

AN INVESTIGATION OF THE EFFECTS OF A MIDDLE SCHOOL READING  
INTERVENTION ON SCHOOL DROPOUT RATES

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## ABSTRACT

The purpose of this study was to investigate the effects on reading achievement for middle school students after participation in a computer-based reading intervention program, READ 180, as well as the relationship of program participation to later dropout rates, compared to students enrolled in a traditional reading remediation program. A nonequivalent control group research design was used to examine data collected from 384 students in Grades 6 through 8 participating in reading interventions spanning a 3-year period from 2003 through 2006. Independent samples *t* test and chi-square statistics were used to analyze data to determine the yearly reading achievement mean gains, differences between the effects of the two reading interventions, and later dropout frequencies. There were no significant differences between the treatment and comparison groups in reading scores during the first year of READ 180 implementation. Computer software problems affected the implementation of READ 180 during the first semester of implementation. The findings reveal a statistically significant difference between the effects on reading achievement scores for students who participated in READ 180 when implemented with moderate fidelity compared to students in a traditional reading remediation program during the 2nd and 3rd years of implementation. The findings in this study revealed that an intensive reading intervention, READ 180, can significantly improve reading achievement for struggling adolescent readers when implemented with moderate fidelity. Analyses of the data revealed differences between the number of 2003-

2004 reading intervention participants and the school division cohort dropout rates. A significant difference was not observed between the 2004-2006 cohort dropout rates when compared to the school division rates. The findings in this study will be beneficial to secondary principals who are held accountable for literacy development, implementation, and evaluation as the school instructional leader.

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## CHAPTER I

### INTRODUCTION

Thomas Jefferson (1816, ¶ 5) wrote, “Where the press is free, and every man able to read, all is safe.” As a nation, the goal to ensure that “every man [is] able to read” has remained elusive, with a national illiteracy rate of 25 percent (Moats, 2001). Literacy is “an individual’s ability to use printed information to function in society, to achieve one’s goals, and to develop one’s knowledge and potential” (Kirsch, Jungeblut, Jenkins, & Kolstad, 1993, p. 2).

Recent reform efforts have resulted in positive literacy results in the primary grades, but far too many students are advancing to secondary schools without the prerequisite literacy skills to be successful in history, literature, mathematics, and science (Moats, 2001; O'Brien, Stewart, & Moje, 1995). What efforts are essential at the secondary school level to ensure that the literacy standard envisioned by Thomas Jefferson and defined in recent No Child Left Behind (2001) legislation is met?

An inability to read and comprehend text is a pervasive problem facing many secondary school students and adults. More than 5 million high school students do not read well enough to comprehend their textbooks or other written material that is required for their grade levels (Hock & Deschler, 2003). According to the National Assessment of Educational Progress (NAEP), 26% of these students cannot read material generally deemed essential for daily living, such as road signs, newspapers, and bus schedules (Grigg, Daane, Jin, & Campbell, 2003). A low reading achievement level is one of the key risk factors for dropping out of school (Biancarosa & Snow, 2004).

It is imperative to study and implement literacy initiatives at the secondary level to ensure that, “every man [is] able to read” (Jefferson, 1816, ¶ 5). Statistics indicate that students who fail to meet literacy goals prior to leaving high school will likely be underemployed, undereducated, and underutilized in the global economy (Scheffel, Shroyer, & Strongin, 2003).

### Background of the Study

The U.S. Department of Education (2000) has reported that reading scores of 12<sup>th</sup>-grade students on the National Assessment of Educational Progress (NAEP) tests have remained relatively level for the past 2 decades. President George W. Bush signed The No Child Left Behind (NCLB) Act as a reauthorization of the Elementary and Secondary Education Act in January 2002, in an attempt to ensure that all students receive a quality education and reach proficiency in the core subject areas. Reporting overall aggregate scores and maintaining the status quo for student academic achievement are no longer acceptable in public schools. At the same time that standards and expectations are being raised, many schools continue to rely on textbooks as the primary printed source of curriculum delivery even in light of evidence that the average student in secondary classrooms is reading below the level of many content-area texts (Allington, 2005).

The reading requirements in core courses represent a barrier to successful completion of high school for many students. The Alliance for Excellent Education released a report, *Reading Next: A Vision for Action and Research in Middle and High School Literacy* (Biancarosa & Snow, 2004), quantifying the enormity of the problem. Biancarosa and Snow reported the following information: (a) more than 8 million students in grades 4 through 12 are struggling readers; (b) every school day, more than

3,000 students drop out of high school; (c) only 69% of high school students graduate on time with a regular diploma; and (d) 53% of high school graduates enroll in remedial courses in postsecondary school.

Policymakers are calling the problems facing many American secondary schools a “crisis” (Conley & Hinchman, 2004). Low literacy achievement is often cited as the foundation and intersection for many of the problems in today’s secondary schools. To illustrate the link between literacy and the current perceptions regarding the crisis in secondary schools, Brandt (2003) wrote,

Literacy is changing because the economy is changing. The United States has become a so-called knowledge economy or informational economy, in which mental labor has replaced physical labor and making information and ideas has replaced making things as our main economic pursuit. Human capital is now regarded as more valuable than land or even money, so literacy has become a hot commodity. (p. 245)

#### Statement of the Problem

Biancarosa and Snow (2004) contended that many students who stop coming to school “lack the strategies to help them comprehend what they read” (p. 11). Despite the major high school dropout problem, little research exists that measures the effects of reading interventions at the secondary level (Moje, 2002) and the relationship to staying in school.

There is a strong correlation between low achievement in literacy and high dropout rates, poverty, and underemployment (Irwin, 2002; Snow, Burns, & Griffin, 1998). Research conducted by the National Assessment of Educational Progress (U.S.

Department of Education 2005) indicated that students in the bottom quartile of reading achievement were 20 times more likely to drop out of school than those in the top quartile.

The southeastern Virginia school district in this study has a 64% graduation rate, compared to the national graduation rate of 69%, based on the Cumulative Promotion Index (Standard & Poor's, 2006). The graduation rate for all students in the Commonwealth of Virginia is slightly higher at 74% based on the Cumulative Promotion Index (National Center for Statistics, 2003). The graduation rate for White students in the school district is 69%, whereas the graduation rates for African American students and Hispanic students are 62% and 31%, respectively. Dropout rates are alarming and unacceptable from an economic, community, and moral perspective. Students with low literacy achievement have become a focus for politicians, parents, teachers, and administrators. Legislation has mandated that schools and school districts make adequately yearly progress in reading (NCLB, 2001). Beyond the mandates, there is a moral imperative to bridge literacy theory with literacy practice to ensure that "every man [is] able to read." The focus on student achievement has increased the awareness of the reading problem facing many of today's youth (Brandt, 2003; Ediger, 2005; Moje, Young, Readence, & Moore, 2005; Stevens, 2002).

The consequences for dropping out of school are dire. It is critical to address the dropout indicators to prevent students from leaving school. Morrow (1987) cited the different ways that dropouts can be defined: (a) *pushouts*, undesirable individuals the schools actively try to force out of school; (b) *disaffiliated* students who neither bond to school nor to people and who do not want to continue to be in contact with the school; (c)

*educational mortalities*, those who are incapable of completing the program before they age out of it, usually struggling students or those in special education; (d) *capable dropouts*, individuals who possess the skills for graduation but who are not socialized to school demands or to the value of a diploma; and (e) *stopouts*, individuals who leave and typically return within the year.

It is important to continue to build on literacy research, replicating and expanding the research base in school settings to meet the work demands of the 21<sup>st</sup> century as well as the expectations of students, parents, businesses, communities, and policymakers. This study adds to the existing research by examining a reading intervention for struggling secondary students and investigating a possible relationship between the reading intervention and dropout rates in an effort to prevent “educational mortalities.”

#### Purpose of the Study

This study investigated the effects of reading interventions on the reading achievement of students in grades six, seven, and eight, from 2003 to 2006, and the influence on dropout rates. There were 192 participants in a computer-based reading program and a similar comparison group of 192 students who participated in a traditional remedial reading program. The quasi-experimental design investigated reading achievement and a possible relationship to dropout rates. The study adds to the existing knowledge of effective adolescent reading models at the secondary school level.

#### Significance of the Study

The 21<sup>st</sup> century presents new challenges for school administrators in meeting the literacy expectations required for today’s economy. Literacy is one of the most crucial items on a principal’s agenda (Booth & Rowsell, 2002; Zipperer, Worley, & Sisson,

2002). Bauman (1984) contended that the success of a school's literacy program is directly linked to a strong instructional leader. Many secondary principals are not formally trained in literacy development; however, they are held accountable for literacy development, implementation, and evaluation (Zipperer et al., 2002). Through continuous literacy improvement efforts, the principal can lead by example, thereby demonstrating to all stakeholders that "literacy is not something extra on the plate, it is the plate, the foundation upon which academic learning and successful student performance depends" (Meltzer & Ziemba, 2006, p. 26).

There is increased accountability for principals to exceed both the spirit and intent of No Child Left Behind legislation. More importantly, there is a responsibility to ensure that all students be prepared for successful completion from high school with the necessary skills for postsecondary education and the global economy they will enter. Despite the need for increased literacy, the National Center for Educational Statistics (2001) reported that reading achievement had not increased over the last 30 years. Goodlad (2004) contended that the dismal state of literacy in the United States is due to the amount of time devoted to literacy instruction. He argued that student engagement in reading during class time is very limited. Fullan (2002) asserted that effective literacy research must be integrated with the changing dynamics facing school leaders. Principals need solid research findings to help them in selecting and implementing effective literacy initiatives. Jensen, Strauser, and Worley (2001) emphasized that principals must join with teachers, parents, staff, and the community to promote literacy development. The research in this study will add to the existing body of knowledge regarding literacy at the

secondary school level as principals create school cultures demonstrating that all stakeholders value literacy development.

Many secondary school teachers are frustrated with the mounting accountability they face to ensure that all students, including those who are significantly below grade level in reading, pass state assessments required for a diploma. Although most secondary school teachers agree that reading is an area that must be addressed, there is a prevailing feeling that reading specialists could better handle the problem (Moore, Bean, Birdyshaw, & Rycik, 2005). Many secondary school teachers view their expertise as sufficient for teaching in a particular content area, but inadequate for incorporating reading strategies. The existing instructional model in most middle and high schools appears to be insufficient to handle the numbers of students who are arriving at the doors each year with significant reading deficiencies. There is a need to identify effective approaches for the reading deficiency issue that presents a barrier for many secondary school students. The research in this study examines the effects of a computer-based reading approach to converge on one possible solution for the significant reading dilemma found in many secondary schools.

#### Definition of Terms

*Adolescent literacy* is defined as “the set of skills and abilities that students need in Grades 4 through 12 to read, write, and think about the text materials they encounter” (National Governors Association [NGA], 2005, p. 6).

*Cohort class* is defined as a group of students that enter the ninth grade for the first time together and who are expected to advance through high school as a group and

become part of the same graduating class after four years of high school (National Center for Educational Statistics, 2003).

*Cohort dropout rates* “measure what happens to a group of students over a period of time. These rates are based on repeated measures of a cohort of students with shared experiences and reveal how many students starting in a specific grade drop out over time” (Kaufman, Alt, & Chapman, 2001, p. 2). Students who dropped out of school or left high school and earned a high school equivalency diploma by taking the General Educational Development (GED) exam are counted as dropouts in the cohort dropout rate.

*Content literacy* is defined as learning based upon text with an expanded emphasis on “reading within the broader context of using language and literacy to learn” (Vacca & Vacca, 1993, p. xiii).

A *dropout* is defined as students in grades seven through twelve who have not graduated from, or is not currently enrolled in a full-time, state-approved education program (Virginia Department of Education, 2006).

*Graduation rate* is derived from the number of diplomas earned in a particular year divided by the ninth grade student enrollment four years earlier. Included in the definition of diplomas are Standard Diplomas, Advanced Diplomas, Special Diplomas, and Modified Standard Diplomas. Students who dropped out of school and students who left high school and earned a high school equivalency diploma by taking the General Educational Development (GED) exam are not counted as graduates (Virginia Department of Education, 2006).

*Intervention* is defined as “integrated, strategic, meaningful, and if necessary, intensive curriculum and instruction to powerfully enrich and expand adolescents’ reading lives” (Greenleaf & Roller, 2002, p. 495).

*Lexile* is defined as a metric used for matching text to reader (Scholastic, 2002).

*Literacy* is defined as “an individual’s ability to use printed information to function in society, to achieve one’s goals, and to develop one’s knowledge and potential” (Kirsch, Jungeblut, Jenkins, & Kolstad, 1993, p. 2).

*Normal Curve Equivalent* (NCE) is defined as a score derived from an achievement or assessment test; it is a way of measuring where a student falls along the normal curve, which is divided into equal intervals from 1 to 99. These scores can be averaged and compared from one year to the next. An NCE score that stays the same from one year to the next indicates a normal growth pattern for that year (MacGinitie, MacGinitie, Maria, & Dreyer, 2000).

*Reading achievement* is defined by Normal Curve Equivalent scores on the fall and spring administered STAR reading, Degrees of Reading Power test, or the Scholastic Reading Inventory and as the gain between the two measures.

*Reading comprehension* is defined as a “crafting process—one in which understanding is constructed by students, authors, and teachers working artistically together to create knowledge” (Bock, 1999, p. 8).

*READ 180* is a computerized software instruction program that combines research-based practices of reading instruction with the use of technology in the classroom to increase reading achievement and proficiency.

*Struggling readers* are defined as “adolescents who for whatever reason are unable to keep up with the reading demands of the school curriculum” (Alvermann, 2001, p. 679).

*Students of diverse backgrounds* are “students in the United States who are: usually from low-income families; of African American, Asian American, Latina/o, or Native American ancestry; and speakers of a home language other than standard American English” (Au, 1998, p. 2).

*Traditional reading remediation* is a resource, pullout program to provide remedial services to children after they have demonstrated reading difficulty (Snow, Burns, & Griffin, 1998).

### Theoretical Framework

Several theoretical literacy models that have influenced adolescent literacy theory emerged from the cognitive revolution, circa 1960. Graves (2004) cited the five themes surfacing after the cognitive revolution: schema theory, interactive reading model, constructivism, reader response theory, and sociocultural theory. Vygotskian perspectives and activity theory have also influenced recent advances in literacy research (Edwards & Daniels, 1996).

READ 180 research is grounded in the broad framework of constructivist theory. Constructivism is a belief that learners create their own understanding based on interactions and the context of the interaction (Draper, 2002). The theory asserts that experience and environment are instrumental in the learning process. Language development is viewed as essential in the acquisition of knowledge (Larochelle, Bednarz, & Garrison, 1998). There is a wide range of constructivist beliefs, which appear to differ

in several aspects, including the role of human social interaction versus that of the individual learner in the construction of knowledge (Phillips, 1995).

The READ 180 model, shown in Figure 1, is based on situated cognition theory, which evolved from constructivism. Hasselbring and researchers with the Cognition and Technology Group (1990) framed the READ 180 instructional model around the tenets of situated cognition theory. The model focuses on the process and context of learning (Willis, 1995).

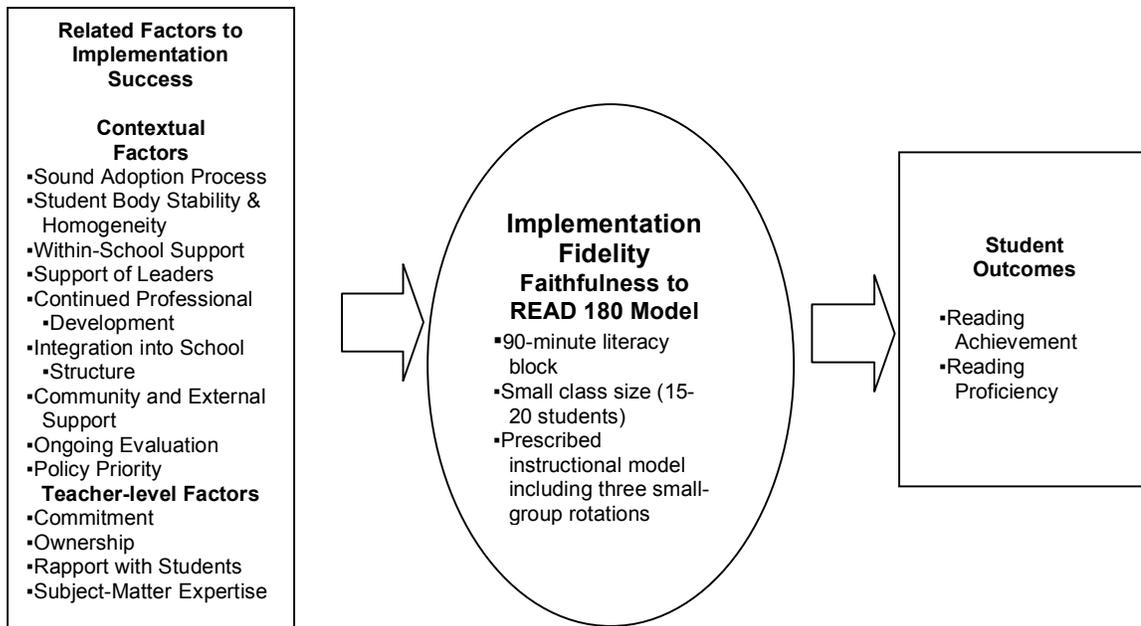


Figure 1. READ 180 research model.

Situated cognition theory is based on research of activity theorists such as Vygotsky, Leontiev, and others (Brown, Collins, & Duguid, 1989). Situated cognition theory posits that learning occurs in authentic contexts and cultures (Lave, 1988). Researchers with the Cognition and Technology group at Vanderbilt University (1990) investigated the relationship between situated cognition and their work on anchored instruction using

video as a context as instruction. Anchoring instruction in context allows students to solve problems by applying skills in class with connections to students' prior knowledge (Moore, Reith, & Ebeling, 1993). The researchers found situated cognition a "useful framework that emphasizes the importance of focusing on everyday cognition, authentic tasks, and the value of in-context apprenticeship training" (p. 2). Situated cognition is predicated on the premise that information becomes knowledge in context of authentic learning. READ 180 uses content-rich videos to provide background knowledge for building mental models that improve reading comprehension (Scholastic, 2004). Constructivist theories continue to evolve and expand based on additional research in the field (Deubel, 2003).

READ 180 exploits the power of integrated media technology (Hasselbring & Goin, 2004). The research basis for READ 180 draws on visual representation, visual information, and mental model building (Kamil, Intrator, & Kim, 2000). This view of mental model building is based on the concept that effective readers construct understanding from the descriptions in the story (Kamil, Intrator, & Kim, 2000). The integrated instructional design of READ 180 facilitates the development of mental models for reading comprehension (Mayer, 1997). This view posits that video and other multimedia help students envision the story, helping to construct a mental model.

The traditional reading remediation model is grounded in the behaviorist model of learning. The program is a "pull-out" concept, with instruction delivered in small groups of about 10 to 15 students. Reading specialists provide direct instruction to students and reinforce it through repetition and feedback (Willis, 1995). Reading comprehension in this model is viewed as a skill that can be isolated into subskills such as sequencing,

predicting outcomes, decoding, drawing conclusions, cause and effect, and finding the main idea (Dole, Duffy, Roehler, & Pearson, 1991). The remedial instruction is focused and organized into units based on student weaknesses and scaffolds the complexity with the progression of skill development. Frequent testing is used to assess student progress in the traditional reading remediation program.

### Research Questions

Three research questions guided this study to investigate the effects of READ 180 with adolescent readers who were in grades six through eight as well as the influence on subsequent dropout rates. The questions are:

1. What are the yearly mean gains in reading achievement scores for adolescent readers, as measured by reading pretests and posttests, following participation in READ 180 compared to students in a traditional reading remediation program serving as a comparison group?

2. Is there a difference between the effects of students who participate in READ 180 on reading achievement scores compared to students in a traditional reading remediation program serving as a comparison group?

3. Are there differences between the dropout rates for students who participate in READ 180 and students who participate in a traditional reading remediation program?

### Limitations of the Study

This research study employed a nonequivalent control group design. This design controlled the main effects of history, maturation, testing, and instrumentation (Campbell & Stanley, 1966, 2005). Students in this southeastern Virginia middle school were similar to other urban middle school students who struggle with the transition to middle school

and the demands of courses in preparation for high school. Threats to internal consistency included statistical regression, selection bias, and experimental mortality.

Threats to internal validity were addressed with certain conditions and statistical measures. The first concern was group differences that affect reading achievement. The utilization of a comparison group consisting of students similar to the participants in the study controlled for selection bias (Riecken et al., 1974). Participants in the comparative control group were in the same grade and age range of the experimental group, with similar pretest scores. Subgroup representation was proportional between the experimental and comparison group.

The fidelity of READ 180 implementation was rated at Level Two, or moderate, as described in Appendix A, the READ 180 Research Protocol and Tools (Scholastic, 2004). The READ 180 teacher completed a survey indicating there were technical problems during the initial year. The 2<sup>nd</sup> and 3<sup>rd</sup> years of implementation were rated at Level Two, without implementation difficulties.

#### Delimitations of the Study

Participants in the research study were students experiencing reading difficulties in grades six through eight in a southeastern, urban, middle school. Student selection for the READ 180 Program and the traditional remedial reading program was based on low performance on reading pretests, SOL scores and teacher recommendation.

The READ 180 class was scheduled for 90-minute blocks every other day. Scholastic (2004) indicated that full implementation, rated at Level One, is defined as offering READ 180 for 90-minute blocks 5 days per week.

## Assumptions

Assumed in this study is the concept that all secondary school students can learn to read at a level that will prepare them for postsecondary opportunities. Underpinning the assumption is a belief that many secondary school teachers and administrators currently do not have adequate preservice training in the area of reading to support struggling adolescent readers. Continual professional development is a cornerstone for reaching the literacy expectations for student success.

## Organization of the Study

Chapter I introduces reading as a major barrier to successful completion of school for many students. The roles and expectations for secondary school principals continue to grow increasingly complex with literacy at the forefront. The principal must provide leadership in the area of effective literacy implementation to ensure that all students are prepared for the demands of the 21<sup>st</sup> century. The results of this study add to the existing body of research on best practices for struggling adolescent readers by examining the effect of a reading intervention model. The next chapter presents a review of relevant literature on the topic of adolescent reading. The methodology for the research in this study is outlined in Chapter III. The results for nonequivalent control-group design research are presented in Chapter IV. A full discussion of the research study and its conclusions is included in Chapter V.

## CHAPTER II

### REVIEW OF THE LITERATURE

This chapter presents a review of the research and literature surrounding adolescent literacy, with a focus on reading at the secondary school level. The literature review is organized around current practices in the area of adolescent reading, drawing on key studies and the work of adolescent reading researchers. The issues of literacy at the secondary level, expansion of content literacy, adolescent literacy research, role of the teacher in literacy development, secondary reading interventions, and READ 180 efficacy studies are explored in the this review of literature. The literature review process began with the search for recent research on adolescent literacy.

A number of databases were used to examine the application and outcomes of various interventions to address reading problems at the secondary school level and to define promising practices. To locate peer-reviewed studies, electronic databases were explored, including Wilson Web, InfoTrac, ERIC, PSYCINFO, and Dissertation Abstracts. Readings from books, conference papers, and peer-reviewed journals provided a foundation for the literature review on adolescent literacy.

