test is measuring" in favor of the Rasch model in order to give each question a "correct item characteristic curve" (ICC) and a blind statistical model should be utilized to ensure that year to year correlations are valid forms of comparative measurement (Bramley, 2005, p. 257).

The use of formative and summative assessments such as MAP that is aligned with individual state curriculum standards can aid at risk Title I schools as tools in the evaluation of literary intervention. These assessments can also be used to evaluate an intervention's short and long term effectiveness as well which is a crucial tool for those schools most at risk for restructuring. Yet among the questions to be answered concerning literacy intervention such as READ 180 is the relationship between its instructional components and potential gains in both literacy and mathematics.

CHAPTER 3:

RESEARCH METHOD

Research Design and Approach

Design Description

A quasi-experimental design was utilized to determine the relative effectiveness of READ 180 over traditional English instruction. Archived MAP test data was acquired from the LS from school year 2008-2009. Students were assigned to two groups of READ 180 (R180) and traditional English instruction (TRAD) by school district personnel for fall and spring semesters. Students were pre and post tested using Measures of Academic Progress (MAP) Lexile reading/ELA and math tests by school district personnel. Scores were compared to test the difference pre and post. Dependent measures were MAP Lexile reading/ELA and math scores. Dependent sample *t* tests were applied to the dependent measures pre and posttest MAP Lexile reading/ELA and math scores represented by RIT (Rasch UnIt) scaled scores from both fall and spring semesters of school year 2008-2009 to evaluate growth in Lexile reading/ELA and math over one semester's time (about 18weeks each) within-subject and between-groups. One-way ANCOVA was conducted on reading/ELA and math scores to determine if the degree of improvement on MAP math and Map reading/ELA measures was significantly different between the two instructional groups and for control of error by adjusting for the treatment effect (TRAD/READ180) with respect to its use as the covariate which in this case were collected by school personnel prior to TRAD or READ 180 instruction. Dependent variables were the posttest MAP math and reading/ELA test scores where the

covariate was MAP math and MAP reading pre test measures. Assumptions included linear regression and homogeneity of regression coefficients. Details on sampling, treatment, instrumentation, data collection, mining techniques, analysis, validity, statistical power, and associated confounding variables will follow.

Sample and Setting

A sample of 512 student MAP math and MAP reading/ELA fall and spring semester test scores were drawn from an archived data set containing approximately 1500 students in grades 9-12 who attended a local rural Title I high school (LS) from August 2008 to May 2009. Student groups consisted of 365 students enrolled in traditional English instruction (TRAD), 89 students enrolled in honors English instruction, and 67 students enrolled in READ 180 (R180). The criteria for selection involved the exclusion of those cases indicating enrollment in honors English and dual enrollment in either R180 or TRAD. The "gender" and "free lunch" variables were also excluded from the data set. Inclusion in the R180 and TRAD groups was based on the following criteria; (a) Each student was enrolled in R180 or TRAD once in school year 2008-2009 either fall or spring semester; (b) students enrolled in either TRAD or R180 had pre and post MAP math and MAP reading/ELA scores for either spring or fall semester. Sample sizes after selection included 365 TRAD students and 67 R180 students.

Treatment

Read 180 Instruction

READ 180 was a 90 minute, five day per week program that lasted approximately 18 weeks or one semester and was based on three rotating 20 minute cycles; individual

silent reading, individual computer based word study, and instructor led exercises in reading comprehension plus a daily 10 minute whole group preview and 20 minute whole group wrap up session. Classes consisted of approximately 15 to 20 students who were broken into groups of three. Each day while one group was working on the computer based word study another would engage in silent reading or in comprehension activities. All the literature was Lexile leveled, and each student's goal was to increase the initial reading Lexile score by 2 or more levels. Daily instructor led wrap up sessions should have lasted approximately 10-15 minutes. Each day was to begin with a read aloud and a brief overview of instruction. READ 180 instructors were under the same district evaluation criteria as were the traditional English instructors. Students enrolled in READ 180 were not required to complete the End of Course Exam (EOCEPT) until their completion of the traditional English class.

Traditional Instruction

The traditional English instruction a was also a 90 minute five day-a-week class that lasted approximately 18 weeks or one semester. Daily instruction was based on South Carolina education standards that required reading literature from a variety of genres, analyzing readings for both accuracy and bias, reading for extended periods of time, developing vocabulary through avid reading, learning to use a dictionary, use of computer software in research, developing oral communication skills, and writing for a variety of purposes using Standard American English (SC Department of Education, 2008). Each TRAD instructor was evaluated according to a state standards based performance criteria, and teacher effectiveness was measured by student performance on

the EOCEPT that was administered during the last nine weeks of TRAD classrooms These scores are included as part of the LS Annual Yearly Progress Report.

Instrumentation and Materials

The following instruments and materials were utilized in this study: (a) MAP Lexile reading and math scores reported as Rausch interval (RIT) scores (b) an Excel data base containing archived TRAD and R180 MAP Lexile reading and MAP math pre and posttest scores reported as RIT scores from both fall and spring semesters of the school year 2008-2009; (c) SPSS Grad Pack 17.0 Advanced Statistical Software.

NWEA Measures of Academic Progress

The NWEA MAP test is a formative assessment that measures the traits of math and language achievement as indicated by ability. MAP does not "definitively measure the underlying trait" (Cronin, 2005, p. 212), but rather a mathematical construct of a particular ability level on a standard continuum identified as Rasch Unit that is used as a simplification of test scores interpretation. Danish Mathematician, George Rasch who established a model of measurement formulated by the Thorndike's (1904) Item Response Theory (IRT) and the psychometric Latent Trait Theory. Modern IRT theory indentifies ability as a variable that impacts the correct response to the test item and allows for a scaled calibration with the same error computation as the ability that acted to free assessment from the "single error of measurement as applied to examine scores rather each individual and item had a unique error term" (Schumacher 1998, p. 4). Although Schumacher's (1991) factor analysis or the study of emerging patterns of dependent variable relationships "with the goal of discovering something about the

independent variables that affect them even though those independent variables were not measured directly" (Darlington, 2008, p. 3) was based more on hypotheses than the observation of independent variables. Yet his results explained the Rasch logistic function as a system that could provide score values that indicated equal-interval locations along a latent linear ability continuum (Schumacher, 1998). The model was preferred over other psychometric models due to its ability to provide estimates considered "unbiased, efficient, and sufficient and a response curve for independent estimates of ability and differentiation" (Schumacher, 1998, p. 10). RIT scores range from around 140-300. According to the NWEA, "students typically start at the 140 to 190 level in third grade and progress to the 240 to 300 level by high school" (NWEA, 2008).

MAP content validity was achieved by its selection of state standards based questions, and its large item pool of approximately 5200 language and 8000 mathematical questions that have been calibrated for "difficulty to an equal-interval, cross-grade scale called the RIT scale" (Cronin, et al., p. 212). Each test item has been aligned by both the subject and content being measured. From the item pool NWEA designed a state standards based computer driven formative assessment that utilizes the "subject classification index" (Cronin, et al., p. 212) that organized the content and question structure of the test that consists of about 2000 questions specifically designed for each state. The item pool calibration (based on IRT and Latent Trait Theory) is designed to allow each individual a unique and differentiated assessment. Each student would receive a test of between 45-50 questions from the pool that is responsive to each

subsequent answer. In other words if the student correctly responded to the test item the next question would be calibrated for a higher level of difficulty. The same would be true for incorrect responses.

Over 17 studies have been conducted (Cronin, 2004-2006) that align the MAP test with differing state standards, tests, and their corresponding proficiency cut scores. Among them were the California Standards Test (CST, 2004), The South Carolina Palmetto Achievement Challenge (PACT, 2004) test, and the South Carolina High School Assessment Program (HSAP, 2004). Each study also included an analysis of MAP language and math scores that were used to predict the percentage of students that would perform at or above the proficient range on future state exams. The California study (2004) used the linear regression equation (CST pred = a (RIT) +c), but for outliers or departures from the upper and lower ends a second order regression model was used (CST pred=a (RIT^2) + b (RIT) + c) (Cronin, 2004, p. 4). " For each of the methods the RIT score was determined by substituting the appropriate CST score for CSTpred and solving the equation for RIT" (Cronin, 2004, p. 4). The results indicated that same subject correlations between CST and MAP were significant to .81 r = .76 reading and r = .77 language. Mathematics correlation was between .74 and .85 (Cronin, 2004, p. 6).

A follow up alignment study between MAP RIT scores and the South Carolina HSAP and PACT tests was also conducted (Cronin, 2004). The HSAP alignment analyzed the relationship between MAP RIT scale scores and HSAP cut scores by utilizing linear regression and a second order regression model plus a "fixed parameter Rasch model was used to estimate RIT cut scores" (Cronin, 2004, p. 2) so that the student

proficiency ranges could be treated as test scores. The HSAP test results were divided into four levels of proficiency in order to obtain the item characteristic curve or the probability of a correct response in relation to ability using the Rasch measurement model (Bramley, p. 258). According to state and federal NCLB legislation, in South Carolina "students must achieve a level 2 performance on the HSAP in order to graduate from high school" (Cronin, 2004, p.1) with a diploma, and results for RIT cut scores predictability for HSAP outcomes were "considered highly accurate (better than 88%) in predicting pass-fail against the HSAP Level 2 cut score" (Cronin, 2004, p. 6), however RIT scores fell 11 points below the median for the NWEA mathematics norm (Cronin, 2004, p. 3).

