

TECHNOLOGY-BASED INTERVENTION FOR AT RISK  
MIDDLE SCHOOL READING STUDENTS:  
A LOOK AT READ 180

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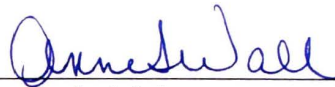
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To the College of Graduate Studies:

We are submitting a field study written by Debra Shoulders entitled "Technology-based Intervention For At Risk Middle School Reading Students: A Look at READ 180."

We have examined the final copy of this field study for form and content. We recommend that it be accepted in partial fulfillment of the requirements for the degree of Education Specialist.



Research Advisor

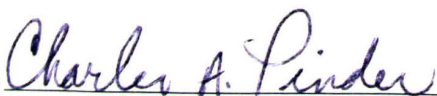


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TECHNOLOGY-BASED INTERVENTION FOR AT RISK MIDDLE SCHOOL  
READING STUDENTS: A LOOK AT READ 180

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## ABSTRACT

DEBRA E. SHOULDERS. Technology-based Intervention for At Risk Middle School Reading Students: A Look at READ 180 (under the direction of DR. ANNE WALL).

The purpose of this study was to observe and compare the effects of a technology-based literacy intervention, READ 180 to traditional reading instruction with at risk, middle school reading students. The sixty-six seventh and eighth grade students involved in the study in both the control and treatment groups scored at least one reading level below grade level on standardized reading tests. The control group included individuals who were coded to be similar to the treatment group in the count, gender, ethnicity, and socioeconomic status.

The testing instrument used for data purposes was the Reading Benchmark test, a formative assessment given three times each school year to determine whether a student has mastered the student performance indicators for that time period. This information was reported using EduSoft assessment management software. An analysis was performed with StatView statistical software. Comparisons of the two groups were obtained through statistical analysis using unpaired t-tests and analysis of variance (ANOVA). Though the t-tests showed a few incidents of statistically significant differences occurred in the three-benchmark tests, there was no statistically significant difference between students receiving READ 180 instruction and students receiving traditional reading instruction allowing the null hypotheses to be retained. The ANOVA did indicate a statistically significant difference but outliers on Benchmark Two may have contributed to this outcome making the result questionable and therefore inconclusive.

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### The Research Problem

#### **Statement of the Problem**

The ability to read and comprehend text impacts academic achievement in all content areas of school as well as future success. The National Association of State Boards of Education (2005) reports, “Reading is a basic human right. An inability to read in today’s world is to be consigned to educational, social and economic failure – an existence entirely devoid of meaningful life, liberty or the pursuit of happiness” (p. 4). Schumaker, Deshler, and Woodruff found the problem to be especially poignant in the middle grades when they observed that the academic growth of students with literacy disabilities seemed to plateau at seventh grade creating an achievement gap that widens throughout the remainder of secondary education (2006). Poor readers in middle school are most at risk for dropping out of school before graduation (Christie, 2007).

There is also a connection between literacy rates and health disparities (Sentell & Halpin, 2006). The National Institute of Child Health and Human Development (2002) concludes, “Literacy is a complex learning process that everyone living in the United States must negotiate successfully in order to compete effectively in this country” (NICHD, ¶ 9).

Alvermann (2000) declares, “Years of neglect in addressing the literacy needs of older readers have exacted their toll” (p. 68). Using 1999 data from the National Assessment of Educational Progress (NAEP) she continues, “Although close to 75% of U.S. adolescents can read and write at the most minimal or basic level, fewer than 5% are

capable of performing at an advanced level” (p. 68). NAEP in 2005 again reported little progress with eighth grade reading students and a decrease of six points in twelfth grade (National Center for Education Statistics, 2007). Biancarosa and Snow summarize, “American youth need strong literacy skills to succeed in school and in life. Students who do not acquire these skills find themselves at a serious disadvantage in social settings, as civil participants, and in the working world” (2004, p. 3).

Fleishman (2004) identifies the struggling adolescent readers as students from “all walks of life” (p. 2). Almost half of African-American and Hispanic eighth graders read below grade level. The National Center for Education Statistics (2005) reveal “more than 8 million students in grade 4 – 12 read below grade level” (as cited in Alliance for Excellent Education, 2006, ¶ 3). English Language Learners and students from low socioeconomic backgrounds have an increased tendency toward reading deficits (AEE, 2006). Balfanz, McParland, and Shaw found that “in a typical high poverty urban school, approximately half of incoming ninth-grade students read at a sixth- or seventh-grade level (as cited in Alliance for Excellent Education, 2006, ¶ 6). Finally six million students have been identified as physically and emotionally disabled, defined by the Individuals with Disabilities Act (IDEA) who experience learning problems (AEE, 2006).

Not only do students have trouble reading, they simply do not read. Trends suggest there is less reading for pleasure in a time of high stakes testing. Manzo (2007) observed “Fewer than one-fourth of 17-year-olds, for example, read almost every day for fun, and young people 15 – 24 read 10 minutes or less a day, on average” (¶ 3). This age group watches television, listens to music or other media rather than use leisure time to read for pleasure (Manzo, 2007).

Students who arrive in secondary education with deficient reading skills bring a history of failure that often determines their social status. They may become part of peer groups that do not value educational outcomes and are more likely to drop out of school, further endangering their future (National Governors Association, 2005).

### **Purpose of the Study**

“READ 180 is a comprehensive reading intervention program designed to meet the needs of students in elementary through high school whose reading achievement is below grade level” (Literacy Matters, 2007, ¶ 2). Scholastic’s program utilizes computer modules that focus on Reading, Spelling, and Word Study through the use of videos, audio books, and individual skill practice. This study will help to determine whether technology-based instruction impacts reading as an intervention tool for at risk middle school students.

### **Significance of the Study**

Due to the mandates of No Child Left Behind (NCLB), all students must reach proficiency in Reading. “President Bush called reading the ‘new civil right’ (National Association of State Boards of Education, 2005, p. 4). The new focus on adolescent literacy acknowledges that reading skills are necessary components of instruction well beyond elementary school. Reading programs must devote time to reading self-selected books, comprehension, and writing (McGrath, 2005). Biancarosa further defines the needs of adolescent reading programs with the inclusion of content area texts, motivating reading activities, technology, and ongoing assessment to improve instruction (as cited in Cassidy, Garrett & Barrera, 2006).

While READ 180 employs many of these strategies, Scholastic, Inc., the program's manufacturer, supplied much of the research conducted on the impact of READ 180. Unbiased studies share mixed results, therefore a study that will show if there are any statistically significant reading gains in middle school students receiving READ 180 instruction provides additional what? to evaluate the intervention.

## **Research Questions**

The following research questions were generated to guide the study.

1. What is the mean score in reading proficiency experienced by students who participate in the READ 180 program as compared to students of similar ability levels who do not participate in the program?
2. Is there a difference in the reading scores of middle school female students who participate in the READ 180 program as compared to middle school female students of similar ability levels who do not participate in the program?
3. Is there a difference in the reading scores of middle school male students who participate in the READ 180 program as compared to middle school male students of similar ability levels who do not participate in the program?
4. Is there a difference in the reading scores of middle school black students who participate in the READ 180 program as compared to middle school black students of similar ability levels who do not participate in the program?
5. Is there a difference in the reading scores of middle school low socioeconomic students who participate in the READ 180 program as compared to middle school low socioeconomic students of similar ability levels who do not participate in the program?

## Hypotheses

1. There is no statistically significant difference in the mean reading scores for middle school students participating in the READ 180 program as compared to middle school students of similar ability levels who do not participate in the program.
2. There is no statistically significant difference in the reading scores of middle school female students who participate in the READ 180 program as compared to middle school female students of similar ability levels who do not participate in the program.
3. There is no statistically significant difference in the reading scores of middle school male students who participate in the READ 180 program as compared to middle school male students of similar ability levels who do not participate in the program.
4. There is no statistically significant difference in the reading scores of middle school black students who participate in the READ 180 program as compared to middle school black students of similar ability levels who do not participate in the program.
5. There is no statistically significant difference in the reading scores of middle school low socioeconomic students who participate in the READ 180 program as compared to middle school low socioeconomic students of similar ability levels who do not participate in the program.

## **Limitations**

The study will be based on these limitations.

1. There is a lack of randomization due to the subjects being READ 180 students at one suburban middle school.
2. READ 180 is in its first year of implementation at the middle school.
3. Students enrolled in READ 180 complete a modified Reading Benchmark test.

## **Delimitations**

The study will be guided by these delimitations.

1. The study is delimited to thirty-three 7<sup>th</sup> and 8<sup>th</sup> grade students who are at least one year below grade level in reading as the treatment group.
2. The study is delimited to thirty-three 7<sup>th</sup> and 8<sup>th</sup> grade students who are at least one year below grade level in the control group.
3. The study will begin with the Fall of 2007 through the spring of 2008.
4. Students will complete the Reading Benchmark test three times throughout the school year.
5. The Reading Benchmark scores will be used to assess achievement.

## **Assumptions**

The study will be based on these assumptions.

1. Some students will enter middle school without the skills necessary for successful comprehension of reading.
2. Adolescents who are struggling in reading are probably challenged in other content areas.

3. All teachers involved in the READ 180 program are trained and use similar instructional strategies and resources.

### **Definition of Terms**

1. At risk – students who are reading one year below grade level.
2. Benchmark Test – an assessment that compares performance of students to targeted standards.
3. Edusoft – a web-based student assessment platform used to track student performance.
4. Middle School – students enrolled in grades seventh and eighth.
5. READ 180 – a comprehensive reading intervention program designed to meet the needs of students in elementary through high school, whose reading achievement is below the proficient level.
6. Socioeconomic Status – students qualifying for free or reduced lunch are identified as low socioeconomic status.
7. Student Performance Indicator – evidence that the knowledge and skills for the standard have been met.
8. Technology – any hardware or software that is intended to aid instruction.