Gaps in the research emerged from the review of literature examining the diverse needs of the struggling adolescent reader and existing research-based interventions aimed at accelerating reading growth at the secondary school level. The review includes literacy studies that are of qualitative, quantitative, and mixed-method designs, with a synthesis of existing research studies of programs yielding significant results with struggling adolescent readers.

## Literacy at the Secondary School Level

Throughout the history of organized schooling in the United States, educators and policymakers have struggled with literacy questions: Who will become literate? In what ways will they become literate? For what purposes will they become literate? (Reutzel, Hollingsworth, & Cox, 1996). The current economic status of the United States has forced legislators to reexamine the goals of literacy development in schools. Almost 40 percent of high school graduates lack the reading and writing skills that employers seek, and almost a third of high school graduates who enroll in college require remediation classes such as noncredit remedial English and remedial math (Achieve, Inc., 2005).

Increasingly, literacy is recognized as the gatekeeper to achievement and opportunity in this global marketplace. College graduates earn 70 percent more than their high school graduate counterparts; high school dropouts are four times more likely than college graduates to be unemployed (Sum, Taggart, McLaughlin, Pond, & Khatiwada, 2001). The failure to develop adequate literacy skills limits career opportunities and preparedness for civic participation (National Governors Association [NGA], 2005).

A 1987 survey conducted by Irvin and Connors (1989) found that by design, most of the nation's schools end systematic reading instruction at the 5<sup>th</sup> grade. The construct of literacy is complex; Moje et al. (2005) asserted that current literacy developmental processes used in schools are based on the premise that learning to read ends in elementary school. It is during the transition from elementary to middle school that students need to shift from *learning to read* to *reading to learn* (Herber, 1978, p. 5). Antiquated systems in public education have perpetuated the notion that middle and high school grades do not need an emphasis on literacy. Swafford and Kallus (2002) supported

the integration of reading and content instruction during the early grades so that students “can learn to read while reading to learn” (p. 14). They asserted that this instructional approach prevents “text shock” as students move to secondary school. Literary needs at the secondary level expand within the various content disciplines, curriculums, and texts (Moje et al.). The new demands of the 21<sup>st</sup> century require new ways of teaching literacy at the secondary level. To explain the need for different strategies, Elkins and Luke (1999) wrote,

Today adolescence and adulthood involve the building of communities and identities in relation to changing textual and media landscapes. They involve finding a way forward in what is an increasingly volatile and uncertain job market, and negotiating a consumer society fraught with risk, where written and media texts are used to position, construct, sell, and define individuals at every turn and in virtually every domain of everyday life, in the shopping mall and the school, online, and face to face. (pp. 6-7)

Despite a growing body of research suggesting that reading must be an instructional focus in all content areas of secondary schools, a prevailing philosophy designates it as the sole responsibility of the reading specialist (Anderson, Hiebert, Scott, & Wilkinson, 1985; Irvin & Conners, 1989). Clearly, reading approaches in secondary schools appear to lag behind reading theory: “Ideally, these schools teach reading, writing, speaking, listening, and thinking as part of an integrated curriculum as these processes relate to content” (Irvin & Conners, p. 311).

Reid Lyon (1998) from the National Institute of Child Health and Human Development estimated, in a speech to the Committee on Labor and Human Resources,

that 60% of the nation's children struggle to learn to read and that reading is a major challenge for at least 20%-30% of students. "If you do not learn to read and you live in America, you do not make it in life" (Lyon, p. 3). The longitudinal data from the National Institute of Child Health and Human Development (NICHD) points to substantial decreases in children's self-esteem and motivation to learn, with detrimental long-lasting effects. It is because of the pervasiveness of reading failure in America's public schools that the NICHD considers reading failure to be a "significant public health problem" (p. 4). Based on the statistics reported by Lyon to the Committee on Labor and Human Resources, until significant changes take place in the traditional high school, many students who leave high school as struggling readers will likely be underemployed and underutilized in society.

To respond to the growing problem of adolescent illiteracy, the United States federal government launched an unprecedented effort to overhaul literacy and overall academic expectations in a new education reform, the No Child Left Behind Act of 2001 (NCLB, 2001). After signing the legislation, President George W. Bush declared,

Today begins a new era, a new time for public education in our country. Our schools will have higher expectations—we believe every child can learn. From this day forward, all students will have a better chance to learn, to excel, and to live out their dreams. (Committee on Education and the Workforce, 2002, p. 1)

Students leaving secondary schools without the literacy skills to be successful in a global community cause a significant economic toll on the United States. Reading achievement, which is required for success in other content areas, has gained national attention due to the glaring economic and social reasons to address the issue. President

George W. Bush created a \$100 million reading-intervention program in 2004 for middle and high school students to address the problem of literacy development (White House Press Release, 2004, p. 5). The President's 2006 budget included \$200 million to support the *Striving Readers* initiative to improve the reading skills of high school students (White House Press Release, 2005). Despite the trend toward an improved literacy focus at the secondary level, this focus has not yet resulted in improved methodology in literacy pedagogy at the secondary level, as evidenced by the ways in which content teachers provide instruction (O'Brien, Stewart, & Moje, 1995). Moats (1999) asserted, "Teaching reading *is* rocket science" (p. 4.). The phrase "every teacher is a teacher of reading" was coined by William S. Gray in 1937. That long established concept of every teacher's being a reading teacher and several decades of content area literacy have not resulted in significant increases in student achievement at the secondary level (Fisher & Ivey, 2005). Barry (2002) found however, that many content teachers resist their role as reading teachers, citing a lack of time, skill, and support.

Adolescents entering the world of work and postsecondary education in the 21<sup>st</sup> century face increased demands to read on a level higher than at any other time in human history (Moore et al., 2005). Despite the increased demands for literacy development, Dr. Carol D'Amico, Assistant Secretary to the Office of Vocational and Adult Education, U.S. Department of Education, described the literacy challenge as a "threat to national economic security" (D'Amico, March 2002, p. 4). She based her position that adolescent literacy is a national threat based on the following: (a) In secondary schools, the levels of achievement, especially for reading and math, decline between grades four to twelve because of the misconception that reading instruction stops after third grade; (b) Many

high school graduates enter college unprepared in reading and math. In community colleges, 40 to 60 percent of freshmen need remedial courses in math and English; (c) Data from international comparisons of 16 to 18 year olds show that even the top ten percent in the United States cannot compete with the top ten percent of 16 to 18 year olds in other industrialized countries; (d) Twenty-five percent leave school without a diploma. Students drop out because they cannot read well enough to do the course work. About 56 percent of Hispanics, African Americans, and students with disabilities do not finish with a diploma four years after they start. They see it as impossible to catch up, so they give up and drop out; and (e) The average eighth grader who is nonwhite and who is from a low-income family reads at three to four grade levels lower than Whites and the more advantaged (D'Amico, March 2002).

#### Expansion of Content Literacy to Adolescent Literacy

Research on adolescent literacy over the past two decades has shifted from the content literacy perspective to a model that contextualizes students' experiences in and outside the classroom environment (Bean, Bean, & Bean, 1999; Gee, 1996; Moje, 2000). Sociocultural theorists have contended that language and literacy are situated contextually and that adolescents are shaped by the way they use literacy tools (Gee, 1996; Moje, 2000). Recent researchers, describing the content literacy approach as too restrictive, have argued that it should be expanded to include adolescent literacy (Alvermann, Hinchman, Moore, Phelps, & Waff, 1998; Bean & Readence, 2002; Elkins & Luke, 1999; Elkins & Luke, 2000; Moje, 2000; Stevens, 2002; Swafford & Kallus, 2002). The adolescent literacy model recognizes multiple discourses and contextual learning environments (Behrman, 2003).

Swafford and Kallus (2002) interviewed key researchers, such as Alvermann, Bean, McKenna, Moore, and Ruddell, regarding their views on the expansion of content literacy. These major literacy researchers have expanded their conceptualization of literacy to include the social and cultural contexts, as well as consideration of the role technology plays in literacy development. This shift from content literacy to adolescent literacy is grounded in situated cognition (Brown, Collins, & Duguid, 1989). Situated cognition recognizes internal and external processes that serve as natural dimensions in new learning (Kirshner & Whitson, 1998). To accelerate literacy development, curriculum writers and teachers are tasked with finding the nexus between adolescents' multiple literacies and the secondary school classroom (Moje, 2000). Hull and Schultz (2001) contended that developing the nexus between school and nonschool literacy and learning is the "democratic impulse of inclusiveness" (p. 602).

The International Reading Association (IRA) Commission on Adolescent Literacy created a position statement on adolescent literacy in 1999 (Moore et al., 2005, pp. 4-9). The position statement helps all stakeholders understand the literacy needs of the adolescent learner. The literacy needs of students entering the 21<sup>st</sup> century are becoming increasingly complex according to the IRA Commission on Adolescent Literacy:

Adolescents will need advanced levels of literacy to perform their jobs, run their households, act as citizens, and conduct their personal lives. They will need literacy to cope with the flood of information they will find everywhere they turn. They will need literacy to feed their imaginations so they can create the world of the future. In a complex and sometimes even dangerous world, their ability to

read will be crucial. Continual instruction beyond the early grades is needed.

(Moore et al., p. 3)

The following statements help define the vision for adolescent literacy and provide a framework for the rights of adolescent readers as recommended by the Commission on Adolescent Reading of the International Reading Association: (a) Adolescents deserve access to a wide variety of reading material that they can and want to read; (b) Adolescents deserve instruction that builds both the skill and desire to read increasingly complex materials; (c) Adolescents deserve assessment that shows them their strengths as well as their needs and that guides their teachers to design instruction that will best help them grow as readers; (d) Adolescents deserve expert teachers who model and provide explicit instruction in reading comprehension and study strategies across the curriculum; (e) Adolescents deserve reading specialists who assist individual students having difficulty learning how to read; (f) Adolescents deserve teachers who understand the complexities of individual adolescent readers, respect their differences, and respond to their characteristics; and (g) Adolescents deserve homes, communities, and a nation that will support their efforts to achieve advanced levels of literacy and provide the support necessary for them to succeed. (Moore et al., 2005, p. 4)

Adolescent reading researchers heralded the adolescent literacy position statement as long overdue (Elkins & Luke, 1999; Kirk, 2000; Rycik & Irvin, 2001). Literacy demands are steadily increasing, not remaining at absolute levels (Snow, Burns, & Griffin, 1998). Students need reading that extends beyond the concept of the reading specialist to “engagement with critical multiliteracies” (Elkins & Luke, p. 213). The literacy complexities of the 21<sup>st</sup> century require a new set of skills. Robert Reich, in his

book, *The Work of Nations: Preparing Ourselves for 21<sup>st</sup> Century Capitalism*, described the skill sets that students need to produce valuable ideas, rather than objects, which were required during the industrial age. The ability to work with multimedia forms of text and information is becoming the requirement for the *symbolic analyst* (Reich, 1992). The symbolic analyst is replacing the industrial worker of the past. Elkins and Luke (1999) expanded the IRA Position Statement on adolescent literacy:

Literacy education has significant social and cultural outcomes, as well as cognitive and behavioral ones. In addition, adolescent literacy education is the very forum where we can shape identities and citizens, cultures, and communities. This is not something we can do by default or as an afterthought. We need to rethink our strategies and approaches in line with a better, stronger understanding of youth cultures and adolescents' everyday lives. (p. 215)

Fifteen critical elements of effective adolescent literacy programs were outlined in the Reading Next (Biancarosa & Snow, 2004) report from the Alliance for Excellent Education. The report outlines fifteen elements that are proven effective to benefit struggling adolescent readers: (a) Direct, explicit comprehension instruction, which is instruction in the strategies and processes that proficient readers use to understand what they read, including summarizing, keeping track of one's own understanding, and a host of other practices; (b) Effective instructional principles embedded in content, including language arts teachers using content-area texts and content-area teachers providing instruction and practice in reading and writing skills specific to their subject area; (c) Motivation and self-directed learning, which includes building motivation to read and learn and providing students with the instruction and supports needed for independent

learning tasks they will face after graduation; (d) Text-based collaborative learning, which involves students interacting with one another around a variety of texts; (e) Strategic tutoring, which provides students with intense individualized reading, writing, and content instruction as needed; (f) Diverse texts, which are texts at a variety of difficulty levels and on a variety of topics; (g) Intensive writing, including instruction connected to the kinds of writing tasks students will have to perform well in high school and beyond; (h) A technology component, which includes technology as a tool for and a topic of literacy instruction; (i) Ongoing formative assessment of students, which is informal, often daily assessment of how students are progressing under current instructional practices; (j) Extended time for literacy, which includes approximately two to four hours of literacy instruction and practice that takes place in language arts and content-area classes; (k) Professional development that is both long term and ongoing; (l) Ongoing summative assessment of students and programs, which is more formal and provides data that are reported for accountability and research purposes; (m) Teacher teams, which are interdisciplinary teams that meet regularly to discuss students and align instruction; (n) Leadership, which can come from principals and teachers who have a solid understanding of how to teach reading and writing to the full array of students present in schools; and (o) A comprehensive and coordinated literacy program, which is interdisciplinary and interdepartmental and may even coordinate with out-of-school organizations and the local community. (Biancarosa & Snow, 2004, p. 12)

Biancarosa and Snow (2004) recommended that the implementation of a secondary reading intervention should include at a minimum professional development, formative assessment, and summative assessment. The professional development and

assessment components are essential for sound instructional effectiveness and monitoring.

### Reading Research

The United States Congress charged the Director of the National Institute of Child Health and Human Development (NICHD) in 1997 to convene a national panel to assess the status of research-based knowledge, including the effectiveness of various approaches to teach children to read (National Reading Panel, 2000, p. 1). The National Reading Panel consisted of 14 representatives of postsecondary institutions, reading teachers, school administrators, and parents. The panel developed standards for an extensive review of research literature, adopting evidence-based methodological standards to determine the efficacy of research conducted on existing reading interventions. The panel examined approximately 115,000 experimental and quasi-experimental studies that had been conducted since 1966. Studies included in the meta-analysis were experimental in design, showed causality between practice and outcomes, and used large sample sizes to examine effectiveness of “behaviorally based interventions, medications, or medical procedures proposed for use in the fostering of robust health and psychological development and the prevention or treatment of disease” (National Reading Panel, 2000, p. 5). The panel summarized their conclusions in five areas: (a) alphabets (phonemic awareness and phonics instruction); (b) reading fluency; (c) reading comprehension (vocabulary, text comprehension, teacher preparation); (d) teacher education; and (e) computer technology and reading instruction. The National Reading Panel research and findings served as a basis for much of the No Child Left Behind Act of 2001.

The National Reading Panel (2000) highlighted phonemic awareness based on correlational studies indicating phonemic awareness and letter knowledge as the primary predictors of how well children will learn to read with 2 years of instruction. The panel defined phonemic awareness as the child's ability to focus on and manipulate phonemes in spoken words. The specific phonemic awareness skills examined in the study included phoneme isolation, identification, categorization, blending, segmentation, and deletion (International Reading Association [IRA], 2002). Based on a meta-analysis of 52 studies, the panel concluded that the research findings supported the premise that teaching children to manipulate phonemes systematically will significantly improve their reading and spelling abilities.

The meta-analysis of 38 studies, which resulted in 66 treatment-control group comparisons, provided significant evidence that phonics instruction, or linking sounds to letter symbols and combining them to make words, produces significant results for children kindergarten through 6<sup>th</sup> grade and for readers having difficulty learning to read. Based on strong evidence collected to support that methodology, the panel recommended tailored systematic phonics implementation as an appropriate strategy for routine classroom instruction, that is, teaching a planned sequence of phonics elements rather than highlighting elements as they appear in text (IRA, 2002, p. 6). The National Reading Panel (2000) noted that the effect of phonics instruction depends on the type of instruction. The panel concluded that synthetic phonics, larger unit phonics that blend subparts of words and phonemes, and miscellaneous systemic phonics programs were the most effective pedagogies.

With regard to reading fluency, the panel concluded that guided oral reading with feedback has significant positive impact on word recognition and comprehension based on 16 studies that met the criteria for inclusion in the National Reading Panel meta-analysis. Conversely, the panel was unable to determine from the extensive review of literature whether or not silent reading results in improved reading fluency. Recognizing that there is a close relationship between fluency and comprehension, the panel recommended that silent reading be combined with other types of reading instruction for effective pedagogy.

The panel analyzed the research on reading comprehension, or the construction of meaning, from three perspectives: vocabulary development, text comprehension instruction, and teacher preparation in comprehension strategies instruction. The panel examined more than 20,000 research citations on reading comprehension but was unable to conduct a meta-analysis because most of the research did not meet the National Reading Panel research methodology criteria. Based upon a *trends-across-studies* analysis, the panel recommended that instructional methods include a combination of methods for increased effectiveness, including the teaching of vocabulary directly and indirectly in context. Additional effective instructional methodologies mentioned by the panel included repetition, multiple exposures to vocabulary words, and use of computer technology. Based on 205 studies that did meet the National Reading Panel research criteria, the panel concluded that teachers should use a combination of methods to meet the needs of students. The needs of struggling adolescent readers are varied and need a variety of methods to effect change. The panel narrowed 16 categories of text

comprehension instruction to 7 that had solid scientific bases for instruction: (a) comprehension monitoring, (b) cooperative learning, (c) use of graphic organizers, (d) question answering, (e) question generation, (f) story structure, and (g) summarization (National Reading Panel, 2000, p. 15).

The panel concluded that research regarding the use of computer technology to teach reading was inconclusive, but suggested that it is possible to teach reading using computer technology. The panel noted that hypertext-highlighted text, speech-to-computer-presented text, and word processing software might be useful instructional approaches for effective reading instruction. The panel recognized the potential of computer technology for reading instruction based on the meta-analysis of seven studies that were reviewed (National Reading Panel, 2000).

The conclusions drawn by the National Reading Panel were broad, based on a wide range of reading research. The panel's suggestions of applying phonemic awareness, phonics, vocabulary development, fluency, and reading comprehension strategies stirred controversy in the reading research community. Garan (2005), wrote in *Phi Delta Kappan*,

Instead of an evidence-based guide that can inform practice in reading, instruction, we are faced with a biased report characterized by misreported, over generalized findings that do not inform but rather mandate education policy—ironically—in the name of science. (p. 438)

There was strong debate regarding the limitation of using only studies that were experimental in design. The panel did not select qualitative research studies that were descriptive, observational, or correlational (National Reading Panel, 2000). The omission

of such qualitative studies also fueled the controversy in the educational research community regarding the National Reading Panel report, including the scientific meta-analysis methodology (Camili & Wolfe, 2004).

Strengths of the meta-analysis research study included the magnitude of the study and the high standard for research methodology criteria, which were similar to the research criteria often used to determine efficacy of medical interventions. The panel excluded qualitative studies from the review, however, thereby drawing criticism from many in the educational community. Nevertheless, classroom teachers can benefit from the panel's recommendations regarding strategies that hold the most promise for specific types of learners. Potential weaknesses of the work conducted by the National Reading Panel included the small samples involved in some of the studies and the overgeneralization of findings (Garan, 2005). Prior to implementing interventions outlined in the panel's report, school administrators and teachers need to carefully study the populations upon which the research was based. Researchers such as Allington (2005) argued that "almost every curriculum scheme works in some sites, and none has ever worked well everywhere. That has been the finding time after time when state and federal educational initiatives have been evaluated" (p. 467). Despite the criticisms of the National Reading Panel report, research is vital for improving the teaching of reading, particularly for those students who continue to struggle with reading in secondary school. The panel's meta-analysis report includes a number of research-based strategies with compelling evidence to suggest pedagogical effectiveness when implemented appropriately. The panel's conclusions provide a framework for reviewing additional reading studies.

## Role of the Teacher in Literacy Development

Sturtevant and Linek (2003) conducted a cross-case analysis to explore the perspectives of nine content area middle and high school teachers from the Mid-Atlantic and Southwestern regions of the United States; these teachers, who were considered to be “outstanding” in their respective discipline areas, used a variety of literary practices, according to their principals and supervisors. Interview techniques were used to explore their instructional beliefs as well as their decision-making techniques, with attention to the impact on literacy.

Principals and supervisors were asked to nominate teachers who had earned the distinction of being excellent in their content area. From a pool of 24 nominees, 9 teachers were chosen to participate in the study based on congruence among the nominator’s perception, the immediate supervisor’s perception, and the teacher’s instruction during an observation (Sturtevant & Linek, 2003).

A qualitative approach using ethnographic techniques was used to gather and analyze data, along with a cross-case analysis to compare and contrast teacher responses. Data were collected through two 1-hour interviews with each participant. Interview questions related to the teacher’s description of his or her teaching situation, the school and community context, the types of instruction used, the types of reading, writing, and discussion used, and the teacher’s rationale for instructional choices (Sturtevant & Linek, 2003).

Two major themes were uncovered from the data collected in the cross-case analysis. The nine teachers consistently believed that students should be engaged in the learning process, with a link across content disciplines, based on a true conviction that all

students can learn. The nine teachers also believed that it was important to make the curriculum relevant by linking it to real world applications and the goal of creating lifelong learners. Another essential component that emerged from the study was the need to establish rapport with students. A sixth-grade teacher said,

The first thing I like to try to do is create a good rapport with the kids.... I have tried real hard to create a risk-taking environment where the kids were comfortable with answering. And if someone said a wrong answer I tried very hard to take them in another direction and not make a big deal out of it so that they wouldn't be afraid to speak out and try. (Sturtevant & Linek, 2003, p. 78)

The second major theme from the study related to the influences identified by the teachers as affecting their instructional decisions. The nine teachers were acutely aware that their perceptions of their own past and current experiences affected their teaching. All of the teachers believed they were affected by contextual conditions such as curriculum regulations, administrative support, availability of materials, and time constraints; however, these conditions impacted the teachers in different ways. Consistently, the nine teachers exceeded their district's expectations for formal and informal professional development activities. Many were involved in a wide range of professional development activities (Sturtevant & Linek, 2003).

The concept of "lifelong" learning was a recurrent theme across the responses of participants in this study to determine the instructional beliefs and decisions of secondary teachers successfully blending literacy and content. This belief in lifelong learning was also evident in the teachers' professional lives as each was engaged in ongoing professional development. "The teachers in this study seemed to take a decidedly

‘professional’ stance: they cared deeply about students and learning, and they worked actively to improve their own learning and design a learning environment that would meet their students’ needs” (Sturtevant & Linek, 2003, p. 86).

Further research regarding instructional influences will expand the knowledge base of classroom and school culture as it relates to school improvement. This study provides valuable themes of support for the instructional decision-making model of secondary teachers that influence student literacy and learning. Certainly the small number of teachers ( $n = 9$ ) in the study is a limitation with regard to generalization. A wider sampling of teachers’ beliefs regarding literacy and learning will fill a research void in these times of increased accountability to ensure learning for all students. Teacher preparation was a key component of the landmark National Reading Panel study (National Reading Panel, 2000). The panel recommended further research on effective components of teacher preparation related to comprehension instruction.