Results indicated that MAP RIT scale scores and PACT scores were closely correlated and that MAP could predict PACT outcomes, yet there were differences in levels of projected proficiency between the 2002 and 2004 studies. Possible reasons reported for the 7-point decline in 2004 from the 2002 estimate that projected an additional 19% of the NWEA norm population would achieve above the proficient bar (Cronin & McCall, 2004, p. 2) were student performance consistency variables, the test content differentiation due the design of the language and writing sections, and the differences between the 2002 and 2004 PACT test items' calibration (Cronin, et al., p. 9). South Carolina's state legislature voted to discontinue the use of PACT for grades 3-8, and to replace it with an alternative summative measurement beginning in 2009 that would act to support " more formative assessments in English language arts and

mathematics" (South Carolina Department of Education, 2008) in accordance with NCLB mandates.

Microsoft Excel 2007

The archived MAP math and MAP reading pre and posttest RIT scores from school year 2008-2009 were recorded on the LS districts computerized test reporting system and upon notification of IRB approval the data was then imported to a Microsoft Excel 2007 spread sheet that contained demographic information such as student gender and enrollment in R180, TRAD, or honors English classes identified by a six digit code. The Excel spreadsheet was readied and delivered to the researcher on password protected disks by the LS district MAP Test Coordinator.

SPSS 17.0 Advanced Statistical software

MAP math and MAP reading/ELA pre and posttest scores from the Excel spreadsheet were then imported to SPSS 17.0 via the *SPSS new query database wizard* ® for analysis to determine emerging patterns and relationships.

Data Collection and Analysis

Collection

Upon IRB approval notification (Walden IRB approval # 060309031230), data were collected. The rural Title I high school's district MAP Test Coordinator provided an Microsoft Excel 2007 spreadsheet on password protected disks that contained the following information: (a) student enrollment in traditional English (TRAD), READ 180, or honors English indicated by separate six digit codes; and (b) 2008-2009 fall and spring

semesters pre and posttest MAP Lexile reading/ELA and MAP math scores reported as RIT scaled scores.

Analysis

Because this study was interested in comparing student reading/ELA and math performance from R180 classrooms with student reading/ELA and math performance from TRAD classroom a pre-post test design that used two standardized measures (i.e., MAP English & MAP math) which were assumed to be correlated was used. Dependent sample *t* tests were conducted for each of the instructional groups (R180 & TRAD) on each of the dependent variables (MAP reading/ELA and MAP math). Two separate one-way ANCOVA tests were conducted using SPSS 17.0 General Linear Model (GLM) were performed in order to determine if the degree of improvement on MAP math and MAP reading/ELA measures was significantly different between the two instructional groups. The pretest scores for MAP math and Map reading were used as the respective covariates to control for preexisting group differences and to minimize regression to the mean effects with fixed factors R180 and TRAD. Correlations of RIT scores to grade level and Lexile reading performance were then conducted in order to further illustrate the effect of R180 and TRAD instruction.

Procedure

All student identifiers included in the Excel database were eliminated from the original document. Variables such as *free lunch* and *gender* and those students enrolled in honors English were excluded from the SPSS spreadsheet because honors instruction does not match TRAD instruction, and higher pre- and posttest scores may have impacted

the regression to mean effect. Research goals did not include inquiry into the effect of R180 or TRAD instruction on gender or SES so the variables were excluded. Enrollment in R180 was coded as 1.00 and TRAD as 2.00. Separate data files for analysis were constructed for dependent sample t-tests for reading/ELA and math, and for ANCOVA as well.

Internal Validity

ANCOVA had the capability to determine the effect of either READ 180 or TRAD on MAP math and MAP reading/ELA performance which "can be determined before and after the study with an acceptable level <.05" (Verma & Goodale, 1993). The confounding variables that could have impacted internal validity were: (a) the equivalence or non equivalence between TRAD and READ 180 groups; (b) the inability to control for missing data points on independent and dependent variables (MAP math and MAP reading/ELA scores); (c) due to the quasi experimental nature of study the inability to control for grouping of students in READ 180 or TRAD classrooms; (d) the READ 180 and TRAD instructional variable. As stated earlier past studies have found "instructor divergence from the READ 180 'ideal instructional model'" (Goin, Hasselbring & McAfee, 2008, p. 13) affected the program's impact on the Terra Nova reading and language arts test. It was found that the instructional component was a significant variable in relation to the program's impact on reading scores (Goin et al., 2008).

External Validity

The dependent sample *t* tests were performed to determine whether the mean difference between the scores on two separate occasions or under the two differing types of instructions (TRAD and R180) was significantly different than zero which answered Research Questions one through four. A separate one-way ANCOVA was performed to evaluate whether the means on the dependent variable (posttest MAP math and MAP reading/ELA) were the same across levels of a factor (TRAD and READ 180 instruction) and adjusted for differences in the covariate (pretest MAP math and MAP reading/ELA) in order to determine whether there was a significant difference between the adjusted group means (Green & Salkind, 2007) and thus provided answers to questions five and six. Results of dependent sample *t* tests pre and posttest MAP reading/ELA and MAP math RIT scores were correlated with NWEA norms study (2008) grade level learning charts to compare the differences between the R180 and TRAD groups' grade level progress. RIT scores were correlated with Lexile reading levels in order to compare the differences between R180 and TRAD Lexile growth.

Statistical Power

Unequal groups, missing data points, the inability to control for student group maturation and differentiation factors, as well as the inability to control the conditions surrounding pre and post MAP math and MAP reading/ELA testing may have affected the statistical power to the research study. However both groups were matched in instructional time (90 minutes 5 days per week for one full semester), and both R180 and TRAD groups were exposed to an instructor based curriculum created by Janet Allen.

ANCOVA was performed as a method of control for preexisting group differences and as a tool for the minimization of regression.

Rights of Participants

The following measures were taken to ensure the rights of sample participants were protected according to IRB guidelines. No data were collected prior to IRB approval of the study. Only the data outlined in the IRB application were collected. No data were collected that identified students by name, demographic, ethnicity, socioeconomic, or any other identifier that placed the student at risk of being identified was used in this study. Neither students nor instructors were observed in class, nor were they interviewed or asked to respond to a questionnaire, so there was no need for confidentiality forms to be completed by either party.

CHAPTER 4:

RESULTS

Chapter 4 will provide the results of dependent sample *t* tests that were conducted for each of the instructional groups (R180 and TRAD) on the dependent variables (MAP reading/ELA and MAP math), and two separate one-way analysis of covariance (ANCOVA) to determine if the degree of improvement was significantly different between the two groups. The chapter will also include a review of the study's findings based on the research questions. A discussion of the relation of MAP RIT scores to grade level and Lexile performance is also included here in order to further illustrate the effects of R180 and TRAD on reading/ELA and math outcomes. The chapter will conclude with a detailed examination of inferences based on the null and alternative hypotheses.

The general purpose of this quantitative study was to examine the differences between READ 180 (R180) and traditional English language instruction (TRAD) on reading/ELA and math performance over a year period at a Title I rural high school (LS) using a quasi experimental design of pre- and posttest MAP Lexile reading/ELA and MAP math RIT scores. The LS, at risk for state and national sanctions for repeated failure to meet AYP, had purchased R180 in an effort to increase grade level reading proficiency for those students who had tested two or three grade levels below 9$^{th.}$ First year 9th grade student samples (R180 $N = 89$ and TRAD $N = 365$) were drawn from a population of approximately 1,500 students who were enrolled at LS in school year 2008-2009. Another purpose of the study was to examine the relationship between literacy instruction and math proficiency.

Statistical Analyses

The Dependent sample *t* tests that were conducted for R180 and TRAD instructional groups on the dependent variables MAP reading/ELA and MAP math RIT scores provided answers to the first four research questions that concerned the differences in the effects of TRAD and R180 instruction on reading/ELA and math performance. The Dependent measures, MAP reading/ELA and MAP math scores, were reported in Rausch intervals or RIT Units (RIT) scores. Two separate one-way ANCOVA were conducted on both measures to determine if the degree of growth or improvement on the MAP math and MAP reading/ELA was significantly different between the instructional groups with pretest MAP reading/ELA and MAP math RIT scores as the respective covariate. ANCOVA added statistical power to the study by its ability to minimize regression to mean effects and control preexisting group differences as well as the provision of answers to research questions five and six. The research questions for this study were:

1. Do students exposed to R180 instruction show a statistically significant change in their reading/ELA abilities as measured by the Map reading pre and posttest differences?
2. Do students exposed to R180 instruction show a statistically significant change in their math abilities as measured by the MAP math pre and posttest differences?

3. Do students exposed to traditional English instruction (TRAD) show a statistically significant change in their reading abilities as measured by MAP reading/ELA pre and posttest differences?
4. Do students exposed to TRAD instruction show a statistically significant change in their math abilities as measured by the MAP math pre and posttest differences?
5. Do the students exposed to R180 show a significantly greater improvement in MAP reading/ELA scores than students exposed to TRAD?
6. Do students exposed to R180 show a significantly greater improvement in MAP scores than students exposed to TRAD?

