

2015

# The Effects of Differentiated Instruction on the Achievement Scores of Struggling Fourth Grade Readers

Carol Elaine Boges  
*Walden University*

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Carol Boges

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Chief Academic Officer

Eric Riedel, Ph.D.

Walden University  
2014

Abstract

The Effects of Differentiated Instruction on the Achievement Scores of  
Struggling Fourth Grade Readers

by

Carol Boges

M.A., Albany State University, 1990

B.S., Albany State University, 1981

Doctoral Study Submitted in Partial Fulfillment  
of the Requirements for the Degree of  
Doctor of Education

Walden University

December 2014

## Abstract

Identifying an effective instructional strategy to remediate struggling readers is a goal for educators. Differentiated instruction (DI) has received much attention as a possible strategy to rectify literacy problems, but quantitative research on its effectiveness is limited. This quantitative study used a quasi-experimental, nonequivalent, pretest–posttest design to determine if DI provided a significant difference in reading comprehension scores between struggling readers instructed with DI strategies and students instructed with whole group strategies. Philosophies grounded in cognitive constructivism constituted the theoretical framework for this study which examined the archival STAR reading assessment pre- and posttest instructional reading level scores of 120 regular education 4<sup>th</sup> graders enrolled in a Title I school during the 2012 - 2014 school years. According to the 1-way analysis of covariance, the difference in post mean scores of the 2 groups was not significant, although the standard deviation for both groups were high, suggesting that students' learning was connected to unexamined intra-individual differences rather than teaching method. Results and recommendations from this study might inform educators and stakeholders on the approaches to remediate struggling readers and the strategies to secure effective tutors for extended school hours and parental workshops. Addressing the needs of diverse learners in today's classrooms will help promote social change by decreasing the achievement gap that persists between struggling and proficient readers and increasing the number of students prepared to compete in a global society.

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## Section 1: Introduction

### **Introduction**

The National Assessment of Educational Progress (NAEP) results for reading revealed no significant change for fourth graders' reading comprehension level from 2007 – 2013, with 33% scoring below basic performance level (National Center for Education Statistics [NCES], 2013, 2011; Rampey, Dion & Donahue, 2009). The results of the Progress in International Reading Literacy Study (PIRLS) from the 2011 administration revealed that scores from fourth grade students in the United States were only above 40 of the 53 education systems that participated (Thompson, Provasnik, Kastberg, Ferraro, Lemanski, Roey, & Jenkins, 2012). In comparison, the previous results revealed that the reading literacy score of the average fourth grade student in the United States was below that of fourth grade students in 10 of 45 countries that participated in PIRLS in 2006. In addition, the number of countries that outperformed students from the United States in reading increased from 3 in 2001 to 7 in 2006 (Provasnik, Gonzales, & Miller, 2009; Baer, Baldi, Ayotte, & Green, 2007). In Georgia, the state in which the study was conducted, the percentage of fourth grade students performing below the Basic level on the 2013 NAEP reading assessment was 34%—not significantly different from the 2009 results of 37% (NCES, 2013, 2011; Rampey, Dion, & Donahue, 2009). These statistics demonstrate the existence of a literacy problem that is not improving in Georgia nor the United States.

Acquiring the ability to read and comprehend provides students with a solid educational foundation and thus the opportunity to pursue numerous educational opportunities and the ability to compete in a global society, one that demands that individuals analyze information effectively (Considine, Horton, & Moorman, 2009). But every student does not become a fluent reader. The NAEP reading results for the nation's fourth graders remained unchanged from 2007 to 2013, and the percentage of Georgia's fourth graders performing below grade level has not significantly improved. There are too many struggling fourth grade readers and the situation does not appear to be improving. Literacy is a major concern in the field of education, a frequent media topic, and an urgent political topic that needs to be addressed (NCES, 2011; Gambrell, Morrow, & Pressley, 2007). High dropout rates and low student achievement scores are indicators of the decline in instructional effectiveness and the need for school improvement (NCES, 2011; Hall & Simeral, 2008). Given these data, schools are focusing on strategies to raise proficiencies (Wan & Gut, 2011).

Research conducted by NCES (2011) suggested that if students are struggling readers at the end of third grade, they will most likely continue to struggle and are more likely to become dropouts. In order to solve this literacy problem, the root cause must be identified and appropriate strategies implemented to remediate and accelerate student achievement. This study will seek answers to addressing the literacy problem among struggling fourth grade readers. Section 2 will provide research-based information on struggling readers and differentiated instruction (DI).

## Background of the Study

Assessing the way students are instructed in reading is a starting point in addressing the issues struggling readers face. Learning theories and instructional practices have been examined and implemented in attempts to decrease the gap between those who are proficient and those who are struggling. DI is one strategy many educators have embraced as a more effective alternative when teaching a highly diversified student body in today's classrooms—and one that might help remediate the reading problems experienced by struggling readers (Bender & Waller, 2011; Sousa & Tomlinson, 2011).

DI is the instructional process of “ensuring that what a student learns, how the student learns it, and how the student demonstrates what has been learned is a match for that student's readiness level, interests, and preferred mode of learning” (Tomlinson, 2003, pp. 188). DI in reading is based on students' developmental needs (Tyner & Green, 2012) and is conceptualized as teachers' response to students' diverse learning styles (Bender, 2012; Loeser, 2008). According to Tomlinson (2003), a renowned expert on DI, the goal is for teachers to actively and consistently create lessons that will assist students to achieve their highest potential (Tomlinson, 2003). Instruction can be differentiated based on four student traits: *readiness*, a student's knowledge, understanding, and skill; *interest*, topics that evoke a student's curiosity; *learning profile*, how a student learns best; and *affect*, the way students feel about themselves. As teachers consider these traits when planning, they must also consider the four classroom elements they can modify: *content*, what teachers teach; *process*, how students comprehend information; *product*,

assessments of what a student knows; and *learning environment*, the tone of the classroom (Tomlinson & Dockterman, 2002, pp. 24-25).

DI allows teachers to respond to students' progress by observing what students already know and what they need to know and then using that information to capitalize on students' strengths and interests by allowing students to exhibit what they have learned (Cash, 2011; Fox & Hoffman, 2011; O'Meara, 2010; Heacox, 2002). DI is instruction-driven; it is monitored by assessment that targets the needs of students directly through flexible small groups, groups that supplement whole-group instruction (Serravallo, 2010; Tomlinson & Imbeau, 2010; Heacox, 2009; Walpole & McKenna, 2007). Several learning models are associated with DI. The two learning models that are relevant to this study are tiered activities and scaffolding. Tiered activities employ assignments of different levels of complexity to accommodate various levels of student readiness within small groups (Denton & Vaughn, 2010; Vaughn, Wanzek, Wexler, Bart, Cirino, Fletcher, Romain, Denton, Roberts, & Francis, 2010; Vaughn, Denton & Fletcher, 2010; Wanzek, Wexler, Vaughn, & Ciullo, 2010; Edmonds, Vaughn, Wexler, Reutebauch, Cable, Tackett, & Schnakenberg, 2009; Wexler, Edmonds, & Vaughn, 2008; Lewis & Batts, 2005). Scaffolding provides supporting information to help a student understand a new concept or develop a new skill (Mooney, 2000).

### **Theoretical Framework**

In this study, the following constructs constituted the theoretical framework: cognitive constructivism, Vygotsky's zone of proximal development, Gardner's theory of multiple intelligences and Bloom's taxonomy.

Based on the work of Swiss developmental psychologist, Jean Piaget, cognitive constructivism proposes that (a) learning is a process and that (b) knowledge is constructed through various experiences, which provide opportunities to challenge and support thinking. Cognitive constructivism emphasizes individual construction of knowledge, ongoing assessment, real-world content, and student interaction (Eggen & Kauchak, 2013, 2007; Guillaume, 2008). DI, as related to cognitive constructivism, allows teachers the opportunity to plan instructional activities based on needs of students as indicated from ongoing assessments, students' readiness and interest levels, and learning profiles (Tomlinson & Imbeau, 2010).

The ideas of Vygotsky constitute the second element of this study's theoretical framework. Vygotsky (1978) maintained that social and cognitive development could not be separated. According to Vygotsky, students learn and grasp new concepts by listening to and talking to peers and adults. This idea translates into the classroom through interaction and collaboration among teachers and classmates and is an important component in advancing students' knowledge (Mooney, 2000). These interactions provide supporting information (scaffolding) to help a student understand a new concept or develop a new skill (Mooney, 2000). The most important concept in Vygotsky's theory is the Zone of Proximal Development or ZPD, "the distance between the most difficult task a child can do alone and the most difficult task a child can do with help" (Mooney, 2000, pp. 83). DI uses scaffolding to support developmental readiness through the use of planned curriculum. The curriculum provides opportunities for students to extend their knowledge and their ZPD.

