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# The Impact of Computer-Assisted Instruction on Ninth- and Tenth-Grade Students

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THE IMPACT OF COMPUTER-ASSISTED INSTRUCTION
ON NINTH- AND TENTH-GRADE STUDENTS

by

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A dissertation submitted in partial fulfillment of the requirements
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in the School of Teaching, Learning, and Leadership
in the College of Education and Human Performance
at the University of Central Florida
Orlando, Florida

Summer Term
2014

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ABSTRACT

With over 60 years of education reform, including the National Defense Education Act (NDEA) in 1958, Individuals with Disabilities Education Act (IDEA) in 1975, and No Child Left Behind (NCLB) in 2002, the achievement gap still existed at the beginning of the 21st century, and the effectiveness of the U. S. public school system continued to be questioned.

This study was conducted to examine the effect of the use of a computer-assisted instruction curriculum, Achieve 3000®, among select secondary reading students in a central Florida school district and their implications for student achievement. This study showed significant difference existed in the type of students rather than the reading program. The ANCOVA performed on all students and the ANOVAs performed for exceptional education students, males and females, free/reduced lunch and ethnic subgroups did not show a significant statistical difference in the 2012-2013 reading achievement scores. The Achieve 3000® reading program did not close the achievement gap any more than the non-Achieve 3000® reading program. Conversely, the ANOVA performed for English language learners did show a significant statistical difference between the 2012-2013 reading achievement scores. However, the effect size each question was small indicating the practical implication was also small. Ultimately, this study made a strong argument for the need for further research.

This dissertation is dedicated to my children, Bryson and Brynna.

I am so blessed to be your mother.

# ACKNOWLEDGMENTS

"It is good to have an end to journey toward;
but it is the journey that matters, in the end." -- Ernest Hemingway

I extend my deep appreciation to the professors who served on my dissertation committee for sharing their time, insight, and expertise. Dr. Kenneth Murray, my dissertation chair, has been a valuable resource and I am forever grateful. The members of my committee, Dr. Barbara Murray, Dr. Lee Baldwin, and Dr. Cynthia Hutchinson, have given generously of their time, encouragement, and feedback. In addition, I would like to thank Dr. Mary Ann Lynn, who served as my editor. I want to thank my professors, Dr. Rose Taylor, Dr. Vickie Cartwright, Dr. Michael Grego, Dr. Harold Border, Dr. Evelyn Lynn, and Dr. Walt Doherty for classes that provided me the gift of knowledge.

I thank my caring family and friends. My parents, Russell and Bobbie, taught me very early in life that learning is its own reward. I want to thank Marlene for kicking me under the table for the last seven years. To the remaining members of the Magnificent 7, Robin, Karla, Ana, Amanda and Lea, thank you for being my friends--day in and day out. I want to thank Russell, Brendan, and Kiki for helping me with the children and helping me realize my dream. I want to thank my best friend, Stephanie, for her encouragement. I would like to recognize our pets. Trinity, Zoey, Jenny, and Snowy were by my side for endless hours on the computer. I thank all of my friends at Orange County Public School who have helped me along this journey with words of encouragement and chocolate when I needed it. I am truly blessed to work with each of you. I want to give an extra-

special thank you to my amigas, Synthia and Lucy.  Thank you for believing in me!

I would not have achieved this honor without the help of so many.  Thank you!

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CHAPTER 1
THE PROBLEM AND ITS CLARIFYING COMPONENTS

Introduction

The American society depends on schools to develop the future workforce (Heckman & LaFontaine, 2010). With the publication of *A Nation at Risk* in 1983 (Gardner, 1983), Americans were faced with the realization that the nation's children were caught in the "rising tide of mediocrity" (p. 6) and that the future workforce could be threatened. Other countries were outperforming the United States in innovation and academics. The United States never scored first or second on international academic tests, creating an achievement gap between the United States and other industrialized countries. A lack of urgency was also present in the schools. The report showed concerns for a decline in reading skills, in Scholastic Aptitude Test (SAT) scores, and in the skills needed for complex problem-solving (Gardner, 1983). The effect of these declines was evident in the global community as well. The United States was vulnerable, as the achievement gap, both internationally and within its borders, was developing (Gardner, 1983).

With over 60 years of education reform, e.g., the National Defense Education Act (NDEA) in 1958, Individuals with Disabilities Education Act (IDEA) in 1975, and No Child Left Behind (NCLB) in 2002 (Paige, 2006), the achievement gap still existed at the beginning of the 21st century (Dobbie & Freyer, 2009; Hanushek & Rivkin, 2009); and the effectiveness of the U. S. public school system continued to be questioned. According to Swanson (2004), graduation rates can be used to determine the

effectiveness of a school system's performance in closing the achievement gap.

Graduation from high school is considered an important educational milestone (Angrist

& Lavy, 2009). According to Swanson (2004), it symbolizes attainment of the minimum

standards needed for a better life and to be an informed citizen (Gardner, 1983).

According to the U.S. Department of Education [USDOE] (2011), the average freshman

graduation rate (AFGR) for public high schools was 75.5% for the 2008-2009 cohort.

Even with increased accountability measures required by NCLB, schools have struggled

to close the achievement gap. In 2013, the Equity and Excellence Commission reported

that America was no longer considered to be the global leader in education achievement.

By measuring the academic performance of all students within its borders and

comparing itself academically to students internationally, the United States can monitor

the achievement gaps identified in NDEA, IDEA, and NCLB. With several important

education needs identified in NCLB, improving reading achievement may provide the

most impact on a student's ability to graduate because many states have identified

minimum reading performance standards as a critical element in the state's graduation

requirements. However, high schools have not had unlimited time in closing the reading

achievement gap, as NCLB defined on-time high school graduation as a student

graduating with a regular diploma within four years of entering high school (Swanson,

2008).

According to Heckman and LaFontaine (2010), the graduation rate is an important

measure of performance for American schools. Of the percentage of Florida's 10th

graders who took the FCAT 2.0 reading test in 2012, only 50% passed with proficiency

scores of level 3 or higher (Florida Department of Education [FLDOE] (2013a). Based on these data, one of two students have been viewed as being in jeopardy of not graduating from high school. It is these students, who have are unable to meet the high academic standards and read proficiently, who have been faced with very difficult decisions. Dropping out of high school limits a person's chance to make a living wage (Orfield, Losen, Wald, & Swanson, 2004). Higher graduation rates increase the skilled workforce and benefit society as a whole, thus serving as a viable measure of the effectiveness of schools (Heckman & LaFontaine, 2010).

According to the FLDOE (2013a), students entering high school for the 2011-2012 school year had the opportunity to select one of the five standard diploma options (FLDOE, 2013a). The diploma options were (a) a four-year, 24-credit regular program, (b) an International Baccalaureate (IB) curriculum program, (c) an advanced International Certificate of Education (AICE) curriculum, (d) a three-year, 18-credit college preparatory program, or (e) a three-year, 18-credit career preparatory program. As put forth by the FLDOE (2013a), regardless of the diploma program selected, students were required to earn a minimum 2.0 grade point average (GPA) on a 4.0 scale, earn a passing score, level 3 or higher, on the 10th-grade reading portion of the Florida Comprehensive Assessment Test 2.0 (FCAT 2.0), and pass specific end-of-course examinations (EOC). With increased pressure for students to compete in a global marketplace, meet increased academic requirements, and pass academic assessments, schools have been challenged to find new and better ways to help all students learn and close the achievement gap.

## Problem Statement

To date, there has been limited information concerning the effect of Achieve 3000®, a computer-assisted instruction program, on student achievement. Schools have begun to invest in this computer-assisted instruction program without adequate research to know which students, if any, would benefit from Achieve 3000® instruction. According to the FLDOE (2012), the percentage of ninth-grade students scoring at a proficient level, level 3 or higher, in reading as measured by the FCAT was 52%, and the percentage of 10th-grade students scoring proficient in reading is fifty percent. At the time of the present study, Orange County Public Schools (OCPS), a large, urban central Florida school district, had reading scores that were below the state average. For ninth grade, students performing at proficient level in reading were at 48%. The results were similar for 10th grade with a reading performance level at 40%. Considering the current state of the student achievement scores, an investigation into new strategies was warranted. This study was focused on the academic success of ninth- and 10th-grade high school students in Orange County, Florida who were taught using Achieve 3000® compared to ninth- and 10th-grade high school students who were not.

## Purpose Statement

Given the high-stakes nature of the state assessment test, especially in 10th grade, school leaders have had the challenging job of matching the right strategies with the right students. The purpose of this study was to examine the effect of the use of a computer-assisted instruction curriculum, Achieve 3000®, with select secondary reading students

in Orange County Public Schools.  It was a goal of the researcher, using the quantitative data generated in this study, to provide school leaders with valuable data useful in determining if Achieve 3000® is an appropriate intervention program for their students.

## Significance of Study

This study was conducted to analyze the effectiveness of Achieve 3000® in high school reading classes. The findings of this study were intended to: (a) assist school-based administrators in making decisions on scheduling, (b) assist the administration of Orange County Public School in making decisions regarding the use of Achieve 3000® in high school reading classes, (c) determine if Achieve 3000® is an effective program to close the achievement gap, and (d) determine if Achieve 3000® helps students meet the proficiency standard in 10th grade required for a regular diploma.  By researching the school improvement plans, the cost of the Achieve 3000® program was reported (Florida Department of Education, 2013c). In addition, this research contributed to the body of knowledge regarding reading intervention curriculum for schools to move marginalized students to the critical mass.

## Research Questions

This study focused on the following questions.

1. To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

2. To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade exceptional education students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

3. To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade English-Language Learner (ELL) students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

4. To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade male and female students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

5. To what extent is there a difference between 2013 FCAT reading scores of free/reduced lunch students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

6. To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade students identified in the subgroups: white, black, and Hispanic students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

## Operational Definitions

Achieve 3000®. Achieve 3000®, a computer-assisted instruction program, was founded in 2000 by Dodelson and Gertler. The company experienced rapid growth and

has served more than one million students (Achieve 3000®, 2013).  The program has

three different levels based on grade-level configuration.  The appropriate level for this

study is Empower3000, the high school version.  Students are evaluated on their

performance on reading passages and are measured by improvement in Lexile scores.

Using students' performance data, this program provides students with an individualized

learning program based on their unique academic profile.  By using non-fiction material,

Achieve 3000® differentiates reading passages based on students' Lexile scores.

 Achievement Levels.  In 2012, the FCAT 2.0 scale scores were established, and

the scale scores in reading ranged from 140 to 302.  The scale scores were divided into

achievement levels ranging from lowest (1) to highest (5) as shown in Table 1.  Levels 1

and Level 2 were reported as below proficiency (FLDOE, 2013b).

Table 1

*Achievement Levels for FCAT 2.0 Reading Scale Scores*

| Grade | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|-------|---------|---------|---------|---------|---------|
| 9 | 178-221 | 222-239 | 240-252 | 253-267 | 268-302 |
| 10 | 188-227 | 228-244 | 245-255 | 256-270 | 271-302 |

 Computer-assisted instruction.  According to Soe, Koki, and Chang (2000),

computer-assisted instruction (CAI) was instruction on a computer that provides students

with learning by drill and practice of reading skills.  Computer-assisted instruction

programs can assist teachers with assessment and diagnostic information. Achieve 3000® is considered to be computer-assisted instruction.

Computer-Based Testing (CBT). Grades 9 and 10 students are required to test using computer-based testing (CBT). Grades 9 and 10 FCAT 2.0 Reading consists of two 70-minutes sessions. The test consists of multiple-choice items and is administered over two days during the approved testing window. Students may only take one session per day (FLDOE, 2013a).

Florida Comprehensive Assessment Test (FCAT). According to the Florida Department of Education (FLDOE, 2013b), the Florida Comprehensive Assessment Test (FCAT) is aligned to the Next Generation Sunshine State Standards (NGSSS), the state academic standards for each grade level. The areas assessed by the FCAT are reading, mathematics, science, and writing. FCAT reading scores were used in this study.

FCAT Reading 2.0. According to Florida Department of Education (FLDOE, 2013b), FCAT Reading 2.0 was used to assess students in vocabulary, reading application, and literary analysis: fiction and non-fiction, informal text and research process. The percentage of questions in the Grades 9 and 10 assessment varied for each content category as follows: vocabulary , 15-25%; reading application, 20-30%; literary analysis (fiction and non-fiction), 20-30%; and informational text and research process, 25-35%. Both Florida educators and Florida citizens have been involved in the review of reading passages. The educators reviewed for grade-level requirements and quality, and Florida citizens reviewed passages for cultural sensitivity and bias. The average length of the ninth-grade reading passage was 900 words with a range of 300-1400 words. The

average length of the 10th-grade passage was 1,000 words and ranged from 300-1500 words.  Literary passages include fiction, non-fiction, poetry and drama.  Information passages contained subject matter content from everyday life.  Reading passages were also rated on cognitive complexity.  The FCAT 2.0 reading used Webb's Depth of Knowledge to determine the cognitive demand on students to answer the questions.  In Grade 9, the cognitive complexity level ranged from low (10-20%), moderate (50-70%), and high (20-30%) compared to complexity levels for the 10th grade of low (10-20%), moderate (45-65%), and high (25-35%).

Graduation Rate.  As defined by Race to the Top Program Executive Summary (2009), the federal graduation rate is a four-year competition rate as defined by 34 CFR 200.19 (b) (i).  According to the FLDOE (2012), Florida uses the federal graduation rate in its accountability systems.  The federal graduation rate only counts regular diploma students, graduating within a four-year cohort group, as positive graduates, thereby eliminating general educational diploma (GED) and exceptional student education (ESE) special diploma recipients from the calculation.  According to the Orange County Public Schools (2012), the district's federal graduation rate for 2012 was 73.9% compared to the state rate of 74.5%.

Lexile Level.  According to Lennon and Burdick (2004), Lexiles measure students' reading ability and text difficulty on the same scale.  By using Lexile scales, instruction can be provided at the student's optimum level, both positive and challenging.  According to Smith (1989), Lexile scale is a relationship between a student's ability and the difficulty of the reading passage.  By using a student's Lexile score to select leveled

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reading passages, the student has a 75% chance of answering a reading comprehension question correctly (Lennon & Burdick, 2004; Smith, 1989).  As a student increases reading and comprehension skills, the reading passages increase in reading difficulty, and the Lexile level increases.  With adult reading material between 1050 and 1250 Lexiles, Smith (1989) reported students need to read and comprehend at the 1100 Lexile level to understand adult literature.

Proficiency.  For FCAT 2.0, proficiency has been defined as scoring at achievement level 3 or higher (FLDOE, 2013b).  In Florida, students have been assessed using FCAT 2.0 in Grades 3-10.  The 10th-grade reading score has been used to meet graduation requirements.  Students entering the ninth grade in the 2011-2012 and the 2012-2013 school years were required to score at achievement level 3 or higher in Grade 10 FCAT 2.0 to meet graduation criteria (FLDOE, 2013a).

Overview of Methodology

*Research Design*

A quantitative, ex-post facto, non-experimental research study was designed to test whether there was: (a) a difference between Achieve 3000® and traditional teaching on student achievement for ninth- and tenth-grade students in reading classes; (b) a difference between Achieve 3000® and traditional teaching on student achievement for ninth- and tenth-grade exceptional education students (ESE);(c) a difference between Achieve 3000 and non-Achieve 3000® on student achievement for ninth- and tenth-grade

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English language learners (ELL) students; and (d) a difference between Achieve 3000®

and traditional teaching on student achievement for ninth- and tenth-grade students in

reading classes regarding gender, SES (as determined by free and reduced lunch status),

and race/ethnicity (White, Black, and Hispanic). Statistical tests were run using pre-

existing, archived data provided by the Orange County Public Schools student data

system.

<center>*Population*</center>

The population for this study were selected ninth- and tenth-grade public high

school students in Orange County Public Schools (OCPS) who were scheduled into

reading classes during the 2012-2013 school year. According to the 2012 Orange County

Public Schools (OCPS) Annual Report, the school district had an enrollment of 181, 448

students in 182 schools, and represented the following ethnic or racial groups: White, 63;

Black, 29%; Asian, 5%; Multicultural, 3%, American Indian/Alaska Native, 1%;

Hispanic, 34%; and Non-Hispanic, 66%. The state of Florida rated 136 of the OCPS

schools as either an A or B for the 2011-2012 school year. Only one school was

designated an F. This study was focused on ninth- and tenth-grade reading students who

were working toward a regular diploma.

*Sample*

Random samples were selected for both ninth and tenth graders in order to create equal sized groups on which to perform a factorial analysis of variance (ANOVA). The sample was stratified to include students from all sub-groups in the study.

*Data Collection Strategies*

In April 2013, ninth- and tenth-grade students took the Florida Comprehensive Assessment Test (FCAT). The results were compared to achievement scale scores from the 2012 administration of the FCAT. Orange County Public Schools (OCPS) was asked for approval for the use of student data. Appropriate statistical procedures were used to calculate the mean difference in mean scores to determine if the results were significant.

*Data Analysis*

The students' FCAT achievement scores were analyzed using descriptive statistics. Frequency, mean, median and mode were computed for each variable. The appropriate statistical tests were used to determine if there was a statistical difference between 2012-2013 reading achievement scores for students who were instructed with Achieve 3000® and students (the control group) who were instructed with a non-Achieve 3000® reading program. Demographic information were collected and analyzed. A factorial analysis of variance (ANOVA) was also performed to analyze the data by subgroup(s) identified in the research questions and determine if there was a significant

difference between the reading achievement scores of the students instructed with Achieve 3000® compared to students in a non-Achieve 3000® reading program .

## Theoretical Framework

The theoretical basis of this study was constructivism.  Fosnot and Perry (1996) and Richardson (1997) reported constructivism as a psychological theory in which students create structures and meaning through discussion and activities.  According to Duffy and Cunningham (1996), constructivism has two main views: "(1) learning is an active process supporting the construction rather than acquiring knowledge, and (2) instruction is a process of supporting the construction rather than communicating knowledge" (p.  2).

In a constructivist classroom, the teacher facilitates learning by creating opportunities for students to learn (Wilson, 2011), and students create meaning from their experiences in the classroom.  Learning, according to Fosnot and Perry (1996),  is complex and non-linear.  The teacher acts as a facilitator and scaffolds the learning. Teachers must monitor student performance and select the experiences for their students to learn new concepts.  Students are encouraged to explore, develop, and create new knowledge based on their experiences.  Instructional materials support discovery, and students can manipulate the material to meet their needs.  Students in constructivist classrooms are encouraged to discover and develop instead of searching for the right answer (Duffy & Cunningham, 1996).  A constructivist classroom is different from a traditional classroom, because it challenges the thought that knowledge is transferred

from the teacher to the student; rather, it is created by the shared experience with teachers and classmates (Bodner, 1986) who believed that "constructivism is a process on which knowledge is both built and continually tested" (p. 6). With the learner as the central focus, the inquiry approach provides long-term benefit for students by helping them develop skills using authentic and rigorous learning activities (Wilson, 2010). According to Hartle, Baviskar, and Smith (2012), constructivism is considered an important learning theory for modern instruction because society has moved from print-based to digital-based with the growth of internet-based programs such as Achieve3000®. Stevenson and Hedberg (2011) noted that 21st century students have been recognized as "digital natives" (p. 322).