The dependent sample *t* tests results including group means and standard deviations are summarized below in Table 1 indicating MAP reading/ELA and Table 2 indicating MAP math:

Table 1

Pre and Posttest scores Indicated by MAP Reading/ELA RIT scores

Class	Pretest MAP Reading/ELA score	*SD*	Posttest MAP Reading/ELA score	*SD*	*t* (prob.)	*df*	Effect Size
R180 *N*=48	210.3 RIT	8.6	211.7 RIT	10.3	.87 (*p*>.05)	47	

TRAD *N* = 279	219.7 RIT	10.6	221.0 RIT	11.8	2.35 (*p*<.01)	278	.36

Table 2

Group Means, Standard Deviations, t statistics, Degrees of Freedom, and Effect Size. Pre and Posttest scores indicated by MAP Math RIT scores

Group	Pretest MAP Math score	*SD*	Posttest MAP Math score	*SD*	*t* (prob.)	*df*	Effect Size
R180 *N* = 48	222.3 RIT	9.8	224.5 RIT	10.7	1.36 (*p* >.05	47	
TRAD *N* = 271	232.1 RIT	13.9	233.3 RIT	14.0	2.32 (*p* <.01)	270	.33

The results of the dependent sample *t*-tests provided evidence with which to answer the first four research questions. Specifically, there were no statistically significant changes in either the MAP Math or MAP reading/ELA pre-posttest scores for the R180 group (t = 1.36, p >.05; t = .87, p >.05, respectively). Cohen's *d* and effect size were calculated by using the means and ŷn□ using the means and standard deviation of the treatment and control.

In contrast, the TRAD instructional group showed significantly improved scores on both MAP math and MAP reading/ ELA (t = 2.32, p <.01; t =2.35, p <.01), with the combined results of the *t* tests indicating that, despite improvements in the average MAP RIT test score performance for both groups in both reading/ELA and math, only the

traditional instructional group demonstrated statistically significant positive change. Although the differences in TRAD and R180 sample group sizes may have impacted the statistical outcomes the results still did not support R180 as the more effective instructional system over traditional, English language instruction.

ANCOVA results are summarized below. Table 3 indicates the MAP reading/ELA statistical results and Table 4 indicates the MAP math results. ANCOVA was used in respect to research questions five and six regarding the differences between R180 and TRAD group performance on MAP reading/ELA and MAP math.

Table 3

ANCOVA Results with Dependent Variable: Posttest MAP Reading/ELA RIT scores

Class	Mean	*SD*	*N*	*F*	*p* value
READ180	211.7	10.3	48		
TRAD	211.0	11.8	279		
Total	219.63	12.1	327	2.34	$p > .05$

Table 4

ANCOVA Results with Dependent Variable: Posttest MAP Math RIT scores

Class	Mean	*SD*	*N*	*F*	*p* value

READ180	224.5	10.6	48		
TRAD	233.3	14.0	271		
Total	232.07	13.9	319	2.02	$p > .05$

Two separate ANCOVA were conducted in order to determine if the degree of improvement on the MAP reading/ELA and MAP math posttest measures were significantly different between R180 and TRAD instructional groups. The pretest scores for MAP reading/ELA were used as respective covariates and held constant to control for any preexisting differences and to minimize regression to mean effects. The results indicated there were no significant differences between the R180 and TRAD instructional groups on MAP reading/ELA *(*$F = 2.34$, $p > .05$) or MAP math ($F = 2.02$, $p > .05$) performance. The analysis supported the results of the *t* tests in that no significant improvements in student reading/ELA or math performance were found for the R180 group when directly compared with students who received traditional English language instruction.

In an effort to further illustrate the differences in student reading/ELA and math performance between R180 and TRAD groups the pre and posttest MAP reading/ELA and MAP math RIT scores were correlated with beginning and ending grade levels utilizing the 2008 NWEA RIT Scale Norms study. Grade levels obtained by correlating pre and post test MAP RIT reading/ELA and math scores were then used to calculate beginning and ending Lexile reading levels. The details of the examination follow.

NWEA MAP Rasch Intervals (RIT) Translation

Overview

The correlation between mean RIT scores and grade levels of learning from the 2008 NWEA RIT Scale Norms Study (2008) that included data from "over 2.8 million students from 6,905 schools in 1.123 districts located in 42 states" (NWEA, 2008) was utilized as a guide to illustrate the differences between pre and post instructional grade levels of R180 and TRAD groups. Pre and posttest results of dependent sample *t* tests were used to compare RIT scores with grade equivalency and the differences in Lexile gains between the two groups based on grade levels.

MAP utilizes Rasch intervals or RIT scale scores to measure progress over time (i.e. beginning, middle, and end-of-school) within a one year interval or fall, winter, and spring respectively. Each mean RIT score is the average of a range of RIT scores that represent specific skills and concepts associated with each curricular category (See Appendix A). Score ranges correspond to reading, language use, or mathematics. The RIT scores also correlate with specific grade levels at differing time intervals throughout the school year (see Tables 5, 6, 7). The skills or learning descriptors (see Appendix A) that correspond with the mean RIT score and the associated range of scores detail the specific skills and concepts within the students learning arena and indicate the series of concepts that necessitate scaffolding.

Table 5

Subject: Language use as illustrated by Mean RIT score, RIT range and Associated Concepts and Skills (VanOrt, 2009)

RIT Score	197
RIT Range	194-200
Word Recognition & Vocabulary	187-201
Informational Text: Structures	198-213
Literacy Text: Comprehension	187-202
Literary Text: Structures	169-190
Literary Text: Comprehension	200-217

The NWEA norm study (2008) results included the use of "each districts unique calendar as an anchor, the numbers of instructional days were estimated for time frames consisting of beginning-of-year tests, middle-of-year tests, and end-of-year tests. Status norms were determined from a stratified sample of students representing the national school age population, more specifically, ethnicity and socio-economic status at each grade level (NWEA, 2008).

Table 6

Reading Status Norms (RIT Values) Northwest Evaluation Association Goal Score Translation Chart (NWEA, 2008)

	Reading (Mean) RIT

Grade Level	Beginning of the Year	Middle of the Year	End of the Year
2	179.9	186.0	189.0
3	191.6	196.3	199.0
4	200.1	203.7	205.8
5	206.7	209.6	211.1
6	211.6	213.8	214.8
7	215.4	217.3	217.9
8	219.0	220.6	221.2
9	220.9	221.9	222.6
10	223.9	224.9	225.4
11	225.2	225.6	225.6

Table 7

Language Use Status Norms (RIT Values) Northwest Evaluation Association Goal Translation Chart (NWEA, 2008)

	Language Use (Mean) RIT		
Grade Level	Beginning of the Year	Middle of the Year	End of the Year
2	181.2	188.3	191.5
3	192.6	198.0	200.5
4	201.0	204.9	207.0
5	207.2	210.2	211.8
6	211.7	214.0	215.1
7	215.1	217.3	217.7
8	218.4	219.8	220.4
9	219.4	220.0	220.8
10	221.6	222.2	222.9
11	223.6	225.1	224.6

Table 8

Mathematics Status Norms (RIT Values) Northwest Evaluation Association Goal Score Translation Chart (NWEA, 2008)

	Mathematics (Mean) RIT		
Grade Level	Beginning of the Year	Middle of the Year	End of the Year
2	179.5	186.5	190.8
3	192.1	198.0	202.4
4	203.0	207.6	211.4
5	211.7	216.0	219.2
6	218.3	221.4	223.8
7	224.1	226.4	228.3
8	229.3	230.9	232.7
9	231.6	232.5	234.0
10	235.2	235.9	237.1
11	237.1	238.5	239.8

Statistical Findings and RIT Comparisons

Both R180 and TRAD groups were pre and post tested at the beginning and ending of the fall and spring semesters dependent on semester enrollment, thus only the beginning and middle-of-the year NWEA norms study (2008) RIT scores were correlated with R180 and TRAD pre and posttest MAP Reading/ELA and MAP RIT scores.

R180 Reading/ELA RIT

Dependent sample *t* tests on MAP Lexile reading/ELA pre test scores showed the mean pre test score for the R180 group was 210.3 RIT (fall and spring semesters). The correlation between NWEA (2008) indicated that the average student in R180 began instruction at a beginning sixth grade learning level for reading/ELA (see Tables 4-5). Dependent sample *t* tests on MAP Lexile reading/ELA posttest scores were 211.7 RIT

(fall and spring semesters). The correlation between NWEA (2008) indicated that there was very little change in language use and reading by grade level (beginning-of-year to middle-of-year) supporting the statistical results that no significant change took place in the learning of concepts on either measure as indicated by learning indicators (see Appendix A).

TRAD Reading/ELA RIT

Dependent sample *t* tests on MAP Lexile reading/ELA pre test scores showed the mean pre test MAP reading/ELA RIT score for the TRAD group was 219.7 RIT (fall and spring semesters). The correlation between NWEA (2008) indicated the average TRAD student began instruction at a beginning eighth grade level of learning for reading/ELA (see Table 4 and Table 5). Dependent sample *t* tests on MAP Lexile reading/ELA posttest scores indicated the TRAD mean posttest MAP reading/ELA score was 221.0 RIT (average for fall and springs semesters). The correlation between NWEA indicated significant growth in language use both grade wise, (from beginning eighth to end-of-year ninth) and by the corresponding skills and concepts (see Appendix A) which also supported the statistical evidence.