The theories of Gardner constitute the third element of this study's theoretical framework. Gardner's theory of multiple intelligences (1983) postulates that individuals learn best in a variety of ways (learning styles). Teachers and policymakers have applied this theory to structure curricula based on the intelligences (Smith, 2008, 2002). DI, when based on a student's preferred learning style, can be used to provide tiered activities. These activities enable the student to work in her or his preferred learning mode and to help develop that learning style (Tomlinson & Eidson, 2003).

The philosophies of Bloom constitute the fourth element of this study's theoretical framework. Bloom (1956) spearheaded a committee of educators who had the task of classifying educational goals and objectives. The result was Bloom's taxonomy, "a multi-tiered model of classifying thinking according to six cognitive levels of complexity." To advance through the taxonomy levels, achievement of the prior skill or ability is required before moving to the next more complex level (Forehand, 2005, pp. 3). Bloom's taxonomy offers a blueprint for instructional planning that supports DI by providing teachers with a guide to move students through the learning process in an organized manner (Buehl, 2011).

DI is supported by a theoretical framework rooted in cognitive psychology and research on student achievement that is tied to real-life demands on students (Walpole, McKenna, & Philippakos, 2011; McTighe & Brown, 2005). DI provides intensive intervention to meet the needs of struggling readers and help them prepare for high school, college, and the workplace (Carnegie Council on Advancing Adolescent Literacy, 2010).

As applied to this study, cognitive constructivism suggests I would expect the independent variable, DI, to influence the dependent variable, achievement scores, because DI offers teachers multiple approaches to modify instruction in order to meet the cognitive developmental needs of students in academically diverse classrooms.

### **Problem Statement**

By fourth grade some students' assessment scores begin to decline particular in the area of vocabulary as the focus of instruction shifts from learning to read to reading to learn. This "fourth grade slump" (Chall & Jacobs, 2003) is a major concern of educators in the United States. This slump is more evident by fourth grade with the widening of the achievement gap between low-income and middle-income students whether using national, local, or classroom assessments results (Sanacore & Palumbo, 2009). This slump is evident at Striving Elementary (a pseudonym), the site of this study.

The latest school report card of Striving Elementary revealed that 22% of the fourth grade students did not meet the standard for reading on the 2013 Criterion Referenced Competency Test (CRCT) and the number of students that met or exceeded the standard in Reading decreased by one percentage point (Georgia Governor's Office of Student Achievement, 2013). The achievement scores of struggling readers are impacted by their inability to comprehend grade-level text, thus increasing the achievement gap between struggling and proficient readers.

To determine whether DI had an advantage over whole group instruction at Striving Elementary over a 2-year period, this quantitative study compared the reading comprehension achievement scores (dependent variable) of fourth grade readers



instructed in small groups that used DI methods (independent variable) to reading comprehension achievement scores (dependent variable) of readers instructed through whole group methods (independent variable).

### **Nature of the Study**

Using a quasi-experimental, nonequivalent, pretest-posttest control group design, this quantitative study compared archival comprehension achievement scores of fourth grade struggling readers instructed through DI methods and fourth grade students instructed through whole group methods.

To assist in measuring student achievement, Striving Elementary had access to computer-adaptive tests that included STAR reading assessments. STAR reading allowed teachers to assess students' reading comprehension and overall reading achievement in a quick and accurate manner. This progress-monitoring assessment: (a) provided immediate feedback to teachers and administrators on each student's reading development, (b) provided a means for tracking growth in a consistent manner, and (c) helped teachers identify students who needed remediation or enrichment (Renaissance Learning, 2013). STAR Reading assessments were administered at least three times per year. Statistical analysis was conducted on the pre- and posttest IRL scores (historical data).

At Striving Elementary, three classroom teachers and one Early Intervention Program (EIP) teacher taught reading to fourth graders. The EIP teacher's role was to provide skill-specific, small group DI based on content and students' readiness during reading instruction. The EIP teacher delivered small group DI to struggling readers 5

days a week in 50 minute segments. Instructional strategies employed during small group instruction included flexible grouping, tiered activities, and scaffolding. A more detailed discussion of STAR and EIP is given in Section 3.

### **Purpose of the Study**

The purpose of this quantitative study was to determine if there was a significant difference in reading comprehension scores between struggling fourth grade readers instructed with small-group DI strategies and struggling fourth grade students instructed with whole-group strategies. According to Tomlinson (2003), DI provides instructional opportunities in diverse classrooms that address students' readiness, interests, and learning style. However, limited empirical evidence—particularly for reading comprehension—is available (Connor, et al, 2011).

The intention of this study was to provide additional empirical evidence about the impact that DI has on comprehension scores and offer information that might be helpful in providing effective reading comprehension instruction for struggling fourth graders.

### **Research Question and Hypotheses**

This study examined the research question: Is there a significant difference between reading comprehension scores of fourth grade students after being instructed with DI methods and reading comprehension scores of fourth grade students instructed with whole group methods?

The independent variables were DI and whole group instruction; the dependent variable was the IRL comprehension scores

**Null Hypothesis**

There is no significant difference between reading comprehension scores of fourth grade students after being instructed with DI methods and reading comprehension scores of fourth grade students instructed with whole group methods.

**Alternative Hypothesis**

There is a significant difference between reading comprehension scores of fourth grade students after being instructed with DI methods and reading comprehension scores of fourth grade students instructed with whole group methods.

**Operational Definitions**

Operational definitions of technical terms used within this study are provided below:

*DI:* A strategy that puts students' learning needs as the focal point of instruction. Teachers develop lessons based on students' learning styles, interests, and needs (Heacox, 2002).

*Struggling Reader:* Any student of any age who has not mastered the skills required to fluently read and comprehend text which is written at a level that one could reasonably expect a student of that age to read (Harris & Hodges, 1995).

*Flexible Grouping:* Allowing students to work in differently mixed groups depending on the goal of the learning task (Harris & Hodges, 1995).

*Remediation:* Teaching that includes diagnosis of a student's reading ability and corrective, remedial, or clinical approaches to improve that ability (Harris & Hodges, 1995).

*Readiness:* A student's knowledge, understanding and skill related to a particular sequence of learning (Tomlinson, 2003, pp. 3).

*Interest:* Topics or pursuits that evoke curiosity and passion in a learner (Tomlinson, 2003, pp. 3).

*Learning Profile:* How students learn best (Tomlinson, 2003, pp. 3).

*Affect:* How students feel about themselves (Tomlinson, 2003, pp. 4).

*Content:* What teachers teach and how students gain access to that body of knowledge (Tomlinson, 2003, pp. 4).

*Process:* How a student makes sense of, or comes to understand, the information, ideas, and skills that are at the heart of a lesson (Tomlinson, 2003, pp. 5).

*Product:* Assessments or demonstrations of what students have come to know, understand and be able to do as the result of an extended sequence of learning (Tomlinson, 2003, pp. 5).

*Environment:* The operation and the tone of a classroom (Tomlinson, 2003, pp. 5).

### **Assumptions and Limitations**

This quantitative study examined the archived pre- and posttest STAR comprehension scores of fourth grade readers in regular education classes in a Title I elementary school. It was assumed that the EIP teacher used DI methods consistently, that students in the non-EIP classes were instructed with whole group methods, and that the STAR test scores were valid and reliable. This study is limited by two facts: (a) only archived STAR comprehension scores were used, (b) the test scores represented students from one school and one grade level.

### **Scope and Delimitations**

This study used only the archived pre- and posttest STAR reading comprehension assessment data of fourth grade students who were enrolled during the 2012–2013 and 2013–2014 school years at a southwest Georgia Title I school. Only these data were used to determine if there was a significant difference between those taught with DI strategies and those taught with whole group strategies.

### **Significance of the Study**

All students deserve to receive the most appropriate instructional method that will enable the acquisition of skills necessary to achieve maximum comprehension achievement levels. As an elementary teacher, I have daily encounters with struggling readers; a fifth grader reading on a second grade level, a second grade repeater unable to identify the sounds that the letters of the alphabet make, a third grader unable to read the grade level basal—and the list goes on. These experiences stimulated the desire to identify strategies that could help students become proficient readers. I feel that it is the responsibility of educators to provide the most effective instructional methods to students. To this end, I felt that a study of the effects of DI on comprehension scores of struggling readers would be important to parents, teachers, administrators, and community stakeholders.

At Striving Elementary the number of struggling readers tends to increase at the beginning of fourth grade as a result of end-of-the-year state and local assessment results of third grade students. Therefore, fourth grade teachers are faced with the task of remediating these students and DI strategies might be helpful. The results of this study

will help determine whether there is a significant difference between the comprehension scores of struggling readers before and after being taught with DI strategies. The results of this study might help administrators and teachers make decisions about offering additional DI professional development opportunities for teachers. The results can help determine whether DI workshops should be conducted to educate parents/guardians and community stakeholders about DI practices used to instruct students and whether these practices assist in closing the achievement gap between struggling and proficient readers. Increasing the number of proficient readers is a goal in education, a goal that will help close the achievement gap thus promoting social change to benefit society. Decreasing the achievement gap results in an increased number of students prepared to compete in a global society.