## Chapter II

### Literature Review

#### **Adolescent Literacy - An Initiative**

The adolescent reader is a unique learner requiring specialized teachers, instruction, and material. Federal programs like Reading First and No Child Left Behind (NCLB) targeted primary students and high schools utilized programs, which focused on graduation rates leaving students between fourth and ninth grade overlooked. Carol Minnick Santa, former president of the International Reading Association, concluded, “Adolescents are being short-changed” (as cited in Moore, Bean, Birdyshaw & Rycik, 1999, p. 1).

Neglecting the literacy needs of adolescents leads to social and economic consequences. Seventy percent of adolescents have some type of reading challenge which if not addressed leads to higher risk for dropping out of school, possible criminal activity and more chances of unemployment (National Association of State Boards of Education, 2005). Forty percent of high school graduates do not have the skills necessary for successful employment in today’s market (National Governors Association, 2005).

Fortunately there are signs of progress in the field of adolescent literacy practices. Researchers have developed concepts of what makes effective reading instruction (National Association of State Boards of Education, 2005). Beginning in 1999, the International Reading Association released a position statement with principles for supporting adolescents’ literacy growth.

1. Adolescents deserve access to a wide variety of reading material that they can and want to read.

2. Adolescents deserve instruction that builds both the skill and desire to read increasingly complex materials.
3. 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.
4. Adolescents deserve expert teachers who model and provide explicit instruction in reading comprehension and study strategies across the curriculum.
5. Adolescents deserve reading specialists who assist individual students having difficulty learning how to read.
6. Adolescents deserve teachers who understand the complexities of individual adolescent readers, respect their differences, and respond to their characteristics.
7. Adolescents deserve homes, communities, and a nation that will support their efforts to achieve advanced levels of literacy and provide support necessary for them to succeed (Moore, Bean, Birdyshaw & Rycik, 1999, p. 4 - 9).

More current recommendations come from The National Association of State Boards of Education study group on middle and high school literacy.

1. Set state literacy goals and standards, ensuring alignment with curricula and assessments, and raising literacy expectations across the curriculum for all students in all grades.
2. Ensure that teachers have the preparation and professional development to provide effective, content-based literacy instruction.
3. Strategically use data to identify student needs, design cohesive policies, and evaluate quality of implementation and impact.

4. Require the development of district and school literacy plans that infuse research-based literacy supports strategies in all content areas.
5. Provide districts and schools with funding, supports, and resources.
6. Provide state guidance and oversight to ensure strong implementation of comprehensive literacy programs (National Association of State Boards of

Education, 2005. p. 6–7).

Regrettably there is a gap between proposals and actual implementation in school districts and classrooms. It is imperative that states adopt practices for adolescent literacy that are well documented and have been demonstrated to be effective (NASBE, 2005).

### **Characteristics of the Adolescent Learner**

Lesesne (2006) found, “As students grow and move from elementary to intermediate and on to middle school, there are tons of transitions they must make” (p. 10). These include physical, emotional, mental, psychological, and social/cultural transitions. “How students process information, how they relate to one another, and how they deal with situations all begin to develop and change” (Lesesne, 2006, p. 12). Slaven, Chamberlain and Daniels (2007) particularly described middle school students, pointing out that they “have more sophisticated interests and social skills, and those who struggle in reading have little patience for methods or materials designed for young children” (p. 22). Bacon (2005) also portrayed this age group as “undeniably social; they love to talk, to share ideas, and to debate” (p. 418). When reading challenges occur, “their emotional and social systems take control” (Lupino, 2005, p. 5). Therefore it is necessary to provide reading methods that build on the developmental strengths of adolescent students with

respect for their interests, social enthusiasm, desire for independence, craving for honesty, and positive feedback (Slavin et al., 2007).

Leisure reading habits, a facet of the emotional aspect of adolescent development, impacts reading achievement. Defining leisure reading as routines borne of pleasure rather than assignments, this type of reading is self-selected and takes place during recreational time (Hughes-Hassell & Rodge, 2007). Creel (2007) lists some popular misconceptions of teen reading habits.

1. Teens don't read at all;
2. Teens only read adult books; and
3. Teens don't have time to read (p. 46).

Students from St. John's University Library Science class surveyed adolescents in public places like libraries, malls, and schools. Using the results of 127 participants (60% female and 40% male) the library science students concluded almost half (44%) read more than once a week. Fifty-seven percent of the participants reported they read books while 30 percent read magazines. They also found that adolescents do not consider the time they spend on the Internet, reading. Recommendations of the study included maintaining libraries with a wide range of current materials. For example, incorporate contemporary resources from a variety of genres like teen magazines (Creel, 2007).

Hughes-Hassell and Rodge (2007) also focused their research on the reading habits of urban adolescents but observed students with low socio-economic characteristics. The subjects of this study attended a middle school located in a large northeastern city of the United States. Primarily Latino (66%) and African-American (27%) as well as eighty-six percent free and reduced lunch, the school was chosen

because of the limited availability of surveys from low-income minority youth and to provide data for a reading incentive program. The librarian administered a 5-page, 20-item survey to 715 students. Due to missing data, 584 surveys provided the data for analysis; 47% were female and 53% male respondents. Seventy-two percent of the students engaged in leisure reading, which the authors found consistent with other studies of adolescent reading. Girls read more than boys (78% versus 64%) and both groups “showed a strong preference for magazines” (p. 24). Hughes-Hassell and Rodge concluded that the reading incentive program impacted the large number of books read for pleasure as the number of readers dropped during the summer months. Their study also recommended that educators provide reading materials that appeal to adolescents such as magazines, comic books, graphic novels, and *manja* (black and white comic book genre printed in the Japanese fashion of reading right to left) as well as allot time for reading on the Internet (2007).

Peer influence is an important consideration in the social development of adolescents. A report from the National Center for Education Statistics (1997) analyzed data from a national longitudinal study. The researchers found that students who socialized with friends who were interested in schools had more positive academic outcomes and were less likely to drop out of school, leading to the conclusion that peer groups influence academic achievement and future educational success.

Bishop, Bishop, and Bishop (2003) also determined that peers are a powerful influence in middle school and affect the learning environment. The researchers suggest that schools recognize peer influences and create strategies to “make learning the cool thing to do” (p. 52). They further advise discontinuing practices that “inadvertently

contribute to the negative view of academic success” (p. 52). These include curving grades, competitions, and lowering academic standards.

Nichols (2008) questions if there is a link between students’ perceptions of belonging and their resultant motivation and achievement in school settings. Anderman found that while prior research showed student belonging positively impacting academic achievement there was little information on the content and value of students’ individual belongingness beliefs, especially students from diverse backgrounds (as cited in Nichols, 2008). Using 150 students enrolled in a new charter school developed to have a school close to the students’ homes, Nichols subjects were 98% Hispanic and 100% free and reduced lunch. These students completed an open-ended, semi-structured interview that concentrated on comparing experiences and levels of belongingness in past and present settings. Most students perceived a sense of belonging at their previous school (60%) as well as their present (67%). There was no correlation between their perceptions of school and belongingness making beliefs about “belongingness complex and multidimensional” (Nichols, 2008, p. 165).

Alvermann (2001) addressed the unique characteristics of adolescents concluding with their effect on literacy instruction. Adolescents’ perceptions of how competent they are as readers and writers, generally speaking, will affect how motivated they are to learn in their subject area classes. Thus, if academic literacy instruction is to be effective, it must speak to issues of self-efficacy and engagement. Adolescents’ interests in the Internet, hypermedia, and various interactive communication technologies suggest the need to teach youth to read with a critical eye toward how writers, illustrators, and the like represent people and their ideas.

## **Adolescent Reading Interventions**

Since adolescent attitudes toward reading, peer influence, and belongingness are factors in literacy success it is necessary to conclude that interventions for secondary reading programs should reflect those ideas. Kelley (2007) looked at the effect of a “direct intervention based on principles of engagement, action and relevance” (p. 72) observing middle school adolescent boys.

Using 120 boys from ten schools in western metropolitan Australia, the subjects began the intervention completing a survey of reading behaviors. During the six-month program the boys engaged in activities that were designed for their relevancy. They met authors, reacted to the authors’ books through online blogs, and toured the State Library of Victoria, ending with a post-program survey. Kelley concluded there was an increase in positive engagement by involving the subjects in a literary environment that had been missing due to geography, economics, or opportunity (2007).

Self-selection of books was an important component of an action research project undertaken by Ahrens (2005). Assigned to a sixth grade reading class in the Silicon Valley of California, she discovered a curriculum in turmoil with dispirited teachers that were hesitant to try research-based strategies. Encouraged to analyze the program as part of a Master’s Degree program, Ahrens began by implementing new assessments for placement of students into homogenous reading classes. As students progressed they were moved into elective classes that were also scheduled during the reading time slot. Ahrens then introduced new instructional strategies. Influenced by Hollingsworth and Boin’s concept of Independent Reading Practice (IRP), students chose their own books for independent reading to practice prosody, fluency, accuracy, and comprehension (as

cited in Ahrens, 2005, p. 646). Finally several explicit instruction best practices were employed for comprehension. A new strategy was selected for each month to develop continuity among teachers and courses.

Ahrens (2005) concluded that the IRP segment encouraged teachers to have more one-on-one time with their students and the students in turn were excited about the opportunities to have choice in their reading material. Eighty percent of the students were moved to elective classes after the first semester signifying they were reading at grade level. The changes seemed promising but additional time to employ the new strategies is needed to assess the success.

Reading Edge addresses the emotional and social development of adolescents as well as being a reading intervention. Slavin, Chamberlain and Daniels (2007) studied students at two middle schools, one in West Virginia and the other in Florida. Each had a high number of free and reduced lunch participants, 50 and 69 percent, respectively.

Reading Edge, a program developed by the Success for All Foundation is designed around the following principles to help break the cycle of reading failure.