R180 Math RIT

Dependent sample *t* tests on MAP math pre test scores for the R180 group indicated the mean pretest MAP math score was 222.3 RIT (fall and spring semesters). The correlation between NWEA (2008) indicated that the average student in the R180 group began instruction between a middle-of-year sixth grade and beginning of year seventh grade learning level for math. Dependent sample *t* tests on MAP Lexile

reading/ELA post test scores showed a posttest RIT score of 224.5 RIT (fall and spring semesters). NWEA Norms study (2008) conversion from RIT score to grade levels of learning indicated that although there was growth in grade level skills and concepts the change was not significant enough to lend support to the alternative hypothesis.

TRAD math RIT

Dependent sample *t* tests on MAP math pretest scores showed 232.1 as the mean RIT pre test score TRAD (fall and spring semesters). The correlation with NWEA (2008) indicated that the average TRAD student began instruction between a beginning-of-the-year ninth and middle-of-the-year ninth grade level of learning (see Table 6). Dependent sample *t* tests on MAP math posttest scores showed the mean posttest MAP math score as 233.3 RIT (fall and spring semesters). The correlation between NWEA (2008) indicated growth within the grade but the growth was not as significant as was growth in reading.

Although the information on the impact of R180 and TRAD instruction on math performance added to current research involving the relationship between a literacy intervention and performance in math, it did not lend support for the use of the READ180 literacy intervention as means for improving math proficiency over traditional instruction.

RIT scores and the Lexile Framework

The Lexile Framework

The Rausch Item response theory model was utilized in the development of the Lexile® reading framework due to its capacity to estimate "the difficulties of items and the abilities of persons on the logit scale" by the use of item calibration (Metametrics,

2007). The Lexile scale provided a measurement of reading comprehension based on the passage or text's level of vocabulary, word and sentence length. Grade equivalence was determined by the percentage of textual content comprehended (.75). The following regression equation was used to determine the results of the Lexile grade equivalent table below (see Table 9): Lexile=500Ln (Grade Level) or, the counterpart GradeLevel=e0.002 (Lexile) (Advantage Learning Systems, Inc., 2009).

R180 Reading Lexile Levels

Dependent sample *t* tests pre and post indicated that R180 students began reading/ELA instruction at a beginning sixth grade reading level (210.3 mean RIT score) and ended with a middle-of-year sixth grade reading level (211.7 mean RIT score) which shows a gain of only 25 Lexile points between 900L at beginning of grade six to 925L at middle of the sixth grade level (see Table 9) and therefore added illustrative support to the statistical results.

TRAD Reading Lexile Levels

Dependent sample *t* tests pre and post indicated that TRAD students began reading/ELA instruction at a beginning of grade eight reading level (219.7 mean RIT score) and ended with an end-of-year ninth grade reading level (221.0 mean RIT score) which shows a gain of between 100 and 125 Lexile points 1050L at beginning of the eighth grade to 1150 at end of the ninth grade (see Table 9), respectively.

Table 9

Lexile® Reading Framework Grade Level Conversion Chart (Advantage Learning Systems, Inc., 2009)

Lexile Level	Grade Level	Lexile Level	Grade Level
225	1.6	875	5.8
250	1.6	900	6.0
275	1.7	925	6.4
300	1.8	950	6.7
325	1.9	975	7.0
350	2.0	1000	7.4
375	2.1	1025	7.8
400	2.2	1050	8.2
425	2.3	1075	8.6
450	2.5	1100	9.0
475	2.6	1125	9.5
500	2.7	1150	10.0
525	2.9	1175	10.5
550	3.0	1200	11.0
575	3.2	1225	11.6
600	3.3	1250	12.2
625	3.5	1275	12.8
650	3.7	1300	13.5

Statistical Analyses and Null Hypotheses

With respect to the null hypotheses being tested in this study that there would be no significant improvement between pre and posttest math/read scores, the following conclusions may be proffered: there is no significant difference in the improvement of Lexile reading/ELA and math performance according to MAP RIT scores of R180 students over TRAD students as statistically reported. However the alternative hypothesis that there is a significant difference in the improvement of Lexile reading/ELA and math

performance according to MAP RIT scores of R180 students over TRAD students was supported for the TRAD groups.

Based on the results of the dependent sample *t* tests specifically there were no statistically significant changes in either MAP math ($t = 1.36$, $p > .05$) or MAP reading/ELA ($t = .87$, $p > .05$) pre-posttest scores for the R180 group which contrasted with the findings for the TRAD instructional group that showed significantly improved scores on both MAP math ((t-2.32, $p < .01$) and MAP reading/ELA measures ($t = .2.35$, $p < .01$). These statistical findings were supported by the results of two separate one-way ANCOVA where no significant differences were found between R180 and TRAD on either MAP reading/ELA ($F = 2.34$, $p > .05$) or MAP math ($F = 2.02$, $p > .05$). The NWEA norms study (2008) RIT score conversion to grade level skills and Lexile reading levels provided further illustrative support the statistical findings.

CHAPTER 5:

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

The major purpose of this research was to provide the researcher's local rural Title I high school (LS) with empirical data regarding the relative effectiveness of the READ 180 (R180) reading intervention on freshmen student reading and math performance during the 2008-2009 school year. The original archived sample consisted of 365 students enrolled in traditional English instruction classes (TRAD) and TRAD math with 67 students enrolled in R180 and math at a local rural Title I high school in South Carolina. After selection criteria was complete samples consisted of TRAD group reading/ELA MAP scores $N = 279$, TRAD group math MAP scores $N = 271$ with R180 group reading/ELA MAP scores $N = 48$, and R180 group math MAP scores $N=48$ due to missing data points.

This quasi experimental study used dependent sample *t* tests for each of the instructional groups, R180 and TRAD, on each of the dependent variables, MAP reading/ELA and MAP math RIT scores in order to provide the statistical evidence to answer the following research questions: (a) Do students exposed to R180 instruction show a statistically significant change in their reading abilities as measured by the MAP reading/ELA pre and posttest differences? (b) Do students exposed to R180 instruction show a statistically significant change in their math abilities as measured by the MAP math pre and posttest differences? (c) Do students exposed to traditional English instruction (TRAD) show a statistically significant change in their reading abilities as

measured by the MAP reading/ELA pre and posttest differences? (d) Do students exposed to TRAD instruction show a statistically significant change in their math abilities as measured by the MAP math pre and posttest differences? (e) Do the students exposed to ER180 show a significantly greater improvement in MAP reading/ELA scores than students exposed to TRAD? and (f) Do the students exposed to R180 show a significantly greater improvement in MAP math scores than students exposed to TRAD?

The results of the dependent sample *t* tests provided the statistical evidence with which to answer the first four questions. There were no statistically significant changes in either the MAP math or MAP reading/ELA pre- and posttest RIT scores for the R180 group ($t = 1.36$, $p > .05$; $t = .87$, $p > .05$). However the results for the TRAD group did show statistically significant growth on both measures of MAP reading/ELA and MAP math ($t = 2.32$, $p < .01$; $t = 2.35$, $p > .01$). These results were supported by the conversion of grade levels between the NWEA norms study (2008) and dependent sample *t* test results. Group differences in Lexile growth also supported the statistical evidence.

The combined results of the *t* tests indicated that although both R180 and TRAD groups experienced growth on both measures, only the TRAD group experienced significant positive change in reading/ELA and math. While these differences could be due in part to the larger TRAD sample size the results do not support the premise of R180 as a more effective instructional tool over that of traditional English language instruction. In regard to the last two research questions one-way ANCOVA was conducted to determine if there was a significant difference between the improvement in MAP reading/ELA and MAP math between the two groups. Pretest RIT scores for MAP math

and MAP reading/ELA were used as covariates in order to control for preexisting group differences and to address the regression to mean effect. Results indicated no significant differences between R180 and TRAD groups on either MAP reading/ELA ($F = 2.34$, $p > .05$) or MAP math ($F = 2.02$, $p > .05$). This analysis supported the findings of both *t* tests in that there were no significant improvements found in the R180 group when directly compared to students who were exposed to traditional English language instruction which led to a failure to reject the null hypothesis that stated that there is no significant difference in the improvement of Lexile reading/ELA and math performance according to MAP RIT scores of R180 students over TRAD students.

Conclusions

The findings of this study are particularly important to the researcher's LS and as well as other school districts that may be in the process of purchasing or repurchasing a commercially available literacy intervention at great cost to the school and district in order to raise the cross curricular proficiency levels mandated by NCLB as reported in each school's AYP report. Although in this particular sample school there was no statistical evidence for the support of R180 as an effective tool for the advancement of reading and math skills, several confounding variables may have impacted outcomes, such as: (a) differences in R180 and TRAD sample sizes; (b) student maturation, differentiation, and the circumstances surrounding the administration of pre and posttests; (c) the quasi experimental nature of the study (i.e., the use of archived MAP reading/ELA and MAP math scores); and (d) the impact of the instructional variable.