### **Summary and Transition**

The latest NAEP results for reading revealed no significant change in fourth graders' reading comprehension level from 2007–2013, with 33% scoring below basic (NCES, 2013, 2011; Rampey, Dion & Donahue, 2009). Acquiring the ability to read and comprehend is mandatory in order to compete successfully in a global society.

Implementing the most appropriate instructional method to teach reading is paramount for educational leaders. DI appears to provide promising results as a response to the variety of learning needs of diverse learners in schools today (Tomlinson, Brimijoin & Narvaez, 2008). Many teachers across the country have implemented activities within their classrooms based on the DI paradigm (Sousa & Tomlinson, 2011; O'Meara, 2010).

Even though DI has received much attention as a possible strategy to rectify literacy problems quantitative research on its effectiveness is limited.

DI is instruction-driven; it is monitored by assessment that targets the needs of students directly through flexible small groups. DI is supported by a theoretical framework rooted in cognitive psychology and research on student achievement that is tied to real-life demands on students (Walpole, McKenna, & Philippakos, 2011; McTighe & Brown, 2005). DI provides intensive intervention to meet the needs of struggling readers and help them prepare for high school, college, and the workplace.

The purpose of this quantitative study using a quasi-experimental nonequivalent pretest-posttest design was to determine if there was a significant difference between reading comprehension scores of struggling fourth grade readers taught with small-group DI strategies and fourth grade students taught with whole-group strategies. Archival STAR reading assessment pre- and posttest IRL scores of 120 regular education fourth graders enrolled in a Title I school during the 2012–2014 school years were examined.

Section 1 presented information on the background for the study, the problem statement, the purpose of the study, the nature of the study, the questions and hypothesis of the study, the definition of terms used in the study, the limitations of the study, and the significance of the study. Section 2 presents the literature review. Section 3 presents the research method, Section 4 presents the results and Section 5 focuses on conclusions and recommendations.

## Section 2: LITERATURE REVIEW

Investigating the effects of DI on the comprehension scores of fourth grade struggling readers is the focus of this quantitative study. Identifying contributing factors that might lead to literacy problems and identifying instructional strategies that might assist in resolving these literacy problems are topics discussed in this investigation.

The literature review was conducted through the use of research studies, journals, textbooks, and works published within the last 5 years. Information dating beyond 5 years was used for foundational purposes. Keywords used during the inquiry included *struggling readers, differentiated instruction, adolescent literacy* and *reading instruction*. To locate published studies and information related to DI, online database searches were conducted through ERIC, EBSCO academic database of peer reviewed and full text documents, and ProQuest dissertations and theses database. Data collected were analyzed to determine relevance to topics discussed in this review: *struggling readers, reading instruction, DI, and research methodology*.

### **Struggling Readers**

Struggling readers are described as students who have not mastered skills necessary to read fluently and comprehend grade level texts (McCormack & Pasquarelli, 2009; Harris & Hodges, 1995). A fluent reader can read silently and she can read orally; the phrasing and intonation are appropriate and delivery is smooth (Duffy, 2009, 2003). A fluent reader comprehends what he has read. A struggling reader is unable to read fluently or comprehend.



According to Hall and Simeral, “the education system is accountable to the greater society” (2008, pp. 7) because reading plays a major role in individual success. Those who cannot read are hampered in their ability to succeed in modern society (Wan & Gut, 2011; Jennings, Caldwell & Lerner, 2010). Data from the 2007 NAEP revealed that a third of the fourth grade students could not read well enough to complete assignments successfully (Stormont, Reinke, & Herman, 2012; Lee, Grigg, & Donahue, 2007). These struggling readers contribute to the achievement gap.

Reading ability is determined by several factors such as background, ability, and instruction (Gregory & Chapman, 2013; Neuman & Dickinson, 2003). Children need to have early childhood experiences so as to provide many opportunities for exposure to a print rich environment (Richardson, Morgan, & Fleener, 2012; Jennings, Caldwell, & Lerner, 2010). Being exposed to reading early establishes the importance of knowing how to read and also develops an interest and a love for reading. Having the opportunity to observe reading early in life gives one an advantage in learning how to read. The ability to learn to read is affected by foundational skills like phonological processing, print awareness, and oral language (Shanahan, Callison, Carriere, Duke, Pearson, Schatschneider & Torgesen, 2010; Neuman & Dickinson, 2003).

As recently as 20 years ago, the ability to read was thought to begin when children entered school. Reading disabilities were considered to be educational problems (Neuman & Dickinson, 2003). In recent years, it has become clear that the acquisition of reading is a process which begins early in preschool years. It is believed that the differences in language and literacy exposure during these preschool years are reliable

indicators of reading abilities and disabilities (Bambrick-Santoyo, Settles, & Wirrell, 2013; Neuman & Dickinson, 2003). Most reading disabilities are associated with weakness in phonemic awareness, decoding skills, sight word recognition, and comprehension (Pedriana 2009; Thames, Reeves, Kazelskis, York, Boling, Newell, & Wang, 2008; Snow, Burns, & Griffin, 1998).

Studies show that children more likely to have problems learning to read are those who start to school with little background knowledge and skills in relevant domains such as verbal abilities, print sound knowledge, and letter recognition (Gregory & Chapman, 2013; Jennings, Caldwell, & Lerner, 2010). Children from low income families and those that do not speak English well appear to be at a higher risk for developing reading problems (Gregory & Chapman, 2013; Snow, Burns, & Griffin, 1998).

Students must meet the challenges of comprehending difficult text as they develop their reading skills. If a student is weak in phonemic awareness, decoding skills, sight word recognition, and comprehension through third grade, there is a greater chance the student will continue to experience difficulties in reading throughout school (Bambrick-Santoyo, Settles, & Worrell, 2013; Rattigan-Rohr, 2012). These students may require intensive intervention and accommodations that may extend into adulthood (Rattigan-Rohr, 2012; Snow, Burns, & Griffin, 1998). Byrnes and Wasik reported the most salient problem in children that experience reading problems is poor decoding skills. These students have difficulties recognizing words automatically which result in their being unable to apply higher level sentence integration and semantic processing (Byrnes & Wasik, 2009). They rely on semantic-contextual cues that are often inaccurate.

They also lack effective comprehension strategies (McCormack & Pasquarelli, 2009; Pressley, 2002).

Environment also plays a major role in the development of reading ability. Children exposed to reading being modeled in their homes and have a print rich environment are more likely to be better readers than those that do not have these opportunities (Gregory & Chapman, 2013; Schumm & Arguelles, 2006). Research by Snow, Burns, & Griffin (1998) supports reducing the number of children who enter school with little or no literacy knowledge and skill will reduce the number of children that experience reading difficulties.

Struggling readers often lack the skills needed to compete for jobs in a highly technological environment. These problems can result in “difficulties in life, including poverty, unemployment, and problems with the law” (Jennings, Caldwell, & Lerner, 2010, pp. 19). Therefore, students with reading difficulties need to be identified early so intensive remediation, accommodations and modifications can take place as warranted (Fisher, Frey, & Lapp, 2012; Afflerbach, 2011; Gunning, 2011). Teachers need to be trained to identify reading difficulties and best practices to remediate reading problems. Parents need to be educated on the importance of stressing reading to their children by modeling good reading practices long before the children are school age. Taking these actions might result in a decrease in the number of students that struggle with reading.

Addressing the needs of struggling readers is a growing concern as indicated from the information shared in this section. As an early elementary remedial reading and math teacher, I encounter struggling readers daily and am concerned with this dismal situation.

It is my hope that DI will offer a successful alternative to instructing struggling readers. DI provides teachers the opportunity to identify the reading deficiencies of students and plan instruction to meet the individual needs of students. If struggling readers are identified early and effective DI practices are put into place before students reach third grade, the number of struggling readers evident in fourth grade should decrease.

### **Reading Instruction**

According to Duffy (2009, 2003), inspiring students to become readers is the ultimate goal of instruction. This inspiration comes from the establishment of a print rich environment both at home and at school. Teachers are primarily accountable for instruction; therefore, demonstrating to students that reading is a valuable and necessary skill becomes a daily task for teachers (Jennings, Caldwell, & Lerner, 2010; Miller & Faircloth, 2009).

Providing effective literacy instruction is one essential step necessary in addressing the needs of struggling readers (Paratore & McCormack, 2011; Gambrell, Morrow, & Pressley, 2007). Students in primary grades experiencing reading difficulties may require intervention in order to prevent failure in reading (Gersten, Compton, Connor, Dimino, Santoro, Linan-Thompson, & Tilly, 2008; Pinnell & Fountas, 2008). The primary responsibility of instructing students with reading problems lies with the teacher (Jennings, Caldwell, & Lerner, 2010). Teachers must be equipped with the knowledge and skills necessary to provide effective instruction to the diverse needs of the students (Cash, 2011; Guillaume, 2008; McTighe & Brown, 2005). The instruction has to be specific to the needs of the students so as to maximize learning for each student

(Gregory & Chapman, 2013; Hall & Simeral, 2008). Given the foregone facts, DI appears to offer teachers the opportunity to meet the needs of the diverse student population which includes struggling readers. DI requires teachers to know the interests, readiness, learning style, and motivation of students (Heacox, 2002). Teachers develop lessons based on students' learning styles, interests, and needs. Teachers take into account students' academic levels, rates of learning, and learning modality (Bender, 2012; Tomlinson, Brimijoin, & Narvaez, 2008). Through the use of DI, teachers are empowered to provide learning opportunities to promote student success.