With the prominence of computers in the classrooms, Wilson (2010) reported the principles of constructivism are maintained with through the integration of technology in learning. Learners use their senses and cognitive structures to create meaning (Bodner, 1986). Constructivists provide learners with real opportunities to make meaning that help with more complex thoughts (Jonassen, Davidson, Collins, Campbell, & Haag, 1995). Jonassen et al. observed that instructional design has embedded constructive principles in the computer software with artificial intelligence. Utilizing the achievements in artificial intelligences, Achieve 3000® creates individualized learning profiles by selecting reading passages based on previous, in-program reading passages and Lexile scores, and demonstrates the principles of constructivism.

## Delimitations of the Study

The following factors delimit this study.

1. The study was delimited to six schools, three schools identified as using computer-assisted instruction, Achieve 3000®, and three schools identified as using traditional methods to teach reading in Orange County, Florida.

2. The study was delimited to freshman and sophomore populations of a large, urban district in central Florida.

3. Only students who had FCAT data from the 2011-2012 school year and who were working toward a regular diploma were included in this study. FCAT scores were used to measure student achievement.

## Limitations of the Study

The following factors limit the validity of this study.

1. Unidentified factors, e.g., student motivation, previous reading instruction, student attendance, were not considered in the study.

2. The use of the FCAT may limit the generalization to other states and populations.

3. Student may have had additional reading instruction not measured in this study.

4. Student mobility may have affected this study. Students who did not have scores for 2011-2012 and 2012-2013 were not included in the analysis.

5. The differences in the schools of proportions of students with disabilities (SWD), English language learners (ELL), and economically disadvantaged (ED) may have impacted the results.

CHAPTER 2
REVIEW OF LITERATURE


Introduction


According to the Gates Foundation (2007), past educational practices have not
prepared students to lead productive and fulfilled lives.  Reading proficiency rates
empirically demonstrate that schools are not meeting of the needs of today's students.
Reading ability was an essential skill in the industrialized age and remains an essential
skill in the information age.  Children who struggle with reading skills miss the
opportunity to connect with literary characters who may teach lessons on adolescent
development and social issues (Pytash, 2012) and prepare students for life after high
school.  Children's literature serves many purposes.  Without foundational skills in
reading, children are at a disadvantage to obtain proficiency scores on standardized tests.
Consequently, earning a high school diploma has become an unobtainable goal for many
students.

A review of the National Assessment of Educational Progress (NAEP) for Grades
4, 8, and 12 by Bromberg and Treokas (2013) revealed the achievement gap between
white students and students of color was present at all levels of academic performance.
The goal of intensive reading classes should not be just to score high enough for the
students to move out of remedial classes, but to improve reading skills so that students
achieve in subjects across the curriculum.  Increased reading performance should lead to
academic success and to the attainment of a high school diploma and the option to
explore college and career options (Bromberg & Treokas, 2013).

This chapter presents a review of literature focused on the adolescent literary experience at the high school level. The literature review has been organized to present a historical perspective of reading, the structural characteristics of high schools, and the development of computer-assisted instruction. Subsequent sections of the literature review include a discussion of variables impacting reading program, computer-assisted reading programs, the adolescent learner, and struggling reading students.

Historical Perspective of Reading

Reading was thrust into the spotlight with publications that warned of the potential failure of the American education system (Alexander & Fox, 2004). American children were taught using the look-say method presented in the Dick and Jane books, but the look-say method was not successful with all students (Alexander & Fox, 2004). In response to the criticism, phonic-based programs became popular. Even with the changes in reading approaches, students continued to struggle to learn to read (Alexander & Fox, 2004). Research was needed to determine effective strategies for reading to meet the challenges of the changing classrooms.

According to the Commission on Reading (1985), reading is "the process of constructing meaning from written texts" (p. 18) and requires the reader to use complex skills. Historically, the reading process starts with the identification of the sound symbol relationship, moves to words, and then to sentences. Reading is more than an interaction between text and schema (Commission on Reading, 1985). Struggling readers have difficulty moving from word-attack skills to determining meaning. In the early grades,

good readers decode accurately and quickly.  In later grades, speed and fluency have been

shown to be a better indicator of a student's reading ability.  Good readers use decoding-

by-analogy and seek patterns in unknown words from known words.  Skilled readers use

different strategies depending on the type of text presented, previous knowledge of the

subject, and the purpose of the reading.  For struggling readers, there is a disconnect.

These students may apply the wrong strategy, or no strategy at all (Commission on

Reading, 1985).  Researchers have relied on data since the first reading data were

collected in 1937 (Commission on Reading, 1985).  In 1957, current students were

compared against the original 1937 sample.  An improvement of a half-year was

reported.

*Reading Models*

According to Harris and Sipay (1985), "Reading is the meaningful interpretation

of printed or written verbal symbols" (p. 12).  They reported on three types of reading

models: bottom-up model, top-down model, and interactive model.  The bottom-up

model focus is on the reading material and strong foundational component of phonemic

awareness.  The top-down models focus is the reader and prior knowledge is a key

component.  The interactive model requires skills and strategies from bottom-up and top-

down models and the reader chooses the needed processes to make meaning of the

printed or written material.  Harris and Sipay (1985) reported both bottom-up and top-

down models had not met the need of certain learners and researchers should investigate

what elements of each programs should be used with which type of learner.  When a

student is not successful in one type of program, instructional leaders should consider

other reading programs to determine the needs of the student rather than the needs of the

reading program.  Supporters of bottom-up and top-down models have found a common

ground in the interactive model.  Recognizing the complex nature of reading, innovation,

dissatisfaction, legal requirements, and research has caused other professionals to

participate in the reading discussions at the highest level.  By studying teachers' manuals

and materials, researchers have been able to study the philosophy and methodology of

reading programs.  The reading programs were categorized into two large, broad methods

of synthetic and analytic.  The synthetic method focused on phonics and the analytic

focused on the word, sentence, or story.  In the 1970s, there were over 100 reading

programs to help teach children to read.  This number increased to 165 in the 1980s after

a lack of progress in closing the achievement gap and national attention from national

reports on the concerns for underperformance of American children.

*Reading Approach Categories*

According to Harris and Sipay (1985), reading programs were classified into four

approaches categories: meaning-emphasis, language-experience approach, code-

emphasis, and individualized skilled-approaches.

In the meaning-emphasis approach, commercially produced reading programs are

given as a package and become the curriculum the teachers use without adding additional

materials.  The books are leveled with grade level recommendations (Harris & Sipay,

1985).

In the language-experience approach, lessons are developed around a story with vocabulary and spelling selected from the story and an emphasis on listening, speaking, and writing. In commercially available language–experience programs, materials are themed-centered stories and not children-selected stories (Harris & Sipay, 1985).

The third major category is the code-emphasis approach referred to as phonics. The order of the phonemes may vary, but the emphasis is on decoding. Teaching by syllables is another form of the code-emphasis approach, but there has been limited research associated with this program. The linguistic approach is a third form of the code-emphasis approach and has very specific rules for the program, teaching reading starting with consonant-vowel-consonant patterns; students are encouraged to learn patterns (Harris & Sipay, 1985).

The fourth and final major category is the individualized skills-emphasis approach in which scripted programs focus on specific skills, active responding, and provide immediate feedback. According to Harris and Sipay (1985), the recognized the work of Atkinson and Fletcher provided an introduction of computers in the classroom as a supplemental program. The computer primary emphasis using computers was decoding and programs operated as an electronic workbook (Harris & Sipay, 1985).

Harris and Sipay (1985) recognized the importance of text complexity. By analyzing sentences used in class materials, the authors noted the importance of understanding the surface structure and deep structure for readers to understand meaning. They realized that analyzing errors by asking questions would help teachers determine why their students made the errors and enable teachers to differentiate their lessons. By

using sentences in context and in their written responses, students are able to make connections by using authentic work.

<center>*Collaborative Strategic Reading (CSR)*</center>

Kim et al. (2006) reported on Collaborative Strategic Reading (CSR) as a technique based on reciprocal teaching which used pre-reading, during reading, and post-reading strategies. In pre-reading, students share their knowledge of the topic and make predictions. During reading, students apply set strategies to assist in comprehension. After reading, students discuss what they have learned. In the beginning, CSR is a teacher-led, whole-class activity, but as students become more skilled, they move into collaborative groups. Kim et al. reported CSR was initially used with special education students who were also English language learners (ELL), and the results showed improvement in reading comprehension.

CSR evolved to include the introduction of computers and became computer-assisted collaborative strategic reading (CACSR). In their research, Kim et al. (2006) selected two special education teachers' classes in which students were assigned into a treatment group and a control group. The results indicated an improvement in reading comprehension in the CACSR treatment group (SMD = 50-1.18). When compared to previous studies of reciprocal teaching and the original CSR, CASCR reported a positive effect in student-generated questions (SMD = .87-1.18).

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*Vocabulary*

Vocabulary is an essential element for students to demonstrate their knowledge of complex concepts and to move to higher levels of cognition. In her extensive review of research supporting the importance of vocabulary development in reading instruction, Allen (2007) reported that moving from research to practice was a problem in teaching reading. The lack of a robust vocabulary is not just a reading issue, but transfers to content areas, and, later, into diminished college and career opportunities. Allen (2007) summarized the importance of vocabulary as, "At the end of the day, however, I think we could all agree that language is power, and those who can use language effectively have an advantage over those who can't or don't" (p. 102).

In the primary grades, reading instruction receives dedicated time in a student's daily schedules. Pre-reading and reading skills are evaluated starting in kindergarten, and students requiring more assistance are supported by classroom teacher interventions. If more support is needed, specialists may be involved and specialized intervention programs may be used. In third grade, students in Florida are required to take a standardized achievement test, the Florida Comprehensive Assessment Test (FCAT) to determine their proficiency level in reading. If a struggling reader improves and reaches proficiency on third grade assessments, the intensive supports are removed. Leseaux (2012) reported that these struggling readers may struggle again without continued support. Proficiency problems often reoccur when students are faced with the increased academic demands of secondary school classrooms and the difference in emphasis on a knowledge-based assessment in high schools from the skills-based assessments in

elementary schools.  Knowledge-based skills highlight the comprehension gap of non-English speaking and economically disadvantaged students.  Leseaux (2012) recommended curriculum changes to focus on knowledge-based skills in the early grades.

<div align="center">Structural Elements of High Schools</div>

When students enter high school, they have been expected to assimilate into a rigid secondary system.  Frebryhugh (2011) discussed the disparity between high school requirements as compared to college expectations.  College-preparation is an espoused value of most high schools.  Surprisingly, however, high school students have not been required to read in every class.  Even in language arts classes, students often have not been required to read an entire book, but have been expected to read excerpts from stories.  Thus, students have not developed the reading stamina for college courses.  The lack of college preparation has been mirrored in the area of writing expectations.  When surveyed, 95% of teachers reported research papers were important, but 62% did not assign major research papers.  The structure in a secondary reading class has basically remained unchanged.  Oral reading has remained a focal point.  Frebryhugh had been critical of the passive manner in which oral reading was used, suggesting that reading is active learning.  Secondary reading classes are an example of the structural elements of a high school, and a barrier for students to overcome.

In 2005, Beers (2007) visited a Houston area high school reading class which was little more than a test prep class.  Students in the class were considered low achieving, because they scored below proficiency on the Texas state assessment.  The school was

under pressure from federal mandates requiring students to make adequate yearly progress (AYP). In short, there was an expectation to fix the problem and to meet individual students' needs. Students' faces and personal stories were replaced with data points (Beers, 2007). According to Beers, the school missed an opportunity to develop lifelong learners by focusing only on students' passing a state test. Beers questioned a student about school and the reading class' ability to help him pass the state test to earn a diploma. The student did not believe a diploma would really help him in his future or that school was relevant. There were several factors involved in the young man's struggle with school, and reading class was only one barrier. The student wanted to be in an elective class, but the reading class had taken away his opportunity. His lack of connection continued when his family could no longer afford band, and he was forced to quit. The student had accepted his place in the system.

When determining the best way to help struggling readers in high school, school leaders are faced with the challenges of the traditional structure of high schools. The master schedule is a key structural assumption. It is the single driving force in the high school structure and illustrates the six assumptions of the structural frame reported by Bolman and Deal (2008). The master schedule, in tandem with the bell schedule organizes the students in the school by assigning student into classes. Personal preferences are not as important as state and federal mandates and needs of the master schedule. Owens and Valesky (2010) described a characteristic of a traditional school as line and staff with vertical lines of authority. This traditional structure has been extended to the student body as well. The more experienced students, seniors, have the first choice

in classes and teachers, and subsequent scheduling choices progress downward from juniors to sophomores to freshmen. Reading classes, due to state requirements, may dictate the courses that a student may take.

In high schools, reading classes have been required to be taught by a teacher with a reading endorsement, and students who need specialized reading instruction are often scheduled into these classes (Cullen, Gregory, & Noto, 2010). A secondary reading classroom will have students with and without disabilities based on the students' performance on the state assessment.

Understanding teachers' concerns about teaching students with disabilities allows the school leadership team to support teachers. Cullen et al. (2010) studied teachers' attitudes toward inclusion and the practice of including students with disabilities in general education classrooms. With the legal requirements of Individuals with Disabilities Education Act (IDEA, 2004) and No Child Left Behind (NCLB), schools have been required to make general education classes accessible for children with disabilities. Because students with disabilities have been served in regular education classes, considered to be the least restrictive environment, general education teachers have been responsible to teach students with and without disabilities in the same classrooms. Many times, the teachers are not given additional support or additional training. This lack of support and training may lead to a negative attitude or belief by the classroom teacher and limit the success of the inclusion. Cullen et al. reported the attitude of general education teachers was essential to the success of the inclusion movement. Some general education teachers have reported concerns for their lack of

specialized training and the additional instruction time needed to meet the diverse needs of the special education learners.

Cullen et al. (2010) were interested in the importance of a positive teacher attitude and the role of staff development in the success of the inclusion in classrooms of students with disabilities. After reviewing several survey instruments, none of which met their needs, the researchers created first the Attitude of Pre-Service Teachers Toward Inclusion Scale (APTAIS) which led to the creation of the Teacher Attitudes Toward Inclusion Scale, TATIS, a new instrument to measure teacher's attitude and the effectiveness of staff development for inclusion success. Based on their literature review, the instrument needed to evaluate effective practices in five areas identified as having an impact of the success of inclusion.

The first instrument, the APTAIS, was a 14-item questionnaire, and its purpose was to measure three attitudinal factors. Kim et al. (2010) reported a strong support for construct validity and internal consistency reliability with alpha coefficients of 0.84, 0.082, and 0.82 for the three components. A total score of 0.88 was reported for the total scale. The researchers used a paired t-test to compare the responses from pre-service teachers and active teachers. The results of the paired t-test were similar regardless of whether the respondent was a pre-service teacher or active teacher.

After the success of the APTAIS, Kim et al. (2010) committed to the development of the TATIS. The TATIS was also tested to determine reliability and validity. In the second stage of the research, the authors had a sample of 252 respondents (64% female and 36% male). The level of teaching experience varied, including 82% with 0-3 years

of teaching experience and 18% with more than four years of experience.  In reporting

their contact with students with disabilities, 43% of responding teachers had minimum

contact working with students with disabilities, 27% reported some contact, and 30%

reported extensive contact.  Though the sample size was sufficient, teachers with 0-3

years of teaching experience were overrepresented.  The sample included 37% of

teachers from elementary, 19% from middle, and 30% from high school levels.  The

respondents worked in 48% suburban, 25% urban, and 12% rural schools.  After

administering the TATIS, Kim et al. reported the TATIS has construct validity and good

content validity.  The items were rotated using the Equamax method using the Kaiser

Normalization.  The reported range was 0.584 to 0.88 with a mean of 0.72.  The

reliability was confirmed with the Chronbach's alpha correlation procedure with a

correlational coefficient of 0.821.

Another challenge to the traditional structure of high schools has been the mixed

ability groups in core content courses.  According to VanScriver (2005), No Child Left

Behind (NCLB) has required school performance data to be disaggregated by subgroups.

Though teachers should use differentiated instruction to meet the needs of the diverse

learners in their class and assume all children to be equally valuable, presenting

information in a lecture format without differentiation is another structural element of a

high school.  This keeps struggling readers from accessing the content knowledge.

Although high schools, historically, have largely held to a traditional structure,

some changes have been necessitated by increased accountability and the seeming

inability to eliminate the achievement gap.  Departmental meetings have often changed to

professional learning communities (PLC) where the emphasis is more on instruction and less on management.  By using professional learning communities (DuFour, 2004) and collaborative groups, a school is able to create an atmosphere for the teachers to grow professionally and support instruction in the classroom.  Through a PLC, teachers are able to discuss data and share ideas.  Developing a culturally-embedded professional learning community (PLC) is considered one of the best strategies for building capacity (Stroll, Bolam, McMahon, & Thomas, 2006).  The professional learning community emerged from the work of Dewey in the 1920s, and the concept has been expanded by other educational researchers.  According to Stroll et al., a PLC has the following five characteristics:  (a) shared values and vision; (b) collective responsibility; (c) reflective professional inquiry; (d) collaboration; and (e) the promotion of group and individual learning.

When PLCs are viewed by teachers as a way to help them improve professionally, they may support a change to the traditional structure.  PLCs allow teachers to improve their effectiveness by using data, discussing instructional strategies, and establishing common planning with improved student achievement as the goal.  In a PLC environment, teachers, according to DuFour (2004), are no longer expected to work in isolation, but as a collaborative team.

In a traditional high school, administrators identify scheduling criteria for classes. With requirements for intensive reading classes, it may appear the school is tracking students because the same students may be scheduled together in all of their classes. With cross-department PLCs , teachers may be able to discuss the students they share.

Braddock and Slavin (1992) reviewed policies and practices based on ability grouping and academic performance. They researched tracked students compared to untracked students. Their results indicated students in untracked schools outperformed students in tracked schools. Similarly, in core subject areas, tracked high achievers did not outperform untracked students in the same core subjects. Tracked students rarely moved from their assigned ability group and were rarely exposed to college preparatory courses. Poorer academic performance was not the only consequence of tracking. Lower achieving untracked students reported low self-esteem and a negative impression of schools. Braddock and Slavin summarized the situation as follows: "Students cannot learn what they have not been taught" (p. 3). Tracked classes were also found to have a disproportionate numbers of minority students. The authors recommended tracking should be replaced with differentiated instruction in heterogeneous classrooms.

Providing differentiated instruction in all classes may provide support for struggling readers. High school students have increased reading demands in all subject areas. The project, Creating Independence through Student-owned Strategies (CRISS), has used research on proficient readers to increase reading skills in struggling readers (Kushman, Hanita, & Raphael, 2011). By providing content-area teachers with strategies to support struggling students in reading proficiency, CRISS has advocated for vocabulary and comprehension explicit instruction with clear and consistent reading comprehension strategies. Teaching for understanding, explanation, and modeling and metacognition are the core principles of Project CRISS. No statistically significant

impact was found in the Project CRISS study of reading comprehension scores (Kushman et al., 2011).

Pyle and Vaughn (2012) identified several concerns regarding implementation of Response to Intervention (RtI) in high schools.  Struggling high school readers require reading intervention in all subject areas.  Pyle and Vaughn (2012) discussed the high school class as a tier 2 intervention in RtI, a multi-tiered layer of support framework for struggling students regardless of exceptional education label.  Their findings supported reading classes.  Students who did not receive an intervention class declined in their reading performance.  Although students in an intervention class did not score at proficiency levels or close the achievement gap, they did not decline in their reading performance.  Pyle and Vaughn (2012) concluded that a reading intervention class may not be enough to make significant gains with struggling readers, and that a systematic, school-wide cross-curricular research-based reading instruction may be required to move struggling readers from tier 2 intervention classes.  Tracking and reporting achievement, as required by No Child Left Behind Act (NCLB), analyzing data in PLCs (DuFour, 2004) are not enough to close the achievement gap (Blank, 2011).