To add further information concerning the instructional variable in the R180 program, it is important to emphasize that each school that purchased the program is charged with the hiring, training, and consistent monitoring of the R180 instructors. Some of the associative problems are the inconsistencies with the adherence to the R180 instructional model. Studies concerning program efficacy and instructional adherence are offered as examples of complications that could interfere with program goals. In a reading intervention effectiveness study Slavin, Cheung, Groff, and Lake (2008) noted that "in these cases instruction time was confounded with the effects of the program itself" (Slavin, et al., 2008, p. 295). In a study of R180 and instructor divergence Goin, Hasselbring, and McAfee (2008) found that "instructor divergence from the READ 180 'ideal instructional model' affected the program's impact on Terra Nova reading and language arts tests (Goin et al., 2008, p. 13). Also noted was the instructional component as a significant variable in relation to the program's impact on reading scores (Goin et al., 2008). It is also important to note that the instructional variable confound is applicable to TRAD results as well. Both instructional programs at the time of the study were based on 90 minutes each day five days per week for a semesters' time or approximately 18 weeks.

Recommendations

Although the results of this study cannot be used to advocate for the use of a literacy intervention or instructional tool to influence growth in math proficiency, they can be used as an impetus to conduct other comparative studies concerning the effect and efficacy of commercially available literacy interventions, which are needed to investigate

this relationship as well as the effect of a costly literacy intervention on reading and language use proficiency. Currently the researcher is working on a longitudinal study proposal that will use a similar design but with larger samples of equal sizes from a number of rural Title I schools. Results of this study will be used to further the discussion on the use of commercially available literacy interventions to positively impact local, state, and national cross curricular proficiency goals.

REFERENCES

ACT Executive summary. (2006). *Reading between the lines: What the ACT reveals about college readiness in reading*. Retrieved from .http://www.act.org/pth/policy/index.html

Aikens, N., & Barbarin, O. (2008). Socioeconomic differences in reading trajectories: The contribution of family, neighborhood, and school contexts. *Journal of Educational Psychology*, *100*(2), 239-251.

AYP 2003 calculation guide for school-based data. Georgia Department of Education. (2003). Retrieved from http://techservices.doe.k12.ga.us/ayp/aypcalculations.pdf

Balfanz, R., Legters, N., & Jordan, W. (2004). *Catching up: Impact of the talent Development ninth grade instructional interventions in reading and mathematics in high povery high schools.* Center for Research on the Education of Students Placed at Risk (CRESPAR). The Johns Hopkins University. Retrieved from: http:// www.eric.ed.gov/ERICWebPortal/recordDetail?

Bracey, G. (2008). Cut scores, NAEP achievement levels and their discontents. (2008). *School Administrator*, *65*(6), 20-23.

Bramley, T. (2005).Accessibility, easiness and standards. *Educational Research*, *47*(2), 252-261.

Caldwell, J. & Lauren, L. (2004). Does proficiency in middle school reading assure proficiency in high school reading? The possible role of think-aldus. *Journal of Adolescent & Adult Literacy*, *47*(4), 324-335.

Carey, K. (2006). Hot air: How states inflate their educational progress under NCLB. Retrieved from http://educationsector.org/research/research_schow.html?doc_id=373044.

Clark, B. (2006). Breaking through to reluctant readers. *Educational Leadership*, *63*(5), 66-69.

Conlon, E., Zimmer-Gembeck, M., Creed, P. ,& Tucker, M. (2006). Family history, self perceptions, attitudes and cognitive abilities are associated with early adolescent reading skills. *Journal of Research in Reading*, *29*(1), 11-32.

Courvoisier, D., Nussbeck, F., Eid, M., Geiser, C., & Cole. (2008). Analyzing the convergent and discriminate validity of states and traits: Development

and applications of multimethod latent state-trait methods. *Psychological Assessment*, *20*(3), 270-280.

Cronin, J. (2004). Aligning the NWEA RIT scale with the South Carolina High School Assessment Program (HSAP). *Northwest Evaluation Association.* 1-20.

Cronin, J., & Bowe, B. (2005). A study of the ongoing alignment of the NWEA RIT scale with the North Dakota state Assessment (NDSA) Achievement Tests. *Northwest Evaluation Association*. 1-26.

Cronin, J., Dahlin, M., Deborah, A., & Kingsbury, G. (2007). *The proficiency illusion.* Washington, DC: Thomas B. Fordham Foundation. Retrieved from http://www.pathwaystocollege.net/PCNLibrary/ViewBiblio.aspx?aid=2993

Cronin, J., Hauser, J., Houser, R., Kingsbury, G. & Olson, A. (2005). *The state of state standards: Research investigating proficiency levels in fourteen states.* North West Evaluation Association. Retrieved from http://www.nwea.org/assets/research/national/State%20of%20State%20standards%20-%20complete%20report.pdf..

Cronin, J., Kingsbury, G., McCall, M., & Bowe, B. (2005). *The impact of the No Child Left Behind Act on student achievement and growth: 2005 edition*. *A Technical Report from the NWEA Growth Research Database,* 2-63. Retrieved from NWEA Research Database: http://www.nwea.org/

Cronin, J., & McCall, M. (2002). *Assessing changes in the projected NWEA RIT scale cut scores for the 2002 and 2004 study of alignment with the Palmetto achievement Challenge Tests,* 1-35. Retrieved from NWEA Research Database: http://www.nwea.org/

Daley, P. (2008). *Reading intervention: Turning the tide.* Retrieved on December 14, 2008. http://www.scholastic.com.

Department of Education, Washington, DC; National Institution of Child Health and Human Development (NIH), Bethesda, Md.: National Institution for Literacy, Washington, DC. (2002). *Summary of the adolescent literacy workshop*: *State of the science and research need.* Retrieved on December 15, 2008 from: http://www.ed.gov/index.jhtml

Dreshler, D. & Hock, M. (2006). *Adolescent literacy: Where we are-where we need to*

go. Retrieved from: http://www.idonline/org/article/12288. Retrieved on November 2, 2008.

Engelhard, G. (1984). Thorndike, Thurstone, and Rasch: A comparison of their methods of scaling psychological and educational tests. *Applied Psychological Measurement*, *8*(1), 21-38.

F-Test for equality of two standard deviations. *Engineering Statistics Handbook.* Retrieved from: http://www.it..nist.gov/div898/handbook/eda/section3/eda359.htm.

Fisher, D., & Ivey, G. (2006). Evaluating the interventions for struggling adolescent readers. *International reading Association*, 180-189.doil: 10.1598/JAAL.503.2,

Florida Center for Reading Research READ 180. (2008). *What is READ 180 Enterprise Edition?* Retrieved from: http://www.fcrr.org.

French, A., Poulsen, J. & Yu, A. (2009). *Multivariate analysis of variance MANOVA*. Retrieved from: http://online.sfsu.edu/`efc/classes/bio1710/manova/manovanew.htm.

Fuchs, D., & Deshler, D. (2007). What we need to know about responsiveness to Intervention and shouldn't be afraid to ask. *Learning Disabilities Research & Practice*, *22*(2), 129-136.

Fuchs, L., & Fuchs, D. (2002). Mathematical problem-solving profiles of students With mathematics disabilities with and without comorbid reading disabilities. *LD Online*. Retrieved from: http://www.Idonline.org/articlw/6326.

Gamble-Risely, M. (2006). Surviving accountability: As easy as AYP. *The Journal*, *3*(13), 38-42.

Georgia Department of Education. (2003). AYP 2003 calculation guide for school-level data, 1-47. Retrieved from: http:// http://www.doe.k12.ga.us.

Grace, C., Shores, E. F., Zaslow, M., Brown, B., Aufseeser, D., & Bell, L. (2006). *Rural disparities in baseline data of early childhood longitudinal study: A chartbook. (Rural Early Childhood Report 3).* Mississippi State, MS: National Center for Rural early Childhood Learning Initiatives, Mississippi State University Early Childhood Institute. Retrieved from

http://www.earlychildhood.msstate.edu/

Green, S., & Salkind, N. (2005). *Using SPSS for Windows and Macintosh: Analyzing and understanding data.* New Jersey: Pearson Prentice Hall.

Goin, L., Hassesbring, T., & McAfee, I. (2008). Executive summary: DoDEA/Scholastic READ 180 Project: An evaluation of the READ 180 intervention program for struggling readers. U.S. Department of Defense doi: MDA410-98-0009. Retrieved from: www.library.walden.edu.

Hasselbring, T., & Bausch, M. (2007). Assistive technologies for reading. *Educational Leadership*, *63*(4), 72-75.

Haslam, B, White, R., & Klinge, A. (2006). *Improving student literacy: READ 180 in the Austin Independent School District 2004-2005*. Policy Studies Associates, Washington, D.C. Retrieved from: http:www.policystudies.com.

Heck, R. (2006). Assessing school achievement progress: Comparing alternative approaches. *Educational Administration Quarterly*, *42*, 667-695. doi: 10.1177/0013161X06293718.

Hoff, D. (2008) NCLB leeway allows states to hone plans. *Education Week*, *27*(43), 1-2.

Hoff, D. (2008). State tests not all ok under law. *Education Week*, 27(31), 1-2.

Interactive, Inc. (2002). *Final report: Study of READ 180 in the Council of Great City Schools*. New York, NY. Retrieved from: http://hl=en&q-interactive+inc+final+report+study+read+180&a.html.

Jarrett, C., & Evans, C. (2007). READ 180-One teachers story. *The Lamar University Electronic Journal of Student Research*, Fall 2007. Retrieved from: www.docstoc.com/.../The-**Lamar-University-Electronic-Journal**-of-Student-Research-Fall-International.