1. Cooperative Learning
2. Proactive Classroom Management
3. Instruction in Metacognitive Skills
4. Goal Setting
5. Frequent Assessment and Feedback (Slavin, et al., 2007, p. 22-25)

Students are assigned to heterogeneous four-member teams. They study together developing responsibility for the entire team's success even though assessment is determined by individual progress. Lessons are motivating and active, using such

strategies as think-pair-share, numbered heads, and discuss and defend to channel a normal adolescent's energy into something positive. Helping students reflect and become strategic readers allows them to think about and manage their own learning as well as plan toward goals. They see the results of the goal setting with frequent feedback through individual and team recognition.

Students at both middle schools were randomly assigned to a Reading Edge class or a traditional reading textbook class. Slavin et al. (2007) summarized the results rather than sharing hard data. Using the *Gates McGinitie Reading Test* for pre-testing in the fall and post-testing in the spring, the researchers observed, "Students in the Reading Edge classes scored significantly higher than those in traditional instruction" (p. 27). They continued the study into the following year in 6<sup>th</sup> grade with the results being nearly identical. A replication of the research in seven additional schools showed an average gain of 24.6 percent for the Reading Edge group on the states' reading assessments compared to an average 2.2 percent gain for the control group.

Understanding that self-esteem is an important element of reading success in adolescents, Glavach (2007) researched the effect of the Core Reading program on middle and high school students. Targeted for content reading, the model for this adolescent reading intervention focused on (1) decoding content vocabulary, (2) organization, (3) summarizing, and (4) interpreting information, key skills for comprehending nonfiction text. Interventions were offered to students in a reading lab funded by the federal Title One program. Referred by state achievement scores in reading, the lower quartile were then given the *Brigance Word Recognition Test* and *Brigance Oral Reading Test* for placement. Sixty-five students from a population of 1600

were chosen for participation in the program. These students took part in the lab activities for one hour each day or five hours a week. The interventions included an individualized software program with five reading levels, explicit instruction in phonics, and silent reading with response writing utilizing a variety of reading materials that matched student interests and reading levels. Results of the *Brigance Word Recognition Test* after one year showed an average growth of 2.95 years and 1.90 years on the *Brigance Oral Reading Test*. After the second year there was a 3.05 average growth on the *Brigance Word Recognition Test*. Glavach summarized, “The assessment results showed that with only a brief intervention, 5 hours a week for one school year, older students could grow significantly more in reading especially word recognition and reading fluency than younger students” (p. 7). While success in all areas of secondary education is critical, the study did not formally gather and analyze data to determine if achievement occurred in the content related courses. Teacher observations seemed to concur that students were more successful but without statistical data the accomplishment remains untested.

Bacon (2005) used strategies from her background as a reading specialist to assist struggling students in a sixth grade humanities class. Used to working one-on-one with students, the instructional strategies had to expand to include thirty students. Bacon opted to have the students become reading coaches. “I decided to train these active, thoughtful, socially motivated children to listen, question, prompt, confirm, explore and reflect on their reading and the reading of their peers” (p. 417). The design of the reading model included the fundamentals of strategy focus, word work, rereading, comprehension activities, and writing but more importantly included the goal to “create a self-motivated, responsible, and respectful learning community” (p. 419). It embraced the idea that

mistakes are logical thought processes, which are a great source of learning for those aware of them. Also everyone has unique strengths and weakness with respect to learning. Finally, goal setting is important as well as being aware of the metacognitive processes of reading. These objectives were met through formal and informal training. Bacon determined achievement by analyzing data from running records and the 1995 *Qualitative Reading Inventory II* (QRI) as well as keeping reflective notes. Overall students increased their reading level by 1 – 3 years in an eight-month span between pre and post-testing. Bacon relies heavily on notes of student reflections to validate her results that students had a “more profound desire to attend to text and monitor their reading” (p. 428).

Researchers from the University of Kansas reacting to the growing achievement gap among secondary students challenged the need for mini courses in such subjects as decoding (Schumaker, Deshler & Woodruff, 2006). Students who were below grade level in decoding were selected for the mini course, which took the place of a language arts class. They remained on this schedule, usually four to eight weeks until progress was made. The mini course followed an eight stage instructional methodology that included explicit instruction followed by application of the new skills at the student’s reading level. After mastery, the students transfer the learning to the content of their other coursework. Two schools were used in the study; one provided the intervention and the other control students who were matched in age, ethnicity, gender and pretest decoding skills. All of the students in the experimental group gained one grade level in decoding skills with an average of 3.4 years. The control group gained an average of .2 grade level. The researchers concluded that intensive interventions are necessary in secondary

education to close the performance gap of adolescent reading achievement (Schumaker et al., 2006).

Fisher and Ivey (2006) assessed the effectiveness of several current reading interventions developing guidelines for successful programs. Attempting to meet the guidelines of NCLB many school districts are adopting commercial reading programs, perhaps neglecting some of the needs of struggling readers, necessitating principles for successful reading intercessions. Initially two assumptions were developed for schools using reading programs, Opportunities for wide reading were available and the school had a strong focus on relevant, content-based literacy achievement. With these concepts in place, the following guidelines provide direction in developing a profitable intervention.

1. The teacher should play a critical role in assessment and instruction.
2. The intervention should reflect a comprehensive approach to reading and writing.
3. Reading and writing should be engaging.
4. Interventions should be driven by useful and relevant assessments,
5. The intervention should include significant opportunities for reading and writing (Fisher & Ivy, 2006, p. 182-184).

Phelps (2005) collecting data for the North Central Regional Educational Laboratory (NCREL) summarized ten years of efforts on behalf of adolescent literacy. Reiterating the conclusions of the International Reading Association's policy statement concerning adolescent literacy (Moore, Bean, Birdyshaw, & Rycik, 1999), Phelps concurred with the need for understanding the uniqueness of adolescents, use of a variety

of reading materials, increasingly complex and meaningful tasks, and assessment with feedback. Observations of ten years of implementation demonstrated the findings of Allington and Walmsley (1995) that “there was no single ‘quick fix’ for complex reading problems” (as cited in Phelps, 2005, p. 26). Solutions required attention to the needs of the school district, must be “comprehensive and multi-faceted, and integrated within and across the curricula” (p. 26). This means addressing the diverseness of the adolescent backgrounds as well as the new literacies introduced through multimedia and technology. Some strategies that proved to be effective were scaffolding instruction and encouraging active participation from the students.

### **Technology As An Instructional Intervention**

Computers and Internet usage by secondary students is increasing and with it the opportunity for improvement in everyday lives, especially to facilitate communication and expedite tasks (DeBell, 2003). This is an immediate concern for reading disabled students. The inability to access texts creates years of discouragement and repeated failures. Can technology provide a viable instructional intervention for disabled readers?

An Electronic Education Report (2007) found “The use of the participating software products did not affect-test scores by amounts that were statistically different from zero” but researchers did conclude “that students were more likely to engage in individual practice and teachers were more likely to facilitate student learning rather than lecture when software was used” (p. 2).

Attitude towards technology use is an influencing outcome of a study by Boon, Fore and Rasheed (2007). Observing that students with disabilities “are frequently overwhelmed with the amount of information to be covered in a secondary content

rooms” (p. 23), Boon et al. examined student attitudes toward technology-based applications in a social studies classroom. The setting of the study was a high school with a population of 1,875 students in a suburb of a large metropolitan city in the Southeast. Forty-nine ninth graders representing a range of socio-economic status, gender, and ethnicity were selected. All were placed in a regular education setting but 12 students were identified Learning Disabled (LD) and 8 Emotionally Disabled (ED). Each class was staffed with a regular education and special education instructor. Using two classrooms, one group used *Inspiration* software to organize ideas while the other received instruction in guided notes. Then the strategies were reversed so that each group was exposed to both ideas. Afterwards, a Likert-scale student satisfaction survey was administered. Seventy percent of the students in special education perceived that they learned more while using *Inspiration* while the students without disabilities were more likely to be undecided, leading the researchers to summarize that at risk students showed a positive attitude toward the use of software (Boon, et al. Fore & Rasheed, 2007).

Almost ten percent of American students receive special services in school but spend most of their day in inclusive versus pullout environments, expected to perform grade level work (Hasselbring & Bausch, 2006). With NCLB and The Individuals with Disabilities Education Act 2004 (IDEA) stressing the need for inclusion of all students in mainstream classes, technology may prove to be an untapped resource for assistive measures (Elder-Hinshaw, Manset-Williamson, Nelson & Dunn, 2006). Additionally NCLB emphasizes the use of technology to improve all student learning (Akiba, 2002).

Assistive Technology as defined by IDEA is any item, piece of equipment, or product system...used to increase maintain or improve functional capabilities of

individuals with disabilities (Individuals with Disabilities Education Act 1990, as cited in Hasselbring & Bausch, 2006). This type of technology has been proven to be useful for students with severe physical impairment and more often found in the special education classrooms but is a rather new implementation for students with learning disabilities in regular classrooms (Hasselbring & Bausch, 2006).

Assistive technologies may supplement a critical need for students that cannot read and its inherent sub-skills of phonics, decoding, and comprehension of text. This need can be met with assistive reading support, any technology that helps students access grade level text and assistive reading intervention, any technology that aids in strengthening and improving reading skills (Hasselbring & Bausch, 2006).

One type of assistive technology is text-reader software “that uses synthetic speech to read text aloud while the same text is highlighted on a computer screen” (Hasselbring & Bausch, 2006, p. 73). Raskind and Higgins found “Reading assistive software with a speech element has been shown to impact comprehension by providing information with accuracy and at an accelerated rate, which might not normally occur if read without the support of the technology (as cited in Dunn, Elder-Hinshaw, Manset-Williamson & Nelson, 2006, p. 7 this doesn’t match the reference). The state of Kentucky successfully used *TextHELP*, obtaining a reasonably priced site license and making most school texts computer-readable. This type of assistive technology can also be used as a testing accommodation for those students with Individual Education Plans (Hasselbring & Bausch, 2006).