Reading encompasses phonemic awareness, phonic, vocabulary, fluency, and comprehension (Stormont, Reinke, & Herman, 2012; Routman, 2003). The National Reading Panel (Snow, Burns, & Griffin, 1998) identified five areas students should receive intensive and explicit instruction in:

*Phonemic Awareness:* The ability to identify and manipulate the individual sounds, or phonemes, in spoken language (pp. 16).

*Phonics:* The process of teaching children sound-letter correspondences, or the relationship between spoken language and written language (pp. 25).

*Vocabulary:* The meanings and pronunciations of words we use to communicate (pp.51).

*Comprehension:* The ability to understand, remember and communicate with others about the text (pp. 63).

*Fluency:* The ability to read text quickly, accurately, and with expression (pp.37).

Instructions in these five critical areas should be delivered in a systematic (methodical and organized) and explicit (clear and obvious) manner using research based instructional materials (Stormont, Reinke, & Herman, 2012; Bursuck & Damer, 2010). The National Reading Panel (2000) recommends students in grades first through third receive explicit, systematic, instruction and practice. DI provides teachers the opportunity to plan instruction to meet the requirements of the five critical areas of reading instruction as identified by the National Reading Panel. Teachers should be knowledgeable of effective instructional practices and receive ongoing staff development and support (Dean, Hubbell, Pitler, & Stone, 2012; Snow, Burns, & Griffin, 1998) in order to deliver this necessary instruction.

Research conducted by the National Reading Panel has prompted the use of research-based practices and the development of instructional strategies, teaching techniques, and programs to address struggling readers' issues. Reading intervention programs that target kindergarten through third grade students have been implemented to remediate reading difficulties. Explicit and systematic instruction in phonemic awareness, phonics, vocabulary, fluency, and comprehension is encouraged to occur daily during reading instructional time (Kuhn, Groff, & Morrow, 2011; Paratore & McCormack, 2011; Snow, Burns, & Griffin, 1998).

During kindergarten through second grades, there is a lot of emphasis placed on calling words and fluency during reading. It is believed during this time students get the idea that reading is about calling words and not comprehending (Routman, 2003). Teachers spend a considerable amount of time assessing comprehension instead of

teaching students how to analyze what has been read in order to take comprehension to a deeper level (Routman, 2003).

In order for students to be able to comprehend what is being read, they must receive instruction on how to develop comprehension skills. If comprehension is the goal of reading, then, students must receive systematic and explicit instruction during reading beginning in the early years, kindergarten through second grade. If students receive this instruction consistently, they will have the opportunity to develop comprehension skills and become better readers.

The foundation for comprehension is word level comprehension. Vocabulary acquisition is a good predictor of reading success (Leikin & Deacon, 2007). Good readers are able to read many words without sounding them out while struggling readers spend a lot of time sounding out words. Sounding out words takes up a lot of short-term memory leaving a smaller amount of memory space for comprehension. With only a small amount of memory capacity available for comprehension, struggling readers are unable to get the meaning of what has been read (Denton, Vaughn, Wexler, Bryan, & Reed, 2012; Pressley, 2002). Results of literacy studies enable teachers to identify various instructional approaches which represent a large range of practices to assist students with the acquisition of literacy skills (Compton-Lilly, 2009).

Another cause of reading problems that has not been addressed until recent years is ineffective teaching practices. Ineffective or insufficient instruction can lead to students having difficulties learning to read, thus; improving reading instruction has become a focus of ongoing professional development (Strickland & Kamil, 2004). Strickland

reported in 2002, the National Invitational Conference, Improving Reading Achievement Through Professional Development, was held in Washington, DC. At this conference, education professionals met to discuss what teachers and administrators needed to know in order to provide literacy instruction in the most effective manner. The participants recommended that professional development be research-based, collaborative, on-going, and designed to assist teachers to plan instruction to meet the individual needs of students (Gregory, 2008; Strickland & Kamil, 2004).

According to Farstrup & Samuels (2002), students from diverse backgrounds are at a disadvantage in acquiring reading skills when the traditional approaches to education such as grouping and placing a lot of emphasis on skill instruction is practiced. Farstrup's & Samuels' research identified five common issues that existed among teachers of struggling readers; motivating students, assisting struggling readers, working with English language learners, teaching culturally responsive manner, and assessing students' progress. These issues present teachers and administrators with challenges that must be approached with a team effort. According to Sergiovanni (2005), teachers and administrators should engage in shared responsibility for the success of the school. Identifying the best instructional practice for teaching reading is an issue that should be addressed as a group effort and developed through ongoing staff development.

Literacy instruction is an area that is often the target of reform; therefore, teachers should receive continuous staff development in effective instructional practices to stay abreast of current trends in order to provide students with the resources they need to meet the demands of changing social conditions (Darling-Hammond, 2010; Gregory, 2008).



Studies reveal that one of the most important factors linked to student achievement is teacher effectiveness (Lyon & Weiser, 2009). Teachers must be able to motivate students to be excited about reading (Bronzo & Flynt, 2008). With continued research and combined efforts of administrators, teachers, and parents, progress can be made in the effort to decrease the gap which exists between readers and struggling readers.

## **DI**

Diverse learners are evident in modern classrooms (Gregory & Chapman, 2013; Goodwin, Lefkowitz, Woempner, & Hubbell, 2011). Within this diversity is a growing number of struggling readers (Bender & Waller, 2011; Gambrell, Morrow, & Pressley, 2007). Educators are constantly challenged with finding the best strategies to remediate these struggling readers. No Child Left Behind, Common Core Standards, and accountability are constant reminders that administrators and teachers must work together to find the best instructional practices to prepare students to function in our culturally diverse, technologically driven society (Wan & Gut, 2011; Kamil, Borman, Dole, Kral, Salinger, & Torgesen, 2008). Providing every student with exemplary literacy instruction is an essential first step in addressing the needs of struggling readers (Johnson & Keier, 2010; Gambrell, Morro, & Pressley, 2007). One strategy at the forefront of educational reform is DI. Many schools are implementing DI as an attempt to address the growing diversity challenge which includes “diverse learners who differ not only culturally and linguistically but also in their cognitive abilities, background knowledge, and learning preferences” (Huebner, 2010, pp. 79). Research conducted by Heacox and Tomlinson,

and Walpole and McKenna suggests differentiation might be the key to effective literacy instruction.

DI is a strategy that puts students' learning needs as the focal point of instruction (Tomlinson, 1999; Tomlinson & Imbeau, 2010; Bender, 2012). According to Heacox (2002), it is important for teachers to know the interests, readiness, learning style, and motivation of students. Teachers must provide learning opportunities to promote student success. Teachers develop lessons based on students' learning styles, interests, and needs. Teachers take into account students' academic levels, rates of learning, and learning modality (Bender, 2012; Tomlinson, Brimijoin, & Narvaez, 2008). In a differentiated classroom, teachers use multiple approaches and support systems to ensure understanding of a full range of learners. These approaches include tiered activities, scaffolding, effective whole-class, small-group, and individual approaches that support learning (Tomlinson & McTighe, 2006). When teachers implement DI strategies, the fact that different readiness levels, interests, and learning profiles are represented within their student population must remain at the forefront of planning (Tomlinson & Imbeau, 2010; Guillaume, 2008). Effective DI is a continuous flow that requires understanding of key elements of teaching, learning and assessment by those implementing it (Fox & Hoffman, 2011; Heacox, 2009). Key elements include continuous assessment to inform instruction, flexible classroom routines and various learning modalities to provide options for students to learn and instruction that is rigorous, relevant, flexible, varied, and complex (Gregory & Chapman, 2013, 2007; Cash, 2011; Tomlinson, Brimijoin, & Narvaez, 2008).

During the past decade DI has gained much attention as an instructional practice that offers a response to the ever growing diverse populations served in today's classrooms (Landrum & McDuffie, 2010); however, only limited empirical evidence or examination of the underlying mechanisms that might warrant such claims, particularly for reading comprehension is available (Connor, Morrison, Fishman, Giuliani, Luck, & et al 2011).

Review of the literature included studies related to DI. I found the following to be relevant. A project study involving 652 elementary students conducted by Lewis and Batts (2005) revealed after five years of using DI, students' state mandated test results increased from 79–94.8% in the proficiency range during the course of the study. Lewis and Batts reported at the beginning of the project, most of the teachers employed whole group strategies which targeted the average student and not the diverse student population. During the study, teachers adjusted the content, process and product during instruction to meet the needs of the diverse population. Results revealed improved student performance for all students in general with the greatest growth seen among students with exceptional needs.