Joftus, S., & Maddox-Dolan, B. (2003). Left out and left behind: NCLB and the American high school every child a graduate. *Alliance for Excellence in Education*, Washington, D.C. 1-34. Retrieved from: http://www.all4ed.org/publication_material.

Kemple, J., Corrin, W., Nelson, E., Salinger, T., Herrmann, S., Drummond, K., & Strasberg, P. (2008). The enhanced reading opportunities study: Early impact

and implementation findings. *Educational Evaluation Regional Assistance IEC. U.S. Department of Education* doi: NCEE 2008-4015.

Kennedy, K. (2006). Graduates can't master college text. Sudy finds students fall off Track after 10th grade. *Education Week*, 25(25), 1-16.

Kennedy, K. (2007). Report pans how states set the bar. *Education Week*, *27*(7), 1-16.

Kerry, L., Swee-Fong, Ee-Lynn, & See-Ying, L. (2004). Working memory and literacy as predictors of performance on algebraic word problems. *Journal of Experimental Child Psychology*, 89(2), 140-158.

Kleckler, B., & Pollock, M. (2005). Congruency of research-based literacy instruction in high and low performing schools. *Reading Improvement*, *42*(3), 149-157.

Kleckler, B., & Pollock, M. (2004). *An examination of the congruence of literacy instruction from middle schools to high schools*. A paper presented at the Mid-South Educational Research Association annual meeting. Gatlinburg, TN. Retrieved from: www.eric.ed.gov/ERICWebPortal/recordDetail?accno.htm.

Kocanda, L. (2008).*READ 180 Program designed to meet the needs of struggling readers*: Program information. Homer School district 33C. Homer Glen, Ill. Retrieved from: http://www.homerschoools.org/read180/index.html.

Kyttala, M. (2008). Visuospatial working memory in adolescents with poor performance in mathematics: Variation depending on reading skill. *Education Psychology*, *28*(3), 273-289.

Lee, J. (2007). Do national and state assessments converge for educational accountability: A meta-analytic synthesis of multiple measures in Main and Kentucky. *Applied Measurement in Education*, *20*(2), 171-203.

Lexile Case Study. (2009). Linking Assessment and Instruction Northwest Evaluation. Association and the Lexile Framework for reading. Advantage Learning Systems, Inc. Retrieved from: http://www.lexile.com_ LexileAsesstudies/nwea.html.

Lexile Framework for Reading. (2008). Retrieved from: http://www.lexile.com/DesktopDefault.apx.

Lissitz, R., & Hua wei. (2006). Consistency of standard setting in an augmented state testing system. *Educational Measurement: Issues and practices.* National Council on Measurement in Education. 46-56.

Luria, A.R., Yudovich, F. (1972). *Speech and the development of mental processes in a child*. Oxford, England: penguin Books.

Manzo, K. K.(2006). Graduates can't master college text. Study finds students off track after 10th grade. *Education Week*, *25*(2), 1-16.

Manzo, K. (2007). Report pans how states set the bar. *Education Week, 27(*7), 1-16.

Martiniello, M. (2008). Language and the performance of English-language learners in math problems. *Harvard Educational Review*, *78*(2), 333-368.

Mastropieri, M.A., Scruggs, T.E., & Graetz, J. (2003). Reading comprehension for secondary students. *Learning Disability Quarterly*, *26*,103-116.

Mastropieri, M.A., Scruggs, T.E., Norland, J., Berkeley, S., McDuffie, K., Tornquist, E. H., & Conners, N. (2006). Differentiated curriculum enhancement in inclusive middle school science: Effects on classroom and high-stakes tests. *Journal of Special Education, 30,* 130-137.

Maxwell, L. (2008). Playing catch-up. *Education Weekly, 27(*32), 22-25.

Mccall, M., Hauser, C., Cronin, J., Kingsbury, G., & Houser, R. (2006). *Achievement gaps: An examination of differences in student achievement and growth*. *Northwest Evaluation Association*. 1-108. Retrieved from: http:NWEA.org.

Menken, K. (2006). Teaching to the test: How No Child Left Behind impacts language policy, curriculum, and instruction for English language learners. *Bilingual Research Journal*, *30*(2), 521-546.

Minna, K. (2008). Visuospacial working memory in adolescents with poor performance in mathematics: Variation depending on reading skills. *Education Psychology, 28*(3), 273-289.

National Joint Committee on Learning Disabilities. (2008). Adolescent literary and older students with learning disabilities. http://www.ldonline.org/

NCLB 2005-2006 Adequate Yearly Progress Report. (2005). Retrieved from: http://www.NCLB.text.html.

NAEP Executive Summary. (2007). The nation's report card: Trial urban district assessment. Retrieved from: http://www.nagb.org/frameworks/reading_07.pdf.

Ng, S., Ng, E., & Lim, Z. (2004). Working memory and literacy as predictors of performance on algebraic word problems. *Journal of Experimental Child Psychology*, *89*(2), 140-158.

No Child Left Behind School Improvement Sanctions for Schools Receiving Title I Funds. NCLB. Text. Retrieved from: http//www.ed.state.hh.us/education/doe/NCLB/sanctions.html.

Northwest Evaluation Association. (2001). *Idaho State Aligned Learning Continuum Release 1.0.* Retrieved from: http://www.foridahoteachers.org/ID%20State%20Learning%20Continuum.pdf.

Northwest Evaluation Association. (2007). *MAP administration workshop*. Retrieved from: http://www.NWEA.org.

Northwestg Evaluation Association. (2008) *MAP administration workshop* Retrieved from: http://www.NWEA.org.

Northwest Evaluation Association. (2008). *Normative Study*. Retrieved from: http://www.nwea.org/assets/downloads/980/Normative%20Data%20Sheet_v2.pdf

Pape, S. (2004). Middle school children's problem-solving behavior: A cognitive analysis from a reading comprehension perspective. *Journal for Research in Mathematics Education*, *35*(3), 187-219.

Pearson, L. & White, R. (2004). *Study of the impact of READ 180 on student performance in Fairfax County Public Schools.* Retreived from: http://www.docstoc.com.

Policy Studies Associates, Inc. (2002). Final report: *A summary of independent research on READ 180*. Retrieved from: http://teacher.scholastic.com/products/read180/

Powell, D. (2004). *The effects of adult literacy and demographics on eighth grade mathematics and language arts literacy scores*. Educational Leadership, Curriculum, and Special Education Conference. Arkansas State University, Jonesboro, Arkansas. Retrieved from: http://www.eric.ed.gov/ERICWebPortal/recordDetail.htm.l

Sandack, R., Mencl, W., Frost, S., & Pugh, D. (2004). The neurobiological basis of skilled and impaired reading: Recent findings and new directions. *Scientific Studies of Reading*, *8*(3), 273-292.

Scholastic Inc Interactive, Inc. (2002). Final report study of READ 180 in the Council of Great City Schools, New York, NY. Carnegie Corporation of New York Reading Next. Retrieved from: teacher.scholastic.com/products/read180/.../JobCorpsStudyRevised.pdf.

Scholastic Inc, Read 180 Enterprise Edition Product Overview. (2005). Scholastic Office of Educational Assistance. Retrieved from: http://www.scholastic.org.

Schumacker, R., & Fluke, R. (1991). Rasch-based factor analysis of dichotomously-scored item response data. University of North Texas presented at the *American Educational Research Association*. 1-33.

Slavin, R. (2003). A reader's guide to scientifically based research. *Educational Leadership*, *60*(5), 12-16.

Slavin, R., Cheung, A., Groff, C., & Lake, C. (2008). Effective reading programs for middle and high schools: A best-evidence synthesis. *Reading Research Quarterly*, *43*(3). 290-322.

Snyder, L., Caccamise, D., & Wise, B. (2005). The assessment of reading Comprehension: Considerations and Cautions. *Top Lang Disorders*, *25*(1), 33-50.

South Carolina Department of Education Department of Assessment. (2008). Assessment ProgramGR3-8.html. Retrieved from: http://www.myscschools.com/agency/accountability/New.

South Carolina Department of Education Department of Assessment. (2006). Retrieved on from: http://ed.sc.gov/agency/offices/assessment/programs/hsap.

Stoneberg, B. (2006). Office of the Idaho state Board of Education. *Practical Assessment Research & Evaluation*, 12(5). ISSN 1531-7714. Retrieved from: http://pareonline.net/

Stotsky, S. (2005). *The state of state English standards*. Thomas B. Fordham Foundation & Institution Washington, D.C, 1-131. Retrieved from: http://www.mackinac.org/7013.

Swanson, H., Jerman, O., & Zheng, X. (2008). *Journal of Educational Psychology, 100(*20*),* 343-379.

U.S. Department of Education. (2008). *Elementary & secondary education: Improving Basic programs operated by local educational agencies* (Title I, Part A). Retrieved from: http://www.ed.gov/programs/titleiparta/index/html.

VanOrt, K. (2009). *Phase II of Case Study: Interpretation of Data.* Northwest Evaluation Association. Retrieved from:

http://www users.manchester.edu/Kavanort/phase%2011%20% 20case%20study.pdf.

Verma, R., & Goodale, J.C. (1995). Statistical power in operations management. *Journal of Operations Management*, *13*(2), 139-152.

Vilenius-Tuohimma, Piia, M., Aunola, K., & Nurmi, J.(2008). The association between mathematical word problems and reading comprehension. *Education Psychology, 28*(4), 409-426.

