

THE IMPACT OF CO-TEACHING ON GENERAL EDUCATION STUDENTS IN SEVENTH  
GRADE MATH

by

Kenneth Lamar James

Liberty University

A Dissertation Presented in Partial Fulfillment  
Of the Requirements for the EDUC 990 Course

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. THE IMPACT OF CO-TEACHING ON GENERAL EDUCATION STUDENTS IN  
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ABSTRACT

Federal legislation has mandated that all students, including students with disabilities, perform at or above a certain level on standardized tests. Students with disabilities consistently have scored below the required minimum score. Educators have begun implementing co-teaching strategies in the general education classroom in order to better serve the students with disabilities. This has caused concern among some parents and other educators as to how the inclusion of special education students in the general classroom will affect the achievement of general education students. This quantitative study is designed to gather data from the math section of the Criterion Referenced Competency Test (CRCT) from four middle schools in South Georgia. This data will be gathered in order to review the scores of general education students in the co-taught environment. The study will employ the causal/comparative (ex post facto data study) design to collect the needed data.

Descriptors: co-teaching, inclusion, general education, special education

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### **Dedication**

*The Lord is my shepherd; I shall not want. He maketh me to lie down in green pastures: he leadeth me beside the still waters. He restoreth my soul: he leadeth me in the paths of righteousness for his name's sake. Yea, though I walk through the valley of the shadow of death, I will fear no evil: for thou art with me; thy rod and thy staff they comfort me. Thou preparest a table before me in the presence of mine enemies: thou anointest my head with oil; my cup runneth over. Surely goodness and mercy shall follow me all the days of my life: and I will dwell in the house of the Lord forever. (Psalm 23)*

As in all things, this manuscript is first and foremost dedicated to my Lord and Savior, Jesus Christ. He truly guides me in His path to bring glory to His precious name. Secondly, I dedicate it to my wife, Michane. I love you so much. You have truly made my life a better place for me to inhabit. Without your love, patience, and support, I would never have completed this work. Finally, to those people who helped me along this path through prayer and encouragement, I dedicate this manuscript to them as well. God is good all the time. All the time, God is good.

### **Acknowledgements**

I am grateful to God for reminding me on a constant basis that He wants what is right and good for me in my life. This promise was a constant comfort during the times I doubted myself as I progressed through this colossal task. He truly wanted me to finish. The fact that I did finish only brings glory to His name and shows that we serve a loving God.

I would like to thank Dr. Amy McLemore for her guidance, patience, and belief in me. No matter what happened during this process, you gave me encouragement and insight into the process of finishing this dissertation. Thank you for being positive and demanding.

I am thankful that Dr. Tamika Hibbert and Dr. Linda Bennett-Elder were willing to work with me as committee members. Dr. Hibbert, you provided insights and quick feedback that made my completion of this work possible. Dr. Bennett-Elder, you always prayed and comforted me during times of doubt and always had a way of making it seem like what I was doing was the right thing even though I did not always believe it myself. Thank you all and I will always feel that I am in your debt.

### List of Tables

|   |    |
|---|----|
| Table 4.0: Observed Mean and Standard Deviation-Spring 2012<br>CRCT.....  | 64 |
| Table 4.1: Trimmed Mean and Standard Deviation-Spring 2012<br>CRCT.....   | 66 |
| Table 4.2: ANCOVA-Spring 2012 CRCT-Adjusted Mean with F-statistic and p-value<br>included.....  | 67 |
| Table 4.3: Observed Mean and Standard Deviation-Spring 2012 CRCT (Male and<br>Female).....  | 68 |
| Table 4.4: Male and female-ANCOVA-Spring 2012 CRCT-Adjusted Mean with F-<br>statistic and p-value included.....   | 69 |
| Table 4.5: Observed Mean and Standard Deviation-Spring 2012 CRCT (African<br>American, Hispanic, and Caucasian).....  | 70 |
| Table 4.6: African American, Hispanic, and Caucasian- ANCOVA-Spring 2012 CRCT-<br>Adjusted Mean with F-statistic and p-value included.....                      | 72 |
| Table 4.7: Observed Mean and Standard Deviation-Spring 2012 CRCT (General<br>education and SWD in co-taught environment)- t-statistic and p-value included..... | 73 |
| Table 4.8: Co-taught SWD and general education students- ANCOVA-Spring 2012<br>CRCT-Adjusted Mean with F-statistic and p-value included.....                    | 74 |
| Table 4.9: Findings for the four null hypotheses.....   | 76 |

**List of Abbreviations**

Least Restrictive Environment (LRE)

Students with Disabilities (SWD)

No Child Left Behind (NCLB)

Adequate Yearly Progress (AYP)

College & Career Ready Performance Index (CCRPI)

Individuals with Disabilities Education Act (IDEA)

Criterion Referenced Competency Test (CRCT)

Regular Education Initiative (REI)

Individualized Education Program (IEP)

Analysis of Covariance (ANCOVA)

Analysis of Variance (ANOVA)

Department of Education (DOE)

Learning Disability (LD)