Canadian scholars McQuarrie, McRae, & Stack-Cutler (2008) conducted a three-year study to review 25 Alberta Initiative for School Improvement (AIS) projects that initiated DI practices to promote school improvement. Qualitative and quantitative data from three sources, annual reports, focus group findings, and telephone interview findings, were analyzed and results showed DI consistently yielded positive results across k-12 classrooms especially when delivered through small group targeted instruction.

Reis, McCoach, Little, Muller, and Kaniskan (2010) conducted an experimental study that used cluster randomized assignments to groups to examine the effects of a differentiated reading program on oral reading fluency and comprehension levels of participants in grades second through fifth from five elementary schools. The study used a school-wide enrichment model as a treatment and randomly assigned 63 teachers and 1,192 students to treatment and control conditions. Quantitative procedures of hierarchical linear modeling and multivariate analysis of variance revealed significant differences in the area of fluency favoring the treatment group in two of the schools, one high-poverty school showed significant difference in the area of comprehension, and no achievement differences were seen in the remaining schools. The results suggested an enrichment reading approach with DI and less whole group instruction was effective as or more effective than a traditional whole group instructional approach.

When comparing the aforementioned studies, similarities existed in the targeted areas of instruction, instructional strategies, and study results. Instructional reading levels, reading proficiency, fluency, comprehension, and small group instruction were common components in the studies. The results of all of the studies suggested DI had a positive effect on the achievement levels of the participants. The studies differed in methodologies. Lewis and Batts reported findings from a project study that spanned a 5 year period and employed quantitative analysis of data obtained from an end-of-grade state achievement test. On the other hand, McQuarrie, McRae, & Stack-Cutler used qualitative and quantitative methods to evaluate results of their 3 year study while Reis, McCoach, Little, & et al. conducted an experimental study that lasted 24 weeks and used

quantitative procedures of hierarchical linear modeling and multivariate analysis to assess their results.

The reviewed studies employed flexible grouping, small group instruction that matched the instructional needs of the students, and targeted fluency and comprehension instruction. The studies included struggling readers but did not target them. This study sought to provide additional empirical information in these areas that might assist in the determination of the effectiveness of DI on the achievement level of struggling readers.

### **Research Methodology**

In preparation for this study, I reviewed three research methodologies, quantitative, qualitative, and mixed methods, to determine which approach would be most appropriate to conduct this study. According to Creswell (2013; 2003), a quantitative approach allows a researcher to use postpositivist claims to extend knowledge by employing strategies of inquiry that includes experiments and surveys. Data is collected through the use of predetermined instruments then statistical analysis is conducted. Qualitative research provides the investigator the opportunity to make knowledge claims based on constructivist perspectives or advocacy/participatory perspectives. The open-ended data that is collected is used to develop themes (Creswell, 2013; 2003). Data collected from a mixed methods approach represents both quantitative and qualitative information. The researcher's knowledge claims are based on pragmatic grounds (Creswell, 2013; 2003).

After a review of the research methods, a quantitative study using a quasi-experimental nonequivalent pretest-posttest control group design was selected. This

method was selected because it provides the opportunity to collect and analyze statistical data on intact groups. Since archival data that represents a pretest, a treatment, and a posttest was analyzed in this study, I felt this design was most appropriate.

The philosophical worldview of this study is supported by postpositivist assumptions. The major elements of a postpositivist position are determination, reductionism, empirical observation and measurement, and theory verification (Creswell, 2013). The deterministic philosophy of postpositivists reflects the need to verify effects or outcomes by identifying and assessing causes. Reductionism involves the plan to reduce ideas to a small set of variables that comprise the research questions and hypotheses to be tested. Empirical observation and measurement of objective reality through the development of numeric measures and the studying of behavior of individuals are paramount for postpositivists. Finally, theory verification through the use of the scientific method is necessary in order to understand the world (Creswell, 2013). This study sought to determine if there is a significant difference between reading comprehension scores of fourth grade struggling readers after being instructed in small groups using DI strategies and reading comprehension scores of students instructed with whole group strategies.

### **Differing Methodologies**

Over the past 30 years a considerable amount of research has been conducted and knowledge about interventions for struggling readers has been shared. Parsons (2004) conducted a comparative study using a non-equivalent pretest, posttest control group design to determine the effectiveness of a DI reading model on the reading achievement

of third grade students as compared to a traditional approach to reading instruction. The results of the comparison of the pre and post test revealed no significant difference among the two groups. This quasi-experimental design provided the researcher the opportunity to use control and experimental groups that were not randomly assigned.

A study conducted by Bradfield (2012) used a quasi-experimental, comparative design to investigate the effects of DI on struggling first grade readers ability to meet reading fluency standards. One group of 40 students received DI while 20 students received whole-group instruction during reading instruction. Results of the study suggested that students who received DI scored significantly higher on their reading fluency test than students that received whole-group instruction.

A sequential mixed-method study conducted by Gilbert (2011) examined teacher perceptions of the effects of DI on primary school students' achievement in reading. Qualitative data was gathered from observations and interviews from a convenience sample of second grade teachers. The results suggested that teachers used instructional approaches that produced satisfactory results on state assessments. Quantitative results determined from t-test analysis implied a significant difference in performance of students taught with DI strategies than those instructed with whole group traditional strategies.

Wanzek, Wexler, Vaughn, and Ciullo (2010), located and synthesized thirteen studies that used a treatment/comparison design and eleven studies that used a single group/subject design. Their findings from the 24 studies showed participants had high effects for comprehension interventions.

Even though the preceding researchers used different methodologies in their inquiries, their results were similar, with the exception of Parson, increased achievement levels for students instructed with DI. From this review, I would expect results from my study to reveal increased student performance after DI strategies have been provided to struggling students.

### **Conclusion**

Struggling readers often lack the skills necessary to compete for jobs in a highly technological environment. These problems can result in “difficulties in life, including poverty, unemployment, and problems with the law” (Jennings, Caldwell, & Lerner, 2010, pp. 19). Therefore, students with reading difficulties need to be identified early so intensive remediation can take place. Investigating the effects of DI on the achievement scores of struggling readers is the focus of this quantitative study. Identifying contributing factors that might lead to literacy problems and identifying instructional strategies that might assist in resolving the literacy problem are topics discussed in this investigation of the effect that DI has on the achievement scores of fourth grade struggling readers. Rock, Gregg, Ellis, & Gable (2008) reports positive results are growing from research conducted on full implementation of DI in mixed-ability classes. Extensive research by Walpole and McKenna (2007) indicated that when instruction was matched to students’ instructional needs, achievement levels were greater. Lawrence-Brown (2004) discusses the impact of DI on the learning outcomes for students with disabilities and concludes that classrooms employing DI with appropriate supports benefit both students with and without disabilities.



Based on findings reported in this review, DI appears to benefit diverse learners; however, there is limited quantitative evidence of the effects that DI has on the achievement levels of struggling readers as related to specific content weaknesses. This study seeks to offer additional information about the impact of DI on reading comprehension achievement scores of struggling fourth grade readers.

Section 3 presents the research method, Section 4 presents results and Section 5 focuses on conclusions and recommendations.

## Section 3: Methodology

### **Introduction**

The purpose of this study was to determine if DI resulted in a significant difference in the reading comprehension scores (dependent variable) between struggling readers taught using DI strategies (independent variable) and whole-group strategies in regular education fourth grade classes at Striving Elementary.

Section 3 provides a description of, and a rationale for, the research design and approach. These are followed by information about the study's population, sampling procedures, instrumentation, variables, data collection and analysis procedures, threats to validity, protection of participants' rights, and the role of the researcher.

### **Research Design and Approach**

Three research methods were considered for this study: quantitative, qualitative, and mixed methods. According to Creswell (2013, 2003), a quantitative approach allows the researcher to use postpositivist claims to extend knowledge by employing strategies of inquiry that includes experiments and surveys. Data is collected using predetermined instruments followed by statistical analysis. A qualitative approach allows the researcher to make knowledge claims based on constructivist or advocacy/participatory perspectives. Open-ended data is collected and used to develop themes (Creswell, 2013, 2003). Data collected using a mixed-methods approach includes both quantitative and qualitative data. The researcher's knowledge claims are based on pragmatic grounds (Creswell, 2013, 2003).

Two designs were considered for this study: a pre-experimental one-group pretest–posttest design and quasi-experimental, nonequivalent, pretest–posttest control-group design. The pre-experimental design allows the researcher to study and provide an intervention to a single group, without including a control group for comparison. On the other hand, the quasi-experimental design allows the researcher to use a control and an experimental group, neither of which requires the random assignment of participants. Both groups are administered a pretest and a posttest. A treatment is given only to the experimental group prior to the posttest. Results from the two groups can be analyzed and compared (Creswell, 2003).