### Secondary Reading Interventions

#### *Talent Development Program*

Research scientists from the Center for Social Organization of Schools at Johns Hopkins University conducted a 2-year study, between 1999 and 2001, in high-poverty schools in Baltimore and Philadelphia; the study was designed to measure achievement effects of the Talent Development High School ninth-grade instructional interventions in the areas of reading and mathematics (Balfanz, Legters, & Jordan, 2004). The quantitative study involved multiple regression analyses of standardized test and survey data from the experimental and control schools. The researchers were interested in studying the effects of the Strategic Reading course, which was designed to accelerate

reading skills for students entering high school reading multiple years behind grade level. The researchers were also interested in assessing the effects of the Transition to Advanced Mathematics course. Students in the experimental and control schools were administered the abbreviated version of the CTBS 5-Terra Nova achievement test in reading and mathematics in February and May, along with a short survey (Balfanz et al., p. 14). There were 140 and 257 participants, respectively, in the math and reading components of the experimental group. The control group contained 233 and 200 participants, respectively, in the math and reading components of the study. The researchers also compared the attendance rates and eighth-grade CTBS standardized test results of students in the experimental and control schools to those of all students ( $N = 6,636$ ).

The purpose of the Talent Development High School Ninth-Grade Instructional Program was to accelerate students with academic deficits by providing double doses (90 minutes daily for the full academic year) of research-based courses in math and English (Balfanz et al., 2004). The teachers of these courses, who had engaged in intensive and sustained professional development, shared a common planning time. Ninth-grade students selected to participate in the program were physically located in a separate part of the school building, which was designed for the Ninth-Grade Success Academy.

The main study was conducted in three nonselective public high schools in the city of Baltimore, using three matched control schools. Students in the control and experimental schools received a double dose of mathematics and English instruction. The control schools designed their own courses, with an emphasis on preparing students for the Maryland State Functional Writing and Mathematics tests. Students in the

experimental settings were provided the Talent Development instructional interventions in reading and mathematics.

The pretest, posttest, and match-control comparisons suggested educationally substantive achievement effects in the experimental settings of the Talent Development High School program in Baltimore. The achievement effect size for the eighth-grade September-to-May gain was .28 for reading ( $n = 257$ ) and .18 for math ( $n = 140$ ). The math and reading coefficients of 11.75 and 9.20, respectively, were significant at  $p < .05$ . The regression equations for the experimental group also indicated a positive effect for improved attendance and being on grade level according to age (Balfanz et al., 2004).

The findings in the Philadelphia study were similar to the Baltimore outcomes, with students in the experimental settings outperforming the control schools on the Stanford 9 Achievement Tests in mathematics and reading. The experimental group had effect sizes of .26 and .52 for reading and mathematics scale scores, respectively. All students in the experimental group obtained higher reading and mathematics scale scores on achievement tests, compared to the scores of the control group. Supplemental surveys administered to students also indicated that a higher percentage of students in the experimental settings reported learning new skills, strategies, and concepts. Moreover, on the teacher satisfaction survey, teachers in the experimental setting reported a higher degree of satisfaction with the curriculum and real-world strategies (Balfanz et al., 2004).

Compared to students in the control groups, students who received the Talent Development High School ninth-grade instructional interventions demonstrated significant reading and mathematics achievement gains, when controlling for their prior achievement, attendance, age, and gender. The main implication derived from this study

is that students who attend high-poverty schools can achieve significant gains in the areas of mathematics and reading when a focused curriculum is taught by highly trained teachers (Balfanz et al., 2004).

A significant strength of the research was the use of a high-poverty setting for the Talent Development intervention study. The researchers experienced a number of methodological problems with the implementation of the study; for example, two of the four schools selected for the study abruptly dropped out of the study at the last minute. The principals dropped out of the study due to pressure from state reconstitution officials who favored traditional state preparation methods. An additional high school joined the study after the school year had begun. The English and mathematics department chairs at one of the experimental schools did not embrace the Talent Development intervention model; their lack of enthusiasm might have had a negative impact upon the study. Nevertheless, the results indicate effectiveness of the strategies in less than ideal conditions. Despite implementation challenges, the results revealed positive gains for students in the experimental schools (Balfanz et al., 2004). Replication studies are necessary to determine if the same effects will be noted in settings other than high-poverty schools. An analysis of the data disaggregated by subsets will be helpful to determine which students benefit from the interventions. Additional study will be necessary to determine the type of interventions that might help the subset of students who did not experience achievement gains with the Talent Development interventions.

The study on the implementation of the Talent Development High School instructional interventions has significant implications for addressing the need for effective secondary reading interventions. The study demonstrated that acceleration

strategies can significantly increase student achievement by addressing the remedial needs of high school learners in two key areas: reading and mathematics. Although the implementation of the instructional strategies did not result in all students' being at grade level, an expansion of the acceleration strategies to higher grades will afford students an opportunity to continue their learning and take advantage of additional rigorous high school offerings (Balfanz et al., 2004).

### *Peer-Assisted Learning*

Research conducted by Fuchs, Fuchs, and Kazdan in 1999 examined a peer-assisted learning approach, which was originally designed to help elementary students, to determine whether or not the strategies might be effective in improving secondary-level students' literacy development. The researchers also studied how the peer-assisted learning (PALS) approach influenced student beliefs about reading. The elementary PALS pedagogy incorporates verbal interaction and feedback between tutors and tutees with reciprocity of roles. Learning disabled, low-achieving, and average-achieving students at the elementary level have shown significant gains in reading fluency and comprehension in studies conducted by Fuchs, Fuchs, Mathes, and Simmons (1997) to determine the efficacy of the instructional approach with high school students. Eighteen special education and remedial reading high school teachers in 10 high schools in a metropolitan southeastern school district were participants in the study. The experimental group of students was exposed to PALS activities five times every 2 weeks for 16 weeks. The control group of students received reading instruction using a conventional approach that did not incorporate peer-mediated strategies (Fuchs, Fuchs, & Kazdan, 1999). PALS participants were exposed to Partner Reading with brief retellings, Paragraph Shrinking,

and Prediction Relay (Fuchs et al., 1999). Partner Reading was structured to improve students' reading accuracy and fluency. Students participated in oral reading for 5 minutes, followed by 10 minutes of sustained reading. Paragraph Shrinking required students to read sections of text and identify the main idea. Prediction Relay required students to formulate and predict outcomes. The teachers of the students in the experimental group were assigned a research assistant to serve as a consultant to the teacher during the study; professional development was provided for both the teacher and the assistant. Teachers and research assistants met once every week for 5 to 10 minutes for feedback (Fuchs et al., 1999).

To designate research participants for outcome measurement, teachers identified all students with reading instructional levels appropriate for Grades 2 through 6. The Comprehensive Reading Assessment Battery (CRAB) was administered individually to assess literary development. To correlate test-retest reliability, the Reading Comprehension portion of the Stanford Achievement Test was used, resulting in a range between .93 and .96. A questionnaire was administered in a whole-class format to sample students' beliefs and attitudes along three dimensions: reading in general, working hard to become a better reader, and working with other students. An analysis of variance (ANOVA) was conducted on each questionnaire item. Effect size calculations were derived using differences between means, divided by the pooled standard deviation (Fuchs et al., 1999).

The research assistants, who were trained in standard administration, administered the CRAB individually to each participant in the experimental and control groups, before and after the 16-week treatment. Student questionnaires also were administered by the

research assistants following the treatment. Using the CRAB results, the researchers conducted a one-way ANOVA (treatment: PALS vs. contrast). In general, the study resulted in mixed findings. Students in the PALS treatment group improved their reading comprehension scores, producing a moderate effect size of .34 standard deviations, thereby indicating better reading growth among PALS students. These results indicate that PALS, compared to conventional reading instruction, effected significant reading comprehension growth among struggling high school readers. Participants' reading fluency, as measured by the number of words read correctly, failed to improve differentially as a function of PALS participation. The lack of improvement in reading fluency was in direct contrast to the PALS findings in studies involving elementary-level students; those studies found significant and sizeable effects (Fuchs et al., 1997). Participants' beliefs about their desire to improve reading were not positively influenced by PALS (Fuchs et al., 1999). Students in the experimental PALS group did report working harder to improve their reading skills.

The overall findings of the PALS study conducted with high school students suggest it as a possible strategy for accelerating reading development of students presenting with reading levels between second and sixth grade. The PALS experimental group demonstrated a moderate reading comprehension effect size of .34 standard deviations; however, PALS participants did not demonstrate significant growth in reading fluency when compared to the control group. PALS participation did not affect student beliefs regarding reading. The researcher suggested that additional studies be conducted to determine methods of improving reading fluency and developing effective strategies for secondary nonreaders (Fuchs et al., 1999).

The PALS study was effective in describing the pedagogy utilized to help students at risk of school failure improve their reading skills. Use of random assignment would have strengthened the efficacy of the study. It is difficult to draw conclusions from the survey administered to assess students' beliefs in an objective or quantifiable manner because the researchers did not survey students' beliefs prior to treatment, nor did they discuss the reliability of the postsurvey. Although no significant differences were noted between the PALS and control group students in their responses to questionnaires after treatment, a comparison between pretest and posttest results might have shown a significant difference in students' beliefs. A relative strength of the study was the use of research assistants, who had been trained in the standardized testing procedures, to provide feedback to teachers as part of the ongoing professional development aspect of the study. The researchers suggested a need for additional studies to examine methods for improving reading fluency and increasing motivation for struggling readers.

The findings of the study showed that the PALS strategies did significantly improve reading comprehension skills for high school students who were 3 to 7 years behind grade-level expectations. Specifically, reading comprehension improved when students received opportunities to practice skills in retelling, summarizing, and predicting as they read (Fuchs et al., 1999). The PALS approach holds promise for many high school educators who are looking for research-based approaches to improve the comprehension facet of reading development, which is delayed for many struggling readers. Although the PALS strategies did not have a positive impact on reading fluency or student motivation to improve reading skills, the study is important in that it highlights

specific methods and strategies to address the reading problems facing some struggling high school readers.

*America's Choice Literacy Program*

The Consortium for Policy Research in Education studied the effects of a school-based coaching model in a national sample, using teacher and coach observation coupled with post observation interviews. The theoretical design for the coaching model represents a nexus between an in-class technical coaching model and group professional development (Poglinco et al., 2003). In the design established for schools designated as *America's Choice* schools, experienced coaches delivered the literacy coach model by conducting literacy workshops, described as readers' and writers' workshops, for teachers. Poglinco et al. wrote, "The workshops feature elements on phonics, oral language, shared books, guided reading, independent reading, daily writing instruction, and independent writing" (p. 4). The purposes of the system developed by the Consortium for Policy Research in Education were to produce standards-based instruction in classrooms and to ensure that all students met the standards (Poglinco et al.).

Poglinco and a team of researchers in 2003 visited *America's Choice* schools across the country and collected data on teachers' and coaches' implementation of the *America's Choice* literacy workshops and professional development activities. Six geographic regions, California, the District of Columbia, Georgia, Illinois, New Jersey, and New York, were selected for the study. The regions included urban and rural school districts. A random sample of 27 elementary and middle schools was selected for three day-and-a-half reviews. Observations from the 27 schools were analyzed according to

common themes to enable the researchers to test the theory of action related to the professional development aspect of the literacy coach model. Observations of teachers and coaches were rated according to an implementation scale developed by *America's Choice*, in conjunction with post observation interviews.

Substantial deviation in the administration of the coach design implementation was noted among the 27 elementary and middle schools. To study the fidelity of the implementation, the researcher conducted 65 observations of teachers and literacy coaches in site visits. Variation in process ranged from complete fidelity in four of the schools to extensive deviations in the implementation of the coach model (Poglinco et al., 2003).

Data revealed that 25% of the teachers' and literacy coaches' classes implemented a partial rollout of the workshop structure, whereas 51% and 55% of the teachers and coaches, respectively, exhibited strict adherence to the workshop structure during the rollout. In just over 10% of the classes, both teachers and literacy coaches fully implemented the writers' workshop strategies. No statistical difference between the teachers and literacy coaches ( $p = .83$ ) was found when a Fisher's Exact Test of Differences in the distributions was calculated. The findings indicate that coaches and teachers were implementing the workshops with the same fidelity after 1 year of implementation. A significant correlation between teacher and coach ratings within the same schools was found ( $r = .75, p < .0001$ ), thereby suggesting a relationship between the quality of the coaches' implementation of prescribed strategies and the teachers' ability to implement the strategies (Poglinco et al., 2003). The strength of the degree of

implementation of strategies was found to be dependent on the coaches' ability to model the new strategies for the classroom teacher.

The strength of the Consortium for Policy Research in Education study lay in the fact that national sampling techniques were used. During the observation phase of the study, there were concerns regarding the fidelity to the workshop strategy implementation: 62% of the observations were rated as valid on the implementation scale, whereas 10% of the observed lessons had no resemblance to the targeted design. The major themes in the study related to reading improvement via a coaching model included modeling instruction, leading teacher meetings, and facilitating study groups. The authors noted that coaching was gaining popularity as a model in school districts across America. Poglinco et al. (2003) indicated that the evidence to support the coaching model's success was primarily anecdotal, with a small research base: "Few, if any, studies provide evidence that coaching strategies, in whatever form, lead to greater student learning" (p. 2).

### Computer-Assisted Reading Programs

There are a number of existing computer-based reading interventions aimed at improving the reading achievement of secondary students. The review of literature examines Merit software, Scientific Learning's *Fast ForWord*, Peabody Literacy Lab, and Scholastic's Read 180.

#### *Merit Reading Program*

Jones et al., (2004) conducted a quasi-experimental study to evaluate the effects of using the Merit Reading Software with middle school students during the winter of 2003 at Calhoun County Middle/High School in West Virginia. The No Child Left

Behind Act of 2001 has served as an impetus for software companies to update and design skill intervention programs such as the Merit software (“NCLB Dominates at FETC,” 2003). The Merit Software’s comprehensive skills intervention program is designed for students in Grades 3 through 12. The program has modules in reading, grammar, spelling, math, problem solving, writing, and critical thinking, which are based on a constructivist model to help students connect concepts and conceptualize information differently using a self-paced approach. The software is designed to provide teachers with feedback regarding student performance to facilitate rapid responsiveness in meeting the immediate instructional needs of students. Merit Software programs are based on the tenets that students should learn to connect concepts, solve unfamiliar problems, communicate ideas, and apply facts and skills (Jones et al.).

The 2000 U.S. Census reported that approximately 37% of the children under 18 years of age in Calhoun County lived below the poverty line and that 28% of the persons over age 5 lived with disabilities. For the study, students were placed into eight heterogeneous classrooms in Grades 6 and 8 (four per grade level). Teachers selected the classes that would constitute the experimental group receiving the Merit reading treatment, as well as the classes that would serve as the control group. The experimental group consisted of 116 students in three sixth-grade and three eighth-grade reading and language arts classes; the control group consisted of 35 students in one sixth-grade and one eighth-grade class (Jones et al., 2004).

The intervention consisted of students’ having access to time on computers for two 45-minute sessions per week for 4 weeks, covering an average of 360 minutes. Using a nonequivalent control group design, a pretest and a posttest were administered to both

the experimental and control groups, without pre-experimental sampling equivalence, using mixed models to measure achievement growth over time. Scores from the Stanford Achievement Test, 9<sup>th</sup> Edition (SAT-9), administered during the 2002 and 2003 school years, were analyzed for both the treatment and control groups (Jones et al., 2004).

The results of the Merit Reading Software Program study indicate that computer-based instruction, as implemented in Calhoun County Middle/Senior High School, can significantly improve the reading achievement scores for middle school students, as measured by standardized tests. Significant and positive coefficients were observed in seven of nine SAT-9 dependent variables: Reading Vocabulary, Reading Comprehension, Math Problem Solving, Math Procedures, Language Expression, Science, and Social Science. Participants in the Merit group demonstrated increased growth in SAT-9 Reading Vocabulary by 13.1% of the total sample mean score of 20.72. This represents an increase, on average, of 2.77 points. The Merit demonstrated increased achievement in Reading Comprehension by 10.5% of the sample mean score of 35.04, or 3.67 points. The experimental group also gained an average of 1.67 points on the SAT-9 Language Expression component (Jones et al., 2004).

Jones et al. (2004) concluded that participation in Merit software interventions yielded higher average scores on the Stanford Achievement Test, with achievement gains noted for each of the dependent variables measured. The experimental group had statistically significant and positive regression coefficients on the SAT-9. Reading comprehension grew by 3.67 grade level points over the control group. The results suggest that participation in Merit interventions will yield higher average scores on high-stakes standardized testing.

Findings from the Merit Software study support the use of technology to accelerate student achievement, as measured by the SAT-9, in the areas of reading vocabulary, reading comprehension, math problem solving, math procedures, language mechanics, language expression, spelling, science, and social studies. The study offers school officials a research-based software approach that can be used to accelerate remediation of students who are struggling to meet the demands of student achievement standards required by the NCLB Act.

The use of regression coefficients to measure students' achievement growth resulting from their participation in the treatment group was a relative strength of the Merit study. The researchers measured at three levels: within students for repeated measures, between students, and between Merit and non-Merit groups. A true experimental design, with stratified sampling and random assignment for the major subgroups as outlined in NCLB legislation, might strengthen the efficacy of future Merit software studies (Jones et al., 2004).

#### *Fast ForWard Reading Intervention*

*Fast ForWard*, developed by Scientific Learning, was introduced in 1997 to improve the language and reading skills of elementary and middle school students who demonstrate auditory temporal processing difficulties. The CD-ROM and Internet-based program is designed to develop the auditory temporal processing, speech, and language comprehension skills. *Fast ForWard* is an intensive program, requiring two hours daily of computer work. There are seven exercises, including sound/phoneme games and three language games designed to increase remedial language skills. A National Field Trial (Miller, S., Merzenich, M., Tallal, P., Devivo, K., & Linn, N., 1999) was conducted using

a randomized control group, with a sample of 400 students in 19 public schools. The Clinical Evaluation of Language Fundamentals (CELF-3) comprehensive test was used to measure receptive and expressive language skills. The findings revealed significant gains in language fundamentals after *Fast ForWord* Language training. Both their listening and speaking skills improved and moved into or near the average range. Twenty percent of the sample scored at or above the standard mean on the CELF-3 expressive test and 27% on the CELF-3 receptive test.

#### *Peabody Literacy Lab*

Research conducted by Hasselbring and Goin (2004) at the Peabody Literacy Lab suggests that technology can play a significant role in the literacy development of older struggling readers. An instructional intervention model, which infused presentation of new content or skills, guided practice, feedback, and independent practice, was implemented in a middle school in Orange County, Florida. The researchers examined several models of reading acquisition to develop a conceptual framework for translating reading theories into skill development. Recoding, which is the process of transforming the spellings of words into sounds, and sight-word reading, which involves the recognition of words by memory retrieval, were defined in the reading models (Hasselbring & Goin).

Hasselbring and Goin (2004) cited the reading theories presented by Ehri (1992), describing how children use recoding and sight word memory to read words with fluency. According to Ehri, children experience three distinct reading phases as they mature as readers. In the first phase, visual cue reading, children develop arbitrary relationships between words and meanings. In the second phase, phonetic cue reading, children make

visual phonological associations with letters and sounds, providing an opportunity for them to read unfamiliar words. In the last phase of development, children progress to sight-word learning, described by Ehri as cipher reading. This stage of development involves significant phonological recoding skill, which children use to develop meaning from visual representations. Students at this stage of development have an effective understanding of the phonemic system.

Ehri (1992) theorized that poor readers do not learn to recode words correctly in the second stage of development and, therefore, remain at risk because of their inability to make systematic visual-phonological associations. Readers must develop substantial visual-phonological associations in order to progress in fluency. The lack of visual-phonological development creates barriers for struggling adolescent readers as they progress through middle school and high school. Hasselbring and Goin (2004) found that phonological awareness consistently differentiated good and poor readers.

Hasselbring and Goin (2004) created an instructional model based on the significance of phonological awareness, orthographic knowledge in the field of reading, and a growing body of evidence regarding media-enhanced learning environments. Studies conducted by Matthew in 1996 indicated that changing from print to electronic text did have an impact upon student reading comprehension. Multisensory technology environments and increased student motivation to read electronic texts enhanced students' reading comprehension. Building on the growing body of research regarding the ways in which media-enhanced environments affect learning, researchers at the Peabody Literacy Lab combined reading theory and technology pedagogy to study its impact on literacy (Cognition and Technology Group at Vanderbilt University, 1994). Using

research conducted at the Peabody College of Vanderbilt University, an instructional model consisting of word recognition, decoding, spelling, and reading comprehension, was developed using video anchoring and technology to monitor student progress. Students received “anchored instruction” in three areas that were metaphorically described as the “Traditional reading remediation, Word Lab, and Spelling Lab” (Hasselbring & Goin, p. 133).

To assess the effectiveness of the Peabody Literacy Lab (PLL), the researchers conducted a study in Orange County Public Schools in Florida. Sixty-three students from three middle schools received instruction in the Peabody Literacy Lab for 30 minutes per day for the entire school year. The teaching was based on anchored computer-based instruction using an animated tutor who guided the student and provided oral feedback to him or her. Sixty-two students not receiving instruction in the PLL constituted the control group. The Stanford Diagnostic Reading Test (SDRT) was administered in the fall and spring to both the experimental (PLL) and control students. Separate 2 x 2 analyses of variance for repeated measures were conducted to analyze the data for each SDRT subtest. Hasselbring and Goin (2004) reported that significant interactions between type of instruction and time of test were found for Auditory Vocabulary ( $F[1,89] = 14.70, p < .0001$ ), Literal Comprehension ( $F[1,92] = 7.83, p < .01$ ), Inferential Comprehension ( $F[1,92] = 4.52, p < .05$ ), and Total Reading Comprehension ( $F[1,92] = 11.37, p < .001$ ). No significant interactions were found for Phonetic Analysis or Structural Analysis. *T*-tests for paired samples on gain scores of the literacy group for each subtest were significant for Auditory Vocabulary ( $t [52] = -3.67, p < .001$ ), Literal Comprehension

( $t [56] = -3.63, p < .001$ ), Inferential Comprehension ( $t [56] = -2.13, p < .05$ ), and Total Reading Comprehension ( $t [56] = -4.53, p < .001$ ). The three experimental teachers remarked that the gains were remarkable for their students because most had lost ground each year on standardized reading tests.

The study of the reading gains following the Peabody Literacy Lab interventions suggests that the treatment is a viable means to accelerate reading growth for struggling adolescent readers. The achievement gains shown by the experimental group in the study are impressive and warrant additional study. A replication of the study to examine the impact of computer software to improve student achievement is warranted. Another possible variable for study is the aspect of motivation that is often witnessed when students are provided opportunities to use technology in their work.

In sum, the Peabody Literacy Lab uses a growing body of empirical research to identify factors that limit students' reading growth over time. Possible factors include weaknesses in phonological awareness, phonological memory, and the rate of phonological progression (Hasselbring & Goin, 2004). The study conducted by Hasselbring and Goin combined research-based literacy strategies and a technology platform to provide students a new instructional approach for making connections from written text by developing fluency in what they learn about letter-sound combinations. The researchers reported being "guardedly optimistic about the future of multimedia applications, such as the Peabody Literacy Lab" (Hasselbring & Goin, p. 141).