Vygotsky, L.S. (1962). *Thought and Language*. MIT Press: Cambridge, Mass.,1995. Retreived from:www.isrl.illinois.edu/.../vygotskythoughtandlanguage.html.

Westat, E.D. (2007). *State ESEA Title I participation 2003-2004 U.S. Department of Education.Office of Planning, Evaluation and Policy Development and Office of Elementary and Secondary Education document*. Retrieved from: http://www.ed.gov/rschstat/eval/disadv/participation...04/finalreport.doc -

Wise, J., Pae, H., Wolfe, C., Sevcik, R., Morris, R., Lovett, M., & Wolf, M. (2008). Phonological awareness and rapid naming skills of children with reading disabilities and children with reading disabilities who are at risk for mathematics difficulties. *Learning Disabilities Research & Practice*, *23*(3), 125-136.

Wood, D. (date). Modeling the relationship between oral reading fluency and performance on statewide reading test. *Educational Assessment, 11*(2), 85-104.

Woolley, M., Grogan-Kaylor, A., Glister, M., Karb, R., Gant, L., Reischl, T., & Alaimo, K.(2008). Neighborhood social capital, poor physical conditions and school achievement. *Children & Schools*, *30*(1), 133-144.

Whorf, B. (1956). *The relation of habitual thought and behavior to language*. Boston: The Massachusetts Institute of Technology. Retrieved from: http://www.sloan.stanford.edu/mousesite/Secondary/Whorfframe2.html.

APPENDIX A:

RIT SCORES CONCEPTS AND SKILLS READING/ELA AND MATH

Concepts and Language of Algebra, Functions and Mathematical Models – includes patterns, functions, solving equations, order of operations, properties, simplifying expressions and continues up through more difficult skills in Algebra specific content

Skills and Concepts

RIT score between 151 and 160
Patterns, Sequences, Functions

• Find and extend patterns

• Recognize and extend a pattern: shape, color and size

RIT score between 161 and 170
Solving Equations, Simplifying Expressions, Order of Operations

• Solve for missing numbers in an addition or subtraction sentence

• Determine what operation is needed to solve a word problem (any operation)

RIT score between 171 and 180
Patterns, Sequences, Functions

• Recognize and extend a pattern: shape, color and size

• Compare objects by shape, size, height, or length (larger, smaller, taller, shorter, longer)

Solving Equations and Inequalities, Simplifying Expressions, Order of Operations

• Solve for missing factors in a multiplication or division sentence

• Evaluate a numerical equation involving more than one operation

• Use > or < symbols to compare two numbers

Properties

• Identify the associative, commutative, identity and zero property of multiplication

• Demonstrate the associative, commutative, and zero property of addition

RIT score between 181 and 190

Patterns, Sequences, Functions

• Find and extend patterns, both increasing and decreasing

• Complete a number pattern

• Complete a table according to a rule

• Choose and apply an appropriate problem solving strategy: Find a pattern

Solving Equations and Inequalities, Simplifying Expressions, Order of Operations

• Solve for missing addends in an addition or subtraction sentence

• Use inverse operations to find missing equation

• Identify missing elements in number sentences

Properties

• Identify the associative, commutative, identity and zero property of multiplication

Concepts and Language of Algebra, Functions and Mathematical Models 1 ▪ NWEA, 2003

RIT score between 191 and 200
Patterns, Sequences, Functions

• Count and write by 4's

• Find and extend patterns

Solving Equations and Inequalities, Simplifying Expressions, Order of Operations

• Identify and understand the greater or lesser of two numerals (use the symbols < and > through 999,999)

• Use symbols of inequality, < and > to write and complete number sentences

• Solve simple addition problems with "n" as an addend or sum

• Solve simple multiplication problems with "n" as a multiple or product

• Solve simple division problems with "n" as a quotient or divisor

• Solve whole number equations with any operation

RIT scores between 201 and 210
Patterns, Sequences, Functions

• Use of a function "machine" to determine input and output

Solving Equations and Inequalities, Simplifying Expressions, Order of Operations

• Evaluate an expression involving more than one operation (order of operations)

• Use the basic properties of multiplication to write an algebraic expression that is equivalent to a given algebraic expression

• Solve equations involving more than one operation

• Multiply and divide polynomials

• Solve equations involving rational numbers (addition and subtraction)

Properties

• Use strategies to develop computational fluency with multiplication: zero property, property of one, arrays, doubles, nine patterns

• Use the basic properties of addition to write an algebraic expression equivalent to a given algebraic expression

• Understand the properties of integers: commutative, associative, identity, zero property of multiplication, distributive property of multiplication over addition, and inverse property of addition

RIT scores between 211 and 220

Patterns, Sequences, Functions

• Use logic to solve a problem involving a function table

Solving Equations and Inequalities, Simplifying Expressions, Order of Operations

• Solve decimal equations (one step, addition and subtraction)

• Solve integer equations (one step, multiplication and division)

• Evaluate expressions using the order of operations (may include parentheses or exponents)

• Solve quadratic equations

Properties

• Understand the properties of integers: commutative, associative, identity, zero property of multiplication, distributive property of multiplication over addition, and inverse property of addition

CONCEPTS AND LANGUAGE OF ALGEBRA, FUNCTIONS AND

MATHEMATICAL MODELS 2 ▪ NWEA

RIT scores between 221 and 230

Patterns, Sequences, Functions

• Complete a function table according to a rule

• Recognize and continue a number pattern and/or geometric representation (e.g. Fibonacci sequence, triangular numbers)

• State a rule to explain a number pattern, including arithmetic progression

• Investigate geometric patterns and relationships and describe them algebraically

Solving Equations and Inequalities, Simplifying Expressions, Order of Operations

• Solve for missing addends in an addition or subtraction sentence

• Use boxes or other symbols to stand for any number in expressions or equations

• Solve whole number equations with one variable (multiplication and division)

• Solve integer equations (one step, all four operations)

• Solve equations involving more than one operation

• Solve one-step linear equations in one variable using addition, subtraction, multiplication, and division with integer solutions

• Simplify numeric expressions by applying properties of rational numbers (e.g. identity, inverse, and distributive, associative, commutative)

RIT scores between 231 and 240

Patterns, Sequences, Functions

• Using whole numbers, complete a function table based on a given rule

• Graph linear functions, noting that the vertical change (change in y-value) per unit of horizontal change (change in x-value) is constant

• Identify linear equation for a straight line

Solving Equations and Inequalities, Simplifying Expressions, Order of Operations

• Write an algebraic expression to model a situation

• Evaluate an algebraic expression for given values

• Explore equivalent ratios involving missing variables

• Use the correct order of operations to evaluate numeric and algebraic expressions

• Simplify and evaluate expressions that include positive and negative integral components

• Simplify polynomials by combining like terms

• Use the rules of exponents to multiply and divide monomials

• Solve simple linear equations and inequalities over the rational numbers

• Create a table of (x, y) values for the given linear equation and graph the function

RIT scores between 241 and 250
Patterns, Sequences, Functions

• Students analyze a given set of data for the existence of a pattern and represent the pattern algebraically and graphically

• Determine whether a relation is defined by a graph, a set of ordered pairs, or a symbolic expression is a function and justify the conclusion

• Use a function table to determine inverse variation

Solving Equations and Inequalities, Simplifying Expressions, Order of Operations

• Students solve equations and inequalities involving absolute values

CONCEPTS AND LANGUAGE OF ALGEBRA, FUNCTIONS AND

MATHEMATICAL MODELS 3 ▪ NWEA, 2003

• Solve a system of two linear equations in two variables algebraically and interpret the answer graphically

• Graph a linear function in two variables using the slope-intercept method and identify intercepts

• Solve a system of two linear inequalities in two variables and identify the solution set

• Understand the concepts of parallel lines and perpendicular lines and how those slopes are related

• Add, subtract, multiply, and divide monomials and polynomials

• Apply basic factoring techniques to second- and simple third-degree polynomials, including finding a common factor for all terms in a polynomial, recognizing the difference of two squares, and recognizing perfect squares of binomials

• Add, subtract, multiply, and divide rational expressions and functions

• Find the difference of two squares

RIT scores between 251 and 260

Solving Equations and Inequalities, Simplifying Expressions, Order of Operations

• Simplify embedded expressions before solving linear equations and inequalities in one variable

• Solve problems that use variables in expressions describing geometric quantities by solving for one variable

• Solve equations with variables as exponents

• Use the rules of exponents to multiply polynomials by monomials

• Derive linear equations by using the point-slope function

• Find the slope given two points on the line of a given graph

• Write the equation of a line when given the graph of the line, two points on the line, or the slope of the line and a point on the line

• Simplify monomials containing integer powers and roots

• Find the solution set for inequalities that include absolute values

• Identify the equation of a parabola

• Simplify expressions containing cube roots

• Solve expressions containing factorials

• Find the number of possible solutions for a system of equations

• Cube a binomial

Quadratic Formula and Equations

• Solve a quadratic equation by factoring or completing the square

• Know the quadratic formula and demonstrates its proof by completing the square

• Identify discriminate and roots

• Use the quadratic formula to find the roots of a second-degree polynomial and solve quadratic equations

• Graph quadratic functions and know that their roots are the x-intercepts

Concepts and Language of Algebra, Functions and Mathematical Models 4 ▪ NWEA, 2003 Concepts and Language of Algebra, Functions and Mathematical Models 5 ▪ NWEA, 2003

RIT scores between 261 and 270
Patterns, Sequences, Functions

• Determine the domain of independent variables and the range of dependent variables in a relation that is defined by a graph, a set of ordered pairs, or a symbolic expression

• Analyze properties and relationships of functions (e.g. linear, polynomial, rational)

Solving Equations and Inequalities, Simplifying Expressions, Order of Operations

• Find the slope of a line parallel to a given line

• Find the x-intercept of a given equation

• Solve equations with fractions as exponents

• Analyze a graph to identify the appropriate system of equations

• Determine the vertex of a parabola

• Determine which of several equations can be factored

• Determine commonalities between three given equations of lines

RIT scores between 271 and 280
Solving Equations and Inequalities, Simplifying Expressions, Order of Operations

• Identify the region defined by a linear inequality

New Vocabulary in this Range: none
New Signs and Symbols: none

Interpretive Reading Comprehension – Students can make reasonable predictions before, during, and after reading, can draw inferences necessary for understanding, can recognize cause-effect relationships, and can summarize and synthesize information from a variety of written materials.