After a review of methods and designs, a quantitative study using a quasi-experimental, nonequivalent, pretest-posttest control-group design was selected. I chose the quantitative approach in order to collect and analyze data from an existing instrument. I chose a quasi-experimental, nonequivalent, pretest-posttest control group design because it afforded the opportunity to collect and analyze statistical data on intact groups. Since archival data that represents a pretest, a treatment, and a posttest of intact groups was analyzed, I felt this design was most appropriate.

This study compared the pre and post archival STAR reading assessment scores over a 2-year period of fourth grade struggling readers instructed through small group using DI strategies and fourth grade students instructed with whole group strategies. Experimental Group A consisted of students that received DI during reading. Control Group B consisted of students that received whole group instruction.

Group A      O ————— X1 ————— O

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Group B      O ————— X2 ————— O

### **Setting and Sample**

The site for this study was a Title I elementary school in Georgia. Approximately 406 students in grades kindergarten through fifth were enrolled. Of the total enrollment, 93% qualified for free or reduced lunch. Enrollment data maintained by the office clerk assisted in the identification of fourth grade students enrolled during the 2012--2014 school years. During these school years 125 fourth grade students were enrolled. Of this number, 60 were identified as struggling readers. Archived STAR reading assessment data from the 2012-2014 school terms were used to identify the participant pool. Students' reading assessment scores that were at or above grade level were eligible for participation in Group B, the control group, and students' scores below grade level were eligible for participation in Group A, the experimental group.

A convenience sample was used since the naturally formed fourth grade classrooms provided the participants scores for the study. The appropriate sample size was determined for 5% margin of error and a 95% confidence level (Creswell, 2013, 2003). A sample size calculator (Raosoft, 2004) revealed that scores of 98 students should be included in the study to allow for the aforementioned margin of error and confidence level.

## **Treatment**

The treatment for this study was the implementation of DI strategies during reading instructional time. Students with scores below grade level at the beginning of the school term on the STAR reading assessment are identified as struggling readers and are eligible for remedial instruction through an EIP. This group of students provided data for the experimental group.

At Striving Elementary struggling readers are scheduled to receive small group instruction in 50-minute segments from a certified EIP teacher other than the regular classroom teacher 5 days per week. The STAR reading assessment provides information that can be used to provide skill specific remediation activities. With this information, the EIP teacher uses DI strategies that include flexible groups, tiered activities, and scaffolding to meet the needs of the students. Flexible groups allow the teacher to group students for direct instruction according to deficits in specific skills. The teacher monitors students' progress and systematically groups and regroups students in an effort to maximize student learning. Tiered activities provide the opportunity for the students to focus on essential skills and understandings at different levels of complexity. Students are given the opportunity to work in learning centers and with computer assisted programs that provide skill specific activities to meet the identified reading comprehension objectives. Scaffolding assists students in moving from one instructional level to the next by providing support systems that assist students in succeeding. Instructional techniques that provide scaffolding include teacher modeling, peer tutoring, and hands-on activities (Tomlinson, 2003).

Teachers at Striving Elementary have received DI training either through attending workshops facilitated by the Association for Supervision and Curriculum Development (ASCD) personnel, local school system professional development sessions, or professional development trainings conducted by trained teachers at the school. Striving Elementary has a DI redelivery team comprised of teachers that have completed a one year training provided by ASCD. These teachers are available to provide assistance with the implementing of DI strategies.

### **Instrumentation**

STAR reading assessments results provided pre and post test data for this study. These assessments are administered at the beginning, middle, and end of the school term. STAR Reading is a computer-adaptive test used to assess the reading achievement of students in grades K–12. STAR allows teachers to assess students' reading comprehension and overall reading achievement in a quick and accurate manner. This computer-based progress-monitoring assessment provides immediate feedback to teachers and administrators on each student's reading development, provides a means for tracking growth in a consistent manner, and assists teachers in identifying students who need remediation or enrichment (Renaissance Learning, 2013). According to Renaissance Learning (2013), reading assessment focuses on measuring student performance with skills in five domains: word knowledge and skills, comprehension strategies and constructing meaning, understanding author's craft, analyzing literary text, and analyzing argument and evaluating text (Renaissance Learning, 2013, pp. 22).

Results from STAR assessments are reported as criterion-referenced or norm-referenced scores. Criterion-referenced scores represent a measurement of student performance against predetermined criteria and norm-referenced scores compare and rank students to similar students that took the same test. The IRL is a criterion-referenced score that represents the highest reading level that a student can comprehend material at 80% proficiency or higher with assistance (Renaissance Learning, 2013) was used for this study.

### **Reliability**

STAR Assessments have been found to be reliable, valid and efficient according to reviews from independent groups that include the National Center on Intensive Intervention. Between September 2012 and June 2013, reliability was estimated through the use of internal consistency and test-retest correlation coefficients during a national random sampling of more than 1.2 million reading tests. Reliability for over all grades combined was 0.97 and within grades reliability ranged from 0.93 to 0.95. Retest reliability for all grades combined was estimated to be 0.90 and ranged from 0.54 to 0.85 within grades (Renaissance Learning, 2014, pp. 22).

### **Validity**

A vital aspect of test validity is content. Validity lies in the alignment between the knowledge and skills being measured by an assessment and the knowledge and skills being taught and learned in a given curriculum at particular grade levels. STAR Reading content is reported to be aligned to state and national curriculum standards. Results of more than 400 concurrent and predictive validity studies involving more than 1 million

students revealed that the average correlations range from 0.60 to 0.87; correlations in that range are considered strong (Renaissance Learning, 2014, pp. 23).

### **Variables**

The independent variables are DI and whole group instructional methods. The dependent variables are the pre and post assessment IRL results from STAR reading assessments.

### **Data Collection Procedures**

Data collection took place at Striving Elementary School from archival assessment documents of fourth grade reading classes to answer the research question: Is there a significant difference between reading comprehension scores of fourth grade students after being instructed with DI methods and reading comprehension scores of fourth grade students instructed with whole group methods?

I received a limited data set that contained only the pre and post IRL STAR reading assessment scores of the two groups, struggling and on-level, from the 2012-2014 school years.

### **Data Analysis**

The inferential statistical test selected to be used in this study was Analysis of Covariance (ANCOVA). ANCOVA is a statistical technique that is a combination of regression and ANOVA that is intended to increase the precision of analysis in quasi-experimental research. Quantitative predictors, referred to as covariates, “represent sources of variance that are thought to influence the dependent variable, but have not been controlled by the experimental procedures” (Rutherford, 2012, pp. 22). Correlation



between covariate(s) and dependent variable(s) are determined and associated variances are removed prior to determining if a significant difference exists between the dependent variable score means (Rutherford, 2012). As reported by Creswell (2013, 2003) it is appropriate to use ANCOVA for statistical analysis in experimental designs to examine the hypotheses. ANCOVA allows the researcher the opportunity to compare averages achieved by the groups.

Within this study, the controlled group and the experimental group are unequal due to their ability levels. The controlled group represents students that perform on grade level and the experimental group represents students that perform below grade level; therefore, a need to equalize the groups exists. Via ANCOVA, I controlled group differences by using pretest scores, which represented students' ability prior to treatment, as a covariate. Controlling pretest scores allowed me to draw conclusions about whether the post scores were due to the instructional method or student ability.

### **Threats to Validity**

Internal threats associated with the study included: administration of pretest and posttest, consistent delivery of DI strategies by EIP teacher, number of participants in the study, and length of study. External threats included generalizations about the participants and teachers.

### **Protection of Participants' Rights**

This study did not include live participants; archival data was used. In order to ensure that the rights and welfare of students that the data represented were protected, the limited data set did not contain students' names. Data that was collected is stored in a

security envelope and locked in a file cabinet at the researchers' residence. After five years, paper data will be shredded and electronic data will be deleted.

### **Researcher's Role**

I have been employed at Striving Elementary for the past 6 years and am currently employed as an (EIP) teacher in grades kindergarten through third and fifth. During the time I have worked at Striving Elementary, I have taught remedial reading and/or math to struggling students at grade levels kindergarten through fifth; however, I have not worked with fourth grade reading students during the past three years. For this study, I used retrieve archival data from the STAR reading database. My roles and relationships at Striving Elementary did not affect the data collection process.

### **Conclusion**

This quantitative study using a quasi-experimental nonequivalent pretest-posttest control group design compared the pre and post archival STAR reading assessment data over a two year period of fourth grade struggling readers instructed through small group using DI strategies and fourth grade students instructed with whole group strategies. This study sought to answer the research question: Is there a significant difference between pre and post reading comprehension scores of fourth grade struggling readers after receiving small group DI. ANCOVA was conducted on pre and post STAR reading assessment achievement scores to determine the impact of the instructional method.