The findings in the Peabody Literacy Lab study indicating that phonological awareness distinguishes good and poor readers are significant in the research with regard to possible approaches appropriate for struggling adolescent readers. The researchers

reported significant gains in reading achievement when *anchored instruction* was used as an intervention to guide student practice, review, and feedback. The significant interactions found between this type of instruction and a number of dependent variables, including Auditory Vocabulary, Literal Comprehension, Inferential Comprehension, and Total Comprehension, as measured by the Stanford Diagnostic Reading Test, offer promise for this instructional process as a strategy for increasing reading skills for struggling adolescent readers.

### *READ 180 Studies*

READ 180 is designed to provide an instructional environment to support students' individual differences in linguistic and conceptual development (DeVivo & Aguhob, 2004). The authenticity of the setting and activities is viewed as essential in the Multimedia environments that Organize and Support learning through Teaching (MOST) model, which is the basis for the READ 180 program. DeVivo and Aguhob wrote, "MOST environments are effective because they engage students in authentic tasks that place the students in the position to create interesting and important multimedia products that teach their peers, parents and others about important life topics" (p. 41). The model supports increased literacy, cognitive, and technology skills, which are all essential for high school and beyond.

The READ 180 theoretical framework is grounded in situated cognition theory. READ 180 researchers have asserted that the situated cognition theory is a practical framework that places value on the context, cognition, and authenticity of the design (Brown, Collins, & Duguid, 1989; DeVivo & Aguhob, 2004). Key researchers in the literacy field have indicated a need to shift from a reading-in-the-content-area model to a

model that values multiple discourses, contexts, and text sources in authentic settings (Alvermann, Hinchman, Moore, Phelps, & Waff, 1998; Bean & Readence, 2002; Elkins & Luke, 1999). READ 180 researchers (Cognition and Technology Group, 1990) have contended that the program enhances the new vision for literacy development. In situated cognition theory, the context of learning is not a controlling variable, but rather the context establishes the intrinsic nature and viability of learning. Situated cognition values both internal and external processes (Kirshner & Whitson, 1998); this concept is juxtaposed with cognitive theory, whereby learning is viewed as an individualized, intrinsic function (Brown, Collins, & Duguid). In the READ 180 model, learning is anchored in apprenticeship training, creating real-world experiences to help students make connections between experiences in the classroom and the community.

The READ 180 program is based on research conducted in 1985 at the Peabody Learning Lab by Dr. Hasselbring and Laura Goin of Vanderbilt University (Scholastic Read 180, 2004). Hasselbring and a team of researchers with the Cognitive and Technology Group at Vanderbilt University were interested in the role technology could play in accelerating learning for students with mild disabilities.

Hasselbring (2004) and his team of researchers concluded that the following factors created barriers to reading success: (a) a lack of decoding skills and reading fluency; (b) poor comprehension due to inability to form mental models, lack of vocabulary, and limited background knowledge; (c) an inability to process and understand grade-level content-area text with a high concentration of academic language; and (d) low motivation and lack of connection to materials and schools.

READ 180 was designed to address the needs of struggling readers as identified by Hasselbring (2004) and the team of researchers. The goal of the research team was to use technology for individualizing instruction to meet the needs of the student. Peabody Learning Lab became the archetype for phase one components of READ 180. “READ 180 utilizes direct and explicit reading instruction, engaging and age-appropriate content, and data-driven technology to ensure that differentiated instruction and guided practice take place” (Scholastic, 2002, p. 1).

Hasselbring (2004) and other researchers of the Cognitive and Technology Group at Vanderbilt University continued to conduct research on the role of technology in accelerating the learning of struggling students. In 1993 the researchers worked collaboratively with more than 10,000 students in Orange County Public Schools to improve READ 180. Hasselbring merged the work conducted by the Cognition Technology Research Group at Vanderbilt with the Orange County Literacy Project. The instructional model from the Orange County Literacy Project served as the basis for the READ 180 instructional model.

In 1997, Scholastic, a company that targets literacy and reading, merged the work conducted at Vanderbilt and the work of the Orange County Literacy Project with universal access features. Dr. David Rose and his team from the Harvard Center for Applied Special Technology designed the product’s universal access features. Universal design features create structures within the READ 180 software that are designed to accommodate all learners, including students with disabilities (Scholastic, 2002). Scholastic also incorporated the lexile leveling system developed by Dr. Jack Stenner of MetaMetrics.

The Lexile Framework for Reading uses reading measurement to match readers to text. Both the reader's ability and the text difficulty are measured on the same scale, the Lexile scale. Using this technique allows educators to monitor reading comprehension and encourage reader progress using Lexile measures within the scope of READ 180 (Scholastic, 2002). The Lexile scale is based on a developmental scale with reading ranges from 200L for the beginning reader to 1700L for the advanced readers. The Lexile Framework provides educators a system to predict reader's comprehension level with respect to written text.

A number of research studies have been conducted to assess the effectiveness of READ 180. In 1999 Scholastic contracted with Interactive, Inc. to conduct a research study to determine the effects of READ 180 on the reading achievement of struggling readers in seven school districts. The school districts that participated in the study were Atlanta, Georgia; Boston, Massachusetts; Columbus, Ohio; Dallas, Texas; Houston, Texas; Miami-Dade, Florida; and San Francisco, California (Interactive, 2002).

The Interactive study was designed to evaluate the effectiveness of READ 180 through the examination of its impact on reading achievement and proficiency, the degree to which teachers faithfully implemented READ 180, and the fidelity of implementation related to student outcomes. The research design began as an experimental study with random assignment of subjects. Based on attrition from the sample, the study was implemented as a nonequivalent control group design. Although it began with seven school districts participating, only three districts (Boston, Dallas, and Houston) provided Interactive, Inc. with year-to-year test scores. When the difference in mean growth on the Stanford 9, from Spring 2000 to Spring 2001, between the treatment and control groups

(+22.94 and +17.24, respectively) was determined for those three districts, there was a statistically significant difference. Students in READ 180 classes demonstrated greater reading achievement than did students in the control group ( $F = 12.624, p = .001$ ). Fall pretests administered during the 2000-2001 academic year also resulted in a statistically significant difference in growth on the reading comprehension subtest of the Stanford 9 between the treatment and control groups (+14.41 and -3.77, respectively). Students in the READ 180 classes demonstrated greater reading achievement than did students in the control group ( $F = 13.182, p = .001$ ).

Students in Columbus, Ohio also demonstrated significant reading achievement growth. Researchers controlled for prior levels of achievement using analysis of covariance. The difference in the adjusted mean between the treatment (648, 48) and control groups (642, 42) was statistically significant, indicating that the READ 180 classes ( $F = 12.624, p = .001$ ) made greater gains in reading achievement.

The fidelity of the implementation of READ 180 was compromised in the Interactive, Inc. study: Researchers modified and tailored READ 180 to accommodate school districts. The researchers acknowledged that the “validation study was tested under world-of-practice conditions” (Interactive, 2002, p. 3). Interactive, Inc. asserted that the variance in the implementation of the study supported the strength of READ 180 in that the program was effective in less than ideal circumstances.

There were several threats to the internal validity of the study. Selection was compromised as students and parents requested inclusion or exclusion from the study and were replaced without attention to random assignment. Mortality also affected the study. In the original design, each school was to select 320 lowest achievers (excluding students

below a 1.5 reading level), with random assignment of students to one of three groups: READ 180 ( $n = 120$ ), a control group ( $n = 120$ ), or a back-up group ( $n = 80$ ). This model would have resulted in 1,680 students in the treatment group. The level of district support was an internal threat to validity. Some of the schools in the study received district support while other schools were implemented the program without guidance. Based on the validity concerns, Interactive, Inc. rated the intervention implementation into categories: (a) standard implementation model (completely and consistently followed the READ 180 instructional model), (b) modified implementation model (significant deviations from the READ 180 instructional model), and (c) no implementation model (not implementing READ 180) (Interactive, 2002).

As internal validity threats emerged, along with the realities of conducting research in multiple public school districts, the treatment group deteriorated from 1,680 participants to 1,182; the control group declined from 1,680 participants to 888; and the back-up group eroded to zero participants (Interactive, 2002).

The overall findings of the study indicated significant improvement in reading achievement in classes with moderate to standard implementation of READ 180 (Interactive, 2002). With regard to faithful implementation of READ 180 in the classroom setting, 50% of the validation-site classrooms implemented READ 180 in the standard fashion, 42% exhibited some modification to the READ 180 model, and 8% failed to implement READ 180 at all. Interactive, Inc. identified leadership, technical support, sustained support, and professional development as factors having an impact upon the faithful implementation of READ 180.

The researchers concluded that READ 180 resulted in growth in reading comprehension ( $F = 13.182, p = .001$ ) in Boston, Houston, and Dallas. Students experiencing the READ 180 model demonstrated academic progress when compared to students in the control group. Reading proficiency for READ 180 students resulted in gains of 80-100 lexiles, gains that were greater than expected (Interactive, 2002). Despite threats to validity and problems with implementation, the results indicate that READ 180 can effect reading improvement for struggling adolescent readers.

The *Compendium of READ 180 Research* contains three additional descriptive studies from various secondary school settings. A descriptive study of Native American, at-risk high school students in Grades 10 through 12 was conducted in Fall 2002 at Shiprock High School, Central Consolidated School District in New Mexico. Thirty-nine students participated in READ 180 during the 2002-03 school year, with 40 additional participants in the program the subsequent year. Shiprock High School staff collected and analyzed statistical data from the Scholastic Reading Inventory (SRI) during the 2002-2004 school years, limiting the analysis to 60 students with both pre and posttest SRI scores. The results indicated that more than half of the students enrolled in the READ 180 showed statistically significant growth by gaining 1 year in reading ability over the course of the school year (Scholastic, Inc., 2004).

Santa Rose County School District in Florida implemented READ 180 during the 2001-02 school year for high school students reading significantly below grade level according to the Florida Comprehensive Assessment Test (FCAT). The program was expanded the following school year with two high schools implementing READ 180. Sixty-seven percent of READ 180 students in Jay High School, versus 61% of non-

READ 180 students, made gains, with 42% moving out of the lowest level reading on the FCAT. Jay High School students gained an average of 16 points on the Florida state assessment, whereas students in Milton High School gained an average of 9 points on the FCAT.

Significant results were also achieved at Juarez-Lincoln High School in Texas, based on results from the Texas Assessment of Knowledge and Skills (TAKS). The pretest mean score on TAKS was 1855, and the posttest mean was 2021, resulting in a significant gain of 165 points on the TAKS (Scholastic, Inc., 2004).

READ 180 was identified as contributing to the improvement of literacy skills of Job Corp students at the Guajome Park Academy in California. Students demonstrated improvement representing four to five grade levels, with the greatest gains achieved by students who had been in READ 180 for an average of 16 weeks.

#### *READ 180 Dissertation Studies*

Several recent dissertation studies have focused on different aspects of READ 180 implementation. The quasi-experimental, correlational, and qualitative dissertation studies report mixed results when examining the effectiveness of READ 180 for a range of subgroup populations and in a variety of settings.

Denman's dissertation study (2004) examined the yearlong gains in reading achievement and attitudes toward reading of middle school READ 180 participants compared to a control group. Surveys, focus groups, interviews, classroom observations, and pretest and posttest scores were measured. Students who participated in READ 180 demonstrated an overall positive effect on attitude towards reading and increased reading achievement by at least one grade level when compared to the control group. The STAR

reading posttest results indicated a mean grade equivalency gain of 3.3 for READ 180 participants ( $n=44$ ). The comparison group ( $n=41$ ) showed a mean gain of 2.1 grade equivalents. Denman concluded that READ 180 was an effective reading intervention to accelerate the reading achievement of struggling middle school students.

Witkowski (2004) studied the effectiveness of READ 180 for students receiving services for learning disabilities using a nonequivalent, control-group design. The study was conducted in a Midwest suburban high school and compared three reading approaches, READ 180 ( $n=21$ ), Reading in the Content Area ( $n=21$ ), and an English Support Program ( $n=21$ ). Sixty-three students with learning disabilities were participants in the yearlong study to measure reading comprehension and attitude towards reading. A repeated measures analysis of variance revealed that students who participated in the Reading in the Content Area Program showed statistically significant gains in reading comprehension when compared to READ 180 and the English Support Program. There were no significant differences noted in student attitude towards reading in any of the three reading interventions. Witkowski (2004) concluded that it is imperative that efforts are made at the elementary level to ensure that students enter secondary school reading on grade level.

Gentry's (2006) dissertation study examined the efficacy of READ 180 to improve reading achievement and the gender differences in attitudes toward reading in an urban secondary public school. Reading achievement gains were measured using Scholastic Reading Inventory pretest and posttest scores, comparing READ 180 participants ( $n=30$ ) to students enrolled in a traditional reading program ( $n=30$ ). An analysis of co-variance revealed mixed findings. READ 180 participants show no

statistically significant improvement in reading gains when compared to students in a traditional reading program. Male students in the comparison group did show significant gains when compared to female students. Female READ 180 participants showed greater reading gains than male READ 180 participants. Survey and interview results indicated that READ 180 participants had a positive desire to improve their reading skills. The comparison group was confident about their reading skills and did not acknowledge a need for improvement. Gentry (2004) concluded that the mixed results did not support the use of READ 180 as an effective reading intervention program to increase the reading achievement of struggling, urban secondary students.

The impact of fidelity of implementation on academic and performance outcomes was explored in Thomas' (2005) dissertation study. Repeated measures of analyses of variance and analysis of variance were used to examine data for 183 middle school students to determine if the fidelity of implementation level affected the outcomes on the Scholastic Reading Inventory (SRI) scores, school attendance, library checkout, and self-efficacy. Each level of fidelity of implementation showed significant reading achievement gains on the SRI, with the highest reading gains noted in the high fidelity classes. A statistically significant main effect was noted for the fidelity of implementation variable, supporting the concept that the strongest reading achievement gains were noted in the classrooms with the highest level of fidelity of implementation. The means for student absences for READ 180 participants increased during the treatment year when compared to the previous year. There was no statistically significant difference between students in low and high fidelity classes in regards to the number of books checked out from the library. The fidelity of READ 180 implementation did not have an effect on

total reader self-efficacy based on the results of the Reader Self-Perception Scale (RSPS). Thomas (2005) concluded that adherence to the fidelity of implementation of the READ 180 model as recommended by the developer increased the desired academic gains for struggling readers.

In the fall of 2004, Memphis City Schools implemented READ 180 in 39 middle schools. Brown's (2006) dissertation study examined the effect of READ 180 on the reading achievement of 925 students in grades 6-8. Paired samples *t*-test and gain score analysis of variance were used to measure the effect of READ 180 on Tennessee Comprehensive Assessment Program (TCAP) reading scores. Results indicated that READ 180 had a significant effect for the whole group. The findings of the study indicated that READ 180 participation was not a significant predictor of scoring proficient on the TCAP when compared to the control group. An analysis of variance revealed that the time-in-class variable was not a predictor for increasing reading proficiency when examined by whole sample or by grade level. Brown concluded that while READ 180 had a significant effect for the whole group, the reading intervention did not yield the expected results when compared to efficacy studies conducted on READ 180 in school districts.

### Synthesis of Studies

The common theme noted among the studies in this review is that effective instructional approaches and strategies can accelerate reading achievement for struggling adolescent readers. The National Reading Panel (2000) identified phonemic awareness, phonics, fluency, vocabulary development, and reading comprehension as the five major research-based strategies to support reading development. A number of studies support

the premise that significant reading gains can be achieved when research-based best practices are implemented in the secondary school setting (Balfanz et al., 2004; Fuchs et al., 1999; Hasselbring & Goin, 2004; Interactive, 2002; Jones et al., 2004). This premise is in direct contrast to the once prevailing attitude among some secondary education teachers that students are doomed to failure if they do not read proficiently by the time they enroll in high school (Denti, 2004).

Sturtevant and Linek (2003) synthesized the instructional beliefs and decision making of highly successful teachers who successfully blend literary and content to help students achieve academic success. *Lifelong learning* emerged as a recurrent theme among teachers viewed as exceptional by their supervisors. These highly effective educators demonstrated exceptional problem-solving abilities and remained focused on the needs of students.

The Merit Software, *Fast ForWord*, Peabody Literacy Lab studies demonstrated the strength of technology in accelerating students' reading growth (Hasselbring & Goin 2004; Jones et al., 2004; Miller, Merzenich, Tallal, Devivo, & Linn, 1999). The No Child Left Behind Act of 2001 provides a strong impetus for examining the ways in which technology can accelerate student learning (NCLB Dominates at FETC, 2003). The research conducted on the Merit Software interventions and studies conducted by the Peabody Literacy Lab suggest that technology is an effective tool for addressing the remediation needs of struggling readers at the high school level. The researchers concluded that insufficient explicit instruction is provided at the high school level to address the needs of struggling readers. Both studies highlighted the need for direct instruction in the areas of reading comprehension and fluency.

The report issued by the Consortium for Policy Research in Education suggests that the coaching model has the potential to fill a *promising niche* in the educational arena for improving literacy (Poglinco et al., 2003). There are major gaps in the research regarding the coaching model, however, thereby uncovering a suitable area for further research and study to examine the efficacy to accelerate reading achievement for struggling adolescent readers.

Interactive, Inc. (2002) conducted an independent research study of the effects of READ 180 on reading achievement and reading proficiency. Despite implementation problems, in the three school districts where data were collected, the findings indicated that READ 180 did positively affect reading achievement, proficiency, and attitude toward academics. Several dissertations conducted on READ 180 have reported significant gains in reading achievement based on student participation in READ 180 at the secondary school level (Brown, 2006; Denman, 2004; Thomas, 2005). Two dissertation studies did not find significant reading achievement gains when implementing READ 180 at the secondary school level with struggling readers (Gentry, 2006; Witkowski, 2004).

There is a gap between literacy and reading research theory and the various approaches and strategies currently implemented in secondary schools for struggling adolescent readers. There is a national plea for responsible research to identify the continuum of research methods and strategies appropriate for the complexities facing struggling adolescent readers, as well as their teachers and administrators (White House Press Release, 2004).

Based on the need identified through a synthesis of the literature reviewed for this research, this study will focus on implementing reading interventions that uses technology to accelerate reading achievement at the secondary level. The research regarding struggling adolescent literacy suggests that a research-based continuum of approaches, facilitated by a trained professional teacher in a supportive school environment, will result in improved adolescent literacy (Balfanz et al., 2004; National Reading Panel, 2000; Sturtevant & Linek, 2003). It is essential to accelerate the reading skills of struggling adolescent readers to avoid course failure, high dropout rates, and increased frustration. There is a gap in the literature regarding the role of technology in accelerating the reading skills of secondary school students (National Reading Panel, 2000). The use of computer technology to accelerate student reading growth represent relatively new areas that are worthy of additional research and study.

Several themes emerged from the literature review. First, it is clear that reading achievement skills for struggling adolescent readers can be improved with research-based strategies. Second, computer-based technology has shown merit in increasing student motivation to read. Third, reading interventions, when implemented correctly, can have an impact on student attitude, achievement, and confidence to obtain a high school diploma.

### Summary

This chapter presents a review of current research on adolescent literacy with a focus on reading at the secondary school level. The review of literature suggests the existence of a major gap between adolescent reading theories and many secondary school classroom practices. Although the issues surrounding older struggling adolescent readers

continue to widen due to increased accountability demands, as Moats (2001) alluded, “plenty can be done to face the challenge if we are committed to applying the best practices supported by reading research” (p. 3). Based on higher expectations from political, economic, and social fronts, this research study will investigate the effectiveness of computer-based reading in accelerating the reading achievement of struggling adolescent readers to ensure that each student is prepared to lead a successful life beyond high school. With mounting accountability demands, it is imperative to find innovative approaches in the educational research arena to close the reading achievement gap that is currently hindering the progress of many secondary school students.

## CHAPTER III

### RESEARCH DESIGN AND METHODOLOGY

#### Introduction

This chapter includes information about the research study design, participant selection, instrumentation, data collection procedures, and data analysis. This study investigated the effect of READ 180 on the reading achievement of struggling readers in grades six, seven, and eight in a southeastern Virginia middle school. The nonequivalent control group study also examined the relationship between participation in READ 180 and subsequent cohort dropout rates. Three years of reading achievement and dropout data were analyzed across various demographic variables to examine the impact of READ 180 and its relationship to dropout rates. Independent samples *t* test and chi-square statistics were used to analyze extant data to determine the yearly reading achievement mean gains, differences between the effects of the two reading interventions, and later dropout frequencies.

Following a review and synthesis of studies in the literature regarding adolescent reading, three questions emerged as the focus of the research:

1. What are the yearly mean gains in reading achievement scores for adolescent readers, as measured by reading pretests and posttests, following participation in READ 180 compared to students in a traditional reading remediation program serving as a comparison group?
2. Is there a significant difference between the reading achievement scores of students who participate in READ 180 compared to students in a traditional reading remediation program serving as a comparison group?

3. Are there differences between the dropout rates for students who participated in READ 180 and students who participated in a traditional reading remediation program?

#### Selection of Participants

An annual cohort group of reading intervention students, from 2003-2006, were the targeted group for participation in the study. Students who needed additional literacy support participated in two settings: (a) the computer-based READ 180 program, or (b) a traditional remedial remediation program. Students were assigned to either READ 180 or the reading remediation program by their guidance counselor based on Degrees of Reading Power (DRP) test results, the Virginia Standards of Learning (SOL) Reading Test, or STAR test results, and teacher recommendation. Identical pretest measures were employed to select participants for READ 180 and the traditional reading remediation program.

The treatment group comprised 192 middle school students; the study spanned 3 years from 2003 to 2006. During the 2003-2004 school year there were 58 READ 180 participants in the study. Seventy-six students participated in READ 180 during the 2004-2005 school year. There were 58 READ 180 participants during the 2005-2006 school year. Students in the treatment group participated in READ 180 every other day for 90 minutes for the entire school year, in addition to a daily, 55 minute, language arts class. Students also engaged in 20 minutes of sustained silent reading.

The fidelity of READ 180 program implementation was rated at Level Two by Scholastic, Inc. (2004). Fidelity of program implementation is the degree of fit between the developer-defined factors of the program and the implementation (Mihalic, 2002).

The developers of Scholastic READ 180 (2004) recommend Level One implementation, which consists of the following: (a) class schedule includes 90-minute blocks 5 days per week with 20 minutes of whole-group instruction and 10 minutes of whole-group instruction at the end of the period; (b) class schedule includes three 20-minute rotations 5 days per week with no more than five to seven students per group; (c) sufficient hardware, software, READ 180 materials; (d) adequate training and professional development; (e) frequent teacher use of the Scholastic Management Suite; (f) regular use of READ 180 guides and materials; (g) administration of the Scholastic Reading Inventory at the beginning, midpoint, and end of the period of student participation in READ 180; and (h) student participation in READ 180 for at least 1 year. READ 180 was implemented with all of the aforementioned factors with the exception of daily 90-minute blocks 5 days per week. READ 180 was implemented at a Level Two based on an alternating day, 90-minute block of instructional time.

The comparison group comprised 192 middle school students who participated in the traditional reading remediation program between 2003 and 2006. During the 2003-2004 school year there were 58 participants in the traditional reading remediation program. Seventy-six students participated in the traditional reading remediation program during the 2004-2005 school year. There were 58 traditional reading remediation participants during the 2005-2006 school year. Students in this comparison group received 90 minutes of remedial reading every other day for one quarter of the school year. In addition to the traditional reading remediation program, students participated in 20 minutes of sustained silent reading, and 55 minutes of daily language arts instruction.