To examine achievement gaps, school structures must address school-wide efforts (Santamaria, 2009).  Simply adding an intensive reading class to a traditional high school schedule cannot provide enough support for struggling students.  Although federal guidelines have resulted in disaggregated data by subgroups, cultural diversity may not necessarily be captured in the same way.  It can, however, be evaluated in individual classrooms.  Culturally diverse learning (CDL) started in 1970s as multicultural

education. At the time of the present study, differentiated instruction (DI) was promoted as one way to meet the needs of diverse learners in a classroom. Santamaria reported on three important differences between differentiated instruction and culturally responsive teaching (CRT). Santamaria reported that though special education research results have been used to shape differentiated instruction, CDL students are not special education students and should not be treated as such. She also noted that although direction instruction may be effective for some CDL learners, it should only be used when appropriate. Santamaria conducted a mini-case study with two North San Diego County, California elementary schools recognized for implementing direct instruction with culturally responsive learners and closing achievement gaps. DI used assessments to determine which students were selected for additional support, but CRT did not address assessments. When DI and CRT were compared to each other, there were several overlapping concepts. Santamaria suggested reform efforts should consider the unique characteristics of each learner and a hybrid of DI and CDL pedagogies may meet the challenges of increasing diversity in schools.

<center>Computer-Assisted Instruction (CAI)</center>

According to Dunkel (1987), the development of computers-assisted instruction can be traced to Skinner's reinforcement research. By the 1940s, the first computer was developed, and its primary purpose was data processing for the business community. In the 1960s, educators made the connection between computers and the classroom. However, the implementation was slow due to several factors. Dunkel (1987) cited those

factors as (a) the high cost of the hardware, (b) the lack of quality software, (c) the lack of evidence to support the effectiveness of computer-assisted instruction, and (d) resistance from teachers.

With the addition of computers in classrooms, the ability to teach differently has been made available. Initially, computers were little more than computerized workbooks, but as software companies have integrated artificial intelligence into educational programs, curriculum opportunities have grown (Harris & Sipay, 1985). Though most children have started first grade by six years of age, each state establishes its own kindergarten entrance criteria and kindergarten retention criteria, thereby creating a variance in ages. Even with a uniform age limit, teachers' classrooms can vary in chronological age and classes may have a full year of age variance (Harris & Sipay, 1985).

Historically, Americans have believed that all students should have access to quality educational programs and an opportunity to attend college or earn a living wage. The authors of the Equity and Excellence Commission (2013) report have cautioned that the achievement gap impacts national interests by creating a continuous recession where people in poverty are unable to escape. Poor communities with less money are unable to compete for the best teachers, lack state of the art hardware, and may not be able to afford computer-assisted programs.

Transitioning from electronic workbooks to interactive stories on the computer that keep students interested in reading is a good start, but secondary students require more access to technology than just digital textbooks (Alvarez, 1998). The World Wide

Web has opened the classroom beyond brick and mortar buildings, extending it into a global learning community (Alvarez, 1998). Teachers have been able to create virtual experiences for students. Students have been able to embed technology in their papers and provide authentic examples of their learning. Tillman reported that computer-assisted instruction (CAI) enhances teaching and learning, but there are still questions about the impact of CAI on learning.

In their review of over 250 computer-based instruction research articles, Kulik and Kulik (1991) reported that 81% of the studies indicated improved assessment averages. Further analysis revealed 94 studies of computer-based instruction (CBI) were statistically significant. When the CBI programs were used as a four-week or less intervention, the effect size improved by 0.42 standard deviations. Longer implementation did not yield the same results.

Falth, Gustafson, Tyus, Herman, and Svenson (2013) reported improved technology provides new possibilities to address reading deficits. The researchers evaluated three different computer-assisted intervention programs. Students demonstrated gains in decoding, reading comprehension, and reading non-words. The small sample size and a lack of consistent procedures for the implementation of the computer-assisted instruction made the results difficult to generalize beyond the sample. Also, the results of the data analysis did not support the importance of the identification of reading deficits and the use of targeted intervention.

Reading has been referred to as the transference of information (Cuevas, Russell, & Irving, 2012). Cuevas et al. (2012) reported students were spending very little time

during the school day reading, and that students cannot improve reading skills if they do not read.  They also observed that modern students may prefer digital inputs compared to textbooks.  Independent Silent Reading (ISR) with computer-assisted support is one way to include technology in the classroom and support content learning.  Based on their research, Cuevas et al. reported ISR with CAI provided struggling high school students with support to improve their reading skills.

When students interact with technology on a daily basis outside the classroom, schools should provide learning opportunities using technology.  The implementation of Computer-Assisted Instruction (CAI) requires teachers to purposely plan for its use or it will not impact learning (Lovell & Phillips,).  The authors reported that parents and teachers recognize the importance of technology, but that schools have reported barriers in the use of technology.  The research and development phase of software production can last 10 years, but that schools often need a quicker turn-around.  By the time software makes it to classrooms, technology has evolved.  Classrooms have fallen behind the current trends in technology.

Given the amount of technology that Americans use on a daily basis, the inevitability of technology in the schoolhouse has become an expectation, approaching a guarantee.  With the exposure of technology to school-age children, many students are more comfortable than their teachers with the integration of technology in the classroom. Cheung and Slavin (2012) completed a meta-analysis of 84 studies with 60,553 participants.  Specifically, computer-assisted instruction was evaluated on program intensity and ability groups.  Program intensity was divided into two categories based on

minutes of use.  Low intensity was measured as less than 75 minutes a week and more than 75 minutes per week was categorized as high intensity.  Ability grouping mean effect was reported as 0.37 (low), 0.27 (middle), and 0.08 (high).  Low and middle ability groups reported a more positive impact than high ability groups.

Using computer-assisted instruction is one way for a teacher to differentiate instruction.  Kim et al. (2006) studied Collaborative Strategic Reading (CSR), a program adopted from reciprocal teaching.  They studied 34 students identified as having learning disabilities as part of in a computer-assisted intervention group to improve reading skills.

Students in secondary school classrooms who lack reading skills may struggle to comprehend and make meaning of the written material, and providing effective interventions for struggling readers is difficult when teachers lack the knowledge and skills to teach at-risk students and the instructional resources needed are not available. Computer-assisted instruction may be one way to address both concerns (Torgesen, Wagner, Rsahotte, Herron, & Lindamood, 2010).  The authors cautioned that computer programs should not replace teacher instruction but should be used as a supplement.  The researchers studied two computer-assisted programs, Read, Write, and Type (RWT) and The Lindamood Phoneme Sequencing Program for Reading Spelling, and Speech (LIPS). RWT and LIPS use explicit and systematic support and target the development of accurate text reading, phonemic awareness, and phonemic decoding. The researchers reported students who received RWT and LIPS intervention improved their reading performance, but the differences were not statistically reliable.

Stetter and Hughes (2010) reported CAI has been used with students with disabilities for several years. With an increase of students with disabilities in regular education classrooms, CAI may provide support in content-area subjects. The studies reviewed by Stetter and Hughes indicated students with disabilities experienced a positive effect for reading comprehension with CAI. They also determined that online reading and web searches have typically been used daily by millennium students with support from the teacher for instruction and support. The authors suggested that CAI should be used with students with disabilities to improve reading skills.

Students with disabilities may have different learning styles (Chiang and Jacobs, 2009). When an instructor teaches using only one learning style, many students are neglected. Marcauruso and Rodman (2011) supported the use of CAI as a supplemental program, because CAI provides for intensive practice for phonological awareness and basic phonic skills.

One way struggling readers in schools access grade-level content is to have the text read to them, and educators have been encouraged that text-reader software would help students improve reading skills. However, researchers have indicated that text-reader software alone is not sufficient to improve skills. The software reads the text, but the reader must be able to make meaning from the written word. Reading is a complex task, and word calling alone does not provide comprehension. Monaet-Williamson et al. studied the addition of self-questioning strategies to the text-reader software to improve word identification, fluency, and comprehension. The results of this study allowed students to interact with the written material.

Roberts, Takahashi, Park, and Stodden (2012) researched the use of text to speech (TTS) to improve student performance in science, improve reading engagement, and improve reading skills. These researchers studied the use of SQ3R, a program that uses survey, question, read, recite, and review techniques to improve reading skills, and TTS to access grade-level materials. Prior knowledge and motivation are two factors that Harris and Sipay (1995) reported affecting comprehension. A limited science background and a lack of reading skills in reading affect, according to Harris and Sipay (1995) impact students' ability to build schema, the way the brain stores information. Computer-Assisted Instruction (CAI) provides classroom teachers with a variety of resources at their fingertips (Johnson, Perry, & Shamir, 2010). These researchers posited that not all CAI are the same and that the needs of the students combined with the teaching style of the teacher and the parameters of the software should be considered when determining if a CAI program is appropriate. As technology has evolved, additional educational tools have been added to CAI software programs. Although Johnson et al. had reported on the positive effects of CAI reading in previous studies, they cautioned that the studies may have been evaluating other factors and CAI was not really studied effectively.

In order to address their concerns regarding CAI, Johnson et al (2010) studied the following three types of CAI programs: (a) learner-controlled systems; (b) adaptive-learning systems; and (c) mastery-learning and CAI. Using a sample recruited from the Salt Lake City and Provo, Utah communities, they focused on the difference in learning gains using the three types of computer-assisted instruction groups. The participants

completed their CAI in computer labs in community facilities for 20-minute sessions held

two days a week for 13 weeks. They used the Dynamic Indicators of Basic Early

Literacy Skills (DIEBELS) test as the pre-test and post-test. The pre-test did not reveal

any significant difference between treatment and control groups. The researchers

identified a one-way directional hypothesis, and the results were statistically similar

between the treatment and control group. Using a Bonferroni post-hoc analysis, the

mastery group performed significantly better in overall reading than the learner-control

group. The researchers cautioned that the study participants were very young children,

kindergarteners and first graders, and the results may not be appropriate to generalize to

other age groups.

In contrast, Allington (2013) promoted early literacy-based research but

acknowledged that schools did not have the systems in place to implement the research.

He argued that computer-assisted programs have diverted resources away from research-

based reading systems that demonstrate best practices. Allington also remarked that

research results have rarely made a difference in the classroom, because outside

initiatives have had a stronger influence. He has been critical of decoding programs that

are not part that of a larger, systematic reading program. Though recognizing decoding

as an essential task of reading development, Allington has indicated that research

findings have not supported decoding as the primary program. Though schools have

continued to use decoding in isolation for quick reading gains, these programs may not

produce reading proficiency at the levels required for 21st century classrooms.

Slavin, Lake, Davis, and Madden (2010) reported that schools have the greatest chance for struggling readers to improve. Given the importance of reading as a foundational skill and the high stakes of reading assessments, finding effective reading programs is important. Slavin et al. (2010) studied computer-assisted instruction and five other categories of reading instruction. They reported that instructional technology had a minimum impact on achievement. The researchers analyzed 14 studies, and the weighted mean effect size was reported as +0.09 for instructional technology. The results indicated that computer-assisted instruction has not delivered positive results in regard to student achievement.

The purchased core reading programs have not provided enough support for guided practice, gradual release, and systematic skill development; and the neediest students may not have had access to the most, experienced skilled teachers or are taught intensive instruction by a paraprofessional (Allington, 2013). Also, schools have not provided time during the day for students to read. In many schools, silent reading is reduced to an at-home activity to make time for core reading instruction based on recommendations from Reading First. In schools where silent reading has remained in teacher's lesson plans, for struggling readers, independent reading has been eliminated in favor of worksheets and skill development (Allington, 2013).

Types of Reading Programs

*Read 180*

Developed by Vanderbilt University, the University of Central Florida, and

Scholastic, Inc., Read 180 was a structured reading program that has been used in over

10,000 classrooms across the United States (What Works Clearinghouse [WWC] (2009).

The structure of the program requires a 90-minute reading block divided into three parts:

large group direct instruction, small group learning stations, and large group concluding

activity.  During the small group learning stations, the teacher instructs one group, one

group works individually on reading skills on the computer, and the third group reads

independently.  WWC (2009) reviewed 101 studies on the effects of Read 180, noting

that the program met only seven of the research criteria established by WWC.  Of the

seven studies, six were rated as meeting the standard with reservations.  By analyzing the

seven studies, the WWC reported the Read 180 extent of evidence for comprehension and

general literacy achievement as medium to large.

According to Kim, Capolosto, Hartry, and Fitzgerald (2011), Scholastic, Inc.

suggested that Read 180 should be used for students scoring in the lowest stanines of

assessments.  Due to a lack of scientific research, Kim et al. (2011) decided to conduct a

research study to determine the effects of Read 180.  They selected an afterschool

program with students who scored below proficiency in the state assessment, determining

that the use of whole group and learning stations produced positive results in reading for

vocabulary and comprehension for moderate risk students. These results were inconsistent with the recommendations from Scholastic.

Des Moines Independent Community District's 1200 special education students used Scholastic's Read 180 reading program. Hewes, Palmer, Haslam and Palmer (2006) analyzed their five-year implementation of the CAI program. The program started in the 2001-2002 school year with the school district's special education students. In 2005-2006, the Read 180 implementation expanded to include a comparison group with regular education students. The researchers reported three reading achievement measures were statistically significant for Read 180; however, there was no measureable effect on two reading achievement measures. The researchers report the study revealed the effect size ranged from 0.11 to 0.16 and argued the effect size was acceptable for an educational study. Although learning improvements were reported in this Read 180 study, program effect did not produce improvements in grade-level proficiency.

Software research was conducted on the impact of students' achievement but not on students' learning experience. Wu and Coady (2010) observed that culturally and linguistically diverse learners have different prior learning experiences, and these differences can be addressed in the classroom by using technology. Because Read 180 is a reading program that has been used with students with learning disabilities and English-language learners, most of the research conducted using the program has been with students with disabilities (SWD). Wu and Coady continued in this direction, studying the culturally relevant literature of ELL students and Read 180. Although Read 180 included a unit about immigration and new Americans, it was only at a surface level and was not

deep enough for the ELL learners to make many connections.  Wu and Cody determined

that Read 180 had missed an opportunity to embed culturally relevant materials in the

program.

*Fast ForWord*

Compared to other reading programs, the Fast ForWord program targets cognitive

skills needed for reading and learning (WWC, 2013).  Compared to Read 180, Fast

ForWord is an intervention-reading program, because it was designed for a short period

of time, usually 4-16 weeks (WWC, 2013).  Scientific Learning Corporation developed

the Fast ForWord computer-based intervention program to improve reading skills by the

use of audiovisual games to improve language difficulties, thus improving reading

(Strong, Torgenson, Torgenson, & Hillme, 2010).  In Fast ForWord, all students start at

the basic level and advance through the program as they demonstrate proficiency.  In

2000, the single license price was $999 for the Fast ForWord Language and $554 for the

Fast ForWord to Reading.  The cost for Fast ForWord to Literacy was not available

(Strong et al., 2010).

Strong et al. (2010) studied the Fast ForWord intervention program to determine

if claims about its effectiveness were accurate.  Fast ForWord reported improvements in

literacy skills and oral language with the use of the program.  Concerned with design

limitations and small sample sizes of previous studies, Strong et al.  (2010) reported that

the effectiveness claims were difficult to accept.  They performed a meta-analysis study,

reviewing 79 relevant studies.  Their results did not support the prior effectiveness reports

of Fast ForWord as an intervention literacy program or that Fast ForWord improved reading. Wasserman, Chare, Beattie, and Eden (2007) had earlier conducted research on middle school students who used Fast ForWord. Their findings did not support the use of Fast ForWord for students with reading difficulties. WWC (2013) identified 342 studies that reported the effects of Fast ForWord. Using research criteria, WWC identified seven studies with reservations and two studies without reservations.

Students identified with specific learning disabilities (SLD) are often included in reading classes. Hook, Mararuso, and Jones (2001) studied the effect of Fast ForWord on reading skills, analyzing both the immediate results and those obtained over a two-year monitoring period. Their research study was conducted to compare reading improvement for students receiving reading instruction using Fast ForWord compared to students receiving instruction in the Orton-Gillingham (OG) program. The 11 participants for the Fast ForWord treatment group were selected from children who responded to a public request placed in the newspaper, and the OG treatment group was matched based on the selected students. Both treatment groups improved in phonemic awareness, but OG students also made improvements in word attack skills. Neither treatment group made gains in word identification. After two years, FFW and OG students showed reading improvements, but the FFW treatment group did not outperform the OG treatment group. The results of this study supported the use of a multi-sensory structured program, but the authors cautioned against generalization due to sample size.

*Success For All*

In the Success for All (Madden, 1991) reading program, technology was infused in reading instruction in two ways:  (a) by embedding multimedia presentation in the Success for All reading lesson and integrating verbal and visual supports to create multiple pathways for learning; and (b) by using computer-assisted tutoring.  Using the requirements of the Success for All reading program, one-to-one tutoring is provided to students who are performing in the bottom third of the Success for All progress monitoring.  The preference of Success for All has been to use only certified teachers, but schools have used paraprofessionals for tutoring.  Adding computer-assisted tutoring provides a structured program that includes plans, instructions, and progress monitoring. A computer-assisted tutoring program, Alphie's Alley, was developed by the researchers of the Success for All program (Madden, 1991) and used in daily 20-minute tutoring sessions.  The results of embedded and computer-assisted tutoring for comprehension had an effect size more than a full standard deviation improvement compared to the control group.

*School-wide reading*

Lemov (2010) identified 49 techniques that assist classroom teachers to improve daily instruction and prepare all students for the rigors of college, defining skills that needed to be practiced and strategies or teaching decisions.  He identified three areas of reading: decoding, vocabulary, and fluency.  According to Lemov (2010), setting high expectations for all students in the classroom is an essential element regardless of the

curriculum. Lemov's no opt-out technique demonstrated that all students must be held accountable for learning. A student response of "I don't know" is not the endpoint for learning and does not relinquish the student's ownership to know the answer, but it is the beginning of learning as a community. Another student shares the answer, but the original student must also know the answer. The teacher also reinforces the area of vocabulary by using vocabulary in class discussions and making connections from students' language to more complex vocabulary. Using probing questions and restating correct answers also reinforce vocabulary. Lemov (2011) continued his suggestions for academic improvements and dedicated a chapter in his book to the premise that all teachers are reading teachers. With a sense of shared responsibility for reading, teachers are able to provide students multiple opportunities to read throughout the day.

*Guided Reading*

Schmoker (2006) was critical of guided reading when activities for students who were not working with the teacher were engaged in a meaningful literary activity. Fluency and decoding are functional elements of reading, but they will not help students meet the demands of literacy in college and career classes. Schmoker (2006) promoted authentic literacy, using close, purposeful reading, re-reading, and writing. Learning to read critically and with a purpose leads to discussions and sharing of ideas. Students are able to evaluate their thinking, re-read and increase their skills. Schmoker (2006) argued that authentic literacy should be used in all grades for all students.