Computer Assisted Instruction (CAI) is another way to provide interventions for struggling readers. Waxman, Padron and Arnold explained, “Researchers have argued

that CAI has the potential to alter the nature of teaching from the traditional, teacher-centered model to a more student-centered instruction approach which especially benefits students at risk” (as cited in Akiba, 2002, p. 97). While Bahr, Kinzer, Rieth and Davey did not find any “significant differences between those students who used a software program and those who did not” (as cited in Kim, Vaughn, Klingner, Woodruff, Reutebuch & Kouzekanani, 2006, p. 236), leading to the conclusion by Forness, Kavale, Blum and Lloyd, “CAI is an invention that shows promise in effectively helping students, rather than an intervention that we know works (as cited in Kim et al. 2006, p. 236).

Waxman, Hessemer & Cantrell developed a list of characteristics that allow CAI to contribute to the learning of at risk students (as cited in Akiba, 2002, p. 97).

1. CAI is non-judgmental and motivational.
2. CAI gives frequent and immediate feedback.
3. CAI can individualize learning through designs to meet students’ needs.
4. CAI allows for more student autonomy.
5. CAI provides a multi-sensory learning environment (images, sounds, and symbols).

Akiba (2002) conducted a meta-analysis of computer-assisted instruction, examining twenty-five studies. Seventeen of them yielded enough data to use quantitative methods to observe the effects of CAI. All of the studies included at risk students from grades one through twelve, although the term “at risk” was defined differently across the studies. Most of the studies focused on math or literacy skills using pre and posttest comparisons between an experimental and control group. The overall effect size, a statistic used in meta-analysis, was .37 or the CAI intervention scored 14 percent higher

than the average student in the control group, considered to be a significantly positive effect, although more effective in mathematics than literacy skills. Akiba observed that most of the studies did not include any information on teacher involvement or the teacher's attitude toward CAI. Kestner found with previous research, teacher input on the assignments of software topics had a positive impact on students in mathematics (as cited in Akiba, 2002, p. 102) while Moore observed CAI was most effective when the instructor had a positive attitude (as cited by Akiba, 2002, p. 103). Many of the studies did not provide information as to the nature of the CAI implementation therefore further study is required to determine the effect of CAI as an intervention for at risk students.

Hasselbring and Goin (2004) acknowledge that early attempts to use computer software to remediate students' learning problems were unsuccessful. Hoping to disprove past history the Peabody Literacy Lab (PLL) was developed to "combine learning theory and pedagogical principles that capitalized on the power of integrated media technology" (p. 12). Instruction through computer modules is based on contemporary topics that are grouped as Reading Lab, Word Lab or Spelling Lab. The labs utilize a video component that "helps build mental modes from text" (p. 13), as well as text-reader assistance. The student receives continuous assessment with individualized feedback, while adjusting the challenge level of the practice. Initially 63 students from three different schools in Orange County, Florida participated in the Peabody Literacy Lab in contrast to a control group of 62 students. Using the Stanford Diagnostic Reading Test (SDRT) as the testing instrument for pre and post-testing, paired *t-tests* showed a statistically significant gain for the Auditory Vocabulary, Literal Comprehension, and Inferential Comprehension subtopics as well as Total Reading Comprehension. The researchers concluded that they

were “guardedly optimistic” and “believe in the capacity of technology to afford students the instruction and practice they need to become fluent, understanding readers” (Hasselbring & Goin, 2004, p. 20).

Concerned by the idea that literacy achievement in the United States is in crisis the Department of Education in Connecticut observed the ways that technology was being integrated into their schools (Sternberg, Kaplan & Borck, 2007). Sternberg et al.’s initial assessment was that, “most Connecticut schools are well equipped with a variety of technologies for use by students; however, these technologies may not always be used in ways that significantly benefit learning” (2007, p. 416). Dividing the opportunities for educational technology experiences into seven areas, these topics were highlighted for empirical research to be used for future practice. The seven areas targeted for further observation were (a) virtual courses and delivery systems, (b) communication tools, (c) artificial intelligence, (d) word processors, (e) new literacies practices, (f) professional development, and (g) technology for parents.

Most important for the topic of this paper is artificial intelligence (AI). Sternberg et al. concluded that it held the greatest potential for the area of literacy (2007). The concept of AI is that students respond to prompts, submit their work, and then receive immediate feedback, allowing for revision of strategies, a process that cannot be replicated by the teacher in such a brief time frame. Minkel (2003) further defines AI as software that “presents students with problems, keeps track of their answers, and designs an individualized learning program that stresses instruction and further testing in areas where they need it the most” (p. 8). How has this type of technology impacted reading interventions?

## READ 180

The need for states to achieve mastery of basic educational skills under NCLB has created a market for the software industry. AI software may provide students with a technology instructional intervention. One of those products, utilizing AI capabilities, attempting to meet the requirement is READ 180 produced by Scholastic, Inc. Designed for students in grades four through twelve who are reading one year below grade level, it combines teacher instruction, paperback and audio books and computer instruction. READ 180 evaluates the student's skills "while creating exercises that reinforce those skills" (Minkel, 2003, p. 8).

The software is a product of research from Ted Hasselbring, formally co-director of the Learning Technology Center at Vanderbilt University. Students move through ninety-minute sessions that utilize group reading and skill lessons using high interest reading materials for independent reading levels followed by three computer-learning stations. An onscreen video jockey, designed to appeal to adolescent learners, helps students to feel comfortable while participating in the modules. As a learner progresses through the computer lessons, the AI component, referred to by Hasselbring as "pseudo-intelligence" helps "to calculate skill levels in decoding, vocabulary and other areas. Each student receives a custom set of lessons stressing needed skills" (Minkel, 2003, p. 8). "The goal of READ 180 is to encourage students to read for pleasure via a library of popular paperback titles as well as fiction, including titles on NASCAR and the NBA (McCaffrey & Minkel, 2003, p. 38).

Scholastic (2006) stands behind its product in its alignment to the tenets of No Child Left Behind. Grounding the development of READ 180 on scientifically based

research, Scholastic asserts, “READ 180’s powerful assessment and management system, Scholastic Achievement Manager (SAM), is a tool that assists teachers and decision makers with adjusting strategies in advance of the annual assessment and predicting increases in student reading achievement” (p. 3)

Half of the first recipients of the Striving Readers federal grants spent their efforts on Scholastic’s READ 180 reading intervention solution. Scholastic’s vice president for K-12+ intervention Stefan Kohler stated, “READ 180’s management system, assessment capabilities, differentiated instruction, and ongoing professional development made the program a good fit for Striving Readers” (Electronic Education Report, 2006, p. 4). Kohler further expressed that several districts have already “realized proven results” (p. 4).

Scholastic (2006) in a report titled, “Compendium of READ 180 Research” provided outcomes of studies broken down by subgroups. Participants for middle schools observations included the Department of Defense (DoDEA) schools in Germany, and public schools in Fairfax County, Virginia, St. Paul, Minnesota, Los Angeles, Holyoke, Massachusetts, Austin, Texas, and Indian River, Delaware.

The DoDEA school system used a sample of 229 students with 128 receiving READ 180 instruction. Analysis of Terra Nova pre- and post-testing showed a gain of 3.48 NCE. Five hundred thirty-six students with no special reading intervention matched 536 READ 180 students from Los Angeles. The intervention group verified an average gain of 3 NCE on Reading and 2 NCE on Language Arts. This study also demonstrated a significant gain with Limited English Proficient (LEP) students. The sample included 42 LEP students that gained a 3.1 NCE in Reading. Producing no sampling data, Austin

students taking the TAKS Reading Test scored an average 6.6 NCE over the 4.7 NCE of students not receiving the intervention (Scholastic, 2006).

Fairfax County utilized a larger sample of 548 seventh and eighth grade READ 180 students measuring success with pre and post-testing of the Scholastic Reading Inventory. The average gain was 97 Lexiles while students entering the program with the lowest comprehension levels made the highest average gains of 179 Lexiles. Similar samples and results were found in the St. Paul school district; 820 READ 180 students with an average gain of 110 Lexiles (Scholastic, 2006).

Holyoke observed students over a two-year period. With no mention of sampling numbers, the sixth and seventh grade students began the program reading at a beginning 4<sup>th</sup>-grade level and exited it at a beginning 8<sup>th</sup> grade level (Scholastic, 2006).

Special Education students were the focus of the Indian River School District. Only 30.8 % met the standard on the DSTP reading test. After nine months of READ 180 instruction 55% met the standard. Scholastic reports found statistically significant gains in all of the published studies, which included students from low socio-economic backgrounds, limited English proficiency and identified Special Education students (Scholastic, 2006).

Lupino (2005), a former READ 180 instructor challenged Scholastic with a different opinion. She points out the program's limitations.

While the software has the potential to be engaging, because the contents of the videos are specific to the passages and activities rather than to general domain knowledge, the effect on reading ability in general is restricted. Furthermore, rather than taking a problem-solution approach to reading, the READ 180

program is premised on surface-level skills. Students answer comprehension questions and spell words with a keyboard and computer screen rather than a glossy booklet, pencil and paper (p. 8).

Thorpe (2003) reviewed the effects of READ 180 on students in a public middle school in Wichita, Kansas. Beginning with an examination of Scholastic's research publications regarding READ 180, Thorpe summarized a validation report provided by Interactive Inc. They observed the program's effectiveness on low performing students in three school districts, Boston, Dallas and Houston, concluding there was a "significant difference in growth (Mean=22.94) over the control group (Mean=17.24)" and "an analysis of covariance on the post-test Stanford-9 scores, controlling for Stanford-9 pre-test scores, showed a significant difference in favor of students who had been enrolled in the READ 180 program" (p. 4).

Further examination by Thorpe though, questioned the non-equivalency of the treatment and control groups. Randomization had not occurred causing the statistical analyses presented in the validation study to be inconsistent with the adjustment in methodology. "The gain scores do not provide adequate evidence that it is the READ 180 program that provides superior results over the control group" (p. 4). Thorpe also questioned the use of analysis of covariance to statistically equate non-equivalent groups, observing "though tempting and frequently used in educational studies, has been shown since the 1970's to be inadequate to the task, and should not be used for this purpose" (p. 4). Eventually conceding to use of the analysis of covariance as an appropriate measure, Thorpe declares the effect size very small; less than .01 in Houston to .04 in Boston.