The comparison group was selected by guidance counselors based on reading pretest scores and teacher recommendation.

An urban middle school in southeastern Virginia was the setting for the research study. At the time of the study, the school had an enrollment of 1,195 students in Grades 6 through 8. The ethnic composition of the school is approximately 50% White, 44% African American, 3% Latino, and 2% Asian or Pacific Islander. A substantial percentage (39%) of the students in the school were economically disadvantaged as defined by the percentage of students eligible to participate in the federal free and reduced-price lunch program, and 14% were receiving special education services. The median household income for students living in this district was \$58,168 compared to the state median of \$70,529 (Standard & Poor's, 2006).

#### *READ 180 Program*

Students enrolled in the READ 180 program received treatment according to the READ 180 Instructional Model, which utilizes a 90-minute block of instructional time, as illustrated in Figure 2, on a block schedule model. Fidelity of implementation was rated at Level Two according to the *READ 180 Research Protocol and Tools* as indicated in Appendix A (Scholastic READ 180, 2004). All implementation indicators were met with the exception of a daily class schedule of 90-minute blocks five days a week. READ 180 was implemented on an alternating day 90-minute block schedule, thus the Level Two, or moderate rating. The READ 180 Teacher Survey protocol is located in Appendix B (Scholastic READ 180, 2004). The READ 180 Principal and Teacher Interview protocols are located in Appendices C and D, respectively, and were used to assess perceptions and attitudes towards the program (Scholastic READ, 2004).

Students were engaged in a multisensory, multimodal approach integrating video software, Universal Access provisions, audiobooks, and paperbacks to effect literacy improvement. For the first 20 minutes of the class block the students engaged in whole-group literacy instruction. The teacher facilitated shared-reading, read-aloud, or mini-skill lessons. Following whole group instruction, students divided into three groups, with groups rotating in three 20-minute sessions, during which the teacher facilitated instruction with each group. The small group instruction provided an opportunity for differentiated, tailored instruction to meet the individual needs of each student.

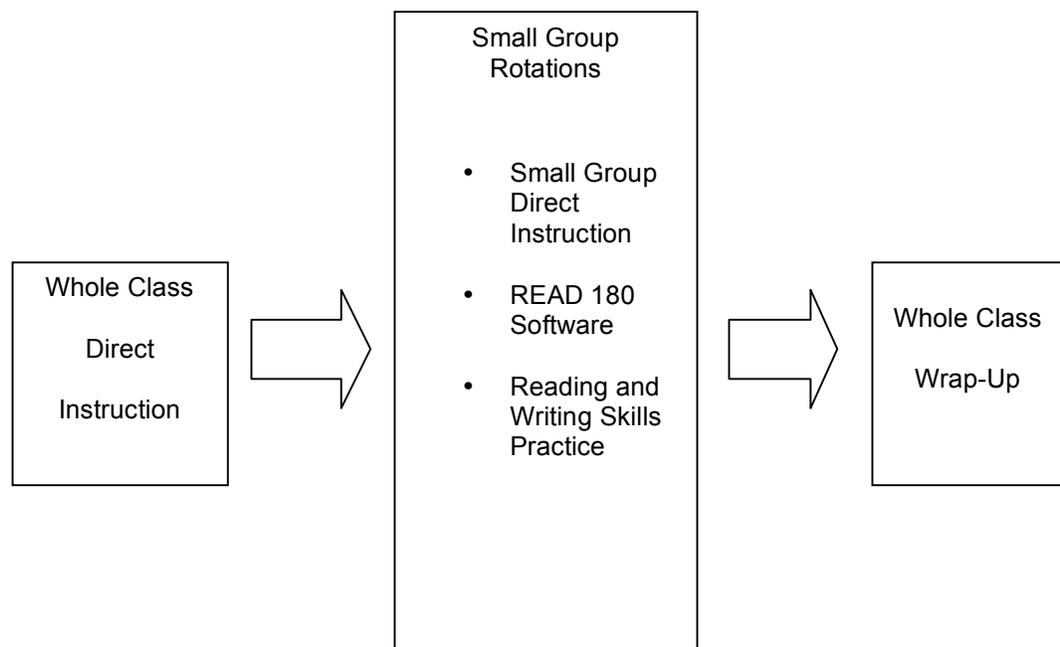


Figure 2. READ 180 instructional model.

Students in one of the small groups worked individually at a computer station using READ 180 software. The READ 180 software applies technological advances to provide individualized instruction based on student input; the software differentiates instruction based on student performance. The software is designed to lessen student frustration and discouragement, as the instruction on the video is aligned to the appropriate level for each student. Instructional software provides students with positive feedback, thereby building increased fluency and literacy skills (National Reading Panel, 2000). The constant diagnostic feedback loop provides assessment information to the teacher regarding a number of reading skills: phonics and word recognition, fluency, vocabulary, spelling, and comprehension (DeVivo & Aguhob, 2004). The Vanderbilt researchers designed the software to adjust activities toward total mastery through practice and review (Scholastic, 2002). The teacher used assessment details to focus instruction during the small group rotations to move toward improved skill development and mastery.

In the third small group area, students engaged in direct reading to build comprehension skills through modeled READ 180 paperback and audiobooks. The audiobooks had coaches who stopped periodically to discuss a reading concept or vocabulary word. The class block concluded with a 10-minute culminating reflection activity.

#### *Traditional Reading Remediation Program*

Students in the comparison group were enrolled in a 90-minute block-schedule, remedial reading class for one quarter of the school year. The traditional reading remediation program is a *pull-out* concept that supplants the student's elective offering.

Students receive reading instruction from a licensed reading specialist. The purpose of the traditional reading remediation program is to provide focused instruction for students who struggle with print literacy by providing skill-based instruction (Klenk & Kibby, 2000). The remediation program provided students with opportunities to integrate writing and thinking skills. The reading specialist provided instructional techniques to increase comprehension of text. The goal in the reading remediation program was to teach reading strategies and skills that students need to benefit from independent reading (Klenk & Kibby, 2000). There was a focus to improve reading subskills such as sequencing, finding the main idea, predicting, drawing conclusions using high interest reading material and authentic text such as the newspaper (Dole, Duffy, Roehler, & Pearson, 1991).

The instructional approaches in READ 180 and the traditional reading program in this study are different. The differences between READ 180 and the traditional reading program are illustrated in Table 1.

Table 1.

*A Comparison of the Program Components of READ 180 and the Traditional Reading Model*

| Characteristics                                  | READ 180  | Traditional Reading Program   |
|--|---|---|
| Instructional Delivery                           | Delivers individualized, adjusted reading instruction to move students to grade level at their own pace using software, literature, and direct instruction.   | Practice on subskills of reading is emphasized; instruction delivered in small groups or one-on-one with reading specialist; technology is not used in the traditional reading program. |
| Assessment                                       | Provides instant and continuous assessment.   | Provides frequent assessment; flexibility in adapting instruction to meet individual needs.   |
| Instructional Components                         | Delivers instruction in areas of phonemic and phonological awareness, fluency, vocabulary, comprehension, spelling, and writing.                              | Delivers instruction in areas of phonemic and phonological awareness, fluency, vocabulary, comprehension, spelling, and writing.  |
| Teacher credentials and professional development | Includes comprehensive instructional materials and professional development to support licensed reading specialist and train them in best teaching practices. | Teachers are licensed reading specialist; professional development is limited.  |

## Instrumentation

### *STAR Reading Test*

The STAR Reading test is a widely used test for measuring reading achievement. It is a fixed-length, 25-item, computer-adaptive test (Renaissance Learning, 2000). STAR Reading was used to measure the dependent variable of reading achievement. A strength of using the STAR is that it can be administered in a small-group setting with quick estimates of students' reading levels. The norms and standardization for the STAR Reading 2.0 test were conducted in 1999 using a nationally representative sample of 30,000 students from 269 schools. The test-retest reliability coefficient estimated for Grades 1 through 12 was .94, with grade estimates ranging from .79 to .91. Norming data were used to report norm-referenced, percentile rank, and Normal Curve Equivalent (NCE) scores.

The pretest scores on the STAR Reading test were used to measure the construct of reading achievement. The posttest scores on the STAR Reading test measured reading achievement, the dependent variable. Multiple analyses were conducted to control for the strengths and weaknesses of the groups (Pedhazur & Schmelkin, 1991).

### *Degrees of Power Reading (DRP) Test*

The Degrees of Reading Power (DRP) test is a criterion-referenced test to assess how well messages within text are understood. Koslin, Zeno, and Koslin (1987) have studied the test and found the test to have high levels of reliability. The Kuder-Richardson Formula 20 reliability coefficient was .95 and the test-retest coefficient was .95. The primary concept of the test is to measure current levels of reading achievement. Like the STAR test, DRP uses a cloze procedure. The reading paragraphs in the test

contain a sentence with a blank space. Four or five single-word options are available for students to select to complete the sentence (Koslin, Zeno, &, Koslin, 1987).

### *Scholastic Reading Inventory (SRI)*

The Scholastic Reading Inventory is a variable-length, computer adaptive reading assessment that can be administered to students in Grades K through 12; it is based on the Lexile Framework for Reading. The SRI uses an *embedded completion* item format that is measured by norm-referenced and criterion-referenced reading tests. A Bayesian scoring algorithm is employed to estimate the student's current reading level (Scholastic, 2001). A modified *cloze* method is employed to assess reading comprehension by omitting words and phrases with the student tasked to restore the deleted words (Scholastic, 2001). The test provides percentile rank, Normal Curve Equivalent, and other norm-referenced scores. The SRI was normed based on a state sample, not a national sample. Scholastic (2001) reported that the distribution of scores on reading comprehension for students in the state sample was similar to the distribution of scores reported for national samples.

The SRI computer-adaptive technology adapts the level of questions based on student responses, adjusting the difficulty level until a student is matched to a Lexile level (Scholastic, 2001). The Lexile Framework for Reading is based on a scientific approach that matches the reader's ability to the level of the text difficulty. The difficulty score is followed by an *L*. The Lexile scale for texts ranges from 100L for beginning readers to 1500L for advanced readers (Scholastic, 2001).

### *Virginia Standards of Learning (SOL) Assessments*

Students in the treatment and comparison groups were assessed using the Virginia Standards of Learning (SOL) tests in the areas of English, mathematics, history, social science, and science. Performance on the fifth grade Reading Standards of Learning Test was used as part of the reading intervention placement decision. The Virginia Standards of Learning are intended “to set reasonable targets and expectations for what teachers are expected to teach and students are expected to learn” (Virginia Department of Education, 2005, p. xi).

The three performance categories used on Virginia’s SOL are *Did not pass*, *Proficient*, and *Advanced*. The performance categories are linked to scaled cut scores. Scaled scores below 400 are linked with *Did not pass*. *Proficient* is linked to the cut point above 400; scores of 500 and higher are linked with cut scores rated as *Advanced*, with 600 representing a perfect score.

The construct validity of the Virginia Standards of Learning Test is correlated with the Stanford 9 Achievement Test. Correlations were found to be in the .50 to .80 range, supporting the validity of the assessment scores.

The reliability of the Virginia assessment was calculated using the Kuder-Richardson Formula 20 (KR-20). The majority of the KR-20 coefficients ranged from .85 to .92. The accuracy of the pass ratings (*Proficient*, *Advanced*, *Not Passing*) ranged from .87 to .93 (Virginia Department of Education, 2005).

## Data Collection

Reading pretests were administered prior to student placement in the treatment group or the comparison group to assess reading achievement of all students in the school setting. Guidance counselors used the results of the reading pretest, fifth-grade SOL test results, and teacher recommendation to assign students to READ 180 and the traditional reading remediation program. The Degrees of Reading Power (DRP) test was administered in the spring of 2003 and 2004 and was used for placement. The school district discontinued administering the DRP test after the 2004 school year. The STAR Reading test was used for pretest and posttest measures in 2004-2005 for the comparison and treatment groups. The Scholastic Reading Inventory (SRI) was administered to all participants in the 2005-2006 reading interventions in the fall and the spring of the academic year.

Age, attendance, discipline, ethnicity, gender, free or reduced-price meals, special education or 504 status, and achievement data for both the experimental and comparison groups for 4 academic years (2003-2007) were collected and analyzed. Additionally, dropout data were collected in January 2007 to investigate the relationship between participation in READ 180 and the cohort dropout rate.

The cohort dropout rate measures what happens to a cohort of students over a period of time (National Center for Education Statistics, 2003). In fall 2002, school officials began tracking ninth graders to determine whether they were still in school each year and whether or not they graduated by the summer of 2006. This gives a cohort rate. The district reported that 100 of the 2,014 students in the cohort group had dropped out of school as of August 2006. The district percentage of ninth graders in this study who were

reported as dropouts four years later was 5% using the cohort dropout method. The sample cohorts in this study were compared to the 2006 district cohort population. Students in the sample cohort who left school to pursue a General Educational Development (GED) were considered to be dropouts in this study.

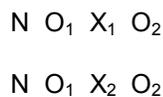
### Data Analysis

Descriptive statistical analyses were performed using SPSS software (Statistical Package for the Social Sciences). Frequency, mean, and standard deviation were computed for each variable. *T*-tests were used to find the mean differences between the pretests and posttests to analyze the first research question: What are the yearly mean gains in reading achievement scores for adolescent readers, as measured by reading pretests and posttests, following participation in READ 180 compared to students in a traditional reading remediation program serving as a control group? Statistical significance was considered to be demonstrated by probability values less than or equal to .05.

Independent samples *t* tests were performed using SPSS to determine if there was a significant difference between the reading achievement scores of students who participated in READ 180 compared to students participating in a traditional reading remediation program serving as a control group.

The quantitative aspects were measured through an experimental design using nonequivalent control groups with pretests and posttests (Campbell & Stanley, 1966, 2005), as shown in Figure 3. The pretest examined the initial differences between the treatment and comparison groups of students. The *N* in the figure indicates that the groups consisted of students selected to participate in one of two groups (i.e., READ 180

or traditional reading remediation). The *O* in Figure 3 represents the pretests and posttest results on the reading achievement tests. The *X* represents the treatment options of READ 180 and the traditional reading remediation comparison treatment. Using the nonequivalent control group design is the recommended design when randomization is not utilized and the control and comparison groups do not have pre-experimental equivalence (Campbell & Stanley, 1966, 2005).



*Figure 3.* Nonequivalent control group design.

The chi-square test for goodness of fit was used to determine whether or not there was a relationship between participation in READ 180 and dropping out of school in comparison with participation in a traditional reading remediation program serving as a comparison group. The effect size was calculated to determine the power of the finding. Chi-square goodness of fit is an appropriate test to use with categorical data, such as the dropout data in this study. According to Creighton (2007), “The test uses frequency counts from a sample and compares those counts to the expected frequency counts from the population” (p. 139). The results of the chi-square goodness of fit test were used to determine whether or not the difference between the sample and the school district population was significant.

### Summary

The nonequivalent control group design is a valuable approach for investigating the interventions that impact reading achievement and dropout rates for struggling readers. READ 180 is grounded in situated cognition as a theoretical framework. Level Two implementation of READ 180 was used for this study (Scholastic, 2004). The

fidelity of implementation was documented in the study by use of the Scholastic Research Tools and Protocols (2004). Conducting the research to investigate the effectiveness of READ 180 in an actual school setting has practical benefits for students and educators (Ridgeway, Dunston, & Qian, 1993).

CHAPTER IV  
DATA ANALYSIS AND RESULTS

Introduction

This chapter presents analyses of the research data. The purpose of the nonequivalent control-group study was to examine the effect on reading achievement for adolescent readers after participation in a computer-based reading program as well as the relationship to dropout rates. Students were selected by their guidance counselor for READ 180, a computer-based reading program, or a traditional reading intervention based on Degrees of Reading Power (DRP) test results, the Virginia Standards of Learning (SOL) Reading Test, or STAR test results, as well as teacher recommendation. Identical pretest measures were employed to select participants for READ 180 and the traditional intervention.

The comparison group participated in a traditional remedial reading program, whereas the treatment group received READ 180 as a reading intervention. Independent-samples *t* tests and chi-square tests are the statistical procedures that were used to analyze the data on reading achievement. The study was designed to answer three research questions.

1. What are the yearly mean gains in reading achievement scores for adolescent readers, as measured by reading pretests and posttests, following participation in READ 180 compared to students in a traditional reading remediation program serving as a comparison group?

2. Is there a difference between the effects on reading achievement scores for students who participate in READ 180 compared to students in a traditional reading remediation program serving as a comparison group?

3. Are there differences between the dropout rates for students who participate in READ 180 and students who participate in a traditional reading remediation program?

#### Demographic Descriptive Statistics

Three hundred eighty-four students in Grades 6 through 8 at an urban, southeastern Virginia middle school were participants in the reading intervention study over a 3-year period from 2003 through 2006. Tables 2-4 provide descriptions of the participants. At the time of the study, the total middle school population in this school ranged from 1100 to 1175 students. The ethnic composition of the school was approximately 50% White, 44% African American, 3% Latino, and 2% Asian or Pacific Islander. Thirty-nine percent of the students in the school were economically disadvantaged, and 14% were receiving special education services. Student enrollment data from 2003 through 2007 were collected to examine the relationship between enrollment in READ 180 and the district cohort dropout rates as compared to the traditional reading remediation participants.

Table 2.

*Description of the 2003-2004 Sample*

|                             |                  | READ 180 | Traditional<br>reading<br>remediation |
|-----------------------------|------------------|----------|---------------------------------------|
|                             | <i>N</i>         | 58       | 58                                    |
| Gender                      | Males            | 28       | 33                                    |
|                             | Females          | 30       | 25                                    |
| Over aged for Grade         |                  | 3        | 16                                    |
| Excessive Absences          |                  | 6        | 15                                    |
| Ethnicity                   | White            | 21       | 16                                    |
|                             | African American | 35       | 37                                    |
|                             | Latino           | 0        | 3                                     |
|                             | Asian            | 2        | 2                                     |
| Special Education or 504    |                  | 17       | 13                                    |
| Free or Reduced-price Meals |                  | 34       | 33                                    |
| High School Dropout         |                  | 4        | 14                                    |

Table 3.

*Description of the 2004-2005 Sample*

|                             |                  | READ 180 | Traditional<br>reading<br>remediation |
|-----------------------------|------------------|----------|---------------------------------------|
|                             | <i>N</i>         | 76       | 76                                    |
| Gender                      | Males            | 45       | 44                                    |
|                             | Females          | 31       | 32                                    |
| Over aged for Grade         |                  | 7        | 8                                     |
| Excessive Absences          |                  | 13       | 11                                    |
| Ethnicity                   | White            | 27       | 21                                    |
|                             | African American | 43       | 53                                    |
|                             | Latino           | 6        | 0                                     |
|                             | Asian            | 0        | 2                                     |
| Special Education or 504    |                  | 18       | 21                                    |
| Free or Reduced-price Meals |                  | 39       | 44                                    |
| High School Dropout         |                  | 6        | 2                                     |

Table 4.

*Description of the 2005-2006 Sample*

|                             |                  | READ 80 | Traditional<br>reading<br>remediation |
|-----------------------------|------------------|---------|---------------------------------------|
|                             | <i>N</i>         | 58      | 58                                    |
| Gender                      | Males            | 27      | 31                                    |
|                             | Females          | 27      | 31                                    |
| Over aged for Grade         |                  | 0       | 1                                     |
| Excessive Absences          |                  | 11      | 10                                    |
| Ethnicity                   | White            | 6       | 28                                    |
|                             | African American | 50      | 25                                    |
|                             | Latino           | 0       | 4                                     |
|                             | Asian            | 1       | 1                                     |
|                             | American Indian  | 1       | 0                                     |
| Special Education or 504    |                  | 13      | 16                                    |
| Free or Reduced-price Meals |                  | 32      | 32                                    |
| High School Dropout         |                  | 0       | 0                                     |

Testing the Research Questions

*Research Question One*

The first research question examined the yearly mean gains in reading achievement scores for adolescent readers, as measured by reading pretests and posttests, following participation in READ 180 compared to students in a traditional reading remediation program serving as a comparison group. The outcomes are discussed in this chapter by year.

*2003-2004 Results*

The variances between the 2003-2004 READ 180 and comparison groups were similar at the baseline. The Levene's Test for Equality of Variances indicated that the treatment and comparison group did not have significant variances on the pretest scores.

Kurtosis illustrates the extent to which the density of observations varies from the probability densities of the normal curve (Kotz and Johnson, 1982). The assumption of homogeneity of variance was met,  $F = .058$ ,  $p = .809$ . Table 5 illustrates that posttest READ 180 and comparison data had a positive kurtosis value, thereby indicating a leptokurtic distribution. Leptokurtic distributions have a larger proportion of extreme scores than a normal curve (Hopkins & Weeks, 1990). The pretest READ 180 and comparison data had a smaller number of extreme scores than expected, resulting in a negative kurtosis value, thereby indicating a platykurtic distribution. The READ 180 and comparison group posttest scores had positive skewness statistics of .056 and .207, respectively. Skewness illustrates the degree of asymmetry in the sample distribution, denoting the distance between the mode and the mean and expressed as the standard deviation (Hopkins & Weeks, 1990). The population sample distribution did not violate the assumption of a normal distribution curve.

Table 5.

*Comparison between 2003-2004 READ 180 and Comparison Group Normal Curve**Equivalent Scores*

| Reading Intervention   |                                 | Pretest NCE Score | Posttest NCE Score |
|------------------------|---------------------------------|-------------------|--------------------|
| READ 180               | Mean                            | 32.0517           | 43.0345            |
|                        | <i>N</i>                        | 58                | 58                 |
|                        | Std. Deviation                  | 8.01407           | 11.69790           |
|                        | Minimum                         | 17.00             | 15.00              |
|                        | Maximum                         | 46.00             | 75.00              |
|                        | Range                           | 29.00             | 60.00              |
|                        | Variance                        | 64.225            | 136.841            |
|                        | Kurtosis                        | -.946             | .158               |
|                        | Std. Error of Kurtosis          | .618              | .618               |
|                        | Skewness                        | -.142             | .056               |
|                        | Std. Error of Skewness          | .314              | .314               |
|                        | Std. Error of Mean              | 1.05230           | 1.53601            |
|                        | Traditional reading remediation | Mean              | 33.8276            |
| <i>N</i>               |                                 | 58                | 58                 |
| Std. Deviation         |                                 | 7.92761           | 12.55271           |
| Minimum                |                                 | 13.00             | 17.00              |
| Maximum                |                                 | 45.00             | 76.00              |
| Range                  |                                 | 32.00             | 59.00              |
| Variance               |                                 | 62.847            | 157.570            |
| Kurtosis               |                                 | -.265             | .206               |
| Std. Error of Kurtosis |                                 | .618              | .618               |
| Skewness               |                                 | -.839             | .207               |
| Std. Error of Skewness |                                 | .314              | .314               |
| Std. Error of Mean     |                                 | 1.04095           | 1.64825            |

In the spring of 2003, the READ 180 and comparison groups ( $n = 116$ ) were administered the Degrees of Reading Power Test (DRP), which served as the pretest for the mean score comparison. The posttest scores were obtained from the 2004 Degrees of Reading Power Test. The pretest and posttest are reported as Normal Curve Equivalent scores (NCEs), which are normalized standard scores with a mean of 50 and a standard deviation of 21.06 on an equal interval scale. NCEs are equivalent to percentile ranks at

the 1<sup>st</sup>, 50<sup>th</sup>, and 99<sup>th</sup> percentile ranks. The posttest Normal Curve Equivalent mean scores indicate that students in the comparison group ( $M = 45.21$ ,  $SD = 12.55$ ) achieved a .40 higher mean gain than did students enrolled in READ 180 ( $M = 43.03$ ,  $SD = 11.70$ ), as illustrated in Table 6.