Variables Impacting Reading Progress in Secondary School Classrooms

*The Teacher's Role*

Although technology may provide resources to a teacher, it should not take away the teacher's instructional decision-making (Kajder, 2007). In 21st century classrooms, students have become high-end users of technology, and teachers have all too often been the individual lacking the technological knowledge to support computer-assisted reading programs. Kajder described a visit to an urban high school that claimed it was a high tech high school, and that technology was used in teaching. What Kajder observed was traditional teaching in which computers were used as a word processors rather than pencil and paper. Instead of being an example of high tech, it was low tech. Kajder continued her visit by speaking with a student who was not completing his work. The student shared his disconnect between the writing he preferred with the writing required by the school. He shared his personal writings from the web, and Kajder discovered he was a very prolific writer and that his writing was more than random thoughts. The student used multi-media tools to express himself. The writing in the high school English class did not have meaning for him because his expression was limited by requiring a report be completed using a specific word processing program. Technology could be the bridge between the requirements of the state standards and desires of students to express themselves, but to do so may push the boundaries of traditional teaching. The result could be, however, a more authentic representation of the students' knowledge by

increasing student engagement and motivation to connect the world outside to the classroom.

Kulik and Kulik (1991) reported that teachers may influence computer-assisted instruction assessment results. There are two possible explanations for this. First, the computer-based classes are typically assigned to the strongest teachers. The teacher may be the effect and not the program. The second reason occurs when the same teacher teaches both the treatment and the control groups; the control group may also receive treatment effect.

Rodriguez's (2011) research on relationship-rich cultures showed transformational opportunities by increasing student engagement. Rodriguez reported relationships were the X factor that makes a difference in schools with high rates of poverty, inequality, and generational struggles.

Marsh, McCombs, and Mortorell (2012) wrote about a reading coach program that was started in Florida as an initiative to improve reading achievement and raise performance of all students to grade level or above by 2012. Florida schools added reading coaches to schools to assist classroom teachers to improve the implementation of reading instruction. Reading coaches have been used to support students directly and indirectly. They may directly teach ad-hoc groups or individual students and work indirectly with teachers. To address content-area needs and improve reading skills with information texts, Michigan schools added literacy consultants to work with core content classes in reading strategies in content areas (Zimmerman, 2011).

As students prepare for a global economy, other countries have examined their reading curricula. According to Lynch, Fawcett, and Nicolson (2000), the United Kingdom has had concerns regarding its reading intervention programs and improvement of students with individual education plans (IEPs).

*Reading Fluency*

Fluency was identified as an essential skill in comprehensive reading program (Morris et al. (2012). Being able to read fluently increases a student's reading enjoyment, increases meaning, and ease of competition in school assignments. Students who are disfluent are at a disadvantage in secondary classrooms. Morris et al. (2012) researched reading instructional levels and the selection of appropriate materials. They studied 274 second-grade students from rural, western North Carolina in a longitudinal study. The subjects were randomly assigned to two groups for the four-year study. Both groups were assessed in word recognition, oral reading, and silent reading. Based on the results of their study, Morris et al. (2012) suggested that a computer could be used in the assessments. By using the three assessment data points, the authors were able to determine minimum standards needed at each grade level and that the information could be used in the classroom to determine a student's instructional level.

*English-Language Learners*

Wu and Coady (2010) reported that software program usage has increased, but the research on the students' experience was lacking. In their study of the cultural aspects of

English as a second language (ESL) students, they noted that English language learners (ELL) should be considered when deciding to add computer-assisted software programs to the reading curriculum. Their study was a qualitative research project involving eight middle school ESL students in a Read 180 classroom. Wu and Coady's research determined that Read 180 was not as culturally diverse as students in an ESL classroom may require. The software program included a unit about immigration, but some students reported they did not identify with the unit as they had different experiences. Wu and Cody noted that the customized educational reading software, though new, was a promising development in culturally and linguistically diverse software.

According to the Excellence and Equity commission (2009), the teaching profession should be respected and compensated for the difficult work of educating and nurturing children to reach their full potential. In other countries, top college graduates become teachers; however, in the United States, the best and brightest students rarely select teaching as a profession. Public schools must be willing to search for innovative ways to teach and move away from the traditional silo structure that has not appealed to top teaching candidates and has failed to meet the academic needs of students. Marzano, Toth, and Schooling (2013) suggested a growth model for teachers that focuses on gains in student achievement, noting that school leadership must guarantee that the best teachers are the ones in the classrooms. In contrast, however, schools often struggle to find qualified candidates.

Colleges and universities have been the traditional avenue for teachers with education preparation classes, but states have increasingly relied on alternative

certification programs (ACP) that allow people from a wide-variety of backgrounds and experiences to become teachers. These ACP programs are supported by federal initiatives. Candidates may not have any training in teaching reading or how to support struggling readers in their classrooms (Baines, McDowell & Faulk, 2001). Each state has been responsible for determining its own certification requirements. Florida developed an alternative certification program (ACP) that has not required any previous teaching experience on the part of the ACP teacher. Florida requires a bachelor's degree, a job offer, and a fingerprinting screening prior to allowing an alternative certification teacher to work with students. Florida's ACP teachers have been required to complete standards-based competencies assigned by the state prior to receiving a professional certificate, but the candidates have been offered a three-year temporary certificate while completing the competencies. ACP candidates have also been assigned a mentor to help them transition into the education profession. Marzano et al. (2013) observed, however, that being a quality teacher was more than just meeting certification requirements.

According to Darling-Hammond (1999), teachers who are more skilled at teaching and have extensive content knowledge are stronger influences on student achievement than teachers lacking both skill and knowledge. Darling-Hammond also concluded that the effects of quality teachers can impact student achievement more than student background factors. Similarly, Marzano et al. (2013) recognized the importance of quality teachers in every classroom. They discussed the importance of continued teacher development, noting that as teachers improve, so do students.

As a public school system, schools have done very little to eliminate the achievement gap on a national level. With the passage of No Child Left Behind in 2001, schools were under increased scrutiny to raise test scores and hire quality teachers (Darling-Hammond, 2008). According to the National Center for Educational Statistics (2011), the average reading achievement score increased from 214 in 1992 to 240 in 2011. According to the FLDOE (2011), the comparison of reading scores from FCAT in 2001-2002 to FCAT 2.0 in 2011 indicated the achievement levels of students scoring as proficient (level 3 or above) increased in every grade level. The greatest gains were made in seventh grade, rising from 47% in 2001 to 68% in 2011. The smallest increase was reported in 10th grade. In 2001, 37% of 10th graders scored at level 3 or higher compared to a 2-point improvement to 39% improvement in 2011.

*Graduation Rate*

With an ever-changing global market, the need for a high school diploma has never been greater. Dropping out of high school limits a person's chance to make a living wage (Orfield, Losen, Wald, & Swanson, 2004). The national average of 68% of all students entering the ninth grade and graduating with a regular diploma by the 12th grade is concerning. According to Swanson (2008), No Child Left Behind (NCLB) targeted high school reform efforts which required additional accountability measures including improving high school graduation rates. According to Heckman and LaFontaine (2010), the graduation rate is an important measure of performance for American schools, and the decision to remove students who earned a General Education

Development (GED) certificate was based on data that GED earners were not afforded the same opportunities as regular high school diplomas students in regard to post-secondary options and employment earnings.

Moore, Porter, Kohren, and Castles (2012) studied the dual route model of reading as experts were divided on the best path. The first procedure is lexical. It focuses on assessing the memory of a familiar word to help identify an unknown word. The second procedure is non-lexical. It uses sound/symbol relationship for unknown words. Students with reading difficulties may struggle in one or both procedures, but using the correct assessment provides targeted support. Moore et al. studied the performance of 30 students on irregular and non-word subsets. In the research, girls scored lower than boys on the reading irregular and non-word subtests. Moore et al. reported a small sample size which limited the generalizability beyond the sample.

*Students with Disabilities*

Students identified with developmental dyslexia have difficulty learning to read. Although the cause is unknown, Johnson et al. (2013) reported development dyslexia affects between 5% and 10% of students. These researchers studied 16 students identified with dyslexia and 16 matched control group students by using EEG and MEG measurements. The results of the study indicated that students with disabilities have difficulty with auditory functions. Though procedural skills are taught in lower grades, adolescent readers require conceptual skills, which are often lacking, to meet the demands of rigorous courses (Lemeaux, 2012).

In the information age, students with disabilities require additional supports,

Lynch et al., 2000).  Students with disabilities may benefit from computer-assisted

instruction because it provides immediate feedback, individualized lessons, and

motivation for students.  Lynch et al. studied the Reader's Interactive Teaching Assistant

(RITA), a computerized program.  The results of the study produced positive results, and

the eight students in the study showed improvement in reading and spelling.  Specifically,

comprehension improved using RITA when in previous years student performance had

declined

Literacy demands of high school students require more than word calling, but the

emphasis is on comprehension.  Compared to elementary school, high schools students

have been required to take content-based courses, and content-based teachers have

expected students to perform reading tasks independently.  In elementary school, students

may be taught to predict, summarize, and self-questions.  In contrast, high schools

students are not encouraged to discuss their readings unless prompted.  Students are

unsure when, where, and what strategies to use as independent readers.  Content-area

teachers are concerned with content instruction and may under-support reading strategies

to improve content comprehension.  Wigent (2013) studied the use of skills in

constructing knowledge, monitoring, and evaluating text.  In this study, 25 students were

divided into two groups.  One group was comprised of above average readers, and the

other group consisted of students identified as reading learning disabled.  The students

were given the Gray Silent Reading Test (GSRT).  The researcher taught each student the

think-aloud strategy, and students were scored on reading passages.  The researchers

noted that students did not question the information they read, accepting it as truthful. According to Wignet (2013), a good reader questions text and makes judgments about accuracy. The results of the study indicated students with a reading disability used reading strategies during the reading but still needed support to use the strategies effectively and more frequently.

Sarroub and Pearson (1998) posited that reading comprehension assessments could be divided into three types: (a) informal assessments, (b) criterion-referenced assessments, and (c) standardized multiple-choice tests. Criterion-referenced assessments were added to basal reading programs in the 1970s and 1980s, and in the 1980s, portfolio assessments were popular. However, due to a lack of consistency, portfolios were short-lived. Assessments returned to standardized, multiple-choice assessments.

Slavin, Chung, Groff, and Lake (2008) studied the effectiveness of high school and middle school reading programs. When students enter high school with poor literacy skills, the chance of reaching post-secondary goals is greatly reduced. Even some high school graduates have diminished reading skills and may have difficulty with the college and careers technical reading. Understanding which reading programs work and which type of reading learner is valuable research. The increased complexity of reading materials and cognitive demands based on comprehension in science and mathematics courses demonstrate the importance of reading in all subjects in school.

The demand for reading curriculum increased with the additional accountability requirements of No Child Left Behind (NCLB), and students who have not met proficiency standards, as assessed on a yearly basis, have been scheduled into remedial

reading classes. These classes, once reserved for elementary schools, have become

commonplace in secondary schools. In the beginning, teacher-selected materials were

used in the secondary reading classes, and publishers developed material for the

adolescent reader. Some reading programs were enhanced elementary programs that

were expanded to include secondary schools. As the number of students requiring

reading classes grew, the demand for research-based secondary reading programs

continued. Several new reading programs became available to the schools. With little

research on the effectiveness of secondary reading programs, Slavin et al. (2008)

compared secondary programs using a common rubric to assist schools in determining

the best program for their students' needs. The programs were divided into four

categories: (a) reading curricula, (b) mixed methods model, (c) computer-assisted

instruction, and (d) instructional process programs. Using a process similar to meta-

analysis and used previously by Slavin in previous research, Slavin et al. (2008)

established the following nine criteria for selecting studies for analysis:

- Research must be on secondary reading programs, but the focus of the study could
  not be structural (scheduling, ability-grouping, same sex classrooms).

- Grades selected must be from middle and high school grades 7-12. Sixth could be
  included if it was part of a middle school.

- Studies must include a treatment group and a control group.

- Random assignment must be used.

- The report must be available in English, but the study could be from any country.

- Pretest data must be used.

- Standardized reading measures must be used.

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- The study must have a minimum duration of 12 weeks.

- There must be a minimum of two teachers and 15 students.

Slavin et al. (2008) conducted a literature search using multiple search terms for studies published from 1970 to 2007.  Compared to the federal What Works Clearinghouse, their study included studies more than 20 years old if the study met the established criteria and was relevant to present-day schools.  In order to compare studies, the researchers used effect size, the difference between pretest and posttest with adjustments made for covariates, and weighted means to account for the small and extremely large sample sizes.  The exclusion of qualitative research, implementation of a minimum of 12 weeks, and the standardized measurement requirement were three limitations noted by the authors of this study.  Slavin et al.  (2008) were critical of the reading curricula research and excluded all studies because they failed to meet the criteria.

In Slavin's 2008 study, Read 180 and Voyager were categorized as mixed methods.  Scholastic recommended a 90-minute reading block with rotations.  In the Read 180 studies, there was concern that the Read 180 students received more instructional time than the other reading classes.  This lack of consistency was significant and impacted the learning gain results.  Voyager Passport used DVD and online resources.  The mixed method effect was reported as +0.23.

Computer-assisted instruction (CAI) programs were divided into two categories, supplemental and computer-managed learning systems.  Eight studies were evaluated in

the CAI category.  The research included 12,984 students and CAI had an effect size of +0.18.

Instructional-process programs were the third category and its focus was on extensive staff development to meet targeted needs.  Peer-assisted learning strategies use cooperative learning structures and had a weighted effect size of +0.28.  Reading Edge and student team reading, both of which were instructional-process programs, had a weighted effect of +0.28.  Reading programs that focused on meta-cognition reading skills were strategy induction programs and had a mean effect size of +0.36.

Comprehensive school reform programs were the last category and the mean effect was +0.12.  The results of Slavin et al.'s 2008 analysis indicated that the largest weighted effect size were for programs with cooperative learning strategies which proved successful across programs.

Chen (2000) reported that throughout the 1990s, educators recognized the importance of technology in the classroom, but software and hardware issues impeded a true integration in daily lessons.  Computer-assisted instruction (CAI) was in its infancy, and classroom implementation was drill and practice.  Wilson, Majslerek, and Simmons (1996) researched CAI on fourth- and fifth-grade students identified as learning disabled and served in special education.  They compared computer-assisted instruction to teacher-led instruction in regard to improvement in basic mathematics facts.  Wilson et al. found that students with teacher-led instruction performed better than those with CAI.  The study was considered valuable in providing a basis for future study.

<div align="center">Computer-assisted Reading Programs</div>

<div align="center">*Read 180*</div>

Software research has not been conducted primarily on its impact on students'

achievement; rather, the students' learning experience has been the focus of various

research initiatives. Culturally and linguistically diverse learners have different prior

learning experiences, and these differences can be addressed in the classroom by using

technology. Read 180 has been of particular interest because it is a reading program for

students with learning disabilities and English-language learners. Most of the research

has been conducted on students with disabilities (SWD), Wu and Coady (2010) studied

the culturally relevant literature of ELL students and Read 180. Although Read 180

included a unit about immigration and new Americans, it was only at the surface level

and did not deep enough for the ELL learners to make many connections. The program

missed an opportunity to embed culturally relevant materials in the program. (Wu &

Coady, 2010).

<div align="center">*Great Leaps Reading Program*</div>

The Great Leaps Reading program is a supplemental reading program used in

Title I schools for students with severe reading difficulties. By using a case study

approach, Haselden and Webster (2011) studied three students identified as having severe

reading disabilities as well as being economically disadvantaged. These students were

studied for six weeks while they were using the Great Leaps supplemental program in a

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rural high school.  Using oral fluency probes, the researchers reported gains in word

phrases and words in a story.

*Accelerated Reader*

Some schools have selected the Accelerated Reader (AR) program as a

recreational program.  AR is a combination program of books and computers.  Johnson

(2003) reported previous studies for AR were conducted by Paul.  Paul's reported

positive effects, however, were suspect because he was the owner of Accelerated Reader,

and other researchers have not reported consistently positive results.  In conducting his

study, Johnson also attempted to determine the effectiveness of AR.  The results of his

study were positive.  Children reading the most books had a 2.24 years growth in reading.

Students who read the least amount of books also had the least amount of growth, but it

was the largest percentage of students.  Johnson concluded AR was most successful with

students who read the books.  He also concluded that understanding adolescent learners

may help teachers implement reading programs with fidelity and increase student

engagement.

<u>Adolescent Learners</u>

Compared to elementary readers, adolescent readers have different needs.

Struggling readers in the secondary setting may have experienced long-term poor

performance on the state-mandated, high stakes testing that has resulted in their being

categorized as at-risk for graduation.  Although there have been some improvements in

the lowest reading levels, there has been little success in moving students from remedial to advanced classes (Harmon, Hedrick, & Vintinner, 2011). Harmon et al. were concerned with the lack of variety in school-wide research-based reading programs to meet the individual needs of students. They believed that with data available on the performance levels and individual needs of each student, there appeared to be a lack of options for the classroom teacher and that the lack of choices may be less about the availability of programs or lack of knowledge of the needed components of a quality-reading program, but the skill set of the reading teacher. The purpose of Harmon et al.'s study was to determine teachers perceptions of high school reading classes. Using purposive sampling, the researchers surveyed 21 high school reading teachers from Florida, North Carolina, and Texas. Using a semi-structured, face-to-face interview protocol, the researchers asked teachers questions about staff development, school and student characteristics, components of the reading programs, and teacher opinion about teaching reading. The teachers reported participation in on-going staff development and in-service on commercially developed curriculum, including Read 180, Plugged into Reading, and Sheltered Instruction Observation Protocol (SIOP). The teachers reported their classes were scheduled based on students' failure on the state assessment, and that there was no student-selected elective reading class for other students. Because proficiency standards on the state assessment served as the gatekeeper for reading classes, and it was not a student-selected course, teachers were concerned with absenteeism and motivation. One teacher summarized the challenges in teaching high school reading class as follows:

We spend a tremendous amount of time trying to build self-esteem, teaching

students what they can do and what they can do well and how to capitalize on

that. [We also] teach them how to manage tests, how to manage anxiety, how to

manage attention issues and other behaviors that impair their ability to

demonstrate what they know. [They know] more than what they are actually able

to show and my job is to figure out how to get them to express it in a standardized

test. Now that's really tricky because by the time they're in 11th or 12th grade

they really feel defeated. I have to turn that around. I have to show them that

they can do it [and] here's the proof you can do it. I know you can do it but you

may not be able to do it the way everyone else does it. Let's try something else to

see what works. (Harmon et al., 2011, p. 111)

The researchers found that the lack of student motivation works in tandem with the lack

of skills to produce additional challenges for secondary reading teachers. The interviews

also revealed teachers had flexibility on the implementation of the reading curriculum but

few mandatory requirements from the school leadership or the district. More than half of

those surveyed used a computer-based reading program, but, again, teachers determined

how, when, and to what extent computer-based instruction would be used. Teachers

reported they had the autonomy to develop the elements of their reading classes, but they

recognized the freedom was also a challenge and a concern. One teacher even

recommended the most experienced teachers should teach high school reading classes,

but Harmon et al. disagreed. Of the 21 teachers interviewed for the study, 10 had limited

experience teaching reading and depending on their state certification and college courses
may have had limited preparation to teach reading as well (Harmon et al., 2011).

<div align="center">Reading Instruction and the Struggling Student</div>

According to Lange, McPhillips, Mulhern, and Wylie (2006), due to different
eligibility requirements, the number of  students identified as experiencing reading
difficulties has been greater than the number of students identified as having a learning
disability.  These researchers were concerned with differentiating between computer-
assisted instruction and assistive technology.  They used speech synthesis, a
technological tool used to assist with reading comprehension by reading the text, as an
example.  They noted that speech synthesis, one type of computer-assisted instruction,
can be used with students with reading difficulties regardless of an exceptional education
label, to assist with comprehension.  Lange et al. recommended that speech synthesis
could be used with post-secondary students who were having reading difficulties, but
post-secondary students who read at grade level or above did not perform as well using
synthesized speech and reported it as a hindrance.