Section 3 presented the methodology I used for the study. The nature of the study, population, sampling procedures, instrumentation, variables, data collection procedures and analysis, and threats to validity were topics of discussion. This study

sought to offer additional information about the impact of DI on achievement scores of struggling fourth grade readers. Section 4 shares results and Section 5 focuses on conclusions and recommendations.

## Section 4: Results

### **Introduction**

The purpose of this study was to determine if DI resulted in a significant difference in the reading comprehension scores (dependent variable) between struggling readers taught using DI strategies (independent variable) and whole-group strategies in regular education fourth grade classes at Striving Elementary. The study evaluated pre- and post archival STAR reading assessment IRL scores over a 2-year period. The IRL scores, used for this study, are criterion-referenced scores that represent the highest level that students can comprehend material at 80% proficiency or higher with assistance (Renaissance Learning, 2013).

At Striving Elementary, an EIP teacher teaches reading to struggling readers 5 days a week, in 50-minute segments. The teacher's role is to provide skill-specific, small-group, DI, based on both content and students' readiness. Instructional strategies employed during small-group instruction include flexible grouping, tiered activities and scaffolding. Flexible groups allow the teacher to group students for direct instruction according to deficits in specific skills. The teacher monitors students' progress and systematically groups and regroups students to maximize learning. Tiered activities allow students to focus on essential skills and understandings at different levels of complexity. Students are given the opportunity to work in learning centers and with computer-assisted programs that provide skill-specific activities to meet the identified reading comprehension objectives. Scaffolding helps students move from one instructional level to the next by providing support systems that help them succeed. Instructional techniques

that provide scaffolding include teacher modeling, peer tutoring, and hands-on activities (Tomlinson, 2003).

### **Research Question and Hypotheses**

The following question guided this study:

#### **Research Question**

Is there a significant difference between reading comprehension scores of fourth grade students after being instructed with DI methods and IRL scores of fourth grade students instructed with whole group methods?

Independent Variables – DI and whole group instruction

Dependent Variable – reading comprehension IRL scores

#### **Null Hypothesis**

There is no significant difference between reading comprehension IRL scores of fourth grade students after being instructed with DI methods and reading comprehension scores of fourth grade students instructed with whole group methods.

#### **Alternative Hypothesis**

There is a significant difference between reading comprehension IRL scores of fourth grade students after being instructed with DI methods and reading comprehension scores of fourth grade students instructed with whole group methods.

### **Research Tool**

Archival STAR reading assessments IRL scores over a two year period provided pre and post test data for this study. STAR Reading is a computer-adaptive test used to assess the reading achievement of students in grades K–12. STAR allows teachers to

assess students' reading comprehension and overall reading achievement in a quick and accurate manner. This computer-based progress-monitoring assessment provides immediate feedback to teachers and administrators on each student's reading development, provides a means for tracking growth in a consistent manner, and assists teachers in identifying students who need remediation or enrichment (Renaissance Learning, 2013). Results from STAR assessments are reported as criterion-referenced or norm-referenced scores. Criterion-referenced scores represent a measurement of student performance against predetermined criteria and norm-referenced scores compare and rank students to similar students that took the same test. The IRL is a criterion-referenced score that represents the highest reading level a student can comprehend material at 80% proficiency or higher with assistance (Renaissance Learning, 2013) was used for this study.

### **Data Analysis**

After obtaining a letter of cooperation and a data use agreement from the principal of the study site and receiving IRB approval to collect data [08-08-14-0064169], a limited data set that contained the pre and post IRL test scores of fourth grade students from the 2012 – 2013 and 2013 – 2014 school years was obtained. The inferential statistical test ANCOVA was used to determine if a significant difference in pre and post IRL scores existed between struggling readers instructed with DI methods and students instructed with whole group methods. ANCOVA is a statistical technique that is a combination of regression and ANOVA that is intended to control variables outside the treatment variable. Quantitative predictors, referred to as covariates, “represent sources of variance

that are thought to influence the dependent variable, but have not been controlled by the experimental procedures” (Rutherford, 2012, pp. 22). Correlation between covariate(s) and dependent variable(s) are determined and associated variances are removed prior to determining if a significant difference exists between the dependent variable score means (Mayers, 2013; Rutherford, 2012). As reported by Creswell (2013; 2003) it is appropriate to use ANCOVA for statistical analysis in experimental designs to examine the hypotheses. ANCOVA allows the researcher the opportunity to compare averages achieved by the groups. Within this study, the controlled group and the experimental group are unequal due to their ability levels. The controlled group represents students that perform on grade level and the experimental group represents students that perform below grade level; therefore, a need to equalize the groups exists. Via ANCOVA, group differences were controlled by using pretest scores, which represent students’ ability prior to treatment, as a covariate. Controlling pretest scores enabled the ability to draw conclusions about whether the post scores were due to the instructional method.

IBM SPSS Statistics 21 analytical software was used to generate statistical data. An ANCOVA was conducted with Alpha at .05 with a 95% confidence interval for difference. The pre (covariate) and post (dependent) IRL scores of 60 students that received instruction that employed DI strategies (experimental group) and the pre (covariate) and post (dependent) IRL scores of 60 students that received whole group instruction (controlled group) were analyzed.

A preliminary analysis to evaluate the homogeneity-of-regression (slopes) assumption, a key assumption in ANCOVA, was conducted. This test evaluated the

interaction between the covariate and the independent variable in prediction of the dependent variable. A significant interaction between the covariate and the dependent variable would suggest that the differences on the dependent variable among groups vary as a function of the covariate; therefore, the validity of the ANCOVA outcomes could not be trusted (Mayers, 2013). Table 1 presents the output.

Table 1

*Tests of Between-Subjects Effects: Homogeneity Descriptive*

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	43.861 <sup>a</sup>	3	14.620	37.101	.000
Intercept	3.581	1	3.581	9.088	.003
TeacMeth	.032	1	.032	.082	.775
Pretest	9.679	1	9.679	24.561	.000
TeacMeth*PreTest	.117	1	.117	.297	.587
Error	45.712	116	.394		
Total	1524.090	120			
Corrected Total	89.573	119			

<sup>a</sup> R-Squared = .490 (Adjusted R-Squared = .476)

The results (Table 1) suggested no significant interaction between teaching methods (TeacMeth) and pretest scores,  $F(1, 116) = .297$ ,  $P = .587$ . That is  $p(.587) > \alpha(.05)$ ; therefore, I proceeded with the ANCOVA analysis.

Descriptive statistics that represent the groups (TeacMeth) obtained from ANCOVA are reported in Table 2. The mean, standard deviation and number of participants are reported for the experimental (DI) and control (whole group) groups along with the standard error and upper and lower bounds.



Table 2

*Descriptive Statistics**Pretest–posttest*

Pretest Scores					95% Confidence Interval for Mean	
TeacMeth	N	Mean	Std. deviation	Std. Error	Lower bound	Upper bound
DI	60	2.547	.6516	.0841	2.378	2.715
Whole Group	60	3.913	.3730	.0482	3.817	4.010
Total	120	3.230	.8662	.0791	3.073	3.387

  

Posttest Scores					95% Confidence Interval for Mean	
TeacMeth	N	Mean	Std. deviation	Std. error	Lower Bound	Upper Bound
DI	60	2.940	.7870	.1016	2.737	3.143
Whole Group	60	3.975	.5951	.0768	3.821	4.129
Total	120	3.458	.8676	.0792	3.301	3.614

These results revealed an insignificant change in the mean scores from pretest to posttest. The DI group (experimental) changed from 2.547 to 2.940 and the Whole Group (control) changed from 3.913 to 3.975.

The main output from ANCOVA is presented in Table 3, Tests of Between-Subjects Effects for the analysis of co-variance for teaching method.

Table 3  
*Analysis of Co-Variance for Teaching Method*

*Dependent Variable: Post*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	43.744 <sup>a</sup>	2	21.872	55.838	.000	.488
Intercept	7.454	1	7.454	19.030	.000	.140
Pre	11.607	1	11.607	29.633	.000	.202
TeacMeth	.579	1	.579	1.478	.227	.012
Error	45.829	117	.392			
Total	1524.090	120				
Corrected Total	89.573	119				

<sup>a</sup> R-Squared = .505 (Adjusted R Squared = .492)

This table informs whether there was an overall statistically significant difference in post IRL scores between the experimental and control groups after their means had been adjusted for pre IRL scores (covariate). The level statistical significance value (p-value) found in the TeacMeth row is equal to .227; therefore,  $p (.227) > .05$  shows that a significant difference between adjusted means does not exist. Subsequently, these results failed to reject the null hypothesis.

### Conclusion

This quantitative study using a quasi-experimental nonequivalent pretest- posttest control-group design sought to determine if a significant difference existed between reading comprehension scores of fourth grade students after being instructed with DI methods and reading comprehension scores of fourth grade students instructed with

whole group methods. Pre and post archival STAR reading assessment IRL scores over a two year period were evaluated.