Thorpe studied three middle schools in Wichita, Kansas, collecting data from seventh and eighth grade students. In the first year of the study, observation of Lexile scores, a measure of reading comprehension used by READ 180 showed “a significant linear increase in Lexile scores for both groups of students. There is also a significant quadratic component in the data, which can be seen in the trends as both groups of students begin to decline in their growth in Lexile scores towards the end of the school year” (p. 5). When looking at the relationship between the READ 180 students’ Lexile scores and their reading comprehension scores as measured by Benchmark Assessments, “no relationship was found” (p. 6). Thorpe concluded, “Clear-cut conclusions regarding the effectiveness of the READ 180 program, based upon the research articles presented and the context of the first-year data cannot be supported from a data-informed decision-making perspective” (p. 6).

A summary of recent dissertations observing the effects of READ 180 on at risk students provided mixed results. Campbell (2006) used a mixed factorial ANOVA to analyze the results of data collected from a sample of 144 participants. Seventy-one students received READ 180 instruction and 73 were enrolled in the comparison group. She found no statistical difference in reading achievement between the two groups but a subgroup of higher performing students made statistically significant reading improvements.

Kratofil (2006) sampled 90 students. Of those, 57 participated in READ 180 and 33 received traditional reading instruction. Using data from the Scholastic Reading Inventory the control group increased by 192 Lexiles over the READ 180 group of 129.2

Lexiles. Conversely a dependent samples *t-test* and ANOVA showed statistically significant results that rejected the null hypothesis.

Caggiano (2007) analyzed archival data from 120 middle school students (grades 6th-8th). Sixty were assigned treatment and sixty made up the control group. While sixth grade students made significant gains in reading comprehension as measured by the Scholastic Reading Inventory, there were no significant gains for seventh and eighth grade students. There was also no significant difference in performance as measured by the 2006 Virginia Standards of Learning when compared to the control group.

## Summary

The literature suggests that adolescents exhibit unique characteristics requiring specialized reading interventions. As one reading teacher described,

Along with teaching strategies for reading and providing materials of varying difficulty and interest, I have to combat their years of repeated frustration and their loss of faith in personal efficacy and capabilities. Ultimately, I am trying to convince my students to believe in themselves, rediscover and value their own resources, and see that the struggle is worth the effort “ (Lupino, 2005).

Biancarosa (2005) summarized the practices that support adolescent literacy instruction. Many of the programs supporting adolescent reading interventions included the following research-based principles.

1. Direct Explicit Comprehension Instruction
2. Effective Instructional Principles
3. Motivation and Self-Directed Learning

5. Strategic Tutoring
6. Diverse Texts
7. Intensive Writing
8. A Technology Component
9. Ongoing Formative Assessment of Students (p. 17-20)

Technology has evolved as an outgrowth of societal changes, today's needs, and

No Child Left Behind. It is an important addition to the curriculum, particularly the concepts of Computer Assisted Instruction and Artificial Intelligence (Elder-Hinshaw, Manset-Williamson, Nelson & Dunn, 2006). READ 180 offers many of these components, attractive to school systems in this time of high stakes testing. Unfortunately few unbiased studies exist to validate its promise (Thorpe, 2003).

## CHAPTER III

### Methodology

#### **Overview**

Students who read three or four years below grade level based on the Tennessee Comprehensive Assessment Program (TCAP) achievement data and have a history of performing Below or Far Below proficient on Reading Benchmark tests are assessed using the American Guidance Service (AGS) Group Reading Assessment and Diagnostic Evaluation (GRADE). A maximum of eighteen students are then selected to participate at each grade level in Scholastic's READ 180 Program for at-risk readers. Using a Reading Benchmark as the testing instrument, a statistical analysis of the 7<sup>th</sup> and 8<sup>th</sup> grade participants will determine if the intervention had an impact on reading achievement.

#### **Research Design**

This is a quantitative descriptive study whose purpose is to determine whether middle school students who are below grade level in reading and receive instruction with Scholastic's READ 180 Program will report higher scores on the Reading Benchmark than middle school students of similar abilities who do not receive the intervention.

Students in the READ 180 program met 90 minutes each day for Reading and Language Arts Instruction. One teacher directed the seventh grade program and another the eighth. The center of the model is a self-paced computer program. Each session begins and ends with whole group instruction. Students then rotate through stations that include small group instruction, independent software use, and independent reading through paperbacks and audio books (Literacy Matters, 2007). Data for both groups was

generated from three Reading Benchmark tests administered in October, January and March of the 2007/2008 schoolyear.

## **Participants**

The participants in the descriptive study included approximately sixty-six 7<sup>th</sup> and 8<sup>th</sup> grade students at a suburban middle school in north central Tennessee. Thirty-three of the participants made up the experimental group, those students reading below grade level, receiving READ 180 instruction and thirty-three other students made up the control group, students reading below grade level receiving traditional reading and language arts instruction rather than participation in the READ 180 Program. The control group contains students who did not qualify for the intervention due to the restrictions in the numbers for the class and were coded and matched to the experimental group by gender, ethnicity, and socioeconomic status.

## **Instrument**

The Clarksville/Montgomery County School District Reading Benchmark helps to determine if students are mastering state standards, specifically Student Performance Indicators (SPI), on a designated timeline. The 30-question test used performance bands to determine proficiency of the SPIs. The performance bands divide as followed:

90 - 100 advanced proficiency

80 - 89 proficient

70 - 79 near proficient

50 - 69 below proficient

0 – 49 far below proficiency

Reliability for the Reading Benchmark tests was determined to be very high, with a coefficient of .89 for 7<sup>th</sup> grade and .90 for 8<sup>th</sup> (Metritsch, 2007). Construct validity for the Reading Benchmark test was determined using principal-axis common factor analysis with priors estimated as squared multiple correlations. The proportion of common variance explained by first eigenvalue for reading/language arts was .90 and .91 for 7<sup>th</sup> and 8<sup>th</sup> grades, respectively (Metritsch, 2007).

## **Procedure**

After receiving permission from the school district research committee and the Austin Peay Institutional Review Board (IRB), this descriptive study used archival data from the school year 2007/2008. Teachers referred at risk students whose scores on the Tennessee Comprehensive Assessment Program (TCAP) were lower than 35 Normal Curve Equivalent (NCE) and were Below or Far Below proficiency on Reading Benchmark tests. These students were administered the AGS (GRADE) test which helped to determine placement of eighteen students per grade level for READ 180 participation. The intervention was administered for the entire school year, ninety minutes each day.

TCAP achievement data was used to select a control group that matched the experimental group in gender, ethnicity, and socio-economic status. Data was gathered on all students who scored non-proficient on the Reading Criterion Reference Test (CRT). This group included students who read below grade level but did not qualify for READ 180 due to limits in class size. The students were then matched to the READ 180 group with reference to count, gender, ethnicity and socioeconomic status. The subjects were coded for randomization purposes and received traditional reading and language arts instruction for the school year.

Using Edusoft data disaggregation software to access Reading Benchmark One, Two, and Three data from both the experimental and control group. The information was analyzed with the application StatView. The analysis utilized data from the school year 2007-2008.

### **Data Analysis Plan**

Quantitative data formed the basis of this study. All data were entered and analyzed through StatView. The margin of error for analysis was set at the 95% confidence level or an alpha level of .05 to determine statistical significance of the research questions.

Unpaired *t-tests* and an Analysis of Variance (ANOVA) were used to test the null hypotheses.

- There is no statistically significant difference in the mean reading scores for middle school students participating in the READ 180 program as compared to middle school students of similar ability levels who do not participate in the program.
- There is no statistically significant difference in the reading scores of middle school female students who participate in the READ 180 program as compared to middle school female students of similar ability levels who do not participate in the program.
- There is no statistically significant difference in the reading scores of middle school male students who participate in the READ 180 program as compared to middle school male students of similar ability levels who do not participate in the program.

There is no statistically significant difference in the reading scores of middle school black students who participate in the READ 180 program as compared to middle school black students of similar ability levels who do not participate in the program.

There is no statistically significant difference in the reading scores of middle school low socioeconomic students who participate in the READ 180 program as compared to middle school low socioeconomic students of similar ability levels who do not participate in the program.

## CHAPTER IV

## Analysis of Data

**Introduction**

This chapter will review the results of data gathered to determine the outcome of the READ 180 intervention program for low performing reading students in one middle school. The study included sixty-six students. Half of the sixty-six seventh and eighth graders were placed into the treatment group, a READ 180 class receiving computer-assisted instruction. A control group of students of low performing reading students was coded to match the treatment group in number, gender, ethnicity, and socioeconomic status and received traditional reading instruction. These students did not participate in the intervention because of class size rules. Two different teachers oversaw instruction with a constant classroom assistant. The testing instrument was three Benchmark Tests designed to measure mastery of Student Performance Indicators. They were administered in October, January, and March of 2007 and 2008.

Table 1

*Pre-intervention Data*

	Control	Treatment
NCE Mean	47.212	46.406

The NCE score on the Reading/Language Arts TCAP CRT was used as a screening device for the READ 180 intervention. A preliminary view of descriptive data comparing the two groups showed that the mean 2007 NCE scores of the treatment group was 45.000 while the control group's mean was 46.406. An unpaired *t*-test calculated at

the  $\alpha = .05$  showed a t-value of  $-.505$  and a P-value of  $.6156$ , demonstrating that there were not statistical differences in the groups before the intervention.

### Hypothesis One

*There is no statistically significant difference in the mean reading scores for middle school students participating in the READ 180 program as compared to middle school students of similar ability levels who do not participate in the program.*

The control group was coded to match the treatment group therefore the counts were alike with two missing test scores for the treatment group on Benchmark Two (Jan) and Three (Mar). The average mean of the control group was  $61.332$  while the treatment group was  $61.922$  indicating similar overall performances. Skewness data are  $< 0$  and kurtosis  $< 3$  signifying the results are within the acceptable range for a normal distribution. This information is displayed in Table 2.