Struggling students can benefit from Response to Intervention (RTI), a federal
initiative from the Disabilities Education Improvement Act (IDEA, 2004).  RTI is a
problem-solving approach to provide resources to students that need them without
waiting for failure or special education labels.  According to Fuchs and Fuchs (2006),
RTI is a multitier systematic approach to instruction and data-driven decisions.  The first
tier is the core curriculum.  Each tier is more intensive and provides a more targeted

approach to the interventions used, and monitoring is more deliberate and purposeful. For the purposes of this study, intensive reading classes were considered a tier 2 intervention. According to Gersten and Dimino (2006), one benefit of RTI is that it is initiated at the classroom level and teachers can provide targeted support. An advantage of RTI is the ability to get services to the student quickly and have a systematic way of assessing students' performance at multiple data points. Using RTI, students should have ongoing assessments with a minimum of three formal assessments a year with progress monitoring by the classroom teacher and the school leadership team. Teachers need additional time to work collaboratively with other educators to discuss interventions and problem-solve by demonstrating knowledge of the core curriculum, a variety of interventions, and the ability to interpret data to make educational decisions.

Focusing on underachieving struggling learners was a concern for Reis, McCoach, Little, Muller, and Kaniskan (2011), who advocated for the use of enrichment-based reading programs to promote long-term effects and create proficient readers. The school-wide enrichment model-reading (SEM-R) utilizes differentiation strategies to create a love of learning by allowing students to self-select reading materials. Reis et al. (2011) studied the impact of SEM-R on reading comprehension and fluency scores. SEM-R uses three phases with an emphasis on Phase 2 with independent reading, and it counters the criticisms of silent reading by creating a structure for silent reading to be implemented with conferencing and feedback. Reis et al. used a cluster-random sample from five elementary schools throughout the United States. Teachers and students reported increased student enjoyment in reading. Analysis of the data revealed, for the

high poverty urban school, SEM-R results for reading comprehension and fluency, when compared to the control group, were statistically significant.  In the face of limited financial resources and the promise of their study, Reis et al. reported the cost of the SEM-R, with independent reading books in the students' interest areas, was approximately $1,000 per classroom library and could be used for several years to offset the initial financial expenditure.

Stetter and Hughes (2011) studied the effect of computer-assisted instruction on students identified with a learning disability as measured by reading comprehension assessments using text structures and story mapping.  The sample consisted of nine high school students.  As measured by the Gates-Macginitie Reading Comprehension Test, students had reading comprehension levels of 3.3 to 4.9.  Students reported a preference for CAI rather than their traditional teaching, but reading comprehension results were not statistically significant.  Stetter and Hughes recognized that there were several limitations to their study.  The sample size was small, and the results did not lend themselves to generalizing beyond the sample.

## Summary

A review of research and related literature on secondary reading with an emphasis on computer-assisted instruction (CAI) has been presented in this chapter.  The review demonstrated the need for research on Achieve 3000®.  Although other reading programs, both traditional programs and CAI programs, have been subjected to some limited research, more study was needed on adolescent reading.  As the achievement gaps

have continued to widen and reading programs have been unable to move students to proficiency, computer-assisted reading programs have increasingly been implemented. With reading proficiency as one of the key requirements for high school graduation, helping students meet proficiency standards is critical.

CHAPTER 3
METHODOLOGY


<u>Introduction</u>

The purpose of this study was to determine if there was a significant difference in the scale score of students who were taught using computer-assisted instruction, Achieve 3000®, compared to those students taught in traditional high school reading instruction. This analysis used data from the 2011-2012 and 2012-2013 results of the Florida Comprehensive Assessment Test (FCAT).

All students enrolled in public education have been required to take the FCAT for reading in Grades 3-10 unless identified as a student with a significant disability. An individual education plan (IEP) team has been charged with determining, based on criteria established by the state, whether a student with a disability would be required to participate in the standardized assessment. If the IEP team determined a student with a significant disability should be exempted, the student would participate in the Florida Alternative Assessment (FAA) and would no longer work toward a regular diploma.

The treatment group for the present study was comprised of ninth- and tenth-grade students from three high schools that implemented Achieve 3000® in their reading classes as their primary reading instruction during the 2012-2013 school year. In Achieve 3000®, class instruction starts with whole group instruction; students are then divided into three learning stations, rotating through them during the class period. As the teacher works with students in a small group with direct instruction, the second group

works on Achieve 3000® on the computers in the classroom, and the third group works on independent activities. The last transition is a quick assessment of the learning goal.

The comparison group was comprised of ninth- and tenth-grade students from three high schools that used Non-Achieve 3000® instruction in a traditional reading class. Students in the traditional reading program were taught using teacher-selected materials. Students were taught in whole group or small group settings, depending on the preference of their classroom teachers. The comparison group did not receive computer-assisted instruction from the Achieve 3000® program.

Variables

*Independent Variable*

The independent variable was the types of reading instruction, either Achieve 3000® or Non-Achieve 3000® programs

*Moderator Variables*

In a quantitative study, a moderator variable influences the relationship between other variables and produces an interaction effect. In this study, the moderator variables were the demographic variables: (a) gender; (b) race; (c) exceptional student education (ESE) status; (d) English language learners (ELL) status; and (e) socioeconomic (SES) status (Baron & Kenny, 1986).

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*Dependent Variable*

The dependent variable for this study was the students' reading scale scores on the Florida Comprehensive Assessment Test (FCAT) 2.0. According to Steinberg (2011), the FCAT is interval data because the distance of the scale scores is consistent and equal.

Research Questions and Hypotheses

This study focused on the following questions.

1. To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

   $H_{01}$: There is no statistical difference between 2013 FCAT reading scores of ninth- and tenth-grade students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

2. To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade exceptional education students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

   $H_{02}$: There is no statistical difference between 2013 FCAT reading scores of ninth- and tenth-grade exceptional education students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

3. To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade English language learner (ELL) students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

$H_{03}$: There is no statistical difference between 2013 FCAT reading scores of ninth- and tenth-grade English language learner (ELL) students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

4. To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade male and female students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

$H_{04}$: There is no statistical difference between 2013 FCAT reading scores of ninth- and tenth-grade male and female students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

5. To what extent is there a difference between 2013 FCAT reading scores of free/reduced lunch students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

$H_{05}$: There is no statistical difference between 2013 FCAT reading scores of ninth- and tenth-grade free/reduced lunch students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

6. To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade students identified in the subgroups: white, black, and Hispanic students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

$H_{06}$: There is no statistical difference between 2013 FCAT reading scores of ninth- and tenth-grade students identified in the subgroups: white, black, and Hispanic students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

## Research Design

A quantitative, ex-post facto, non-experimental research study was designed to test whether there was (a) a difference between Achieve 3000® and traditional teaching on student achievement for ninth-and tenth-grade students in reading classes; (b) a difference between Achieve 3000® and non-Achieve 3000® reading programs on student achievement for ninth- and tenth-grade exceptional education students (ESE) and regular education students in reading classes; (c) a difference between Achieve 3000® and non-Achieve 3000® reading programs on student achievement for ninth- and tenth-grade English language learner (ELL) students; and (d) a difference between Achieve 3000® and non-Achieve 3000® reading programs on student achievement for ninth- and tenth-grade students in reading classes regarding gender, SES (as determined by free and reduced lunch status), and race (White, Black, and Hispanic). Statistical tests were run

using pre-existing, archived data provided by the Orange County Public Schools student data system.

## Population

The population for this study was selected ninth- and tenth-grade public high school students in Orange County Public Schools (OCPS) who were scheduled into reading classes during the 2012-2013 school year.  According to the 2012 Orange County Public Schools (OCPS) Annual Report, the school district had an enrollment of 181, 448 students in 182 schools.  The state of Florida rated 136 schools either as an A or B for the 2011-2012 school-year.  Only one school was designated an F.  For the 2012-2013 school year, the 181,448 students enrolled in Orange County Public Schools represented the following ethnic or racial groups: White, 63%; Black, 29%; Asian, 5%; Multicultural, 3%; American Indian/Alaska Native, 1%; Hispanic, 34%; and Non-Hispanic, 66%.  This study focused on ninth-and tenth-grade reading students who were working towards a regular diploma.

## Sample

Random samples were selected for both ninth and tenth grades in order to create equal sized groups.  The sample was stratified to include students in all sub-groups and types of reading classes in the study.  The reading classes included those which were taught with Achieve 3000®, both single and double block; and those which were not taught with Achieve 3000®, both single block and double block.

Prior to any data collection, permission was obtained from UCF through its Institutional Review Board procedures to conduct the study (Appendix A). Permission was then obtained from the Orange County Public Schools to gather data for the study (Appendix B).

The FCAT test scores of all students enrolled in reading classes in the four identified high schools were used in this study. The previous year's Florida Comprehensive Assessment Test (FCAT) scores were used for placement in the reading classes and students who scored as level 1 and 2 on the FCAT reading test, were scheduled into reading classes by their high school guidance counselors. Reading coaches verified the appropriate placement of the students. Each of the data elements was edited to eliminate data that were not matched for the 2011-2012 and 2012-2013 FCAT reading scores.

## Data Analysis

The students' FCAT achievement scores were analyzed using descriptive statistics. Frequency, mean, median, and mode were computed for each variable. An analysis of covariance (ANCOVA) was used to determine if there was a statistical difference in the 2012-2013 reading achievement scores for students who were instructed with Achieve 3000® and those of students (control group) who were instructed not using Achieve 3000® reading program. Demographic information was collected and analyzed. A factorial analysis of variance (ANOVA) was also performed to analyze the subgroups

identified in the research questions and determine if there was a difference between the reading achievement scores of the students instructed with Achieve 3000® compared to those of students instructed with a traditional reading program. Steinberg (2011) reported that a factorial ANOVA is an appropriate statistic when the populations are normally distributed, have equal variances, and have two independent variables (factors) or one independent variable and one moderator variable. According to Steinberg (2011), the probability of determining a difference should be reported using the $F$ statistic. The formula for the deviation score in a Factorial ANOVA was:

$$SS_{tot} = \sum_{1}^{N} (X\text{-}M_{tot})^2 \rightarrow \text{each individual scores from the total mean}$$

$$SS_{with} = \sum_{1}^{k} \sum_{1}^{n} (X\text{-}M_{cell})^2 \rightarrow \text{each individual score from the group mean}$$

$$SS_{bet\ reading} = \sum_{1}^{k} (M_{Achievereading\ cells} \text{-} M_{tot})^2$$

$$SS_{bet\ moderator\ variable} = \sum_{1}^{k} (M_{moderatorvariable\ cells} \text{-} M_{tot})^2$$

$$SS_{reading\ X\ moderator\ variable} = SS_{tot} - (SS_{with} + SS_{bet\ reading} + SS_{bet\ moderator\ variable}) \qquad (1)$$

The F statistic measures the main effect and the interaction effect. Because the F statistic compares all of the groups at the same time, the researcher also analyzed the data for significance of pairs. According to Steinberg, when the F statistic is significant, a post-hoc test for pairwise comparison should be used. For this study, the post-hoc test that was used was the Tukey honestly significant difference, Tukey HSD. This analysis was reported as part of the factorial ANOVA table. The interaction formula is:

$$N$$

$$SS_{tot} = n_g \sum {}_1 X^2 - \frac{(\sum X_{tot})^2}{N}$$

$$SS_{with} = \sum_1^k X^2 - \sum_1^k \frac{(\sum X_{cell})^2}{n_{cell}}$$

$$SS_{bet\ reading} = \sum_1^k \frac{(\sum X_{row})^2}{n_{row}} - \frac{(\sum X_{tot})^2}{N}$$

$$SS_{bet\ moderator\ variable} = \sum_1^k \frac{(\sum X_{column})^2}{n_{column}} - \frac{(\sum X_{tot})^2}{N}$$

$$SS_{reading\ X\ moderator\ variable} = SS_{tot} - (SS_{with} + SS_{bet\ reading} + SS_{bet\ moderator\ variable}) \qquad (2)$$

Another important statistical element that was reported in this study was effect size (Steinberg, 2011). Unlike comparing this study's F statistic to the F-critical table, the researcher must determine the size of the effect (small, medium, and large) to decide if the effect is of practical importance to the purpose of this study. All of the statistics that were used in the study enabled the researcher to analyze the results and determine if there was a difference in the 2012-2013 reading performance of students taught with Achieve 3000® compared to students taught using traditional reading instruction in the same time period.

<u>Summary</u>

This chapter has presented the methods and procedures used to conduct the study. The research questions and hypotheses have been restated, and the population and sample have been described. The research design and the details associated with data collection were presented. A rationale was provided for the use of the selected data analysis procedures and the formulas used in the analyses have been revealed.

CHAPTER 4
ANALYSIS OF THE DATA

Introduction

This chapter presents the findings and results of the statistical analyses performed

for this study.  The purpose of the study was to examine the effect of the use of a

computer-assisted instruction curriculum, Achieve 3000®, among select secondary

reading students in a central Florida school district.  With the quantitative data generated

in this study, school leaders should be able to better determine if Achieve 3000® is an

appropriate intervention program for their students.  An analysis of covariance

(ANCOVA) and a factorial analysis of variance (ANOVA) were used to determine if

program status (Achieve 3000® compared to Non-Achieve 3000®) had an effect on the

2012-2013 FCAT reading achievement scores, developmental scale scores (DSS), of a

sample of ninth- and tenth-grade students from four central Florida high schools.

For this study, a stratified random sample was used to measure differences in

FCAT performance between Achieve and Non-Achieve schools.  Four schools were used

in this study with two schools representing Achieve schools and two schools representing

Non-Achieve schools.  The statistical tests analysis of covariance (ANCOVA) and

factorial analysis of variance (ANOVA) were used appropriately.  A factorial ANOVA

provides analysis of the independent main effects and the interaction effect.  According to

Steinberg (2011), main effect occurs when "one independent variable has a significant

effect on the dependent variable" (p. 337).  A main effect is reported for each

independent variable.  A factorial ANOVA also reports an interaction effect.  The

interaction effect is "one independent variable has a significant effect on the dependent variable, but only under certain levels or conditions of the other independent variable" (p. 339).

A total of 489 participants were used in this study. There were 227 females and 262 males in the sample. The means and standard deviations for Achieve program status are reported in Table 2. The mean score for Achieve Schools was 229 with a standard deviation of 16.74. The mean score for Non-Achieve Schools was 230 with a standard deviation of 15.44.

Table 2

*Means and Standard Deviations for Sample*

| Source | N | M | SD |
|---|---|---|---|
| Achieve school | 243 | 229.00 | 16.74 |
| Non-Achieve school | 246 | 230.00 | 15.44 |

Quantitative Data Presentation and Analysis

*Research Question 1*

To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

$H_0$:  There is no statistical difference between 2013 FCAT reading scores of ninth- and tenth-grade students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

Means and standard deviations for the 2013 FCAT reading scores of ninth- and tenth-grade students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not are reported in Table 3.  The mean for the ninth-grade Achieve 3000® program status was an FCAT mean scale score of 225.76 compared to the FCAT mean scale score of 226.67 for the ninth-grade Non-Achieve 3000® program students.  The mean for the tenth-grade Achieve 3000® program was an FCAT mean scale score of 232.80 compared to the FCAT mean scale score of 234.08 for the tenth-grade Non-Achieve 3000® program students.  This analysis showed a difference on the FCAT reading mean scale scores.  The Non-Achieve 3000® program student mean scores were slightly higher when compared to Achieve 3000® program students mean scores.

Table 3

*Descriptive Statistics for Grade Level*

| *Source* | *N* | *M* | *SD* |
|---|---|---|---|
| Achieve program | | | |
| Ninth grade | 131 | 225.76 | 17.42 |
| Tenth grade | 112 | 232.80 | 15.13 |
| | | | |
| Non-Achieve program | | | |
| Ninth grade | 115 | 226.67 | 15.40 |
| Tenth grade | 131 | 234.08 | 14.68 |

A two-way analysis of covariance (ANCOVA) was conducted for this question. The independent variable, Achieve 3000® participation, included two levels: schools that used the Achieve 3000® reading program and schools that did not use the Achieve 3000® reading program. The dependent variable was the students' performance on the 2012-2013 FCAT reading test, and the covariant was the previous year's FCAT reading test. The statistical application, ANCOVA, was applied to the data set of 500 students with 125 students randomly selected from each of the four schools. It was found that the interaction between the covariate and the independent variable was not significant (F (1,484) = .251, p =.62) and the ANCOVA test was applied. The main effect for the Achieve program was not significant, F (1, 484) .015, p=.90. The main effect for grade level was significant, F (1, 484)= 15.23, p=.00. When the ANCOVA was conducted, Achieve reading program status (Achieve and Non-Achieve) was not significant related to the differences between the programs after accounting for the covariate (2012 FCAT). Thus, the null hypothesis for achieve program failed to reject. The results indicate that the 2013 FCAT DSS mean scores for ninth- and tenth-grade students did not differ

significantly for students in the Achieve 3000® and Non-Achieve 3000® reading programs.  The effect size was reported as small at .05.  These results are presented in Table 4.

Table 4

*Analysis of Covariance for 2013 FCAT Achievement by Grade Level*

| Source | SS | Df | MS | F | Sig. |
|--------|-----|----|-----|-----|------|
| Achieve programs | 1.92 | 1 | 1.92 | .02 | .90 |
| Grade level | 2011.82 | 1 | 2011.82 | 15.23 | .00 |
| Error | 63915.70 | 484 | 132.06 | | |
| Total | 126576.07 | 488 | | | |

*Note*. R Squared = .50 (Adjusted R Square =.49)

*Research Question 2*

To what extent is there a difference between 2013 FCAT reading scores of ninth and tenth grade exceptional education students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

$H_{02}$:  There is no statistical difference between 2013 FCAT reading scores of ninth and tenth grade exceptional education students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

Descriptive statistics provided data on the schools' 2013 FCAT reading scores of ninth- and tenth-grade exceptional education students who experienced computer-assisted

reading instruction with Achieve 3000® and those who did not are reported in Table 5. The exceptional education student FCAT developmental scale score mean for the Achieve 3000® program was 221.59 compared to the exceptional education student FCAT mean of 223.45 for Non-Achieve 3000® program students.  The Non-Achieve 3000® program students' mean score was slightly higher when compared to those of Achieve 3000® program exceptional education students.

Table 5

*Descriptive Statistics for Exceptional Student Education (ESE)*

| *Source* | *N* | *M* | *SD* |
|---|---|---|---|
| Achieve program | | | |
|    ESE | 49 | 221.59 | 18.60 |
|    Non-ESE | 194 | 230.88 | 15.75 |
| | | | |
| Non-Achieve program | | | |
|    ESE | 38 | 223.45 | 15.52 |
|    Non-ESE | 208 | 231.92 | 15.10 |

A factorial ANOVA was conducted to examine the effect of ESE status and Achieve3000® program participation on 2013 FCAT DSS scores.  There was not a statistically significant interaction between the effects of ESE status and achieve program status on FCAT achievement for students in intensive reading classes $F (1, 485) =. 046$, $p =.83$.  The main effect for ESE status was $F (1, 485) = 22.38$, $p =.00$, and it was statistically significant.  The main effect for achieve program was $F (1, 485) = .60$, $p = .44$ and it was not statistically significant.  Specifically, for this study, Achieve status (Achieve or Non-Achieve) was not significantly related to ESE status, and the null

hypothesis for Achieve program was not rejected. The effect size was reported as small at .04. The results indicate that the 2013 FCAT DSS mean scores for ninth- and tenth-grade ESE students did not differ significantly for students in the Achieve3000® and Non-Achieve3000® reading program. These results are presented in Table 6.