Table 6.

*2003-2004 Means of READ 180 and Comparison Group*

| 2003-2004 Reading Interventions |                              |                               |                                |                                 |
|---------------------------------|------------------------------|-------------------------------|--------------------------------|---------------------------------|
| Intervention                    | Read 180 Pretest<br>$n = 58$ | Read 180 Posttest<br>$n = 58$ | Comparison Pretest<br>$n = 58$ | Comparison Posttest<br>$n = 58$ |
| Mean                            | 32.05                        | 43.03                         | 33.83                          | 45.21                           |
| Std. Deviation                  | 8.01                         | 11.70                         | 7.93                           | 12.55                           |
| Mean Gains                      |                              | 10.98                         |                                | 11.38                           |

*Note:* Mean gains at  $p > .05$

As shown in Table 7, mean gains for READ 180 seventh- and eighth-grade participants were higher than gains for the comparison group at 11.44 and 10.84 ( $SDs = 10.19$  and  $11.80$ ), respectively. The  $ns$  for seventh- and eighth-grade READ 180 trials were 18 and 19, respectively. The mean gain for sixth-grade students in the traditional reading remediation program was higher at 13.76 ( $SD = 7.62$ ),  $n = 19$ , whereas the READ

180 sixth grade students generated a mean gain of 10.72 Normal Curve Equivalents ( $SD = 10.98$ )  $n = 21$ .

Table 7.

*2003-2004 READ 180 and Comparison Group Mean Gains by Grade Level*

| Reading Intervention            | Grade Level |                | Pretest NCE Score | Posttest NCE Score |
|---------------------------------|-------------|----------------|-------------------|--------------------|
| READ 180                        | 6th Grade   | Mean           | 27.5714           | 38.2857            |
|                                 |             | <i>N</i>       | 21                | 21                 |
|                                 |             | Std. Deviation | 6.09567           | 10.98245           |
|                                 | 7th Grade   | Mean           | 37.5556           | 49.0000            |
|                                 |             | <i>N</i>       | 18                | 18                 |
|                                 |             | Std. Deviation | 7.63292           | 10.18650           |
|                                 | 8th Grade   | Mean           | 31.7895           | 42.6316            |
|                                 |             | <i>N</i>       | 19                | 19                 |
|                                 |             | Std. Deviation | 7.29976           | 11.80024           |
|                                 | Total       | Mean           | 32.0517           | 43.0345            |
|                                 |             | <i>N</i>       | 58                | 58                 |
|                                 |             | Std. Deviation | 8.01407           | 11.69790           |
| Traditional reading remediation | 6th Grade   | Mean           | 30.2857           | 44.0476            |
|                                 |             | <i>N</i>       | 21                | 21                 |
|                                 |             | Std. Deviation | 7.61671           | 16.07942           |
|                                 | 7th Grade   | Mean           | 35.1111           | 44.8333            |
|                                 |             | <i>N</i>       | 18                | 18                 |
|                                 |             | Std. Deviation | 7.89556           | 11.77859           |
|                                 | 8th Grade   | Mean           | 36.5263           | 46.8421            |
|                                 |             | <i>N</i>       | 19                | 19                 |
|                                 |             | Std. Deviation | 7.19080           | 8.72584            |
|                                 | Total       | Mean           | 33.8276           | 45.2069            |
|                                 |             | <i>N</i>       | 58                | 58                 |
|                                 |             | Std. Deviation | 7.92761           | 12.55271           |

The 2003-2004 pretest and posttest mean gains for African American participants were compared to the mean gains of White participants in READ 180 and the traditional reading remediation program. The mean gain for White participants was higher than the mean gain for African American participants in the treatment group, at 14.66 and 8.63

(SDs = 9.38 and 12.39), respectively, as shown in Table 8. The *ns* for White and African American READ 180 participants were 21 and 35, respectively. The mean gain for White participants in the comparison group was higher than the mean gain for African American participants, at 12.5 and 9.59 (SDs =14.32 and 11.19), respectively. The *ns* for the White and African American comparison participants were 16 and 37, respectively.

Table 8.

*2003-2004 READ 180 and Comparison Group Mean Gains by Ethnicity*

| 2003-2004 Reading Intervention  | Ethnicity        |                | Pretest NCE Score | Posttest NCE Score |
|---------------------------------|------------------|----------------|-------------------|--------------------|
| READ 180                        | African American | Mean           | 32.1429           | 40.7714            |
|                                 |                  | <i>N</i>       | 35                | 35                 |
|                                 |                  | Std. Deviation | 8.53416           | 12.39328           |
|                                 | White            | Mean           | 31.4762           | 46.1429            |
|                                 |                  | <i>N</i>       | 21                | 21                 |
|                                 |                  | Std. Deviation | 7.15974           | 9.38235            |
| Traditional reading remediation | African American | Mean           | 33.9189           | 43.5135            |
|                                 |                  | <i>N</i>       | 37                | 37                 |
|                                 |                  | Std. Deviation | 8.92057           | 11.19182           |
|                                 | White            | Mean           | 33.7500           | 46.2500            |
|                                 |                  | <i>N</i>       | 16                | 16                 |
|                                 |                  | Std. Deviation | 5.92734           | 14.32248           |

*2004-2005 Results*

The Levene's test of homogeneity of variance tests indicated that the 2004-2005 treatment and comparison groups had similar variances on the pretest dependent variable. The Levene statistic (Gravetter & Wallnau, 2000) was not significant at the .737 level; thus equal variances were assumed. Table 9 illustrates that the posttest READ 180 group skewness was positive for a leptokurtic distribution of .968. The comparison group skewness had a negative value of -.070, suggesting a normally distributed set of test

scores. The READ 180 posttest data had a positive kurtosis statistic of 1.932, with a leptokurtic distribution. The comparison group kurtosis was platykurtic at -.270. The data are consistent with that from a normal distribution, as illustrated in Table 9.

Table 9.

*Comparison between 2004-2005 READ 180 and Comparison Group Normal Curve Equivalent Scores*

| 2004-05 Reading Intervention |   | 2004 Pretest NCE Score | 2005 Posttest NCE Score |
|------------------------------|---|------------------------|-------------------------|
| 2004-05 READ 180             | Mean                                    | 32.9868                | 38.8461                 |
|                              | N                                       | 76                     | 76                      |
|                              | Std. Deviation                          | 10.90411               | 13.54778                |
|                              | Minimum                                 | 6.70                   | 10.40                   |
|                              | Maximum                                 | 62.90                  | 89.60                   |
|                              | Range                                   | 56.20                  | 79.20                   |
|                              | Variance                                | 118.900                | 183.542                 |
|                              | Kurtosis                                | .546                   | 1.932                   |
|                              | Std. Error of Kurtosis                  | .545                   | .545                    |
|                              | Skewness                                | -.040                  | .968                    |
|                              | Std. Error of Skewness                  | .276                   | .276                    |
|                              | Std. Error of Mean                      | 1.25079                | 1.55404                 |
|                              | 2004-05 Traditional reading remediation | Mean                   | 32.9184                 |
| N                            |   | 76                     | 76                      |
| Std. Deviation               |   | 11.02115               | 11.82172                |
| Minimum                      |   | 6.70                   | 1.00                    |
| Maximum                      |   | 63.50                  | 58.70                   |
| Range                        |   | 56.80                  | 57.70                   |
| Variance                     |   | 121.466                | 139.753                 |
| Kurtosis                     |   | .336                   | -.270                   |
| Std. Error of Kurtosis       |   | .545                   | .545                    |
| Skewness                     |   | .202                   | -.070                   |
| Std. Error of Skewness       |   | .276                   | .276                    |
| Std. Error of Mean           |   | 1.26421                | 1.35604                 |

The school district in which the study was conducted discontinued administering the Degrees of Reading Power Test in 2004. The second cohort group ( $n = 152$ ) was

administered the STAR Reading Pretest and Posttest in 2004 and 2005, which served as the measures for the mean score comparison. As illustrated in Table 10, the posttest Normal Curve Equivalent mean scores indicate that students in the READ 180 group ( $M = 38.85$ ,  $SD = 13.55$ ) achieved a 5.86 mean gain, whereas students in the comparison group demonstrated a mean decline of 3.71 ( $M = 29.21$ ,  $SD = 11.82$ ), as illustrated in Table 10.

Table 10.

*2004-2005 Means of READ 180 and Comparison Group*

| 2004-2005 Reading Interventions |                                   |                                    |                                     |                                      |
|---------------------------------|-----------------------------------|------------------------------------|-------------------------------------|--------------------------------------|
| Intervention                    | Read 180 Pretest<br><i>n</i> = 76 | Read 180 Posttest<br><i>n</i> = 76 | Comparison Pretest<br><i>n</i> = 76 | Comparison Posttest<br><i>n</i> = 76 |
| Mean                            | 32.99                             | 38.85                              | 32.92                               | 29.21                                |
| Std. Deviation                  | 10.90                             | 13.55                              | 11.02                               | 11.82                                |
| Mean Gains                      |                                   | 5.86                               |                                     | -3.71                                |

Table 11 presents the mean Normal Curve Equivalent gains by grade level, comparing 2004-2005 READ 180 participants to the 2004-2005 comparison group. Mean gains for 2004-2005 READ 180 participants in Grades 6, 7, and 8 were higher than those of the comparison group by 15.91, 6.63, and 6.44 ( $SDs = 10.83$ ,  $11.83$ , and  $16.71$ ) NCEs, respectively.

Table 11.

*2004-2005 READ 180 and Comparison Group Mean Gains by Grade Level*

| 2004-05 Reading Intervention            | Grade Level |                | 2004 Pretest NCE Score | 2005 Posttest NCE Score |
|---|-------------|----------------|------------------------|-------------------------|
| 2004-05 READ 180                        | 6th Grade   | Mean           | 31.4524                | 37.5429                 |
|   |             | N              | 21                     | 21                      |
|   |             | Std. Deviation | 7.37581                | 10.82588                |
|   | 7th Grade   | Mean           | 31.6000                | 36.9286                 |
|   |             | N              | 28                     | 28                      |
|   |             | Std. Deviation | 14.39496               | 11.82633                |
|   | 8th Grade   | Mean           | 35.6185                | 41.8481                 |
|   |             | N              | 27                     | 27                      |
|   |             | Std. Deviation | 8.64763                | 16.71417                |
|   | Total       | Mean           | 32.9868                | 38.8461                 |
|   |             | N              | 76                     | 76                      |
|   |             | Std. Deviation | 10.90411               | 13.54778                |
| 2004-05 Traditional reading remediation | 6th Grade   | Mean           | 30.7500                | 20.9318                 |
|   |             | N              | 22                     | 22                      |
|   |             | Std. Deviation | 7.32288                | 10.01791                |
|   | 7th Grade   | Mean           | 32.4464                | 30.2929                 |
|   |             | N              | 28                     | 28                      |
|   |             | Std. Deviation | 14.46862               | 10.96675                |
|   | 8th Grade   | Mean           | 35.2615                | 35.0538                 |
|   |             | N              | 26                     | 26                      |
|   |             | Std. Deviation | 9.11961                | 10.38904                |
|   | Total       | Mean           | 32.9184                | 29.2118                 |
|   |             | N              | 76                     | 76                      |
|   |             | Std. Deviation | 11.02115               | 11.82172                |

The 2004-2005 pretest and posttest mean difference scores for African American participants were compared to the mean difference scores of White participants in READ

180 and the traditional reading remediation program. Mean gains for White participants were higher than those for African American participants in the treatment group, at 8.17 and 4.95 (*SDs* = 12.07 and 14.30), respectively, as shown in Table 12. The *ns* for White and African American READ 180 participants were 27 and 43, respectively. There were mean declines in reading achievement for both White participants and African American participants in the comparison group, at -3.12 and -4.13 (*SDs* = 11.56 and 12.00, respectively). The *ns* for White and African American comparison participants were 21 and 53, respectively.

Table 12. 2004-2005 READ 180 and Comparison Group Mean Gains by Ethnicity

| Reading Intervention            | Ethnicity        |                | Pretest NCE Score | Posttest NCE Score |
|---------------------------------|------------------|----------------|-------------------|--------------------|
| READ 180                        | African American | Mean           | 32.0581           | 37.0140            |
|                                 |                  | <i>N</i>       | 43                | 43                 |
|                                 |                  | Std. Deviation | 10.00051          | 14.30162           |
|                                 | White            | Mean           | 34.7444           | 42.9074            |
|                                 |                  | <i>N</i>       | 27                | 27                 |
|                                 |                  | Std. Deviation | 11.59494          | 12.07601           |
| Traditional reading remediation | African American | Mean           | 32.5849           | 28.4509            |
|                                 |                  | <i>N</i>       | 53                | 53                 |
|                                 |                  | Std. Deviation | 11.39710          | 12.00347           |
|                                 | White            | Mean           | 35.0190           | 31.9048            |
|                                 |                  | <i>N</i>       | 21                | 21                 |
|                                 |                  | Std. Deviation | 9.54021           | 11.56198           |

### *2005-2006 Results*

The 2005-2006 cohort of READ 180 and comparison students were administered the Scholastic Reading Inventory Test in the spring and fall of the school year. In an effort to direct resources to students in grades six and seven, eighth-grade students were excluded from READ 180 participation during the 2005-2006 school year. Independent samples *t* tests were used to answer the question, “What are the yearly mean gains in reading achievement scores for adolescent readers, as measured by pretests and posttests, following participation in READ 180 compared to students in a traditional reading remediation program?”

The assumption of homogeneity of covariance was not met using Levene’s Test for Equality of Variances ( $F = 5.65, p < .019$ ). Statistics for nonassumption of equal variances were used for the analyses of the pretest. Table 13 illustrates that pretest and posttest READ 180 data had a positive kurtosis value indicating a distribution of 2.58 and 2.47, respectively. The comparison group posttest had a platykurtic kurtosis distribution of -.33. The pretest and posttest comparison data had a negative value indicating a platykurtic skewness distribution of -1.17 and -.63, respectively. The treatment and comparison samples had skewed distributions that were platykurtic, representing a normal distribution.

Table 13.

*Comparison between 2005-2006 READ 180 and Comparison Group Normal Curve*

*Equivalent Scores*

| Reading Intervention   |                                 | Pretest NCE Score | Posttest NCE Score |
|------------------------|---------------------------------|-------------------|--------------------|
| READ 180               | Mean                            | 32.3207           | 46.9378            |
|                        | N                               | 58                | 58                 |
|                        | Std. Deviation                  | 10.09583          | 13.61091           |
|                        | Median                          | 34.6500           | 50.1200            |
|                        | Std. Error of Mean              | 1.32565           | 1.78720            |
|                        | Sum                             | 1874.60           | 2722.39            |
|                        | Minimum                         | 1.00              | 1.00               |
|                        | Maximum                         | 44.50             | 68.39              |
|                        | Range                           | 43.50             | 67.39              |
|                        | Variance                        | 101.926           | 185.257            |
|                        | Kurtosis                        | 2.579             | 2.456              |
|                        | Std. Error of Kurtosis          | .618              | .618               |
|                        | Skewness                        | -1.624            | -1.397             |
|                        | Std. Error of Skewness          | .314              | .314               |
|                        | Traditional reading remediation | Mean              | 31.8490            |
| N                      |                                 | 58                | 58                 |
| Std. Deviation         |                                 | 13.78857          | 15.63524           |
| Median                 |                                 | 37.0500           | 36.1150            |
| Std. Error of Mean     |                                 | 1.81053           | 2.05301            |
| Sum                    |                                 | 1847.24           | 1964.45            |
| Minimum                |                                 | 1.00              | .00                |
| Maximum                |                                 | 49.90             | 58.01              |
| Range                  |                                 | 48.90             | 58.01              |
| Variance               |                                 | 190.125           | 244.461            |
| Kurtosis               |                                 | .286              | -.328              |
| Std. Error of Kurtosis |                                 | .618              | .618               |
| Skewness               |                                 | -1.173            | -.631              |
| Std. Error of Skewness |                                 | .314              | .314               |

A comparison of the Normal Curve Equivalent pretest and posttest scores indicates that students enrolled in the READ 180 program ( $M = 46.93$ ,  $SD = 13.61$ )

achieved higher mean gains than did the students enrolled in a traditional reading program

( $M = 33.87$ ,  $SD = 15.64$ ); these results are depicted in Table 14. The READ 180 students exhibited a gain of 14.61 NCEs in reading, whereas the comparison group had a gain of 2.02 NCEs.

Table 14.

*2005-2006 Means of READ 180 and Comparison Group*

| 2005-2006 Reading Interventions |                                   |                                    |                                     |                                      |
|---------------------------------|-----------------------------------|------------------------------------|-------------------------------------|--------------------------------------|
| Intervention                    | Read 180 Pretest<br><i>n</i> = 58 | Read 180 Posttest<br><i>n</i> = 58 | Comparison Pretest<br><i>n</i> = 58 | Comparison Posttest<br><i>n</i> = 58 |
| Mean                            | 32.32                             | 46.93                              | 31.85                               | 33.87                                |
| Std. Deviation                  | 10.09                             | 13.61                              | 13.79                               | 15.64                                |
| Mean Gains                      |                                   | 14.61                              |                                     | 2.02                                 |

Mean gains for READ 180 sixth- and seventh-grade participants were higher than those for the comparison group by 16.24 and 8.11 NCEs ( $SDs = 14.41$  and  $11.91$ ), respectively, as illustrated in Table 15. Sixth- and seventh-grade students in the comparison group demonstrated gains of .69 and 3.66 NCEs ( $SDs = 16.33$  and  $15.04$ ), respectively. Sixth- and seventh-grade students in the READ 180 group demonstrated gains of 16.93 and 11.77 NCEs ( $SDs = 14.41$  and  $11.91$ ), respectively.

Table 15.

*2005-2006 READ 180 and Comparison Group Mean Gains by Grade Level*

| Reading Intervention            | Grade Level |                | Pretest NCE Score | Posttest NCE Score |
|---------------------------------|-------------|----------------|-------------------|--------------------|
| READ 180                        | 6th Grade   | Mean           | 32.8469           | 49.7825            |
|                                 |             | <i>N</i>       | 32                | 32                 |
|                                 |             | Std. Deviation | 12.22641          | 14.40850           |
|                                 | 7th Grade   | Mean           | 31.6731           | 43.4365            |
|                                 |             | <i>N</i>       | 26                | 26                 |
|                                 |             | Std. Deviation | 6.79992           | 11.91001           |
|                                 | Total       | Mean           | 32.3207           | 46.9378            |
|                                 |             | <i>N</i>       | 58                | 58                 |
|                                 |             | Std. Deviation | 10.09583          | 13.61091           |
| Traditional reading remediation | 6th Grade   | Mean           | 32.7825           | 33.4716            |
|                                 |             | <i>N</i>       | 32                | 32                 |
|                                 |             | Std. Deviation | 13.32640          | 16.33088           |
|                                 | 7th Grade   | Mean           | 30.7000           | 34.3600            |
|                                 |             | <i>N</i>       | 26                | 26                 |
|                                 |             | Std. Deviation | 14.51829          | 15.04036           |
|                                 | Total       | Mean           | 31.8490           | 33.8698            |
|                                 |             | <i>N</i>       | 58                | 58                 |
|                                 |             | Std. Deviation | 13.78857          | 15.63524           |

The 2004-2005 pretest and posttest mean gains for participants were compared to the mean gains of White participants in READ 180 and the traditional reading remediation program. As depicted in Table 16, mean NCE score gains for White participants in the READ 180 treatment group were higher than the score gains for African American READ 180 participants, by 18.25 and 13.92 NCEs ( $SDs = 21.43$  and  $12.63$ ), respectively. The  $ns$  for White and African American READ 180 participants were 6 and 50, respectively. Similarly, mean NCE score gains for White participants in the comparison group were slightly higher than the score gains for African American participants, by 2.24 and 1.3 NCEs ( $SDs = 15.40$  and  $14.95$ ), respectively. The  $ns$  for the

White and African American participants in the comparison group were 28 and 25, respectively.

Table 16.

*2005-2006 READ 180 and Comparison Group Mean Gains by Ethnicity*

| Reading Intervention            | Ethnicity        |                | Pretest NCE Score | Posttest NCE Score |
|---------------------------------|------------------|----------------|-------------------|--------------------|
| READ 180                        | African American | Mean           | 33.0400           | 46.9564            |
|                                 |                  | <i>N</i>       | 50                | 50                 |
|                                 |                  | Std. Deviation | 8.68548           | 12.62739           |
|                                 | White            | Mean           | 24.6167           | 42.8667            |
|                                 |                  | <i>N</i>       | 6                 | 6                  |
|                                 |                  | Std. Deviation | 18.16088          | 21.43265           |
| Traditional reading remediation | African American | Mean           | 30.0776           | 31.3816            |
|                                 |                  | <i>N</i>       | 25                | 25                 |
|                                 |                  | Std. Deviation | 15.05536          | 14.94863           |
|                                 | White            | Mean           | 33.4321           | 35.6736            |
|                                 |                  | <i>N</i>       | 28                | 28                 |
|                                 |                  | Std. Deviation | 12.16002          | 15.39128           |

*Research Question Two*

The second research question investigated the difference between the effects on reading achievement for students who participated in READ 180 compared to students in a traditional reading remediation program serving as a comparison group. An independent samples *t* test was used to compare the pretest and posttest reading achievement to determine if there was a significant reading achievement difference between the treatment and comparison groups.

*2003-2004 Results*

A comparison of the 2003-2004 cohort posttest scores did not show a significant difference at a confidence level of .05 in reading achievement for students enrolled in READ 180 compared to students in a traditional reading remediation program. A *t* test of independent samples was used to compare the Normal Curve Equivalent pretest and posttest scores between the treatment and comparison groups using the Degrees of Reading Power test (see Table 17). The Levene's Test for Equality of Variances indicated the treatment and comparison groups did not have significant variances on the pretest scores ( $p = .809$ ). The results indicate there is not a statistically significant difference between the mean reading Normal Curve Equivalent score gains for students who enrolled in READ 180 during the 2003-2004 academic year compared to the gains achieved by students enrolled in a traditional remedial reading program ( $t(114) = 0.96, p > .05$ ).

Table 17.

*A Comparison of 2003-2004 READ 180 and Comparison Group Mean Gains Between Pretest and Posttest Normal Curve Equivalent Scores*

| Group            | Mean Gain | S.D.  | <i>t</i> -Ratio | Significance |
|------------------|-----------|-------|-----------------|--------------|
| READ 180         | 10.98     | 11.70 | 0.96            | 0.337        |
| Comparison Group | 11.38     | 12.55 |                 |              |

Both the treatment and comparison groups had statistically significant improvement in reading achievement based upon comparison of pretest and posttest results as depicted in Table 18. The READ 180 posttest was significantly higher than the

pretest ( $t(114) = -5.90, p < .01$ ). The comparison group posttest ( $M = 45.21, SD = 12.55$ ) was significantly higher than the pretest ( $M = 33.57, SD = 8.13$ ), ( $t(114) = -5.93, p < .01$ ).