Table 2

#### *Descriptive Benchmark Statistics for Both Reading Groups*

	Control Group			Treatment Group		
	BM 1	BM 2	BM 3	BM 1	BM 2	BM 3
	(Oct)	(Jan)	(Mar)	(Oct)	(Jan)	(Mar)
Count	33	31	31	33	33	33
Mean	54.576	65.355	64.065	63.929	55.656	66.182
SD	20.066	16.362	14.362	13.162	11.164	13.080
Kurtosis	-1.311	-.039	-.588	-1.103	-.485	-.260
Skewness	-.131	-.573	-.525	-.016	-.254	-.050

The progress of each group over the course of the school year was erratic. The control group gained progress as shown by the mean scores of Benchmark Two in January but dropped by Benchmark Three in March although the control group retained a higher mean than the results of Benchmark One in October.

The treatment group made no gains on Benchmark Two in January but improved over the first benchmark in October with the scores of the Benchmark Three in March. Although the treatment group initially showed greater improvement, their performance was even with the control group by the last benchmark test given in March of the 2008 school year. The mean scores of the treatment group were higher than the control group on Benchmark One in October and Benchmark Three in March.

StatView statistical software was used to calculate an unpaired  $t$ -test at the  $\alpha = .05$  level to gain a detailed insight of the impact of READ 180 on student reading scores. The results helped to determine if there was a statistically significant difference between the control and the treatment groups, one for each of three Benchmark Tests administered at regular intervals in October, January, and March throughout the school year. The results are displayed in Table 3.

Table 3

*Means of Benchmark Tests for Both Reading Groups*

Groups	Benchmark	Count	Mean	<i>t</i>	<i>df</i>	<i>p</i>
	One			2.242	64	.0285*
Control		33	54.576			
Treatment		33	63.939			
	Two			-2.785	62	.0071*
Control		31	65.355			
Treatment		33	55.656			
	Three			.617	62	.5394
Control		31	64.065			
Treatment		33	66.182			

\*  $p < .05$ 

The results as summarized in Table 3, show statistically significant differences in the scores of students receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark One in October ( $t = 2.242$ ;  $p = .0285$ ) and Benchmark Two in January ( $t = -2.785$ ;  $p = .0071$ ) rejecting Null Hypothesis One at the  $\alpha = .05$  level. Benchmark Three in March ( $t = .617$ ;  $p = .5394$ ) showed no statistically significant difference supporting retaining Null Hypothesis One at the  $\alpha = .05$  level. Additionally an Analysis of Variance (ANOVA) was calculated using each of the three benchmarks for the control and treatment group at the  $\alpha = .05$  level indicating an F-Value of 3.771 and a P-Value of .0028. This indicates a statistically significant difference that supports a rejection of the null hypothesis.

*There is no statistically significant difference in the reading scores of middle school female students who participate in the READ 180 program as compared to middle school female students of similar ability levels who do not participate in the program.*

The control group was coded to match the treatment group; therefore, the counts were alike with one missing test score for the control group. The control group had lower mean scores than the treatment group on Benchmark One and Three but was higher Benchmark Two. Skewness data is  $< 0$  and kurtosis  $< 3$  signifying the results are within the acceptable range for a normal distribution. This information is displayed in Table 4.

Table 4

*Descriptive Benchmark Statistics for Both Reading Groups – Female Students*

	Control Group			Treatment Group		
	BM 1	BM 2	BM 3	BM 1	BM 2	BM 3
	(Oct)	(Jan)	(Mar)	(Oct)	(Jan)	(Mar)
Count	16	15	15	17	17	17
Mean	55.688	64.600	63.333	63.726	57.646	65.647
Kurtosis	-.371	.077	.048	-.031	.308	.039
Skewness	-1.169	-.880	-1.397	-1.089	-1.388	.026

StatView statistical software was used to calculate an unpaired  $t$ -test at the  $\alpha = .05$  level to determine if there was a statistically significant difference between the control group, female students reading below grade level and the treatment group, female students participating in READ 180, one for each of three benchmark tests administered

at regular intervals throughout the school year in October, January, and March. The results are displayed in Tables 5.

Table 5

*Means of Benchmark Tests for Both Reading Groups – Female Students*

Groups	Benchmark	Count	Mean	<i>t</i>	<i>df</i>	<i>p</i>
	One			1.410	31	.1685
Control		16	55.688			
Treatment		17	63.726			
	Two			-1.541	30	.1337
Control		15	64.600			
Treatment		17	57.646			
	Three			.546	30	.5893
Control		15	63.333			
Treatment		17	65.647			

Results indicated there were no statistically significant differences in the scores of female students receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark One in October ( $t = 1.410$ ;  $p = .1685$ ), Benchmark Two in January ( $t = -1.541$ ;  $p = .1337$ ) or Benchmark Three in March ( $t = .546$ ;  $p = .5893$ ). These results support retaining Null Hypothesis Two. Additionally an Analysis of Variance (ANOVA) was calculated using each of the three benchmarks for the control and treatment group at the  $\alpha = .05$  level indicating an F-Value of 1.415 and a P-Value of

.2262. This indicates there is no statistically significant difference supporting a retention of the null hypothesis.

### Hypothesis Three

*There is no statistically significant difference in the reading scores of middle school male students who participate in the READ 180 program as compared to middle school male students of similar ability levels who do not participate in the program.*

The control group was coded to match the treatment group; therefore, the counts were alike with one missing test score for the control group. The control group had lower mean scores than the treatment group on Benchmark One and Three and a higher mean on Benchmark Two. Skewness data is  $< 0$  and kurtosis  $< 3$  signifying the results are within the acceptable range for a normal distribution. This information is displayed in Table 6.

Table 6

#### *Descriptive Benchmark Statistics for Both Reading Groups – Male Students*

	Control Group			Treatment Group		
	BM 1	BM 2	BM 3	BM 1	BM 2	BM 3
	(Oct)	(Jan)	(Mar)	(Oct)	(Jan)	(Mar)
Count	17	16	16	16	16	16
Mean	53.529	66.062	64.750	64.166	53.541	66.750
Kurtosis	.068	-.967	-.891	-.014	-.477	-.137
Skewness	-1.366	-.404	-.110	-1.143	-.634	-.715

StatView statistical software was used to calculate an unpaired  $t$ -test at the  $\alpha = .05$  level to determine if there was a statistically significant difference between the control group, male students reading below grade level and the treatment group, male students participating in READ 180, one for each of three benchmark tests administered at regular intervals throughout the school year in October, January, and March. The results are displayed in Table 7.

Table 7

*Means of Benchmark Tests for Both Reading Groups – Male Students*

Groups	Benchmark	Count	Mean	$t$	$df$	$p$
	One			1.410	31	.1685
Control		17	53.529			
Treatment		16	64.166			
	Two			-2.319	30	.0274*
Control		16	66.062			
Treatment		16	53.541			
	Three			.362	30	.7201
Control		16	64.750			
Treatment		16	66.750			

\*  $p = < .05$

Results indicated there was a statistically significant difference between the scores of male students receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark Two in October ( $t = -2.319$ ;  $p = .0274$ ) rejecting Null Hypothesis Three. Additionally there were no statistically significant differences in the

scores of male students receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark One in October ( $t = 1.693$ ;  $p = .1005$ ) and Benchmark Three in March ( $t = 362$ ;  $p = .7201$ ), retaining Null Hypothesis Three. An Analysis of Variance (ANOVA) was calculated using each of the three benchmarks for the control and treatment group at the  $\alpha = .05$  level indicating an F-Value of 2.347 and a p-Value of .0473. This indicates a statistically significant difference that supports a rejection of the null hypothesis.

### **Hypothesis Four**

*There is no statistically significant difference in the reading scores of middle school black students who participate in the READ 180 program as compared to middle school black students of similar ability levels who do not participate in the program.*

The control group had lower mean scores than the treatment group on Benchmark One and Three and a higher mean on Benchmark Two. Skewness data is  $< 0$  and kurtosis  $< 3$  signifying the results are within the acceptable range for a normal distribution. This information is displayed in Table 8.

*Descriptive Benchmark Statistics for Both Reading Groups – Black Students*

	Control Group			Treatment Group		
	BM 1 (Oct)	BM 2 (Jan)	BM 3 (Mar)	BM 1 (Oct)	BM 2 (Jan)	BM 3 (Mar)
Count	17	16	17	12	12	12
Mean	52.412	63.500	62.765	66.945	49.165	65.667
Kurtosis	.015	-.011	.526	-.557	-.277	-.046
Skewness	-1.344	-.843	-.656	-.296	-.381	-.520

StatView statistical software was used to calculate an unpaired  $t$ -test at the  $\alpha = .05$

level to determine if there was a statistically significant difference between the control group, black students reading below grade level and the treatment group, black students participating in READ 180, one for each of three benchmark tests administered at regular intervals throughout the school year in October, January, and March. The results are displayed in Table 9.

*Means of Benchmark Tests for Both Reading Groups – Black Students*

Groups	Benchmark	Count	Mean	<i>t</i>	<i>df</i>	<i>p</i>
	One			2.123	27	.487
Control		17	54.412			
Treatment		12	66.945			
	Two			-2.780	26	.0100*
Control		16	63.500			
Treatment		12	49.165			
	Three			.553	26	.5848
Control		17	62.765			
Treatment		12	65.667			

\*  $p = < .05$ 

Results indicated there was a statistically significant difference between the scores of black students receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark Two in October ( $t = -2.780$ ;  $p = .0100$ ) rejecting Null Hypothesis Four. Additionally there were no statistically significant differences in the scores of black students receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark One in October ( $t = 2.123$ ;  $p = .487$ ) and Benchmark Three in March ( $t = .553$ ;  $p = .5848$ ), retaining Null Hypothesis Four. An Analysis of Variance (ANOVA) was calculated using each of the three benchmarks for the control and treatment group at the  $\alpha = .05$  level indicating an F-Value of 2.840 and a

p-Value of .0207. This indicates a statistically significant difference that supports a rejection of the null hypothesis.