Table 6

*ANOVA for Exceptional Student Education (ESE) and Achieve Programs*

| Source | SS | Df | MS | F | Sig |
|--------|-----|-----|-----|-----|-----|
| Achieve program | 148.60 | 1 | 148.60 | .60 | .44 |
| ESE status | 5564.37 | 1 | 5564.37 | 22.38 | .00 |
| Achieve program* ESE status | 11.54 | 1 | 11.54 | .05 | .83 |
| Total | 485 | | | | |

*Research Question 3*

To what extent is there a difference between 2013 FCAT reading scores of ninth and tenth grade English language learners (ELL) students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

$H_{03}$: There is no statistical difference between 2013 FCAT reading scores of ninth- and tenth-grade students English language learners (ELL) who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

Means and standard deviations for ELL students on the 2013 FCAT reading scores of ninth- and tenth-grade students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not are reported in Table 7. Achieve

3000® program had an FCAT mean scale score of 213.35 for ELL students compared to

the FCAT mean scale score of 222.72 for the Non-Achieve 3000® ELL students.  The

Non-Achieve 3000® program ELL students' mean score was slightly higher when

compared to Achieve 3000® program students' mean score.

Table 7

*Descriptive Statistics for English Language Learners (ELL)*

| Source | N | M | SD |
|---|---|---|---|
| Achieve program | | | |
| ELL | 29 | 213.35 | 17.12 |
| Non-ELL | 234 | 231.13 | 15.56 |
| | | | |
| Non-Achieve program | | | |
| ELL | 36 | 222.72 | 17.44 |
| Non-ELL | 210 | 231.97 | 14.70 |

A factorial ANOVA was conducted to examine the effect of ELL status and

Achieve 3000® program participation on FCAT DSS scores.  There was a statistically

significant interaction between the effects of ELL and achieve program status on FCAT

DSS scores for achievement for students in intensive reading classes $F (1, 485) = 4.27$, $p=$

.04.  The interaction indicated that any differences in the 2013 FCAT DSS scores were

dependent upon the ELL status and that any differences between ELL and non-ELL were

dependent upon the reading program in which students were enrolled.  The main effect

for ELL status was $F (1, 485) = 42.76$, $p = .00$, and the main effect for the Achieve

program was $F (1, 485) = . 6.11$, $p = .01$.  Specifically, in this study, Achieve status

(Achieve or Non-Achieve) was significantly related to ELL status, and the null

hypothesis was rejected.  The effect size is reported as small at .12.  As shown in Table 8,

the 2013 FCAT DSS mean scores for ninth- and tenth-grade ELL students differed

significantly for Achieve and Non-Achieve programs.  The Achieve 3000® program had

an FCAT mean scale score of 213.35 for ELL students compared to the FCAT mean

scale score of 222.72 for the Non-Achieve 3000® ELL students.  The non-Achieve

3000® program ELL students' mean score was slightly higher when compared to

Achieve 3000® program students' mean score.  Figure 1 shows the estimated marginal

means of the FCAT developmental scale scores (DSS) for 2013 for Achieve 3000® and

non-Achieve ELL students.

Table 8

*ANOVA for English Language Learners (ELL) and Achieve Programs*

| Source | SS | Df | MS | F | Sig |
|---|---|---|---|---|---|
| Achieve program | 1456.24 | 1 | 1456.24 | 6.11 | .01 |
| ELL status | 10187.46 | 1 | 10187.46 | 42.76 | .00 |
| Achieve program* ELL status | 1016.50 | 1 | 1016.50 | 4.27 | .04 |
| Total | 485 | | | | |

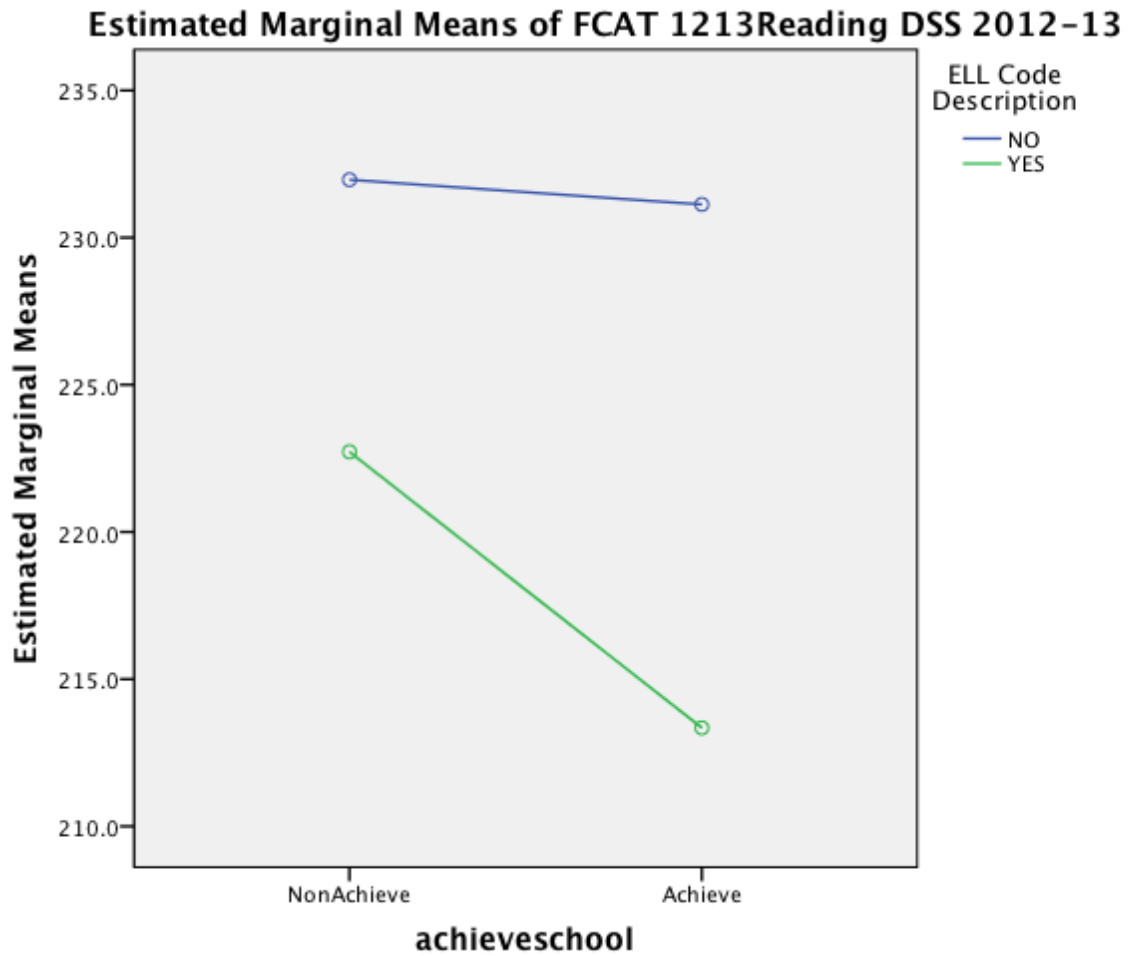**Estimated Marginal Means of FCAT 1213Reading DSS 2012–13**

*Figure 1*. Estimated Marginal Means of FCAT Reading Developmental Scale Scores for English Language Learners 2013.

*Research Question 4*

To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade male and female students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

$H_{04}$:  There is no statistical difference between 2013 FCAT reading scores of ninth- and tenth-grade male and female students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

Means and standard deviation on the schools' 2013 FCAT reading scores of ninth- and tenth-grade students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not categorized by gender are reported in Table 9.  Achieve 3000® males had an FCAT mean scale score of 225.76 compared to the FCAT mean scale score of 226.67 for the Non-Achieve 3000® male students.  The Non-Achieve 3000® program students' mean score was slightly higher for females when compared to Achieve 3000® program female students' mean score.  Achieve 3000® females had an FCAT mean scale score of 232.80 compared to the FCAT mean scale score of 234.08 for the Non-Achieve 3000® female students.  The Non-Achieve 3000® program students' mean score was slightly higher for females when compared to Achieve 3000® program students' mean score.

Table 9

*Descriptive Statistics for Gender*

| Source | N | M | SD |
|---|---|---|---|
| Achieve program | | | |
|    Males | 131 | 225.76 | 17.42 |
|    Females | 112 | 232.80 | 15.13 |
| | | | |
| Non-Achieve program | | | |
|    Males | 131 | 226.67 | 15.40 |
|    Females | 112 | 234.08 | 14.68 |

A factorial ANOVA was performed to examine the effect of gender and Achieve 3000® program participation on FCAT DSS scores. There was no statistically significant interaction between the effects of gender and Achieve program status on FCAT achievement for students in intensive reading classes, $F (1, 485) = .45$ p $= .50$. The main effect for gender was $F (1, 485) = .04$, p $= .84$, and the main effect for achieve program status was $F (1, 485) = .1.31$, p $= .25$. Thus, they were not statistically significant. Specifically for this study, Achieve status (Achieve or Non-Achieve) was not significantly related to gender status and the null hypothesis was not rejected. The effect size is reported as small at .03. The results indicated that the 2013 FCAT DSS mean scores for ninth- and tenth-grade male and female students did not differ significantly for students enrolled in the Achieve and Non-Achieve programs. These results are presented in Table 10.

Table 10

*ANOVA for Gender and Achieve Program*

| Source | SS | Df | MS | F | Sig. |
|---|---|---|---|---|---|
| Achieve program | 339.84 | 1 | 339.84 | 1.31 | .25 |
| Gender | 10.60 | 1 | 10.60 | .04 | .84 |
| Achieve program* Gender | 117.35 | 1 | 117.35 | .45 | .50 |
| Total | 485 | | | | |

*Research Question 5*

To what extent is there a difference between 2013 FCAT reading scores of ninth and tenth grade free/reduced lunch students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

$H_{05}$: There is no statistical difference between 2013 FCAT reading scores of ninth and tenth grade free/reduced lunch students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

As shown in Table 11, means and standard deviation for free/reduced lunch students were calculated for the 2013 FCAT reading scores of ninth-and tenth-grade students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not. Achieve 3000® program students had an FCAT mean scale score of 227.10 for free/reduced lunch status compared to the FCAT mean scale score of 229.85 for the Non-Achieve 3000® free/reduced lunch students. The Non-Achieve 3000® program free/reduced lunch students' mean score was slightly higher when compared to Achieve 3000® program students' mean score.

Table 11

*Descriptive Statistics for Free/Reduced Lunch Status*

| Source | N | M | SD |
|---|---|---|---|
| Achieve program | | | |
|    Free/reduced | 195 | 227.10 | 16.72 |
|    Non-free/reduced | 40 | 236.73 | 14.61 |
| | | | |
| Non-Achieve program | | | |
|    Free/reduced | 181 | 229.85 | 15.15 |
|    Non-free/reduced | 65 | 232.74 | 16.15 |

A factorial ANOVA was performed to examine the effect of Free/reduced Lunch status and Achieve 3000® program participation on FCAT DSS scores. There was no statistically significant interaction between the effects of free/reduced lunch status and achieve program status on FCAT achievement for students in intensive reading classes, $F (1, 485) = 3.85$, p=.051. The p-value for this study was .05 and significance was reported at less than .05. The main effect for free/reduced lunch status was $F(1, 485) = 13.25$, p=.00 and was statistically significant. The main effect for achieve program was $F (1, 485) = .13$, p = .72, and it was not a significant effect. Thus, the 2013 FCAT DSS mean scores free/reduced lunch status students differed significantly for both instructional groups (Achieve and Non-Achieve). Specifically for this study, Achieve status (Achieve or Non-Achieve) was not significantly related to Free/reduced lunch status, and the null hypothesis was not rejected. The effect size is reported as .03. The 2013 FCAT DSS mean scores for ninth- and tenth-grade free/reduced lunch students did not differ significantly for the Achieve and Non-Achieve reading program. These results are presented in Table 12.

Table 12

*ANOVA for Free/Reduced Lunch Status and Achieve Programs*

| Source | SS | Df | MS | F | Sig. |
|---|---|---|---|---|---|
| Achieve program | 32.93 | 1 | 32.93 | .13 | .72 |
| Free/reduced lunch | 3341.21 | 1 | 3341.21 | 13.25 | .00 |
| Achieve program* Free/reduced lunch | 968.91 | 1 | 968.91 | 3.85 | .05 |
| Total | 485 | | | | |

*Research Question 6*

To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade students identified in the subgroups: white, black, and Hispanic students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

$H_{06}$: There is no statistical difference between 2013 FCAT reading scores of ninth- and tenth-grade students identified in the subgroups: white, black, and Hispanic students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

Descriptive statistics presented in Table 13 include means and standard deviation for 2013 FCAT reading developmental scale scores of students who experienced computer-assisted reading instruction with Achieve 3000® and those who did not for the subgroups: white, black, and Hispanic students. The Non-Achieve program mean scores were higher than Achieve program mean scores for both black and Hispanic subgroups.

The mean score for the white subgroup was higher for the Achieve program compared to the Non-Achieve mean score.

Table 13

*Descriptive Statistics for Ethnicity*

| Source | N | M | SD |
|---|---|---|---|
| Achieve program | | | |
| Black | 23 | 225.78 | 13.74 |
| Hispanic | 163 | 227.08 | 17.18 |
| White | 45 | 236.91 | 15.10 |
| | | | |
| Non-Achieve Program | | | |
| Black | 43 | 231.19 | 17.29 |
| Hispanic | 143 | 229.51 | 15.48 |
| White | 42 | 233.31 | 14.06 |

A factorial ANOVA was performed to examine the effect of ethnicity and Achieve 3000® program participation on FCAT scores. There was no statistically significant interaction between the effects of ethnicity and achieve program status on FCAT achievement for students in intensive reading classes, $F(1, 477) = 1.39$, $p =.23$. The main effect for ethnicity was $F (5, 477) = 2.71$, $p = .02$, and it was statistically significant. This indicated that the 2013 FCAT DSS mean scores for ninth- and tenth-grade students identified by race/ethnic groups differed significantly between groups. The main effect for achieve program was $F (1, 477) = .09$, $p = .77$, and there was not a significant effect. Specifically for this study, Achieve status (Achieve or Non-Achieve) was not significantly related to ethnicity identification. The null hypothesis failed to be rejected. The effect size was reported as small at .00. This indicated that the 2013 FCAT

DSS mean scores for ninth- and tenth-grade students identified by race/ethnic groups did not differ significantly for Achieve and Non-Achieve program students. These results are presented in Table 14.

Table 14

*ANOVA for Ethnicity and Achieve Programs*

| Source | SS | Df | MS | F | Sig. |
|--------|-----|-----|------|------|------|
| Achieve Program | 22.26 | 1 | 22.26 | .09 | .77 |
| Ethnicity | 3431.30 | 5 | 686.26 | 2.71 | .02 |
| Achieve Program* Ethnicity | 1760.24 | 5 | 352.05 | 1.39 | .23 |
| Total | | 477 | | | |

Summary

The purpose of the study was to examine the effect of the use of a computer-assisted instruction curriculum, Achieve 3000®, among select secondary reading students in a central Florida school district. Using a random sample of 500 students, the results revealed a slight difference between the Achieve 3000® mean score (M=229, SD=16.74) compared with non-Achieve mean scores (M=230, SD=15.44). ANCOVA and ANOVA statistical test were performed and analyzed. FCAT DSS means based on gender were not significant at any level. English language learner (ELL) scores were significant in both main effects and the interaction effect. Free/reduced lunch status, gender, Exceptional student education (ESE) status, and ethnicity reported significance for the main effect between the subgroups. The difference between subgroups may be used to

determine the characteristic of students who would benefit from a specific reading intervention.  In order to meet grade level proficiency, students must score Level 3 or higher on the FCAT reading test (FLDOE, 2013b).  The 2013 Reading Level 3 proficiency score was reported as the developmental scale score of 240 and higher for Grade 9 and 245 for Grade 10.  A review of the descriptive statistics for each research question revealed the means from neither reading programs (Achieve 3000® or Non-Achieve 3000®) raised FCAT scores to grade level standards.

CHAPTER 5
SUMMARY, DISCUSSION, AND RECOMMENDATIONS


Introduction

The objective of this study was to determine the impact of Achieve 3000® on the

FCAT reading scale scores of ninth- and tenth- grade students.  This study evaluated

what impact Achieve 3000® has in FCAT scores as it relates to race, gender, ESE, ELL,

and socioeconomic status.  The findings of this study focused on whether the null

hypothesis for each research question was rejected or failed to reject, indicating whether

participation with the computer-assisted program, Achieve 3000®, did or did not impact

student achievement.


Summary of the Findings

The study revealed the impact of Achieve 3000® on the Reading FCAT scores of

ninth- and tenth- grade students.  For this study, a stratified random sample was used to

measure differences of FCAT performance between Achieve and Non-Achieve program

status.  Four schools were used in this study with two schools representing Achieve

schools and two schools representing Non-Achieve schools.  The statistical tests, analysis

of covariance (ANCOVA) and factorial analysis of variance (ANOVA), were used

appropriately.  A factorial ANOVA provides analysis of the independent main effects and

the interaction effect.  According to Steinberg (2011), main effect occurs when "one

independent variable has a significant effect on the dependent variable" (p. 337).  A main

effect is reported for each independent variable.  A factorial ANOVA also reports an

interaction effect.  The interaction effect is "one independent variable has a significant effect on the dependent effect on the dependent variable, but only under certain conditions of the other independent variable" (Steinberg, 2011, p. 339).

With limited information concerning the effect of Achieve 3000®, a computer-assisted instruction program, on student achievement, schools have implemented a reading program that warrants further study.  According to the FLDOE (2012), the percentage of ninth-grade students scoring at a proficient level, level 3 or higher, in reading as measured by the FCAT was 52%, and the percentage of 10th-grade students scoring proficient in reading was 50%.  At the time of the present study, Orange County Public Schools (OCPS), a large, urban central Florida school district, had reading scores that were below the state average.  For ninth grade, 48% of students performed at proficient level in reading.  The results were similar for 10th grade with a reading performance level at 40%.  The present study was focused on the academic success of ninth- and 10th-grade high school students in Orange County, Florida who were taught using Achieve 3000® compared to ninth- and 10th-grade high school students who were not taught using Achieve 3000®.

This study focused on six research questions.  Findings of this study were used to determine whether to reject or fail to reject each null hypothesis at the statistically significant level measured at an alpha level less than .05.  The effect size, reported as eta, was used to determine practical significance by the application of Cohen's subjective standards (Steinberg, 2011, p. 398).  The specific findings of the study are presented for each of the six research questions and the respective hypotheses.

*Research Question 1*

To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

$H_{01}$: *Fail to reject*. There is no statistical difference in 2013 FCAT reading scores of ninth- and tenth-grade students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

An analysis of covariance (ANCOVA) was used to determine if there was a statistical difference in 2012-2013 reading achievement scores for students who were instructed with Achieve 3000® and those of students who were not instructed using the Achieve 3000® program. A two-way analysis of covariance (ANCOVA) was conducted for this study. The independent variable, Achieve 3000® participation, included two levels: schools that used the Achieve 3000® reading program and schools that did use the Achieve 3000® reading program. The dependent variable was the students' performance on the 2012-2013 FCAT reading test, and the covariant was the previous year's FCAT reading test. The statistical application, ANCOVA, was applied on the data set of 500 students with 125 students randomly selected from each of the four schools.