IBM SPSS Statistics 21 analytical software was used to generate statistical data. A one-way analysis of covariance (ANCOVA) was conducted with Alpha at .05 with a 95% confidence interval for difference. The pre (covariate) and post (dependent) IRL scores of 60 students that received instruction that employed DI strategies (experimental group) and the pre (covariate) and post (dependent) IRL scores of 60 students that received whole group instruction (controlled group) were analyzed.

ANCOVA revealed that no significant difference existed between the means of the post scores of the two groups when the pretest scores were used as a covariate for the groups. These findings suggested that the null hypothesis should fail to be rejected.

Section 5 presents conclusion and recommendations.

## Section 5: Discussion, Conclusion and Recommendations

### **Overview**

Identifying a strategy that would help close the reading achievement gap between struggling and non-struggling readers in regular education fourth grade classes prompted this study. The purpose of this quantitative study—using a quasi-experimental, nonequivalent, pretest–posttest design—was to determine if a significant difference in post mean scores existed between the reading comprehension scores of struggling readers after receiving instruction that used DI strategies and reading comprehension scores of students who received whole group instruction when pretest scores were used as a covariate.

This study evaluated 2-year period of archival pre- and post-STAR reading assessment IRL scores. The results of an (ANCOVA) revealed no significant difference between the means of the pre- and post-scores of the two groups.

### **Interpretation of Findings**

ANCOVA results revealed the mean score for the experimental group increased from 2.547 (pretest) to 2.940 (posttest); the standard deviation increased from .6516 to .7870. The control group's mean score increased from 3.913 (pretest) to 3.975 (posttest); the standard deviation increased from .3730 to .5951. The tests of between-subjects effects for the analysis of co-variance for teaching method revealed that an overall statistically significant difference in post-IRL scores between the experimental and control groups after their means had been adjusted for pre IRL scores (covariate) did not exist. The statistical significance value (p-value) was equal to .227; therefore,  $p (.227) >$

.05 shows that a significant difference between adjusted means does not exist. Thus, these results failed to reject the null hypothesis.

An examination of these results shows that both groups did have an increase in mean scores from pre- to post-test. Even though these were not statistically significant gains, they may be important. McClusky and Lalkhen, (2007) reported that the difference between the mean scores for the groups could be due to chance or to the sample size rather than the intervention. This increase suggests that improvement did occur regardless of the teaching method. The standard deviation also increased for both groups. High standard deviation results for both groups mean that scores of students were not close together; therefore, learning appears to be connected to individuals rather than to teaching method. Gregory and Chapman (2013) suggested that students' personal experiences, interests, and attitudes affect learning every day. Therefore, the individual differences in scores could be attributed to variables such as gender, student motivation, parental involvement, socioeconomic status, and background ability, all of which play major roles in student achievement (Hattie, 2009; Gregory & Chapman, 2013). None of these variables were considered in this study.

Cognitive constructivism provided a theoretical framework for this study. Cognitive constructivism purports learning is a process and knowledge is constructed through various experiences which provide opportunities to challenge and support students' thinking. Emphasis is placed on individual construction of knowledge, ongoing assessment, real world connected content and student interaction (Eggen & Kauchak, 2013, 2007; Guillaume, 2008). As applied to this study, DI was expected to influence the

dependent variable, achievement scores, because DI offered the EIP teachers multiple approaches to modify instruction to meet the cognitive developmental needs of students.

The results of this study, no significant change in IRL mean scores after employing DI strategies, were different from a three-year study conducted by McQuarrie, McRae & Stack-Cutler (2008) and a five-year study conducted by Lewis & Batts (2005) that revealed improved student performance after using DI. However, the results were more in line with results from an experimental study at five elementary schools conducted by Reis, McCoach, Little, et al. (2010) where three of the schools showed no achievement differences between pre and post data.

### **Implications for Social Change**

Positive social change, as defined by Walden University, is a “deliberate process of creating and applying ideas, strategies, and actions to promote the worth, dignity, and development of individuals, communities, organizations, institutions, cultures, and societies. Positive social change results in the improvement of human and social conditions” (Walden University Ed.D. Program Candidate Handbook, 2013, Social Change, pp. 5). Results of this study prompted the question: “What strategies and actions can be implemented to promote the worth and development of struggling readers?”

The interpretation drawn from the results of this study suggests that individual differences of students accounted for the differences in the pre and post mean scores. Therefore, factors that could contribute to these differences should be addressed in order to promote positive social change. Some of the factors that could be addressed at the

school level include providing additional instructional support for struggling readers before or after regular school hours and promoting parental involvement.

Increased instructional time from a reading specialist or tutor has been shown to be beneficial to struggling readers. This time can be either before or after school or at a time other than the regular classroom instruction. During this time, the various needs of students are met by providing DI through small groups using the results of diagnostic assessment to target areas of weakness (McEwan-Adkins, 2010). Promoting parental involvement has also shown to be beneficial. Findings from a study by Dearing and colleagues (2006) suggested that differences in levels of parental involvement between families and changes in parental involvement within families were predictors of students' literacy achievement and growth.

The results of this study might be helpful in prompting administrators and teachers to reach out to parents and community stakeholders with a renewed urgency to address the needs of struggling readers. Identifying strategies and actions to enlist effective tutors and increase parental involvement will assist in closing the achievement gap and promoting social change by decreasing the number of students unable to read.

### **Recommendations for Action**

The results of this study suggested that the use of DI strategies did not result in a significant effect on the IRL assessment mean scores of struggling nor on-grade level readers. However, the results did show that the posttest mean scores did increase from the pretest mean scores for both groups. The fact that the mean scores did increase is an important fact to me. In my opinion this is an indication of the potential of providing DI

to students. The results suggested that individual differences played a role in the pre and post scores of students; therefore, I would recommend that administrators, regular education and remedial education teachers collaborate on ways to address the needs of individual students. Suggestions from me would include reaching out to community stakeholders, local colleges, and universities to secure effective tutors to work with students during extended school hours; and forming a committee to identify available resources to improve parental involvement. These resources could include offering parent workshops on ways to assist students with assignments and providing take-home instructional materials. Faculty meetings, data team meetings, and leadership meetings could provide a forum for dissemination and discussion of this study and the development of a plan of action to address the needs of students.

### **Recommendations for Further Study**

This quantitative study using a quasi-experimental nonequivalent pretest- posttest control-group design study was limited to archival data of 120 fourth grade students at one Title I school. Further study should include live participants from several sites and multiple grade levels involved in an experimental study that evaluates pre and post data of experimental and control groups. A closer examination of the implementation of DI strategies to determine if the strategies were implemented with fidelity might also be conducted. Perhaps a mixed-method study that includes data from more than one site would offer quantitative and qualitative data that is more reflective of the impact of DI on achievement scores of struggling readers. Variables such as gender, student motivation,



socio-economic status, and parental involvement could also be included to shed light of individual student differences.

### **Conclusion**

The purpose of this quantitative study using a quasi-experimental nonequivalent pretest-posttest design was to determine if a significant difference existed between reading comprehension scores of struggling fourth grade readers instructed with small group DI strategies and fourth grade students instructed with whole group strategies. The intention of this study was to provide additional empirical evidence about the impact that DI has on comprehension scores and offer information that might be helpful in providing effective reading comprehension instruction for struggling readers.

Results obtained from an ANCOVA analysis failed to reject the null hypothesis, there is no significant difference between reading comprehension scores of fourth grade students after being instructed with DI methods and reading comprehension scores of fourth grade students instructed with whole group methods. An interpretation of the results suggested that the increase in the mean scores from pretest to posttest was due to individual differences rather than instructional method. Factors that have an influence on individual achievement differences such as gender, student motivation, parental involvement, or socioeconomic status were not considered in this study.

Recommendations for further study would include considering the effect these factors have on student achievement and investigating various implementations of DI.

The results of this study might be helpful in assisting administrators, teachers, parents, and community stakeholders in determining the best instructional strategies to

remediate struggling readers. As educators, it is our responsibility to seek the most effective instructional strategy to decrease the achievement gap between proficient and struggling readers. Determining this strategy is a continuous process that must be practiced daily in an effort to promote positive social change by applying strategies and procedures to meet the individual cognitive and affective needs of students to benefit mankind in this diverse society in which we live.

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## Curriculum Vitae

Carol Boges  
cboges229@aol.com

## Education:

2014	Walden University Dr. of Ed., Administrator Leadership for Teaching and Learning
2009	University of Georgia Certification, Educational Leadership
1994	Albany State University Certification, Teacher Support Specialist
1990	Albany State University Masters Degree, Early Childhood Education
1987	Albany State University Certification, Early Childhood Education
1981	Albany State University Bachelors of Business Administration

## Experience:

2005 – Present	Instructional Coach/EIP Teacher
2003 – 2005	Reading First Literacy Coach
2000 – 2003	America's Choice Literacy Coach
1987 – 2000	Second Grade Teacher
1981 – 1987	Paraprofessional

**Professional Activities:**

Georgia Association of Educators

National Association of Educators

Area Reading Council

State Superintendent's Teacher Advisory Council