### Hypothesis Five

*There is no statistically significant difference in the reading scores of middle school low socioeconomic students who participate in the READ 180 program as compared to middle school low socioeconomic students of similar ability levels who do not participate in the program.*

The control group had lower mean scores than the treatment group on Benchmark One and Three and a higher mean on Benchmark Two. Skewness data is  $< 0$  and kurtosis  $< 3$  signifying the results are within the acceptable range for a normal distribution. This information is displayed in Table 10.

Table 10

#### *Descriptive Benchmark Statistics for Both Reading Groups – Low SES Students*

	Control Group			Treatment Group		
	BM 1	BM 2	BM 3	BM 1	BM 2	BM 3
	(Oct)	(Jan)	(Mar)	(Oct)	(Jan)	(Mar)
Count	13	12	12	16	16	16
Mean	57.154	62.167	61.667	63.542	54.999	67.000
Kurtosis	-.433	.117	-.500	-.023	-.556	.643
Skewness	-1.066	-.668	-.883	-1.289	-.456	-1.138

StatView statistical software was used to calculate an unpaired  $t$ -test at the  $\alpha = .05$  level to determine if there was a statistically significant difference between the control

group, low SES students reading below grade level and the treatment group, low SES students participating in READ 180, one for each of three benchmark tests administered at regular intervals throughout the school year in October, January, and March. The results are displayed in Table 11.

Table 11

*Means of Benchmark Tests for Both Reading Groups – Low SES Students*

Groups	Benchmark	Count	Mean	<i>t</i>	<i>df</i>	<i>p</i>
	One					
Control		13	40.440	-1.894	33	.0670
Treatment		16	30.529			
	Two					
Control		12	29.556	-2.166	33	.0377*
Treatment		16	22.059			
	Three					
Control		12	48.389	-1.737	33	.0917
Treatment		16	44.529			

\*  $p = < .05$

Results indicated there was a statistically significant difference between the scores of low SES students receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark Two in October ( $t = -2.780$ ;  $p = .0100$ ) rejecting Null Hypothesis Five. Additionally there were no statistically significant differences in the scores of low SES students receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark One in October ( $t = 2.123$ ;  $p = .487$ ) and

enchmark Three in March ( $t = .553$ ;  $p = .5848$ ), retaining Null Hypothesis Five.

Additionally an Analysis of Variance (ANOVA) was calculated using each of the three

enchmarks for the control and treatment group at the  $\alpha = .05$  level indicating an F-Value

f 1.293 and a P-Value of .2756. This indicates there is no statistically significant

ifference and supports the retention of the null hypothesis.

## CHAPTER V

### Summary, Conclusions and Recommendations

The purpose of this investigation was to compare the achievement of students who read two years below grade level and participated in the technology-based literacy program, READ 180 to their academically at risk peers not enrolled in the intervention. This will help to evaluate the significance of READ 180 as an intervention strategy. A control group was created based on 2007 Tennessee Comprehensive Assessment Program (TCAP) by matching coded scores in the Reading/Language Arts CRT. The group similarities were further constructed by coding for gender, ethnicity and socioeconomic status. The study used seventh and eighth grade students at one suburban middle school comparing Reading Benchmark Test scores that measure mastery of Student Performance Indicators of Tennessee Standards.

### **Summary of Findings**

The analysis began with five research questions. The population of the study included sixty-six control and treatment students who read at least one year below grade level as measured by the Reading Tennessee Comprehensive Assessment Program Criterion Reference Test (TCAP CRT). The population was further divided by gender, ethnicity and socioeconomic status for both the control and READ 180 students. The results are summarized for each research question.

### **Research Question One**

What is the mean score in reading proficiency experienced by students who participate in the READ 180 program as compared to students of similar ability levels who do not participate in the program?

The students in the control and experimental group had similar NCE Reading TCAP CRT scores prior to initiating treatment, indicating that the subjects began with comparable at-risk reading backgrounds. Initially there appeared to be a statistically significant difference as evidenced by the results of the *t*-tests from the first two Benchmarks. The scores of students receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark One in October ( $t = 2.242$ ;  $p = .0285$ ) and Benchmark Two in January ( $t = -2.785$ ;  $p = .0071$ ) supported rejecting Null Hypothesis One at the  $\alpha = .05$  level. The differences narrowed by Benchmark Three in March. The results of Benchmark Three ( $t = .617$ ;  $p = .5394$ ) showed no statistically significant difference supporting retaining Null Hypothesis One, at the  $\alpha = .05$  level. An analysis of variance (ANOVA) test calculated at the  $\alpha = .05$  included the three Benchmark Tests from the Control and Treatment group resulting in an F-Value of 3.771 and a P-Value of .0028, which is a statistically significant difference that rejects Null Hypothesis One - There is no statistically significant difference in the mean reading scores for middle school students participating in the READ 180 program as compared to middle school students of similar ability levels who do not participate in the program.

*Means of Both Reading Groups Benchmark One, Two, and Three*

Groups	Benchmark	Mean
Control	One	54.576
Treatment	One	63.939
Control	Two	65.355
Treatment	Two	55.656
Control	Three	64.065
Treatment	Three	66.182

When observing the mean gain in test scores as shown in Table 12, there is no particular pattern. The mean score for students in the control group rose from the first to the second benchmark by ten points. The mean score then dropped by the third benchmark but showed a gain for the year. The mean score for the treatment group dropped from the first to the second benchmark by eight points. The scores rebounded by the third benchmark rising three points over the first benchmark and eleven points over the second benchmark. The mean scores of the treatment group were higher than the control group on Benchmark One in October and Benchmark Three in March but markedly lower on Benchmark Two. Overall both groups did make gains in the mean scores from the first to the last benchmark of the 2007/2008 school years.

Is there a difference in the reading scores of middle school female students who participate in the READ 180 program as compared to middle school female students of similar ability levels who do not participate in the program?

There were no statistically significant differences in the scores of females receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark One in October ( $t = 1.410$ ;  $p = .1685$ ), Benchmark Two in January ( $t = -1.541$ ;  $p = .1337$ ) or Benchmark Three in March ( $t = .546$ ;  $p = .5893$ ) supporting the retention of the null hypothesis that no statistically significant difference exists in the scores of students receiving the Read 180 intervention and those receiving traditional reading instruction. An analysis of variance (ANOVA) test calculated at the  $\alpha = .05$  included the three Benchmark Tests from the Control and Treatment group resulting in an F-Value of 1.415 and a P-Value of .2262, which shows no statistically significant difference and retains Null Hypothesis Two - There is no statistically significant difference in the reading scores of middle school female students who participate in the READ 180 program as compared to middle school female students of similar ability levels who do not participate in the program.

*Means of Both Reading Groups – Female Students*

Groups	Benchmark	Mean
Control	One	55.688
Treatment	One	63.726
Control	Two	64.600
Treatment	Two	57.646
Control	Three	63.333
Treatment	Three	64.000

Observation of the mean gain in test scores as shown in Table 13, demonstrates the mean score of the female students in the control group rose from the first to the second benchmark by nine points. The mean score then dropped by the third benchmark showing a gain for the year. The mean score of the treatment group dropped from the first to the second benchmark by six points. The scores rebounded by the third benchmark rising .25 points over the first benchmark and seven points over the second benchmark. The mean scores of the treatment group were higher than the control group on Benchmark One in October and Benchmark Three in March but lower on Benchmark Two. Overall both groups did make gains in the mean scores from the first to the last benchmark of the 2007/2008 school years.

Is there a difference in the reading scores of middle school male students who participate in the READ 180 program as compared to middle school male students of similar ability levels who do not participate in the program?

There was a statistically significant difference as evidenced by the results of the  $t$ -tests from Benchmark Two with males receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark Two in October ( $t = -2.319$ ;  $p = .0274$ ) rejecting the null hypothesis that no statistically significant difference exists in the scores of students receiving the Read 180 intervention and those receiving traditional reading instruction. Additionally there were no statistically significant differences in the scores of males receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark One in October ( $t = 1.693$ ;  $p = .1005$ ) and Benchmark Three in March ( $t = 362$ ;  $p = .7201$ ) supporting the retention of the null hypothesis that no statistically significant difference exists in the scores of students receiving the Read 180 intervention and those receiving traditional reading instruction. An analysis of variance (ANOVA) test calculated at the  $\alpha = .05$  included the three Benchmark Tests from the Control and Treatment group resulting in an F-Value of 2.347 and a P-Value of .0473, which is a statistically significant difference that rejects Null Hypothesis Three - There is no statistically significant difference in the reading scores of middle school male students who participate in the READ 180 program as compared to middle school male students of similar ability levels who do not participate in the program.

*Means of Both Reading Groups – Male Students*

Groups	Benchmark	Mean
Control	One	53.529
Treatment	One	64.166
Control	Two	66.062
Treatment	Two	53.541
Control	Three	64.750
Treatment	Three	66.750

Observation of the mean gain in test scores as shown in Table 33, demonstrates the mean score of male students in the control group rose from the first to the second benchmark by thirteen points. The mean score then dropped by the third benchmark but was showed a gain for the year. The mean score of the treatment group dropped from the first to the second benchmark by eleven points. The scores rebounded by the third benchmark rising thirteen points from the second benchmark. The mean scores of the treatment group were higher than the control group on Benchmark One in October and Benchmark Three in March but lower on Benchmark Two. Overall both groups made gains in the mean scores from the first to the last benchmark of the 2007/2008 school years.

Is there a difference in the reading scores of middle school black students who participate in the READ 180 program as compared to middle school black students of similar ability levels who do not participate in the program?