The results of the two-way analysis of covariance (ANCOVA) in this study indicated that the Achieve program status (Achieve and Non-Achieve) was not significantly related to grade level. The main effect for Achieve program was not significant at $F_{(1, 484)}$ .015, $p=.90$. The main effect for grade level was significant at $F_{(1, 484)}= 15.23$, $p=.00$.

Achieve program status did not make a statistically significant difference in the mean FCAT developmental scale scores at the .05 level. Evaluating the practical significance using eta, the ANCOVA showed that Achieve program status accounted for 5 % of the variance in the mean 2013 FCAT Reading DSS score. This was considered to be a small effect based on Cohen's subjective standards (as cited by Steinberg, 2011, p. 398).

The mean for the ninth-grade Achieve 3000® program was an FCAT mean scale score of 225.76 compared to the FCAT mean scale score of 226.67 for the ninth-grade Non-Achieve 3000® students. The mean for the tenth-grade Achieve 3000® program was an FCAT mean scale score of 232.80 compared to the FCAT mean scale score of 234.08 for the tenth-grade Non-Achieve 3000® students. The Non-Achieve 3000® DSS mean score for tenth-grade students was slightly higher when compared to Achieve 3000® program students' mean score.

*Research Question 2*

To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade exceptional education students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

$H_{02}$: *Failed to reject*. There is no statistical difference between 2013 FCAT reading scores of ninth- and tenth-grade exceptional education students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

A factorial ANOVA was conducted to examine the effect of ESE status and Achieve3000 program participation on 2013 FCAT DSS scores. There was not a statistically significant interaction between the effects of ESE status and achieve program status on FCAT achievement for students in intensive reading classes $F (1, 485) =. 046$, $p =. 83$. The main effect for ESE status was $F (1, 485) = 22.38$, $p =.00$, and it was statistically significant. The main effect for Achieve program was $F (1, 485) = .60$, $p = .44$ and it was not statistically significant. Specifically for this study, Achieve status (Achieve or Non-Achieve) was not significantly related to ESE status, and the null hypothesis was not rejected. The 2013 FCAT DSS mean scores for ninth- and tenth-grade ESE students did not differ significantly for Achieve and Non-Achieve program status students.

Achieve program status did not make a statistically significant difference in the mean FCAT developmental scale scores for students at the .05 level. Evaluating the practical significance, using eta, the ANOVA showed that Achieve program status accounted for only 4 % of the variance in the mean 2013 FCAT Reading DSS score between Achieve and Non-Achieve students. This was considered to be a small effect based on Cohen's subjective standards (as cited by Steinberg, 2011 p. 398).

Descriptive statistics provided data from the schools' 2013 FCAT reading scores of ninth-and tenth-grade exceptional education students who experienced computer-assisted reading instruction with Achieve 3000® and those who did not. The exceptional education student (ESE) FCAT developmental scale score mean for Achieve 3000® students was 221.59 compared to the exceptional education student FCAT mean of

223.45 for Non-Achieve 3000® students.  The Non-Achieve 3000® program mean score was slightly higher when compared to the mean score of the Achieve 3000® program.

Students with disabilities may require supports provided by computer-assisted standards of immediate feedback, individualized lessons, and motivation for students (Lynch et al., 2000).  Wilson et al. (1996) found that students with teacher-led instruction performed better than those with computer-assisted instruction (CAI).

*Research Question 3*

To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade English language learners (ELL) students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

$H_{03}$: *Reject*.  There is no statistical difference between 2013 FCAT reading scores of ninth- and tenth-grade English language learners (ELL) students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

A factorial ANOVA was conducted that examined the effect of ELL status and Achieve 3000® program participation on FCAT DSS scores.  There was a statistically significant interaction between the effects of ELL and achieve program status on FCAT DSS scores for achievement for students in intensive reading classes F (1, 485) =4.27, p= .039. The interaction indicates any differences in the 2013 FCAT DSS scores were dependent upon the ELL status and that any differences between ELL and non-ELL were dependent upon which reading program they were in. The main effect for ELL status is F

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(1, 485) = 42.76, p = .00, and the main effect for Achieve program is F (1, 485) = . 6.11, p = .01. Specifically for this study, Achieve status (Achieve or Non-Achieve) was significantly related ELL status. The research rejected the null hypothesis. The research indicated that the 2013 FCAT DSS mean scores for ninth- and tenth-grade ELL students differed significantly for Achieve and Non-Achieve program status.

Achieve program status did make a statistically significant difference in the mean FCAT developmental scale scores at the .05 level. Evaluating the practical significance, using eta, the ANOVA showed that Achieve program status accounted for 12% of the variance in the mean 2013 FCAT Reading DSS score, and it is considered to be a small effect based on Cohen's subjective standards (as cited by Steinberg, 2011 p. 398).

Means and standard deviation for ELL students on the 2013 FCAT reading scores of ninth- and tenth-grade students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not are reported in Table 6. The Achieve 3000® program for ELL students had an FCAT mean scale score of 213.35 compared to the FCAT mean scale score of 222.72 for the Non-Achieve 3000® ELL students. The non-Achieve 3000® program ELL students' mean score was slightly higher when compared to Achieve 3000® program students' mean score.

The result from this study supports the findings of Wu and Coady (2010). Their study was a qualitative research project involving eight middle school ESL students in a Read 180 classroom. Wu and Coady determined that Read 180 was not as culturally diverse as students in an ESL classroom may require. The software program included a unit about immigration, but some students reported they did not identify with the unit as

they had different experiences.  The lack of culturally relevant literature for ELL students

may create a lack of relevance for the student and may be a contributing reason for the

lack of ELL students performing at grade-level standards.


*Research Question 4*

To what extent is there a difference between 2013 FCAT reading scores of ninth-

and tenth-grade male and female students who experienced computer-assisted reading

instruction with Achieve 3000®, and those who did not?

$H_{04}$*: Fail to reject.*  There is no statistical difference between 2013 FCAT reading

scores of ninth- and tenth-grade male and female students who experienced

computer-assisted reading instruction with Achieve 3000®, and those who did

not.

A factorial ANOVA was performed to examine the effect of Gender and Achieve

3000® program participation on FCAT DSS scores.  There was no statistically

significant interaction between the effects of gender and Achieve program status on

FCAT achievement for students in intensive reading classes $F (1, 485) = .45$ $p = .25$.  The

main effect for gender was $F (1, 485) = .04$, $p = .84$, and the main effect for the Achieve

program was $F (1, 485) = .1.31$, $p = .25$, not statistically significant.  Specifically for this

study, Achieve status (Achieve or Non-Achieve) was not significantly related to gender

status, and the null hypothesis was not rejected.  The 2013 FCAT DSS mean scores for

ninth- and tenth-grade male and female students did not differ significantly by Achieve

and Non-Achieve program status.  Achieve program status did not make a statistically

significant difference in the mean FCAT developmental scale scores at the .05 level. Evaluating the practical significance, using eta, the ANOVA showed that Achieve program status accounted for 3% of the variance in the mean 2013 FCAT Reading DSS score, and it was considered to be a small effect based on Cohen's subjective standards (Steinberg, 2011, p.398).

Means and standard deviations of schools' 2013 FCAT reading scores for ninth- and tenth-grade students by gender who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not were included in this study. Achieve 3000® males had an FCAT mean scale score of 225.76 compared to the FCAT mean scale score of 226.67 for the Non-Achieve 3000® male students. The Non-Achieve 3000® program students' mean score was slightly higher for females when compared to Achieve 3000® program students' mean score. Achieve 3000® females had an FCAT mean scale score of 232.80 compared to the FCAT mean scale score of 234.08 for the Non-Achieve 3000® female students. The Non-Achieve 3000® program students' mean score was slightly higher for females when compared to Achieve 3000® program students' mean score.

*Research Question 5*

To what extent is there a difference between 2013 FCAT reading scores of free/reduced lunch students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

*H$_{05}$: Fail to reject.* There is no statistical difference between 2013 FCAT reading

scores of ninth- and tenth-grade free/reduced lunch students who experienced

computer-assisted reading instruction with Achieve 3000®, and those who did

not.

A factorial ANOVA was performed to examine the effect of free/reduced lunch

status and Achieve 3000® program participation on FCAT achievement. There was no

statistically significant interaction between the effects of free/reduced lunch status and

Achieve program status on FCAT achievement for students in intensive reading classes,

$F (1, 485) = 3.85$, p=.05. The main effect for free/reduced lunch status code was $F (1,$

$485) = 13.25$, p=.00, and it was statistically significant. The main effect for achieve

program was $F (1, 485) = .13$, p = .72, and it was not a significant effect. Thus, the 2013

FCAT DSS mean scores free/reduced lunch status students differed significantly for both

instructional groups (Achieve and Non-Achieve). The null hypothesis was not rejected.

The 2013 FCAT DSS mean scores for ninth- and tenth-grade free/reduced lunch students

did not differ significantly by Achieve and Non-Achieve program status.

Means and standard deviation for free/reduced lunch students on the 2013 FCAT

reading scores of ninth- and tenth-grade students who experienced computer-assisted

reading instruction with Achieve 3000® were compared with those who did use Achieve

3000® reading program. Achieve program status did not make a statistically significant

difference in the mean FCAT developmental scale scores for students at the .05 level.

Evaluating the practical significance, using eta, the ANOVA showed that Achieve

program status accounted for 3% of the variance in the mean 2013 FCAT Reading DSS

score.  This was considered to be a small effect based on Cohen's subjective standards (as cited by Steinberg, 2011, p. 398).

<center>*Research Question 6*</center>

To what extent is there a difference between 2013 FCAT reading scores of ninth- and tenth-grade students identified in the subgroups: white, black, and Hispanic students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not?

$H_{06:}$ *Fail to reject.*  There is no statistical difference between 2013 FCAT reading scores of ninth- and tenth-grade students identified in the subgroups: white, black, and Hispanic students who experienced computer-assisted reading instruction with Achieve 3000®, and those who did not.

A factorial ANOVA was conducted that examined the effect of ethnicity and Achieve 3000® program participation FCAT.  There was no statistically significant interaction between the effects of ethnicity and achieve program status on FCAT achievement for students in intensive reading classes $F (1, 477) = 1.39$, $p = .23$.  The main effect for ethnicity was $F (5, 477) = 2.71$, $p = .02$, and it was statistically significant.  The main effect for achieve program is $F (1, 477) = .09$, $p = .77$, and it was not a significant effect.  Specifically for this study, Achieve status (Achieve or Non-Achieve) was not significantly related to ethnicity identification, and the null hypothesis was not rejected. The 2013 FCAT DSS mean scores for ninth- and tenth-grade identified by race/ethnic groups did not differ significantly for Achieve and Non-Achieve program status.

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Achieve program status did not make a statistically significant difference in the mean FCAT developmental scale scores at the .05 level. Evaluating the practical significance, using eta**,**, the ANOVA showed that Achieve program status accounted for 0% of the variance in the mean 2013 FCAT Reading DSS score, and this was considered to be a small effect based on Cohen's subjective standards (as cited by Steinberg, 2011, p. 398).

Descriptive statistics included means and standard deviations for 2013 FCAT reading developmental scale scores of students who experienced computer-assisted reading instruction with Achieve 3000® and those who did not for the subgroups: white, black, and Hispanic students. The Non-Achieve schools' mean scores were higher than those of Achieve schools in all three subgroups.

As reported in this study, the main effect for ethnicity was significant. This indicated that the 2013 FCAT DSS mean scores for ninth- and tenth-grade students identified by race/ethnic groups differed significantly between groups. Based on these results, different ethnic group may require different reading materials within the reading programs. The results from this study support the achievement gap of white students and students of color identified by Bromberg and Treokas (2013) in the National Assessment of Educational Progress (NAEP) report. There were approximately 400 students identified as black and Hispanic in both Achieve and Non-Achieve programs for the sample in contrast to 100 white students. The high number of black and Hispanic students in reading classes indicated a need for reading material to be inviting and interesting to the students. Expanding culturally diverse learning (CDL) has been

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recommended by Santamaria (2009).  CDL is not a special education initiative and should be recognized for its unique characteristics.  As the results presented in the Santamaria study showed, CDL can be implemented with differentiated instruction to meet the increasing diversity in schools.

<div align="center">Discussion and Implications for Practice</div>

The findings of this study indicated that significant differences may exist in the type of students rather than in the reading program.  Reading achievement is the proficiency standard in Florida for meeting grade level requirements.  Students must perform at Level 3 or higher on state assessments to be considered proficient.  In order to determine achievement gains, this study compared developmental scale scores from the previous year to the 2013 FCAT developmental scale scores.

The ANCOVA in Research Question 1 did not show a significant statistical difference in the 2012-2013 reading achievement scores for students who were instructed with Achieve 3000® and those of students who were not instructed using Achieve 3000®.  Therefore, the Achieve 3000® reading program did not close the achievement gap any more than the Non-Achieve 3000® reading program.

Additionally, the ANOVAs in Research Questions 2 (ESE students), 4 (males and females), 5 (free/reduced lunch), and 6 (ethnic subgroups) did not show statistically significant difference in the 2012-2013 reading achievement scores for these groups of students who were instructed with Achieve 3000® and those of students who were instructed with a traditional reading program.  Therefore, the Achieve 3000® reading

program did not close the achievement gap any more than the Non-Achieve 3000®

reading program.

Conversely, the ANOVA in Research Question 3 (English language learners) did

show a significant statistical difference in the 2012-2013 reading achievement scores for

ELL students who were instructed with Achieve 3000® and those of ELL students

(control group) who were instructed with a traditional reading program.  Further

investigation indicated the mean scores for students in the Achieve3000 schools were

lower than non-Achieve 3000 schools.  This indicated that Achieve 3000 did not

contribute to closing the achievement gap.  As with Research Questions 1, 2, 4, 5, and 6,

the effect size for Question 3 was small, indicating the practical implication is also small.

With the shift to Florida Standards, the demand for increased literacy skills

becomes more rigorous and thinking more complex.  Students are required to provide

textual evidence and synthesize from multiple sources.  The need for reading skills has

never been greater.  In the past, students with limited reading skills could participate in

discussion based on life experiences by stating their opinion.  However, with the new

Florida Standards, this practice will no longer meet the academic requirement.

Additionally, with increased attention on college and career readiness skills, there

is a clear indication that the high school diploma cannot be the end goal.  Rather, it will

be a launching point for post-secondary education.  Slavin et al. (2008) have noted that

students who enter high school with poor literacy skills have greatly reduced chances of

reaching post-secondary goals.  Gardner (1983) and Swanson (2004) have stressed the

importance of supporting students as they meet minimum standards needed for a better

life.  Understanding which reading programs work for various types of reading learners is a first step in meeting this obligation.

<p align="center">Recommendations for Future Research</p>

Results of the literature review and the findings of this study revealed the need to further investigate ways to improve the effectiveness of schools (Heckman & LaFontaine, 2010).  Researching reading programs that will close the achievement gap, produce higher graduation rate, increase the skilled workforce, and benefit society as a whole is worthy of consideration.  Following are recommendations for further research based on the findings of this study:

1. A longitudinal study is needed to examine the impact of Achieve 3000® beyond the identified year in this study.

2. Further research is recommended to determine if gains achieved in reading classes are transferred to core classes.  Another challenge to the traditional structure of high schools has been the mixed ability groups in core content courses.  According to VanScriver (2005), No Child Left Behind (NCLB) has required school performance data to be disaggregated by subgroups.  Though teachers should use differentiated instruction to meet the needs of the diverse learners in their classes and assume all children to be equally valuable, presenting information in a lecture format without differentiation is another structural element of a high school.  This keeps struggling readers from accessing the content knowledge.

3. Further research is recommended to study the impact of teachers' years of experience on student performance. According to Darling-Hammond (1999), teachers who are more skilled at teaching and have extensive content knowledge are stronger influences on student achievement than teachers lacking both skill and knowledge. Darling-Hammond also concluded that the effects of quality teachers could impact student achievement more than student background factors.

4. Further research is recommended to study culturally diverse learning materials in reading classes. Wu and Coady (2010) observed that culturally and linguistically diverse learners have different prior learning experiences, and these differences can be addressed in the classroom by using technology.

5. As reported on the Florida Department of Education website (FLDOE, 2013c), the School Improvement Plan reported the cost of the Achieve 3000 reading program was $22,978.30. Additional details were not provided. With only one school's cost identified, there is not enough information to accurately identify overall cost for analysis. As more schools are added in a district, pricing costs may be less, and cost per student may be lowered. This is a viable topic for future research.

6. Continue to monitor reading program adoptions. With a centralized textbook adoption committee and district textbook purchases implemented, the decision to purchase a reading program impacts the entire school district. With increasing demands of state and federal requirements for scientifically

researched programs, school districts must monitor the materials selected.

With only one year of data, this study has established a baseline for school

districts and researchers to monitor the effectiveness of reading programs in

future years.

Summary

This study was conducted to measure the 2013 reading performance of four

central Florida high schools with 500 ninth- and tenth-graders. Specifically, the

researcher measured the reading developmental scale score performance on the 2013

Comprehensive Assessment Test (FCAT) as the dependent variable. The findings of this

study focused on whether the null hypothesis for each research question was rejected or

failed to reject, indicating whether participation with the computer-assisted program,

Achieve 3000®, did or did not impact student achievement.

Ultimately, the goal of intensive reading classes in high schools is to provide

students with additional assistance to meet grade level proficiency standards. According

to the FLDOE (2012), the percentage of ninth-grade students scoring at a proficient level,

level 3 or higher, in reading as measured by the FCAT was 52%, and the percentage of

10th-grade students scoring proficient in reading was 50%. At the time of the present

study, Orange County Public Schools (OCPS), a large, urban central Florida school

district, had reading scores that were below the state average. For ninth grade, 48% of

students in the school district performed at a proficient level in reading. The results were

similar for 10th grade students, 40% of whom were performing at a proficient level in

reading. Without new strategies to address the reading needs of 21st century students,

more children will fail to earn an important educational milestone, a high school diploma

(Angrist & Lavy, 2009), and meet the minimum standards needed for a better life

(Gardner, 1983, Swanson 2004). Although the results of this study did not indicate that

the Achieve 3000® program made a significant statistical difference in reading

achievement based on mean 2013 FCAT reading scale scores, it did provide foundational

information that can be used to improve the implementation of the Achieve 3000®

reading program. Recognizing that the 2012-2013 school year was the first year of

implementation, the results were encouraging. Schools should continue to investigate the

Achieve 3000® reading program and develop quality teachers to provide maximize

support to struggling readers.