Table 18. *Comparison of 2003-2004 READ 180 and Comparison Group Pretest and Posttest Normal Curve Equivalent Scores*

| Groups              | Mean  | S.D.  | df  | t     |
|---------------------|-------|-------|-----|-------|
| READ 180 Pretest    | 32.05 | 8.01  | 114 | -5.90 |
| READ 180 Posttest   | 43.03 | 11.70 |     |       |
| Comparison Pretest  | 33.57 | 8.13  | 114 | -5.93 |
| Comparison Posttest | 45.21 | 12.55 |     |       |

#### *2004-2005 Results*

A comparison of the 2004-2005 READ 180 and comparison group pretest and posttest scores indicated a significant difference at a confidence level of .05 in reading achievement for students enrolled in READ 180 compared to the scores of students in the traditional reading remediation program. A  $t$  test of independent samples was used to compare the Normal Curve Equivalent pretest and posttest scores between the treatment and comparison groups using the STAR Reading Test (see Table 19). The Levene's Test for Equality of Variances indicated that the treatment and comparison groups did not have significant variances on the pretest scores ( $F = .113, p = .737$ ).

A comparison of the pretest and posttest results indicated that a statistically significant difference exists in the mean reading Normal Curve Equivalent scores for students who enrolled in READ 180 during the 2004-2005 school year. As depicted in

Table 19, the READ 180 group demonstrated a statistically significant increase in reading achievement ( $M = 38.85$ ,  $SD = 13.55$ ) when compared to the group that received the traditional reading remediation program ( $M = 29.21$ ,  $SD = 11.82$ ), ( $t(4.67) = .301$ ,  $p < .05$ ).

Table 19.

*A Comparison of 2004-2005 READ 180 and Comparison Group Mean Gains Between Pretest and Posttest Normal Curve Equivalent Scores*

| Group            | Mean Gain | S.D.  | <i>t</i> | Significance |
|------------------|-----------|-------|----------|--------------|
| READ 180         | 5.86      | 13.55 | 4.67     | 0.000        |
| Comparison Group | -3.71     | 11.82 |          |              |

Both the READ 180 and comparison groups demonstrated statistically significant differences in reading achievement based upon examination of the pretest and posttest results. The READ 180 posttest mean ( $M = 38.85$ ,  $SD = 13.55$ ) was significantly higher than the pretest mean ( $M = 32.99$ ,  $SD = 10.90$ ), ( $t(150) = -2.94$ ,  $p < .004$ ). The comparison group posttest mean, however, declined significantly ( $M = 29.21$ ,  $SD = 11.82$ ) from the pretest mean ( $M = 32.91$ ,  $SD = 11.02$ ), ( $t(150) = 1.00$ ,  $p < .05$ ). These findings are depicted in Table 20.

Table 20.

*Comparison of 2004-2005 READ 180 and Comparison Group Pretest and Posttest*

*Normal Curve Equivalent Scores*

| Groups                    | Mean  | S.D.  | df  | t     |
|---------------------------|-------|-------|-----|-------|
| READ 180 Pretest          | 32.99 | 10.90 | 150 | -2.94 |
| READ 180 Posttest         | 38.84 | 13.55 |     |       |
| Comparison Group Pretest  | 32.92 | 11.02 | 150 | 1.99  |
| Comparison Group Posttest | 29.21 | 11.82 |     |       |

*2005-2006 Results*

A comparison of the 2005-2006 pretest and posttest scores indicated a significant difference at a .05 confidence level in reading achievement for students enrolled in READ 180 compared to students in a traditional reading remediation program. A *t* test of independent samples was used to compare the Normal Curve Equivalent pretest and posttest scores between the treatment and comparison group using the Scholastic Reading Inventory (see Table 21). The Levene's Test for Equality was met for the posttest; therefore, the statistics for equal variances were used ( $F = 1.67, p > .197$ ). The posttest mean scores for READ 180 participants ( $M = 46.94, SD = 13.61$ ) were significantly higher than the mean Normal Curve Equivalent posttest scores ( $M = 33.87, SD = 15.64$ ) for the comparison group, thereby revealing significant differences between the groups ( $t(114) = 4.80, p < .001$ ). The results indicate a statistically significant effect between the mean reading Normal Curve Equivalent posttest scores for students who enrolled in

READ 180 during the 2005-2006 academic year and the scores of students enrolled in a traditional remedial reading program.

Table 21.

*A Comparison of 2005-2006 READ 180 and Comparison Group Mean Gains Between Pretest and Posttest Normal Curve Equivalent Scores*

| Group            | Mean Gain | S.D.  | <i>t</i> | Significance |
|------------------|-----------|-------|----------|--------------|
| READ 180         | 14.62     | 13.61 | 4.80     | 0.000        |
| Comparison Group | 2.02      | 15.64 |          |              |

Examination of the pretest and posttest results revealed that the READ 180 cohort group demonstrated statistically significant improvement in reading achievement. The READ 180 posttest score ( $M = 46.94$ ,  $SD = 13.61$ ) was significantly higher than the pretest score ( $M = 32.32$ ,  $SD = 10.09$ ), ( $t(114) = -6.57$ ,  $p < .01$ ). The comparison group posttest score ( $M = 33.87$ ,  $SD = 15.64$ ) was not significantly higher than the pretest score ( $M = 31.85$ ,  $SD = 13.79$ ), ( $t(114) = -.738$ ,  $p > .05$ ). The READ 180 group posttest gain was statistically significant at  $p < .01$  as illustrated in Table 22.

Table 22.

Comparison of 2005-2006 READ 180 and Comparison Group Pretest and Posttest  
Normal Curve Equivalent Scores

| Groups              | Mean  | S.D.  | df  | t      |
|---------------------|-------|-------|-----|--------|
| READ 180 Pretest    | 32.32 | 10.10 | 114 | -6.572 |
| READ 180 Posttest   | 46.94 | 13.61 |     |        |
| Comparison Pretest  | 31.85 | 13.79 | 114 | -.738  |
| Comparison Posttest | 33.87 | 15.64 |     |        |

*Research Question Three*

To investigate research question three, the chi-square test for goodness of fit was used; the test uses frequency counts from a sample and compares them to the frequency counts of a population. In this study, the sample included 116 subjects and the population included 2,014 according to the most recent dropout statistics for the 2006 school division cohort group. The chi-square procedures were not used for the 2005-2006 reading intervention groups because there were no dropout occurrences in either the treatment or the comparison sample between September 2005 and January 2007.

The chi-square formula (shown in Figure 4) measures any discrepancy between the observed frequencies (sample) and the expected frequencies (population). If the chi-square value is small, one can conclude that there is not a statistically significant difference between the sample and the population (Gravetter & Walnau, 2000). If, on the other hand, the chi-square value is large, it suggests a statistically significant difference between the dropout rate of the sample and the rate of the school division.

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e}$$

Figure 4. The chi-square formula.

Essentially, there are four steps to the chi-square procedure:

1. Find the difference between the observed frequencies and the expected frequencies for each of the categories.
2. Square the difference for each (eliminating the negative values).
3. Divide the squared difference by the expected frequency for each category.
4. Finally, sum all the values from all the categories.

Two assumptions and restrictions must be met to assure confidence in the results of the chi-square test: (a) independence of observations and (b) size of expected frequencies. Independence was met since individual students were counted only once in the categories. With regard to frequency size, a chi-square test is not appropriate when the expected frequency of any cell is fewer than five.

*2003-2004 Results*

Figure 5 displays the construction of the chi-square used in this study and the expected and observed frequencies for Year 2003-2004.

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|                    | Read 180 | Traditional Reading Remediation |
|--------------------|----------|---------------------------------|
| Observed Frequency | 4        | 14                              |
| Expected Frequency | 5        | 5                               |

---

Figure 5. Expected and observed frequencies for Year 2003-2004.

Using the chi-square distribution curve and critical value table (Creighton, 2007), it was determined that with 1 degrees of freedom (C-1)(R-1) and an alpha level of .05, a critical value of 3.841 must be met for the result to be considered statistically significant. Calculating the chi-square value with the formula, the dropout rate for the sample was found to be statistically significantly different from the school division average for Year 2003-2004 ( $\chi^2 (1, n = 116) = 16.4, p < .05$ ). There is a low probability that the differences found are due to chance sample fluctuations (Creighton, 2007; Muijs, 2004).

The effect size, or *phi*, was calculated to measure the strength of the dropout relationship. *Phi* was calculated by taking the square root of the chi-square value divided by the intervention sample size (Creighton, 2007). The 2003-2004 cohort group had a medium effect size of 0.35. A medium effect size means that one can be reasonably confident in rejecting the null of no significance between the dropout rate of the sample and the rate of the school district population. This effect size is significant when compared to other meta-analysis studies in the educational arena, with modest effect sizes of 0.11 and 0.15 reported by Title I and CSR, respectively (Borman & D'Agostino, 1996; Borman, Hewes, Overman, & Brown, 2003).

#### *2004-2005 Results*

Figure 6 displays the construction of the chi-square used in this study, as well as the expected and observed frequencies for Year 2004-2005.

|                    | Read 180 | Traditional Reading Remediation |
|--------------------|----------|---------------------------------|
| Observed Frequency | 6        | 2                               |
| Expected Frequency | 5        | 5                               |

*Figure 6.* Expected and observed frequencies for Year 2004-2005.

Using the chi-square distribution curve and critical value table, it was determined that with 1 degrees of freedom (C-1) and an alpha level of .05, a critical value of 3.841 must be met for the result to be considered statistically significant. Calculating the chi-square value with the formula, the dropout rate for the sample was found to be not statistically significantly different from the school division average for Year 2004-2005 ( $\chi^2 (1, n = 116) = 2.00, p > .05$ ).

### *Summary*

Chapter IV presented the results of the reading intervention research study to answer three research questions:

1. What are the yearly mean gains in reading achievement scores for adolescent readers, as measured by reading pretests and posttests, following participation in READ 180 compared to students in a traditional reading remediation program serving as a comparison group?

The 2003-2004 posttest Normal Curve Equivalent mean scores indicate that students in the comparison group ( $M = 45.21, SD = 12.55$ ) had a .40 higher mean gain than did students enrolled in READ 180 ( $M = 43.03, SD = 11.70$ ). The posttest Normal Curve Equivalent mean scores for the 2004-2005 school year indicate that students in the READ 180 group ( $M = 38.85, SD = 13.55$ ) achieved a 5.86 mean gain whereas students in the comparison group demonstrated a mean decline of 3.71 ( $M = 29.21, SD = 12.55$ ). The 2005-2006 data reveal that students enrolled in READ 180 ( $M = 46.93, SD = 13.61$ ) achieved higher mean gains than did students enrolled in a traditional reading program ( $M = 33.87, SD = 15.64$ ). The 2005-2006 READ 180 students exhibited a gain of 14.61 NCEs in reading, whereas the comparison group demonstrated a gain of 2.02 NCEs.

2. Is there a difference between the effects of students who participate in READ 180 on reading achievement scores compared to students in a traditional reading remediation program serving as a comparison group?

A comparison of the 2003-2004 cohort posttest scores did not show a significant difference at the .05 level of confidence in reading achievement for students enrolled in READ 180 compared to students in a traditional reading remediation program. A comparison of the 2004-2005 and 2005-2006 READ 180 and comparison group pretest and posttest scores indicated a significant difference, with a confidence level of .05, in reading achievement for students enrolled in READ 180 compared to students in a traditional reading remediation program. The effect of READ 180 resulted in statistically significant mean gains compared to the traditional reading remedial program.

3. Are there differences between the dropout rates for students who participate in READ 180 and students who participate in a traditional reading remediation program?

The chi-square test revealed a significant difference between the dropout rates for the 2003-2004 reading intervention cohort groups and the school district population ( $\chi^2 (1, n = 116) = 16.4, p < .05$ ), with a medium effect size of 0.35. A significant difference was not observed between the dropout rates of the 2004-2005 cohort sample and the school division. There were no dropout occurrences in the 2005-2006 reading intervention sample.

A full discussion of the research study, including conclusions and implications, is included in Chapter V, along with interpretation of the research findings. This research is discussed within the context of best practices for providing effective reading acceleration

for struggling adolescent readers. Chapter V also includes recommendations for future research.

## CHAPTER V

### SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

This chapter summarizes the findings of the research study on reading interventions by drawing conclusions related to the three research questions, examining implications, and making recommendations for further research and practice in the field of education. The findings in this study will be beneficial to many secondary principals who may not be formally trained in literacy development, but, nevertheless, are held accountable for literacy development, implementation, and evaluation as instructional leaders (Zipperer, Worley, & Sisson, 2002).

#### Summary of Findings

The purpose of this study was to examine the effects on reading achievement for middle school students who were enrolled in a computer-based reading intervention program, READ 180, as well as the relationship of the instruction to subsequent dropout rates, compared to students enrolled in a traditional reading remediation program. There is a strong correlation between low literacy achievement and high dropout rates (Irwin, 2002; Snow, Burns, & Griffin, 1998). Despite the need for research on best practices for struggling adolescent readers, there has been limited research on reading interventions for older readers compared to the amount of research for preadolescent readers (Vacca & Vacca, 2002). The research in this study adds to the research on the effects of reading interventions at the secondary level as a possible way to prevent students from dropping out of school. A low reading achievement level is one of the key risk factors for dropping out of school (Biancarosa & Snow, 2004).

A nonequivalent control group research design was used to examine data from 384 students in Grades 6 through 8, who attended an urban, southeastern Virginia middle school and were participants in reading interventions over a 3-year period from 2003 through 2006. Independent samples *t* test and chi-square statistics were used to analyze extant data to determine the yearly reading achievement mean gains, differences between the effects of the two reading interventions, and subsequent dropout frequencies.

The treatment and comparison groups comprised 192 students each; the study spanned 3 academic years from 2003 to 2006. In addition to the traditional language arts instructional period, students in READ 180 received 90 minutes of daily instruction on an alternating-day block schedule for the entire school year. Students in the traditional reading remediation program received a reading intervention for 90 minutes a day on an alternating-day block schedule for a 9-week period.

#### *Research Question One*

What are the yearly mean gains in reading achievement scores for adolescent readers, as measured by reading pretests and posttests, following participation in READ 180 compared to students in a traditional reading remediation program serving as a comparison group?

The findings based on the pretest and posttest reading achievement data indicated that both the treatment and comparison group students in the 2003-2004 and 2005-2006 cohort years exhibited NCE gains. The 2004-2005 treatment group demonstrated reading achievement gains, whereas the comparison group demonstrated a decline on the posttest. The 2003-2004 and 2005-2006 comparison groups did generate mean score gains on the posttest. The national NCE average is 50. Although the treatment and comparison groups

demonstrated reading achievement gains, the NCE posttest scores remained below the national average.

### *Research Question Two*

Is there a difference between the effects on reading achievement scores of students who participate in READ 180 compared to students in a traditional reading remediation program serving as a comparison group?

The findings reveal a statistically significant difference between the effects on reading achievement scores of students who participated in READ 180 compared to students in a traditional reading remediation program during the 2004-2005 and 2005-2006 school years. The reading achievement gains could be attributed to the study's independent variable. The READ 180 effect on reading achievement was not significant during the first year of READ 180 implementation. During the first semester of the initial year of READ 180 implementation, there were computer software problems that affected the implementation of the intervention. The problems were corrected by the second semester, and teacher confidence in the program increased as indicated in the teacher interview (Appendix D).

### *Research Question Three*

Are there differences between the dropout rates for students who participate in READ 180 and students who participate in a traditional reading remediation program?

The analyses of the data for the differences between the dropout rates for the 2003-2004 cohort students who participated in READ 180 and those participating in the traditional reading intervention revealed differences compared to the school division average. No significant difference was observed between the dropout rates of the 2004-

2005 cohort sample and the school division dropout rates. There were no dropout occurrences for the students in the 2005-2006 reading intervention cohort. The mixed findings indicate a rise in the dropout rates for struggling middle school readers as the years progress through high school. This finding is aligned with research findings indicating a strong correlation between low achievement in literacy and student dropout rates (Irwin, 2002; Snow, Burns, & Griffin, 1998). Recent reading assessments have indicated that 25% of the students arriving in ninth grade are unable to comprehend high school textbooks (U.S. Department of Education, 2005). The Alliance for Education (Biancarosa & Snow, 2004), indicated that eighth-grade reading scores are a predictor of which students will drop out of school before 12<sup>th</sup> grade.

#### Implications

Policymakers are calling the literacy problems facing many American secondary schools a *crisis* (Conley & Hinchman, 2004). To respond to the crisis, the 2006 federal budget included \$200 million to support the *Striving Readers* initiative to improve the reading skills of high school students (White House Press Release, 2005). There is a realistic expectation that all of America's students will be academically prepared as they graduate from high school. The implications from this study support the research indicating that reading achievement skills for struggling adolescent readers can be accelerated with research-based intervention strategies. The findings in this study indicate that a Level Two Implementation of READ 180 can produce significant gains in reading achievement.

Struggling adolescent readers construct new knowledge and understanding based on what they already know and believe; many secondary students need a conceptual

framework as a context for new learning. Biancarosa and Snow (2004) identified 15 critical elements of effective adolescent literacy programs in the Reading Next report from the Alliance for Excellent Education. The cornerstone of any highly effective literacy program for struggling adolescent readers must include professional development, formative assessment, and summative assessment. READ 180 contains comprehensive implementation training, including an online course and instructional support (Scholastic, 2002). The Scholastic Reading Inventory serves as the formative and summative assessment component for READ 180. Normative reports and recommendations for helping students meet grade level expectations are available to teachers (Scholastic, 2002).

READ 180 anchors student learning to scaffold background knowledge and create mental models (Cognition & Technology Group at Vanderbilt, 1990). The findings in this study indicate that greater gains in reading achievement can be obtained by developing higher order thinking through the implementation of READ 180. The READ 180 software was designed to motivate students to read and revisit concepts needing reinforcement and development. The findings in this study support the concept that anchoring instruction in computer-based technology has merit in increasing reading achievement gains. This finding is similar to findings from other computer assisted reading interventions such as Merit Software (Jones et al., 2004) and *Fast ForWord* (Miller, S., Merzenich, M., Tallal, P., Devivo, K., & Linn, N., 1999).

The findings of the study revealed significant gains in reading achievement when READ 180 was implemented at Level Two as defined by Scholastic (2004). Level Two implementation falls short of the full implementation recommended by Scholastic (2004) and yields less than optimal outcomes. The implementation indicator that fell short of the recommendation from Scholastic was a class schedule including 90-minute blocks 5 days per week (Scholastic, 2004). Students in this study received half the recommended READ 180 instructional time. The implication from this study is that Level Two Implementation, although not optimal, can yield significant gains when fidelity is maintained at the Level Two status. Level One Implementation is preferred, however; it is projected to yield the best results for students according to Scholastic (2004). If schools choose to use READ 180, school leaders should create student schedules so that READ 180 can be implemented at the recommended Level One status to facilitate optimal student benefit from participation in this program.

The 2<sup>nd</sup> and 3<sup>rd</sup> years of implementation revealed statistically significant reading achievement gains associated with the use of READ 180. Software difficulties, which were beyond the control of the reading specialist who was implementing READ 180, were problematic during the initial year of implementation. The reading specialist reported being more confident in implementing READ 180 during the 2<sup>nd</sup> and subsequent years. READ 180 research literature indicates that stronger academic gains are obtained when students are exposed to programs implemented with high fidelity (Thomas, 2005). Implementation difficulties during this era of high accountability are problematic because struggling readers cannot afford to lose instructional time due to technical software

difficulties. The implication from the study is that the technical support aspect of READ 180 is vital to maintain fidelity in program implementation and to ensure reading gains.

White students consistently exhibited higher mean gains in reading achievement when compared to African American participants in READ 180 or the traditional reading remediation program. An observation of this study is that there is a reading achievement gap between white and African American students; this gap is an area for further investigation.

Allington (2000) argued that “almost every curriculum scheme works in some sites, and none has ever worked well everywhere. That has been the finding time after time when state and federal educational initiatives have been evaluated” (p. 467). The implications of this study suggest that READ 180 is effective as a reading intervention when moderate fidelity of implementation is maintained.

President George W. Bush signed The No Child Left Behind (NCLB) Act as a reauthorization of the Elementary and Secondary Education Act in January 2002, ensuring that all students receive a quality education and reach proficiency in the core subject areas. The NCLB Act requires that highly qualified teachers use reading interventions that are scientifically based and proven to be effective. During this era of increased accountability, the findings in a number of READ 180 studies have shown significant reading achievement gains for middle school in school districts such as Los Angeles, Boston, Houston, Columbus, Ohio, Orange County, Florida, and Las Vegas, Nevada (DeVivo & Aguhob, 2004; Hasselbring & Goin, 2004; Interactive, 2002; Scholastic, 2004). Several dissertations also have reported significant gains in reading achievement based on student participation in READ 180 at the secondary school level

(Brown, 2006; Denman, 2004; Thomas, 2005). Two dissertation studies did not find significant reading achievement gains when implementing READ 180 at the secondary school level with struggling readers (Gentry, 2006; Witkowski, 2004). At the same time that standards and expectations are being raised, many schools continue to rely on textbooks as the primary printed source of curriculum delivery, even in light of evidence that the average student in secondary classrooms is reading below the level of many content-area texts (Allington, 2005). This study adds support to the research indicating that when the READ 180 instructional model is implemented with fidelity, reading achievement gains are realized.

Literacy is one of the most crucial items on a principal's agenda (Booth & Rowsell, 2002; Zipperer, Worley, & Sisson, 2002). Bauman (1984) contended that the success of a school's literacy program is directly linked to a strong instructional leader. Likewise, Marzano (2005) asserted that the school leader is a major influence on student achievement. Despite the significant impact that the principal has on student achievement, many principal preparation programs are not adequately preparing principals for the instructional demands, particularly in the area of literacy (Kibble, 2004). Principal preparation programs must prepare school leaders for the standards-based instructional environments to ensure the goal of educational equity for all students (Young & Creighton, 2002). Principal preparation programs must provide research in reading pedagogy and best practices. The programs must help aspiring leaders identify optimal reading instruction through effective professional development. The principal's decision to implement and maintain READ 180 in this middle school setting demonstrates a commitment to literacy improvement in the school (see Appendix C).

Research conducted by the National Assessment of Educational Progress (NAEP) (U.S. Department of Education, 2005) indicated that struggling adolescent readers are 20 times more likely to drop out of school than those in the top quartile. The findings in this study found a higher dropout rate for struggling readers in the sample than for students in the school district population. The implication is that literacy must be embraced vertically across the grade levels and content areas. The phrase “every teacher is a teacher of reading,” coined by William S. Gray in 1937, must be embraced and fully realized to ensure that all students are ready for postsecondary education and the ever-changing world of work.

#### Recommendations for Further Research

The findings in this study revealed that an intensive reading intervention, READ 180, did significantly improve reading achievement for struggling adolescent readers when implemented with moderate fidelity. There were mixed findings when examining the dropout rate of struggling readers when compared to the school district population. Future research should focus on sustaining highly effective reading intervention processes at the secondary school level to increase the likelihood of high school graduation.