There was a statistically significant difference in the scores of black students as evidenced by the results of the *t*-tests from Benchmark Two. Results indicated there was a statistically significant difference in the scores of black students receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark Two in January ( $t = -2.780$ ;  $p = .0100$ ) rejecting the null hypothesis that no statistically significant difference exists in the scores of students receiving the Read 180 intervention and those receiving traditional reading instruction. Additionally there were no statistically significant differences in the scores of black students receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark One in October ( $t = 2.123$ ;  $p = .487$ ) and Benchmark Three in March ( $t = .553$ ;  $p = .5848$ ), supporting retention of the null hypothesis that no statistically significant difference exists in the scores of students receiving the Read 180 intervention and those receiving traditional reading instruction. An analysis of variance (ANOVA) test calculated at the  $\alpha = .05$  included the three Benchmark Tests from the Control and Treatment group resulting in an F-Value of 2.840 and a P-Value of .0207, which is a statistically significant difference that rejects Null Hypothesis Four - There is no statistically significant difference in the reading scores of middle school black students who participate in the READ 180 program as compared to middle school black students of similar ability levels who do not participate in the program.

*Means of Both Reading Group - Black Students*

Groups	Benchmark	Mean
Control	One	52.412
Treatment	One	66.945
Control	Two	49.165
Treatment	Two	50.000
Control	Three	62.765
Treatment	Three	65.667

Observation of the mean gain in test scores as shown in Table 15, demonstrates the mean score of black students in the control group dropped from the first to the second benchmark by three points. The mean score rose by sixteen points for the third benchmark showing an overall gain for the year. The mean score of the treatment group dropped from the first to the second benchmark by sixteen points. The scores rebounded by the third benchmark rising fifteen points from the second benchmark. The mean scores of the treatment group were higher than the control group on each of the three benchmarks. The control group made gains in the mean scores from the first to the last benchmark of the 2007/2008 school year but the treatment group's mean scores dropped in that same time period.

Is there a difference in the reading scores of middle school low socioeconomic students who participate in the READ 180 program as compared to middle school low socioeconomic students of similar ability levels who do not participate in the program?

There was a statistically significant difference in the scores of Low SES students as evidenced by the results of the *t*-tests from Benchmark Two. Results indicated there was a statistically significant difference in the scores of Low SES receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark Two in January ( $t = -2.166$ ;  $p = .0377$ ) rejecting the null hypothesis that no statistically significant difference exists in the scores of students receiving the Read 180 intervention and those receiving traditional reading instruction. There was no statistically significant differences in the scores of Low SES receiving the Read 180 intervention and those receiving traditional reading instruction on Benchmark One in October ( $t = -1.894$ ;  $p = .0670$ ) and Benchmark Three in March ( $t = -1.737$ ;  $p = .0917$ ) supporting the retention of the null hypothesis that no statistically significant difference exists in the scores of students receiving the Read 180 intervention and those receiving traditional reading instruction. An analysis of variance (ANOVA) test calculated at the  $\alpha = .05$  included the three Benchmark Tests from the Control and Treatment group resulting in an F-Value of 1.293 and a P-Value of .2756, which shows no statistically significant differences and rejects Null Hypothesis Five - There is no statistically significant difference in the reading scores of middle school low socioeconomic students who participate in the READ 180 program as compared to middle school low socioeconomic students of similar ability levels who do not participate in the program.

*Means of Paired Differences (Socioeconomic Status – Low SES Students)*

Groups	Benchmark	Mean
Control	One	57.154
Treatment	One	63.542
Control	Two	62.167
Treatment	Two	54.999
Control	Three	61.667
Treatment	Three	67.000

Observation of the mean gain in test scores as shown in Table 16, demonstrates Low SES students in the control group's mean rose from the first to the second benchmark by five points but dropped by .5 point for the third benchmark. The Low SES treatment group's mean dropped from the first to the second benchmark by eight points. The scores rebounded by the third benchmark rising twelve points from the second benchmark. The mean scores of the treatment group were higher than the control group on Benchmark One in October and Benchmark Three in March. Overall both groups made gains in the mean scores from the first to the last benchmark of the 2007/2008 school year.

### Conclusions

The study targeted at risk reading students who were enrolled in READ 180, a technology-based literacy intervention program comparing them to similar students who were not asked to participate due to limits on enrollment. The reading scores of female

students and male students were analyzed as well as black students and students of low socioeconomic status. Was there an interaction between students participating in the READ 180 program and those receiving traditional instruction? Was there an interaction among students participating in the READ 180 program as female or male, black, or low socioeconomic students and those receiving traditional instruction?

The study provided some evidence of support. The two groups, control and treatment began at similar starting points. The control groups' mean NCE score on the TCAP CRT for 2007 was 47.212 while the treatment group's was 46.406 with a  $t$ -value of  $-.505$  and  $P$ -Value of  $.6156$  indicating that there were not statistical differences in the groups. After the intervention the mean NCE score for the control group on the 2008 Reading TCAP CRT was 53.212 compared to the treatments group's 47.939. Had the study used the TCAP CRT as the testing instrument, an unpaired  $t$ -test at the  $\alpha = .05$  level indicated a  $t$ -value of  $2.219$  and  $P$ -value of  $.0301$ , which is a statistically significant difference between those students participating in the READ 180 intervention and students of similar abilities who received traditional instruction. An Analysis of Variance (ANOVA) that included all three benchmarks from the control and treatment group also supported a statistically significant difference with a  $F$ -Value of  $3.771$  and a  $P$ -Value of  $.0028$ .

Three Reading Benchmark tests were used as the testing instrument in an attempt to show progress in intervals over time. These assessments were designed to determine whether students have mastered student performance indicators taught previous to the benchmark. They were administered in October, January and March. Initially the READ 180 students showed a statistically significant difference over the students receiving

traditional reading instruction on the first two benchmark tests administered in October and January but the gap closed by the third benchmark test in March with the treatment group showing a slightly higher score than the control group. There also appeared to be some benefit to males, black students and low SES but this was restricted to the second benchmark in January of 2008.

It is then necessary to determine which data is more conclusive. Looking at the information in a large group it seems that the READ 180 intervention was successful but upon closer inspection that success was affected primarily from the scores of Benchmark Two. It was at that point that the subgroups of boy, black and low socioeconomic students seemed to show the positive effects of the intervention. The range of the control group was 67 with a low score of 23. The range of the READ 180 group was 43.330 with lowest score being 30. The range of all the benchmarks tests is shown in Table 17.

Table 17

*Ranges of Benchmark Tests*

	Control Group			Treatment Group		
	BM 1	BM 2	BM 3	BM 1	BM 2	BM 3
	(Oct)	(Jan)	(Mar)	(Oct)	(Jan)	(Mar)
Range	66.000	67.000	53.000	46.670	43.330	52.000
Minimum	20.000	23.000	30.000	40.000	30.000	36.000

The control group had a wider range than the treatment group on each of the three-benchmark tests. The control group also had lower minimum scores on each benchmark

when compared to the READ 180 group. This may be a factor for the positive interaction of READ 180 when comparing the two groups.

It is a rational to conclude that if students succeed in reading it should help in other content areas like science and social studies where reading is an important element of success. The mean NCE gain on the TCAP CRT for the treatment group was 46.697 in Science and 43.424 in Social Studies somewhat comparable to the 47.939 in Reading. An Analysis of Variance (ANOVA) indicated an F-Value of 1.206 and a P-Value of .3030 indicating there is no statistically significant difference in these test scores. The numbers are encouraging but lead to no obvious conclusion that READ 180 was valuable as a strategy for success in reading achievement for at-risk students.

There were limitations to the study. The investigation was based on the premise that skilled teachers followed the principles set forth by the READ 180 program, but this was the first year of implementation. The teachers were assigned, rather than chosen from volunteers, and the study used a population from one school. The class size for the READ 180 was limited to eighteen students, while students receiving traditional reading instruction participated in classes with up to thirty students. Smaller class sizes may have impacted the results. A final limitation came from the Benchmark Tests. Students in READ 180 take the test at a different time than the rest of the student population. The test is administered during the READ 180 class time allowing ninety-minutes for completion. Traditional students take the test in their homerooms, which may not be reading classrooms, and they are allowed sixty minutes for completion.

A Reading Benchmark test was chosen as the testing instrument for this study. It was thought that this assessment would provide insight to progress over time. If the study

was replicated the TCAP CRT might be a better testing instrument providing a simpler investigation rather than looking at three different assessments. Sixth grade was omitted from the study because initially the investigation was broadened to include a look at the previous year's benchmark scores and it would have been difficult to gather scores from various elementary schools. It was later determined not to include this data therefore the study would have been stronger with the inclusion of sixth grade scores.

## **Recommendations**

While there was some encouraging information especially with the second Reading Benchmark, the study provided little conclusive evidence that the READ 180 intervention was a practical solution for at-risk reading instruction. By the end of the school year both groups made progress despite the style of reading instruction. READ 180 is taught over two class periods and is limited to eighteen students. This means that students receiving traditional instruction are in classes that average between twenty-seven and thirty students. Therefore class size becomes a secondary variable. Additionally the program costs \$37,000 to implement per school, not including the cost of the computers. The Technology Department absorbs that expenditure. Is it worth allotting that amount in the school's system's budget for a program whose outcome is not more conclusive? A study that utilizes a larger population would be beneficial to answer that question. More research is needed to recommend an expensive program that influences the class size of traditional classrooms.

Using technology is a necessary instructional strategy for today's students. Larson (2008) summarized, "Teachers and researchers agree that today's students need and deserve the skills, strategies, and insights to successfully exploit the rapidly changing

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information and communication technologies that continually emerge in the world" (p. 21). Kajder (2006) acknowledged the at risk reader's struggle while engaging in traditional text but adds, "The resistant or reluctant readers in my classroom know how to do this kind of work when reading an image or writing a Web log entry" (p.7). It is recommended that schools look for a more cost effective way to implement engaging new literacies using technology for at risk reading students.

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