Skills and Concepts

RIT Scores between 151 and 160

Draw Conclusions/Inferences

• Use simple details to make simple inferences

Summarize and Synthesize

• Determine the main idea of a simple factual section

Cause and Effect

• Identify or determine simple cause and effect relationships

New Vocabulary: missing word, story, paragraph, sentence

RIT Scores between 161 and 170

Draw Conclusions/Inferences

• Infer the qualities or purposes of a list

• Draw conclusions based on information in a story about events taking place

Prediction

• Predict future events based on the simple details of a story

Summarize and Synthesize

• Determine the main idea of a simple story

Cause and Effect

• Identify, determine, or infer simple cause and effect relationships in simple situations

New Vocabulary: questions, main idea, riddle, list, passage

RIT Scores between 171 and 180

Draw Conclusions/Inferences

• Make inferences by noting specific details in multi-paragraph selection

• Infer the qualities or purposes of a list

• Make inferences using details in an advertisement

• Infer characteristics and qualities of main characters

• Infer answers to riddles by noting details

• Draw conclusions based on information in a story as to what will probably happen next

Predictions and Generalizations

• Predict future events based on a multi-paragraph passage

Summarize and Synthesize

• Look at details to determine and refine the main idea of 30-50 word paragraphs

• Identify the topic sentence in a simple paragraph

Interpretive Reading Comprehension/Idaho 1 ▪ NWEA, 2001

• Create a topic sentence for a simple paragraph

• Determine the main idea by selecting the best title for a story or passage

• Refine and explain the main idea of a selection

Cause and Effect

Format: Read short passages with relatively simple sentences and basic vocabulary where cause and effect are stated in same sentence with some clue words supplied (because, so…)

Determine cause and effect relationship in a passage containing extraneous information

Identify causes and effects stated in different sentences

Identify causes and effects implied, not stated directly

New Vocabulary: title, cause, facts, effect, opinion, ad, describes, author

RIT Scores between 181 and 190

Draw Conclusions/Inferences

• Draw conclusion based on interpretation of information read

• Infer conclusion from prior information

Predictions and Generalizations

• Predict what will happen next in a multi-paragraph passage

• Generalize from specific information within the passage

Summarize and Synthesize

• Summarize a short passage of 100-150 words

• Determine main idea in different genre

• Identify the main idea of a poem

• Make inferences about main idea of a personal note

• Determine main idea from a variety of nonfiction

• Identify topic sentence

• Infer best title for a story or passage

Cause and Effect

• Format: At lower RITs, read simpler passages, vocabulary, and content; at higher RITs, read more complex content in passages

• Identify basic cause and effect relationships, stated in same or adjoining sentences

• Use clue word "because" supplied in answer choices to help focus thinking

• Identify implied cause and effect relationships

New Vocabulary: predict, outcome, statement, poem, article, conclude, summary, problem

<u>RIT Scores between 191 and 200</u>

Draw Conclusions/Inferences

• Draw a conclusion based on interpretation of information read

Predictions and Generalizations

• Generalize a statement from specific information within the passage

Summarize and Synthesize

• Summarize a longer passage by outlining

• Infer main idea from a variety of genre

Interpretive Reading Comprehension/Idaho 2 ▪ NWEA, 2001

RIT Scores between 201 and 210

Draw Conclusions/Inferences

• Make inferences from announcements

• Make inferences about directions on labels

• Make inferences about a character type within a variety of literature

• Make inferences from information found on book flap

• Make inferences from textbook technical reading

• Form a conclusion based on interpretation of information from a variety of sources

Predictions and Generalizations

• Predict future events based on prior conclusions drawn

Summarize and Synthesize

• Identify main idea in magazine articles or stories from other sources

Cause and Effect

Read slightly longer passages, with more difficult content and vocabulary which use clue words “since” and “because of”

Demonstrate combining several pieces of information to understand the cause and effect relationship

Identify which is the “cause” and which is the “effect” when given a situation

New Vocabulary: infer, solution, prediction, announcement, biography, explanation, chapter, legend, topics, characteristics, main characters, assume, library, speaker

RIT Scores between 211 and 220

Draw Conclusions/Inferences

• Make inferences from catalog selections

• Make inferences from handbooks

• Make inferences from a science fiction passage

• Draw a conclusion from the passage by inferring the interpretation of the information read

• Identify conclusion to story

Predictions and Generalizations

• Create prediction for recipe

• Predict outcome from advertisement

Interpretive Reading Comprehension/Idaho 3 ▪ NWEA, 2001 Interpretive Reading Comprehension/Idaho 4 ▪ NWEA, 2001

RIT Scores between 221 and 230
Locating Information

Read passages where details being located are more specific and less obvious, requiring careful reading or re-reading

Use an announcement:

- Find and combine specific pieces of information
- Find and understand specific, detailed information
- Compare specific pieces of information

Use a weather report: Find and understand small but significant details

Use sports scores: Understand commonly used abbreviations

Use a recipe: Find and understand small but significant details

Reading Directions

Understand intent of directions

Synthesize complex directions

Sequencing

Summarize events in correct order

Use reasoning to determine the correct order of scrambled sentences

Determine what comes after in passages with complex phrasing (just before he did this, he did that)

Use word clues and reasoning to determine what comes first when sentences contain flashbacks or are not written in exact time order

Reading for Detail

Read passages that contain rich and varied detail, generally unfamiliar content, extensive vocabulary, complex sentence phrasing

Isolate information not stated in a detail-filled passage

Paraphrase and interpret significant detail

Locate specific detail in a long, detail-filled passage

Locate and interpret several details in a detail-filled passage
New Vocabulary: publications, editorial

RIT Scores between 231 and 240
Reading Directions

Synthesize/paraphrase directions

Reading for Detail

Read passages that contain rich and varied detail, generally unfamiliar content, extensive vocabulary, complex sentence phrasing

Locate, paraphrase, and interpret multiple details in a detail-filled passage

New Vocabulary: none

(Literal Reading Comprehension/Idaho 8 NWEA, 2001 Literal Reading Comprehension/Idaho 9).

CURRICULUM VITAE

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CURRICULUM VITAE

EDUCATION

Ph.D. Education: Specialty in Literacy and Intervention Evaluation (2009)
Dissertation **"**Facilitating High School Student Success through READ 180: Analysis of Program Impact Utilizing Measures of Academic Progress (MAP)"
Advisors: Dr. Richard Shepard, Chair
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Dr. Jerry Moskus
Richard W. Riley College of Education and Leadership Walden University, Minneapolis, Minnesota

RESEARCH CERTIFICATION:
The National Institutes of Health (NIH) Office of Extramural Research
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Master of Arts in Teaching (2005)
Clemson University, Clemson, South Carolina
Suma cum Laude

Lander University, Greenwood, South Carolina
Secondary Methods in English (2003)
President's List (2002-2003)

Bachelor of Arts in Journalism (1985)
University of South Carolina, Columba, South Carolina

TEACHING CERTIFICATIONS:

English Language Arts, US and World History grades 6, 7, and 8 (Renewal Date 2013)
English Language Arts grades 9, 10, 11, and 12 (Renewal Date 2013)

TEACHING EXPERIENCE:

PC Department of Education, Clinton, SC
Off Campus Faculty Practicum Student Supervisor (2008-2009)
Off Campus Faculty Student Teacher Supervisor (2008-2009)
Location: Laurens District 55 High School, Laurens, SC

Laurens District 55 High School, Laurens, SC
English Language Arts instruction grades 10-12 (2006-present)

Piedmont Technical College, Greenwood, SC
English 101, 102 (2005-2007)

Newberry Middle School, Newberry, SC
English Language Arts, World History, Geography grades 6 (2005-2006)

Bell Street Middle School, Clinton, SC
English Language Arts, World History, US History, Geography grades 7 and 8 Honors (2004-2005)

PROFESSIONAL AFFILIATIONS:

American Research Association
International Reading Association
South Carolina Middle School Association
National Education Association

Technical Reports:

Cortical Pathways and Reading Proficiency: Utilizing MAPS Testing to Predict PSAT and SAT Performance. Laurens County School District 55, Laurens, SC (2007)

Scholastic Read 180: To Fund or Not To Fund. Laurens County School District 55, Laurens, SC (2009)

References furnished upon request