APPENDIX A
UCF INSTITUTIONAL REVIEW BOARD REVIEW

## NOT HUMAN RESEARCH DETERMINATION

From :  **UCF Institutional Review Board #1**
        **FWA00000351, IRB00001138**

To  :  **Melanie McNeely**

Date :  **November 14, 2013**

Dear Researcher:

On 11/14/2013 the IRB determined that the following proposed activity is not human research as defined by
DHHS regulations at 45 CFR 46 or FDA regulations at 21 CFR 50/56:

|  |  |
|---|---|
| Type of Review: | Not Human Research Determination |
| Project Title: | THE IMPACT OF COMPUTER-ASSISTED INSTRUCTION ON NINTH AND TENTH GRADE STUDENTS |
| Investigator: | Melanie McNeely |
| IRB ID: | SBE-13-09690 |
| Funding Agency: | |
| Grant Title: | |
| Research ID: | N/A |

University of Central Florida IRB review and approval is not required. This determination applies only to the
activities described in the IRB submission and does not apply should any changes be made. If changes are to be
made and there are questions about whether these activities are research involving human subjects, please
contact the IRB office to discuss the proposed changes.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Patria Davis  on 11/14/2013 01:25:45 PM EST

IRB Coordinator

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APPENDIX B
SCHOOL DISTRICT PERMISSION TO CONDUCT THE STUDY

**ATTACH THE FOLLOWING ITEMS TO THIS FORM:**

- A copy of your IRB approval (if available)

- (2) Two copies of your approved proposal, grant, or project

- All survey and/or interview instruments

## ASSURANCE

Using the proposed procedures and instrument, I hereby agree to conduct research within the policies of Orange County Public Schools. Deviations from the approved procedures must be cleared through the Senior Director of Accountability, Research and Assessment. Reports and materials should be supplied when specified.

Requester's Signature _Melanie McNeil Gilley_ Date _11/18/13_

**NOTE TO REQUESTER:** When seeking approval at the school level, a copy of the entire Request Form, signed by the Senior Director, Accountability, Research, and Assessment, should be shown to the school principal who has the option to refuse participation depending upon any school circumstance or condition. The original Research Request Form is preferable to a faxed document.

## APPROVAL STATUS

☒ **Approved:** The research request was completed in full and the research meets all OCPS requirements. The following must be completed to meet security requirements before your research can begin:

_____

_____

_____

☐ **Conditionally Approved:** The research request contains one or more elements that must be clarified or are missing. However, the request has an opportunity to be approved if the following is completed:

_____

_____

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Please make these changes within two weeks and resubmit the entire Request Form and supporting documents.

☐     **Rejected:** The research request contains significant omissions and/or does not meet OCPS requirements. This research request has been rejected due to the following:

_____

_____

_____

**Signature of the Senior Director for Accountability, Research and Assessment**

_____

**Date**

_November 25ᵀᴴ, 2013_

REFERENCES

Achieve3000 (2013). *Literary solutions*. Retrieved from: http://www.achieve3000.com/

Alexander, P. A., & Fox, E. (2004). A historical perspective on reading research and practice. *Theoretical Models and Processes of Reading*, *5*, 33-68.

Alfassi, M. (1998). Reading for meaning: The efficacy of reciprocal teaching in fostering reading comprehension in high school students in remedial reading classes. *American Educational Research Journal, 35*(2), 309-332. doi:10.2307/1163426

Allington, R. L. (2011). What at-risk readers need. *Educational Leadership*, *68*(6), 40-45

Allen, J. (2007). *Mastering the art of effective vocabulary instruction.* In K. Beers, R. E. Probst, & L. Rief, L. (Eds.), *Adolescent literacy: Turning promise into practice* (pp. 87-104). Portsmouth, NH: Hieneman.

Angrist, J., & Lavy, V. (2009). The effects of high stakes high school achievement awards: Evidence from a randomized trial. *The American Economic Review*, 1384-1414.

Anderson, R. C. and others (1985). *Becoming a Nation of Readers: The Report of the Commission on Reading*. Washington, DC: National Academy of Education.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173.

Beers, K. (2007). The measure of our success. In K. Beers, R.E. Probst, & L. Rief (Eds.), *Adolescent literacy: Turning promise into practice* (1-14). Portsmouth, NH: Hieneman.

Blank, R. K. (2011). *Closing the Achievement Gap for Economically Disadvantaged Students? Analyzing change since No Child Left Behind using state assessments and the National Assessment of Educational Progress*. Washington, DC: Council of Chief State School Officers.

Bodner, G. M. (1986). Constructivism: A theory of knowledge. *Journal of Chemical Education 63*(10), 873-878.

Bolman, L.G., & Deal, T. E. (2008). *Reframing organizations: Artistry, choice and leadership.* San Francisco, CA: Jossey-Bass.

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Braddock, J. H., & Slavin, R. E. (1992). *Why ability grouping must end: Achieving excellence and equity in American education.* Baltimore, MD: Center for Research on Effective Schooling for Disadvantaged Students.

Bromberg, M., & Theokas, C. (2013). *Breaking the glass ceiling of achievement for low-income students and students of color.* Shattering Expectations Series. Washington, DC: Education Trust.

Chiang, H. Y., & Jacobs, K. (2009). Effect of computer-based instruction on students' self-perception and functional task performance. *Disability & Rehabilitation: Assistive Technology*, *4*(2), 106-118.

Cheung, A. C., & Slavin, R. E. (2012). How features of educational technology applications affect student reading outcomes: A meta-analysis. *Educational Research Review*, *7*(3), 198-215.

Cooper, P. A. (1993). Paradigm shifts in designed instruction: From behaviorism to cognitivism to constructivism. *Educational Technology*, *33*(5), 12-19.

Cullen, J. P., Gregory, J. L., & Noto, L. A. (2010). The Teacher Attitudes Toward Inclusion Scale (TATIS) technical report. *Online Submission*. Retrieved from EBSCOhost.

Dalgarno, B. (2001). Interpretations of constructivism and consequences for computer-assisted learning. *British Journal of Educational Technology*, *32*(2), 183-194.

Dobbie, W., & Fryer Jr, R. G. (2009). *Are high quality schools enough to close the achievement gap? Evidence from a social experiment in Harlem* (No. w15473). Cambridge, MA: National Bureau of Economic Research.

Duffy, T. M. & Cunningham, D. J. (1996). Constructivism: Implications for the design and delivery of instruction. In D. H. Jonassen (Ed.), *Handbook of research for educational communications technology* (pp. 170-198). New York, NY: Simon & Schuster Macmillan.

DuFour, R. (2004). What is a" professional learning community"?. *Educational leadership*, *61*(8), 6-11.

Dunkel, P. A. (1987). Computer-assisted instruction (CAI) and Computer-assisted language learning (CALL): Past dilemmas and future prospects for audible CALL. *The Modern Language Journal*, *71*(3), 250-260.

Equity and Excellence Commission. (2013). *For each and every child--A strategy for education equity and excellence.* Washington, DC: US Department of Education.

Falth, L., Gustafson, S., Tjus, T., Heimann, M., & Svensson, I. (2013). Computer-assisted interventions targeting reading skills of children with reading disabilities-a longitudinal study. *Dyslexia, 19*(1), 37-53. doi:10.1002/dys.1450

Fisher, D., & Ivey, G. (2005). Literacy and language as learning in content-area classes: A departure from "Every teacher a teacher of reading". *Action in Teacher Education*, *27*(2), 3-11.

Florida Department of Education (2012). *2012 Florida statewide assessment scores*. Retrieved from: http://fcat.fldoe.org/mediapacket/2012/

Florida Department of Education (2013a). *Graduation requirement*. Retrieved from: http://www.fldoe.org/bii/studentpro/grad-require.asp

Florida Department of Education (2013b). *FCAT 2.0 fact sheet*. Retrieved from: http://fcat.fldoe.org/fcat2/pdf/2012-13FactSheet20.pdf

Florida Department of Education (2013c). *School improvement plans*. Retrieved from https://www.flsiponline.com/districts/48 https://www.flsiponline.com/districts/48

Florida Department of Education (2013d). *2013 Guide to calculating school grades.* Retrieved from: http://schoolgrades.fldoe.org/pdf/1213/SchoolGradesTAP2013.pdf

Fosnot, C. T., & Perry, R. S. (1996). Constructivism: A psychological theory of learning. *Constructivism: Theory, Perspectives, and Practice*, 8-33.

Fosnot, C.T., & Perry, R.S. (2005) *Constructivism: A psychological theory of learning*. Retrieved from http://rsperry.com/fosnotandperry.pdf

Fuchs, D, & Fuchs, L. (2006). Introduction to response to intervention: What, why, and how valid is it? *Reading Research Quarterly, 41*(1), 93-99.

Gardner, D. P. (1983). *A nation at risk*. Washington, DC: The National Commission on Excellence in Education, US Department of Education.

Gates Foundation (2007). *Annual report 2007*. Retrieved from: http://www.gatesfoundation.org/~/media/GFO/Documents/Annual%20Reports/2007Gates%20Foundation%20Annual%20Report.pdf

Gersten R., & Dimino, J. A. (2006). RTI (response to intervention): Rethinking special education for students with reading difficulties (yet again). *Reading Research Quarterly, 41*(1), 99-108.

Hanushek, E. A., & Rivkin, S. G. (2009). Harming the best: How schools affect the black-white achievement gap. *Journal of Policy Analysis and Management*, *28*(3), 366-393.

Harris, A. J., & Sipay, E. R. (1985). *How to increase reading ability: A guide to developmental and remedial methods*. New York, NY: Longman.

Hartle, R. T., Baviskar, S., & Smith, R. (2012). A field guide to constructivism in the college science classroom: Four essential criteria and a guide to their usage. *Bioscene, 38*, 31-35.

Heckman, J. J., & LaFontaine, P. A. (2010). The American high school graduation rate: Trends and levels. *The Review of Economics and Statistics*, *92*(2), 244-262.

Johnson, E. P., Perry, J., & Shamir, H. (2010). Variability in reading ability gains as a function of computer-assisted instruction method of presentation. *Computers & Education*, *55*(1), 209-217.

Jonassen, D., Davidson, M., Collins, M., Campbell, J., & Haag, B. B. (1995). Constructivism and computer-mediated communication in distance education. *American Journal of Distance Education*, *9*(2), 7-26.

Kajder, S. B. (2007). Unleashing potential with emerging technologies. In K. Beers, R. E. Probst, & L. Rief (Eds.), *Adolescent literacy: Turning promise into practice* (pp. 213-229). Portsmouth, NH: Heineman.

Kim, A., Vaughn, S., Klinger J. K., Woodruff, A. L., Reutebuch C. K., & Kouzekanani, K. (2006). Improving the reading comprehension of middle school students with disabilities through computer-assisted collaborative strategic reading. *Remedial and Special Education, 27*(4), 235-249.

Kulik, C. L. C., & Kulik, J. A. (1991). Effectiveness of computer-based instruction: An updated analysis. *Computers in human behavior*, *7*(1), 75-94.

Kushman, J., Hanita, M., and Raphael, J. (2011). *An experimental study of the project CRISS reading program on grade 9 reading achievement in rural high schools*. (NCEE 2010-4007). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

Lange, A. A., McPhillips, M., Mulhern, G., & Wylie, J. (2006). Assistive software tools for secondary-level students with literacy difficulties. *Journal of Special Education Technology*, *21*(3), 13.

Lemov, D. (2012). *Teach like a champion field guide: A practical resource to make the 49 techniques your own*. San Francisco, CA: Jossey-Bass.

Lennon, C., & Burdick, H. (2004). *The lexile framework as an approach for reading measurement and success*. Metametrics. Retrieved from http://www.lexile.com/research/1/

Lesnick, J., Goerge, R., Smithgall, C., & Gwynne, J. (2010). *Reading on grade level in third grade: How is it related to high school performance and college enrollment*. Chicago: University of Chicago.

Lovell, M., & Phillips, L. (2009). Commercial software programs approved for teaching reading and writing in the primary grades: Another sobering reality. *Journal of Research on Technology in Education*, *42*(2).

Lynch, L., Fawcett, A. J., & Nicolson, R. I. (2000). Computer assisted reading intervention in a secondary school: an evaluation study. *British Journal of Educational Technology*, *31*(4), 333-348.

Macaruso, P., & Rodman, A. (2009). Benefits of computer-assisted instruction for struggling readers in middle school. *European Journal of Special Needs Education*, *24*(1), 103-113.

Madden, N. A. (1991). *Success for all*. Retrieved from http://files.eric.ed.gov/fulltext/ED329630.pdf

Marsh, J. A., McCombs, J., & Martorell, F. (2012). Reading coach quality: Findings from Florida middle schools. *Literacy Research And Instruction*, *51*(1), 1-26.

McTighe, J., & Brown, J. (2005). Differentiated instruction and educational standards: Is détente possible? *Theory Into Practice, 44*, 234-244.

Nelson, J. M., & Manset-Williamson, G. (2006). The impact of explicit, self-regulatory reading comprehension strategy instruction on the reading-specific self-efficacy, attributions, and affect of students with reading disabilities. *Learning Disability Quarterly*, *29*(3), 213-230.

Orange County Public Schools (2012). *2012 Orange County Public School annual report*. Retrieved from: https://www.ocps.net/Documents/AnnualReport2012.pdf

Orfield, G., Losen, D., Wald, J., & Swanson, C. B. (2004). *Losing our future: How minority youth are being left behind by the graduation rate crisis*. Retrieved from http://www.urban.org/UploadedPDF/410936_LosingOurFuture.pdf

Moore, D. M., Porter, M. A., Kohnen, S., & Castles, A. (2012). Detecting different types of reading difficulties: A comparison of tests. *Australasian Journal of Special Education, 36*, 112-133.

Morris, R. D., Lovett, M. W., Wolf, M., Sevcik, R. A., Steinbach, K. A., Frijters, J. C., & Shapiro, M. B. (2012). Multiple-component remediation for developmental reading disabilities iq, socioeconomic status, and race as factors in remedial outcome. *Journal of Learning Disabilities*, *45*(2), 99-127.

Owens, R. G. & Valesky, T. (2011). *Organizational behavior in education* (10th ed.). Needham Heights: Allyn and Bacon.

Paige, R., & Witty, E. (2009). *The black-white achievement gap: Why closing it is the greatest civil rights issue of our time*. New York, NY: AMACOM.

Pyle, N., & Vaughn, S. (2012). Remediating reading difficulties in a response to intervention model with secondary students. *Psychology in the Schools*, *49*(3), 273-284.

Pytash, K.E. (2012). Ain't nothing wrong with reading books. *Young Adult Library Services,10*(4), 31-35.

Pytash, K., & Ferdig, (2012). *TILE-SIG feature: Exploring e-readers in literacy acquisition and instruction*. Retrieved from http://www.reading.org/reading-today/digital/post/rty/2012/05/11/TILE-SIG_Feature_Exploring_E-Readers_in_Literacy_Acquisition_and_Instruction.aspx#.U39k88JOVD8

Reis, S.M., McCoach, D.B., Little, C. A., Muller, L. M., & Kaniskan, R. B. (2011). The effects of differentiated instruction and enrichment pedagogy on reading achievement in five elementary schools. *American Educational Research Journal, 48*(2), 462-501.

Richardson, V. (1997). Constructivist teaching and teacher education: Theory and practice. In V. Richardson (Ed.) *Constructivist teacher education: Building a world of new understandings* (pp. 3-14). London, UK: Falmer Press.

Roberts, K. D., Takahashi, K., Park, H., & Stodden, R. A. (2012). Supporting struggling readers in secondary school science classes. *TEACHING Exceptional Children*, *44*(6), 40-48.

Rock, M.L., Gregg, M., Ellis, E., & Gable, R. A. (2008). REACH: A framework for differentiating classroom instruction. *Preventing School Failure, 52*(2), 31-47.

Santamaria, L. J. (2009). Culturally responsive differentiated instruction: Narrowing gaps between best pedagogical practices benefiting all learners. *The Teachers College*

*Record, 111*(1), 214-247.

Sarroub, L., & Pearson, P. (1998). Two steps forward, three steps back: The stormy history of reading comprehension assessment. *Clearing House*, *72*(2-), 97-105.

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

Smith, D. R. and others (1989). *The lexile scale in theory and practice. Final report*. Washington, DC:  Metametrics.

Schmoker, M. (2006). *Results now*. Alexandria, VA: Association for Supervision and Curriculum Development.

Soe, K., Koki, S. & Chang, J. (2000). Effect of computer-assisted instruction on reading achievement: A meta-analysis. Retrieved from http://www.prel.org/products/Products/effect-cai.htm

Steinberg, W. J. (2011). *Statistics alive!* Thousand Oaks, CA: SAGE.

Stetter, M. E., & Hughes, M. T. (2010). Computer-assisted instruction to enhance the reading comprehension of struggling readers: A review of the literature. *Journal of Special Education Technology*, *25*(4).

Stevenson, M., & Hedberg, J. G. (2011). Head in the clouds: a review of current and future potential for cloud-enabled pedagogies. *Educational Media International*, *48*(4), 321-333.

Stodden, R. A., Roberts, K. D., Takahashi, K., Park, H., & Stodden, N. (2012). Use of Text-to-speech software to improve reading skills of high school struggling readers. *Procedia Computer Science*, *14*(Proceedings of the 4th International Conference on Software Development for Enhancing Accessibility and Fighting Info-exclusion (DSAI 2012), 359-362. doi:10.1016/j.procs.2012.10.041

Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional learning communities: A review of the literature. *Journal of Educational Change, 7*(4), 221-258.

Strong, G. K., Torgerson, C. J., Torgerson, D., & Hulme, C. (2011). A systematic meta-analytic review of evidence for the effectiveness of the 'Fast ForWord' language intervention program. *Journal of Child Psychology and Psychiatry*, *52*(3), 224-235.

*SuccessMaker: What Works Clearinghouse* Intervention Report. (2009). Washington, DC: Institute of Education Sciences.

Swanson, C. B. (2004). *Who graduates? Who doesn't?: A statistical portrait of public high school graduation, class of 2001*. Washington, DC: Urban Institute. Retrieved from http://www.urban.org/publications/410934.html

Swanson, C. B. (2008). *Cities in crisis: A special analytic report on high school graduation.* Bethesda, MD: EPE Research Center. Retrieved from http://www.edweek.org/media/citiesincrisis040108.pdf

Tillman, P. S. (n. d.). *Computer-assisted instruction (CAI) and reading acquisition: A synthesis of the literature.* Retrieved from http://chiron.valdosta.edu/are/TillmanPLRFinal.pdf

Tieso, C. (2003). Ability grouping is not tracking anymore. *Roper Review, 26*, 29-36.

Tomlinson, C. A. (1999). Mapping a route toward differentiated instruction. *Educational Leadership, 59,* 12-16.

Tomlinson, C. A. (2003). Deciding to teach them all. *Educational Leadership, 61*(2), 6-11.

Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Herron, J., & Lindamood, P. (2010). Computer-assisted instruction to prevent early reading difficulties in students at risk for dyslexia: Outcomes from two instructional approaches. *Annals of dyslexia*, *60*(1), 40-56.

U. S. Department of Education (2009). *Race to the top executive summary*. Retrieved from http://www2.ed.gov/programs/racetothetop/executive-summary.pdf

U. S. Department of Education (2011). *Trends in high school dropout and completion rates in the United States: 1972–2009: Compendium report.* Retrieved from: http://nces.ed.gov/pubs2012/2012006.pdf

United States Department of Education (2013). *For each and every child-a strategy for equity and excellence*, Washington, DC: Author.

VanScriver, J. H. (2005) Motherhood, apple pie, and differentiated instruction, *Phi Delta Kappan*, *86*(7), 534- 535.

Wigent, C. A. (2013). High school readers: A profile of above average readers and readers with learning disabilities reading expository text. *Learning and Individual Differences*, *25*, 134-140.

Wilson, B. G. (2011). Constructivism in practical and historical context. In B. Reiser, & J. Dempsey (Eds.), *Current trends in instructional design and technology*. Upper Saddle River, NJ: Pearson Prentice Hall.

Wu, C., & Coady, M. R. (2010). "The United States is America?": A cultural perspective on READ 180 materials. *Language, Culture And Curriculum*, *23*(2), 153-165.

Zimmerman, M. (2011). Increasing Secondary Reading Comprehension and Reading Proficiency across Content Areas. *Online Submission.*