This reading intervention study was limited by sample size and restricted to a 3-year span. For future research, larger samples should be selected from subgroups with a longitudinal approach of 5 or more years of evaluation. Many questions remain regarding effective strategies to accelerate the reading improvement of struggling adolescent readers.

The recommendations from the results of this study are the following:

1. Principal leadership is critical for improved student outcomes. Future research is recommended to measure the correlates of effective principals with regard to literacy development using computer-based reading interventions that lead to successful outcomes for struggling adolescent readers. A qualitative study is recommended to examine the following principal leadership characteristics to determine the effect on reading achievement: (a) Upholds the vision of every student reading; (b) Collaborates with the district reading coordinator; (c) Ensures that teachers collect assessment data and assists teachers in a collaborative analysis and application of the data for making key instructional decisions; (d) Places effective reading teachers in reading/core classes where students struggle the most; (e) Supports, guides, and evaluates reading teachers, interventionists, specialists, and coaches; (f) Involves parents and families in school-wide reading seminars, endeavors and celebrations; (g) Stays current on scientifically based reading research; (h) Serves as the instructional leader for the school; (i) Provides time for collaboration amongst staff, with a focus on reading achievement; (j) Ensures that schedules adequately provide uninterrupted time for reading instruction; (k) Knows the names and faces of all students who are in danger of failing to learn to read competently and actively seeks them out in order to motivate and encourage them (Banks, Ebbers, Geiger, Hasbrouck, 2005)

2. A longitudinal study is needed to examine the impact of READ 180 on student retention throughout high school as well as the desired outcomes of graduation and readiness for postsecondary opportunities. Research in this study indicated that eighth-grade reading achievement is a good predictor of high school graduation (Biancarosa & Snow, 2004). The longitudinal study can investigate the effect of vertical alignment

across grade levels with regard to the implementation of READ 180 at the elementary, middle, and high school levels to provide support to struggling readers for academic and postsecondary success. Will the continuation of intensive reading intervention at the high school level influence at-risk students to remain in school?

3. The elective or physical education offering was supplanted by the READ 180 intervention for the struggling adolescent readers in this study, thereby creating motivational problems for some students. The removal of a course that a struggling reader enjoys can serve as a motivational barrier to academic success. Future research is recommended to investigate the outcomes of embedding READ 180 into the traditional language arts course and configuring a schedule to provide time for READ 180 without removing the elective offering. This action may require policy and curricular changes to embed READ 180 in the local middle school language arts curriculum. Analyses of the achievement of the READ 180 students enrolled in a language arts class where READ 180 is embedded could be compared to the achievement of a like group of students who receive a double dose of language arts instruction without READ 180.

4. There is a need for systemic and inclusive professional development in all subject areas at the secondary school level to ensure that *every teacher is a teacher of reading*. A school-wide commitment to implementation of a literacy plan is essential to increasing the academic success of all students. Further research is recommended to investigate the types of professional development that will improve literacy across all subject areas.

5. Further research is recommended to investigate whether or not the reading gains achieved by participation in reading interventions transfer to academic achievement

in core areas. A correlational study is recommended that examines participation in a reading intervention and academic performance in core classes and performance on state standards.

6. Research is warranted to investigate the differences in the achievement gap between diverse groups of students to further guide instructional practices and school improvement models to close the achievement gap. The findings in this study revealed a difference in the mean gains between White and African American participants.

7. A qualitative study of READ 180 may provide additional analyses of reasons that a computer-based reading intervention yields higher reading gains than do traditional reading remediation programs. The focus of the study would be on motivational factors that effect reading achievement when computer-based reading interventions are used.

#### Summary

Chapter V presented the findings of the research study, as well as conclusions, implications, and recommendations for researchers and educators. This study investigated the effects of READ 180 on reading achievement for middle school students as well as the relationship of the instruction to subsequent dropout rates. The findings indicated that with fidelity of Level Two Implementation of READ 180 (Scholastic, 2004), there was a significant increase in reading achievement. The findings also revealed a difference in the dropout rate of struggling readers in the sample when compared with the school district cohort dropout rate.

Many secondary principals are faced with increased demands as instructional leaders due to complex accountability standards. More importantly, there is a responsibility to ensure that all students are prepared for successful completion from high

school with the necessary skills for postsecondary education and the global economy they will enter. Literacy is one of the major issues facing secondary principals (Booth & Rowsell, 2002; Zipperer, Worley, & Sisson, 2002). Central office personnel, principals, teachers, reading coaches must all accept a leadership role in order to improve academic achievement for all students. Effective principal preparation and professional development programs are essential to ensure that principals are prepared for the instructional demands of the position.

In order to meet the instructional and literary demands that students will face in the global economy, the principal must build leadership capacity at all levels of the school organization. Principals are entrusted with the responsibility to make sure that all students graduate from high school prepared for further education, training, and the world of work.

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## APPENDIX A

### READ 180 IMPLEMENTATION LEVEL

The following sets of indicators define three levels of implementation of Scholastic *READ 180*. For purposes of research and reporting, Level 1 defines full implementation, and Levels 2 and 3 define incomplete implementation. Implementation that does not at least meet the standard suggested by Level 3 will be considered as not implementing *READ 180*.

*Level 1 Full Implementation* – All Indicators (1-10).

*Level 2 Implementation* – Indicators 2-7, plus any combination of Indicators 8-10.

*Level 3 Implementation* – Indicators 3-6, plus any combination of Indicators 7-10.

Yes     No

1. Class schedule includes 90-minute blocks 5 days a week with 20 minutes of whole-group instruction at the beginning of each class period and 10 minutes of whole-group instruction at the end of each class period.

Yes     No

2. Class schedule includes three 20-minute rotations 5 days a week with no more than 5 to 7 students per group.

Yes     No

3. Sufficient working hardware (computers, headphones and cassette or CD (in 2005) players for all students to pass through the rotations each day the class meets.

Yes     No

4. Adequate sets of *READ 180* Paperbacks, Audiobooks, and Topic CDs.

Yes     No

5. Adequate training, professional development and technical support to

- facilitate use of the program model.
- Yes     No
6. Appropriate configurations of furniture and equipment, including: teacher workstation, independent reading area, computer stations, and whole/small group instructional areas. The furniture and equipment is arranged for comfort and ease of mobility through rotations.
- Yes     No
7. Frequent (at least every 2-3 weeks) teacher use of the Scholastic Management Suite for tracking and monitoring student progress and reports.
- Yes     No
8. Regular teacher use of *READ 180* instructional guides and reproducibles contained in *READ 180* teacher and program guides.
- Yes     No
9. Administration of the SRI at the beginning, mid-point, and end of the period of student participation in *READ 180*.
- Yes     No
10. Student participation in *READ 180* for at least a year.

APPENDIX B

READ 180 TEACHER SURVEY

1. Are you currently using the Scholastic *READ 180* program as part of the instruction you provide to students? If No, discontinue survey.

- Yes  No

2. How long have you been a teacher (including all of your teaching positions)?

- Less than 1 year  4-5 years  
 1-3 years  More than 5 years

3. When did you begin using *READ 180*?

- Fall 2003  Fall 2002  
 Spring 2003  Other (please specify)

4. Have you participated in at least one day of professional development related to the implementation and use of *READ 180* since September 2002?

- Yes  No

5. Which stage of *READ 180* are you currently using?

- Stage A  Stage C  
 Stage B  Don't Know

6. How many sections of *READ 180* do you currently teach?

- One  Three  
 Two  Four or more

7. How many students are in each of your *READ 180* sections?  
*Ten students are in each section.*

8. Use the following chart to indicate the grade levels, not reading levels, of the students in each of your *READ 180* sections (select all that apply):

|            | 3rd<br>Grade             | 4th<br>Grade             | 5th<br>Grade             | 6th<br>Grade | 7th<br>Grade | 8th<br>Grade | 9th<br>Grade             | 10th<br>Grade            | 11th<br>Grade            | 12th<br>Grade            |
|------------|--------------------------|--------------------------|--------------------------|--------------|--------------|--------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Section 1: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 10           | 10           | 10           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Section 2: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 10           | 10           | 10           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section 3:                                           

9. For each of your *READ 180* sections, please estimate the percent of students reading below grade level in each of the following categories:

|            | Percent of students reading 1 year below grade level | Percent of students reading 2 years below grade level | Percent of students reading 3 or more years below grade level |
|------------|--|---|---|
| Section 1: | <u>35%</u>   | <u>35%</u>  | <u>30%</u>  |
| Section 2: | <u>35%</u>   | <u>35%</u>  | <u>30%</u>  |
| Section 3: | <u>35%</u>   | <u>35%</u>  | <u>30%</u>  |

10. Use the following chart to indicate each of the *READ 180* sections you teach includes students who are English-Language Learners or students who have been identified as needing services (select all that apply):

|            | Section includes English-Language Learners | Section includes students needing special education services |
|------------|--|--|
| Section 1: | <input type="checkbox"/>                   | <input checked="" type="checkbox"/>                          |
| Section 2: | <input type="checkbox"/>                   | <input checked="" type="checkbox"/>                          |
| Section 3: | <input type="checkbox"/>                   | <input checked="" type="checkbox"/>                          |

11. Use the following chart to indicate how many minutes each of your *READ 180* sections meets each day. (Type in the number of minutes in the boxes below. If a *READ 180* section does not meet on a day, type "0" in the box for that day.)

|            | Monday | Tuesday | Wednesday | Thursday | Friday |
|------------|--------|---------|-----------|----------|--------|
| Section 1: | 90     | 0       | 90        | 0        | 90     |
| Section 2: | 90     | 0       | 90        | 0        | 90     |
| Section 3: | 90     | 0       | 90        | 0        | 90     |

12. Please use the following chart to indicate whether your *READ 180* schedule regularly includes each of the following components for each section you teach (select all that apply):

|            | 20 minutes of whole-group instruction at the beginning of each class | Three 20-minute rotations for small-group instruction, independent reading, and computer use | 10-minute wrap-up                   |
|------------|--|--|-------------------------------------|
| Section 1: | <input checked="" type="checkbox"/>                                  | <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> |
| Section 2: | <input checked="" type="checkbox"/>                                  | <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> |

Section 3:



13. In general, how often do you assign homework to your *READ 180* students?
- Less than once a week                       2-3 days a week  
 Once a week                                       4-5 days a week
14. Does your *READ 180* classroom have enough working computers (including headsets and microphones) to permit each student to rotate through use of the *READ 180* Software each day the class meets?
- Yes     No
15. Does your *READ 180* classroom have enough working cassette players to permit each student to rotate through use of the *READ 180* Audiobooks each day the class meets?
- Yes     No
16. Do you have any of the *READ 180* Topic CDs in your classroom?
- Yes                       No                       Don't know
17. A complete set of *READ 180* Topic CDs includes nine different CDs (different titles). How many complete sets of Topic CDs do you have in your classroom?
- I do not have a complete set of Topic CDs  
 1-3 sets  
 4 sets  
 5 sets  
 6 or more sets
18. Do you have any of the *READ 180* Paperbacks in your classroom? If No, go to question 20.
- Yes                       No                       Don't know
19. A complete set of *READ 180* Paperbacks includes 40 different books (different titles). How many complete sets of Paperbacks do you have in your classroom?
- I do not have a complete set of Paperbacks  
 1-3 sets  
 4 sets  
 5 sets  
 6 or more sets

20. Do you have any of the *READ 180* Audiobooks in your classroom?

- Yes                       No                       Don't know

21. A complete set of *READ 180* Audiobooks includes 12 different Audiobooks (different titles). How many complete sets of Audiobooks do you have in your classroom?

- I do not have a complete set of Audiobooks  
 1-3 sets  
 4 sets  
 5 sets  
 6 or more sets

22. Scholastic provides a number of guides to help you use *READ 180*. For each of the guides listed in the left-hand column below, please select the statement or statements that describe your experience in using the guide:

|  | The guide has helped me understand <i>READ 180</i> | The guide has helped me be more effective with my students | The guide has not been very useful | N/A: I have a copy of this guide, but I have not read it | N/A: I do not have a copy of this guide |
|--|--|--|------------------------------------|--|---|
| Teacher's Guide                          | <input checked="" type="checkbox"/>                | <input checked="" type="checkbox"/>                        | <input type="checkbox"/>           | <input type="checkbox"/>                                 | <input type="checkbox"/>                |
| Reading Strategies                       | <input type="checkbox"/>                           | <input checked="" type="checkbox"/>                        | <input type="checkbox"/>           | <input type="checkbox"/>                                 | <input type="checkbox"/>                |
| Phonics Strategies                       | <input type="checkbox"/>                           | <input checked="" type="checkbox"/>                        | <input type="checkbox"/>           | <input type="checkbox"/>                                 | <input type="checkbox"/>                |
| Writing and Grammar Strategies           | <input type="checkbox"/>                           | <input checked="" type="checkbox"/>                        | <input type="checkbox"/>           | <input type="checkbox"/>                                 | <input type="checkbox"/>                |
| Teacher's Resource Book                  | <input checked="" type="checkbox"/>                | <input checked="" type="checkbox"/>                        | <input type="checkbox"/>           | <input type="checkbox"/>                                 | <input type="checkbox"/>                |
| Strategies for English-Language Learners | <input type="checkbox"/>                           | <input checked="" type="checkbox"/>                        | <input type="checkbox"/>           | <input type="checkbox"/>                                 | <input type="checkbox"/>                |
| Test-Taking Strategies                   | <input type="checkbox"/>                           | <input checked="" type="checkbox"/>                        | <input type="checkbox"/>           | <input type="checkbox"/>                                 | <input type="checkbox"/>                |
| Reports Guide                            | <input checked="" type="checkbox"/>                | <input checked="" type="checkbox"/>                        | <input type="checkbox"/>           | <input type="checkbox"/>                                 | <input type="checkbox"/>                |
| Software Manual                          | <input checked="" type="checkbox"/>                | <input checked="" type="checkbox"/>                        | <input type="checkbox"/>           | <input type="checkbox"/>                                 | <input type="checkbox"/>                |

23. Have you administered the Scholastic Reading Inventory (SRI) to all of your *READ 180* students during the current school year?

- Yes                       No

24. About how many times will you administer the SRI to your students this year, including administrations that you have already completed? (select one)

- One time                       Five times  
 Two times                       More than five times  
 Three times                       Don't know

- Four Times
25. In general, how long do your *READ 180* students remain in the program? (select one)
- |  |   |
|--|---|
| <input type="checkbox"/> Less than a quarter | <input checked="" type="checkbox"/> The whole year        |
| <input type="checkbox"/> A quarter           | <input type="checkbox"/> More than a year                 |
| <input type="checkbox"/> Two quarters        | <input type="checkbox"/> It varies too much to generalize |
| <input type="checkbox"/> Three quarters      | <input type="checkbox"/> Don't know                       |
26. Which of the following statements best describes the reason why most students leave *READ 180*? (select one)
- They reach proficiency as readers, as measured by the SRI
- They reach proficiency as readers, as measured by a standardized test administered in my district (please specify the name of the test)
- They complete a regular school term
- It varies too much to generalize
- Don't know
27. Approximately what proportion of students in your *READ 180* classes experience gains in their test scores (SRI or another standardized test) while enrolled in the *READ 180* program? (select one)
- All students
- Most students
- Some students
- A few students
- No students
- It's too soon to tell how many students experience gains in test scores
- Don't know
28. If some of your *READ 180* students experience higher gains in test scores than others, please use this space to briefly describe the students who benefit the most: *Sixth and eighth grade students have experienced higher gains in test scores than seventh grade students for the past two years. Special education students have also experienced higher gains in test scores.*

## APPENDIX C

### READ 180 PRINCIPAL INTERVIEW

Begin the interview by asking the principal for a brief description of the school, including a description of the student population and a description of the reading/language arts components of the instructional program.

1. How did you and the teachers in your school first decide to use *READ 180*?

*The reading specialist attended a workshop on READ 180 and asked that we investigate the possibility for our struggling readers. Further research and discussions with Scholastic representatives indicated that READ 180 was aligned to meet the needs of our students.*

2. How do you pay for *READ 180*?

*The school received funding for the program from the local school district. There is an annual renewable support plan that is paid from the school's instructional account each year.*

3. Based on your observations and experiences thus far, what have been the primary challenges in implementing and using *READ 180* in your school? Have you and the teachers been successful in overcoming the challenges?

*One initial challenge was the compatibility piece regarding the program's computer software. During the first year of implementation, Scholastic had just released the Macintosh version of the software. This issue served as a challenge for approximately one entire semester during the first year of implementation. A second challenge has been scheduling (i.e., How do we implement the program to best meet the needs of our struggling adolescent readers?). A decision was made*

*to serve 60 students (based on our site license) – 20 students per grade level – on an elective rotation. Thus, students participate in the program every other school day. While we realize the issue regarding program fidelity, at the time of implementation we felt that this was the best way to serve our population. While the issue regarding software compatibility has been resolved, data to date indicates that the school might want to focus working with students in Grade 6 in the program and on a daily basis in future years. For example, an analysis of SRI data from the 2005-2006 school year found that students participating in READ 180 demonstrated growth in Lexiles scores on the year-end posttest at significantly higher levels when compared to students with similar ability levels.*

4. Based on your observations and experiences thus far, what has been the impact of *READ 180* on student learning and other areas of student outcomes? What is the evidence of this impact?

*Perhaps the biggest impact we have seen has been in the area of student motivation. Many of the students placed in the program are recommended due to a lack of motivation in addition to deficiencies with literacy skills. The instructor is a very positive person and, as a result, the volume of reading for students participating in this program has increased tremendously based on the number of books these students are checking out from the school's library and this instructor's classroom.*

5. Is *READ 180* more effective with some kinds of students than others? If so, which students benefit most from the program? Which students benefit the least?

*SRI pre vs. posttest data indicate that the program during the 2005-2006 school year was more effective for students in Grade 6. In addition, the program also appears to be making a positive difference for students who demonstrated very little interest in reading prior to being enrolled in this program. The students that benefit the least appear to be those students who do not take the program seriously or cause disruptions to the learning environment. If after repeated warnings a student does not listen to concerns surrounding time on task, then that student is removed from the program and the slot is filled with another student. Due to the number of students in our school identified as reading below grade level, the limited slots are too valuable not to have all students on task. In addition, based on feedback from the program instructor, students who are no more than two years below grade level (reading comprehension) are best served by this program.*

6. Is *READ 180* more suitable for some teachers than others? If so, which teachers are most able to use the program? Which teachers are least able to use the program?

*It is essential in my opinion that READ 180 instructors are able to develop a strong rapport with students and remain positive about strengthening all students' literacy skills. It is also important for READ 180 instructors to have sound knowledge of best practices regarding adolescent literacy. In addition, due to the number of activities taking place in the classroom at any given time, classroom management and organizational skills must be strong.*

7. How does *READ 180* compare to other approaches to reading instruction in this school in terms of student outcomes? In terms of teachers' ability to implement and use the program? In terms of costs?

*In terms of student outcomes, some data surrounding growth in Lexiles based on the SRI were noted above. An analysis of SOL scores in the content areas of reading and mathematics did not show any significant differences for students enrolled in the READ 180 program when compared to peers of the same ability levels that did not receive this reading intervention. No analysis to date has been conducted examining students' grades. At the present time, this program is the only option our school provides regarding a formal remediation setting for students. In terms of cost, I believe the program is worthwhile. The program is not difficult to implement and Scholastic has done an excellent job of providing a number of resources for the instructor to utilize.*

8. Would you recommend *READ 180* to other principals? What specific advice would you give them about using the program?

*According to our data, I would advise that schools implement the program based on how it was designed to be used. For example, for fidelity purposes, I do believe that students would benefit more from attending the program on a daily basis. I also believe that schools should focus their efforts on closing gaps in the earlier grades (i.e., Grade 6 in a middle school setting). One idea would be for students (with parent permission) to forgo being taught science or social studies and instead attend READ 180 daily. In addition, it is important that the instructor differentiate instruction as much as possible for all students. In our district this*

*means using results from SOL assessments and benchmark assessments to design individual learning plans to meet students where they are at any given point in time. I would recommend this program to other middle schools.*

## APPENDIX D

### READ 180 TEACHER INTERVIEW

1. How long have you been a teacher (including all of your teaching assignments)?  
*I have been teaching for 21 years.*
2. How long have you been using *READ 180*?  
*I have been using READ 180 for four years.*
3. How many sections of *READ 180* do you currently teach?  
*READ 180 is my full-time teaching responsibility. I teach six sections of READ 180.*
4. Using the most recent *READ 180* class session as an example, briefly describe how the session was organized in terms of the kinds of teaching and learning activities and the amount of time devoted to each one.  
*The eighth grade READ 180 class is structured for 90 minutes, with time split between the mini-lesson, software, Reading Counts, and group wrap-up.*
5. Is this the general pattern of all of your *READ 180* classes? If not, briefly describe how the class sessions vary.  
*The general pattern of the READ 180 sections are the same with five minutes fluctuations of the class schedules.*
6. Briefly describe your most recent experience in using the *READ 180* Scholastic Management Suite™ (SMS). How often do you use the SMS and for what purposes?  
*The Management Suite helps to adjust instruction and generate reports to assess learning.*

7. How are students selected to enroll in *READ 180*? Who makes the decisions? What factors are considered? In general, are the selection criteria applied consistently to all students?

*Students are assigned to READ 180 by their guidance counselor based on pretest reading results, the Virginia Standards of Learning (SOL) Reading Test, and teacher recommendation.*

8. In general, how long do students remain in *READ 180*? (If the answer is less than a year or other than a complete school term, ask about the reasons why students exit the program.)

*Most students remain in READ 180 for the complete school term. Students exit the program if reading growth accelerates to grade level.*

9. Briefly describe the students in your *READ 180* classes (by race/ethnicity, ELL status, eligibility for special education services).

*The READ 180 classes include students of all races and students who are eligible for special education services.*

10. What are your observations about the impact of *READ 180* on student outcomes? (Probe for observations about the impact on reading, achievement in other subject areas, and student behavior.) What are the specific indicators that you see? Does *READ 180* have more or less the same impact on all students? If not, how does the impact vary?

*The majority of the READ 180 students love it and report higher grade point averages as a result of the program.*

11. What have been the biggest challenges in implementing and using *READ 180*?

How have you overcome the challenges?

*There were technical difficulties with the software during the initial year of implementation. Scholastic sent a technical expert who diagnosed and corrected the problem.*

12. Would you recommend *READ 180* to other teachers? If yes: Are there any conditions or reservations to your recommendation?

*I highly recommend READ 180, particularly with the new Enterprise Edition.*

## APPENDIX E

### IRB APPROVAL

**Office of Research Compliance**

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DATE: January 5, 2007

**MEMORANDUM**

TO: Theodore Creighton

Donna Woods

FROM: Carmen Green

**IRB Exempt Approval:** "Investigation of the Effect of a Middle School Reading Intervention and School Dropout Rates," IRB # 06-748

I have reviewed your request to the IRB for exemption for the above referenced project. I concur that the research falls within the exempt status. Approval is granted effective as of January 5, 2007.

As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

FWA00000572 (expires 7/20/07)

IRB # is IRB00000667.

VIRGINIA POLYTECHNIC INSTITUTE UNIVERSITY AND STATE UNIVERSITY

cc: File