## Table of Contents

|   |    |
|---|----|
| ABSTRACT.....                                       | 3  |
| Copyright.....                                      | 4  |
| Dedication.....                                     | 5  |
| Acknowledgements.....                               | 6  |
| List of Tables.....                                 | 11 |
| List of Abbreviations.....                          | 12 |
| CHAPTER ONE: INTRODUCTION.....                      | 13 |
| Background.....                                     | 13 |
| Problem Statement.....                              | 17 |
| Purpose Statement.....                              | 18 |
| Significance of the Study.....                      | 18 |
| Research Questions.....                             | 19 |
| Research Hypothesis(es).....                        | 19 |
| Identification of Variables.....                    | 20 |
| Research Plan.....                                  | 20 |
| Definitions.....                                    | 22 |
| CHAPTER TWO: LITERATURE REVIEW.....                 | 23 |
| Introduction.....                                   | 23 |
| Conceptual or Theoretical Framework.....            | 23 |
| Review of the Literature.....                       | 25 |
| The development of special education.....           | 25 |
| Push by the Regular Education Initiative (REI)..... | 26 |

|   |    |
|---|----|
|   | 10 |
| Special education service models.....                 | 31 |
| Different models of co-teaching.....                  | 34 |
| Factors associated with implementing co-teaching..... | 36 |
| Benefits of co-teaching.....                          | 39 |
| Co-teaching in middle school.....                     | 40 |
| Co-teaching in math.....                              | 44 |
| Effectiveness of co-teaching.....                     | 45 |
| Opponents of Co-Teaching.....                         | 47 |
| Summary.....  | 52 |
| CHAPTER THREE: METHODOLOGY.....                       | 53 |
| Introduction.....                                     | 53 |
| Research design.....                                  | 53 |
| Research Question and Hypotheses.....                 | 55 |
| Participants.....                                     | 56 |
| Setting.....  | 57 |
| Instrumentation.....                                  | 58 |
| Procedures.....                                       | 60 |
| Data Analysis.....                                    | 61 |
| CHAPTER FOUR: FINDINGS.....                           | 62 |
| Introduction.....                                     | 62 |
| Research Questions.....                               | 63 |
| Hypotheses.....                                       | 63 |
| Data Analysis.....                                    | 64 |

|   |    |
|---|----|
| Research Question One.....                | 64 |
| Descriptive Statistics.....               | 64 |
| Analysis.....                             | 65 |
| Research Question Two.....                | 67 |
| Descriptive Statistics.....               | 67 |
| Analysis.....                             | 68 |
| Research Question Three.....              | 70 |
| Descriptive Statistics.....               | 70 |
| Analysis.....                             | 71 |
| Research Question Four.....               | 72 |
| Descriptive Statistics.....               | 72 |
| Analysis.....                             | 74 |
| Summary of Results.....                   | 75 |
| CHAPTER 5: DISCUSSION.....                | 78 |
| Overview.....                             | 78 |
| Research Questions.....                   | 79 |
| Findings.....                             | 80 |
| Findings for Research Question One.....   | 80 |
| Findings for Research Question Two.....   | 81 |
| Findings for Research Question Three..... | 81 |
| Findings for Research Question Four.....  | 83 |
| Discussion.....                           | 84 |
| Limitations.....                          | 89 |

Implications and Recommendations.....90

Conclusion.....91

REFERENCES.....93

APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL.....103

APPENDIX E: INVESTIGATOR AGREEMENT AND SIGNATURE PAGE.....104

## CHAPTER ONE: INTROUCTION

### Background

According to Hardman and Dawson (2008), Public Law 94-142 and its subsequent reauthorizations in 1990, 1997, and 2004 has impacted education since its passage. Students who have special needs can no longer be excluded from schools, nor can they be excluded from certain classes just because of their disability. This law also requires schools to educate students with disabilities (SWD) in the least restrictive environment (LRE) possible.

LRE refers to the educational placement for SWD. Schools are required to educate SWD with their non-disabled peers to the maximum extent possible (the LRE possible would be in the general education setting and the most restrictive environment would be in a private facility). Schools are required to follow certain legal considerations when determining LRE. Even though the push in special education at this point in time is for students to be educated with their general education peers as much as possible, a full range of special education services must be available to SWD in order to make sure each student's individual needs can be met. If the school deems it necessary to move a student to a more segregated environment for service, the school should be able to show documented proof (test results, drop in grades, behavior charts) that this change in placement was required. Schools must also consider the needs of the non-disabled students when deciding on the LRE for a student. If the student is going to be a distraction to his peers and hinder their opportunity to learn, then a more integrated classroom may not be the answer. (Yell, Ryan, Rozalski, & Katsiyannis, 2009; Roberts, 2008.)

The passage of the No Child Left Behind (NCLB) legislation in 2001 put further emphasis on the way SWD are educated in public school systems, as well as putting more pressure on schools to have SWD achieving at the same level as their non-disabled peers. NCLB

requires that schools make AYP starting in 2002 until 2014 when all students, including SWD, will be performing at minimum level of proficiency. According to the Georgia Department of Education website (2010), failure of schools to make AYP two years in a row will lead to the school dedicate 5% of its Title 1 dollars to the transportation of students to schools that are making AYP. Three consecutive years will require schools to continue previous year's consequences as well as dedicating more money to supplemental services and tutoring for students who are struggling. Sanctions continue to build until the sixth year of missing AYP when the school is subject to closure and having staff replaced or being re-opened as a charter school.

Perhaps legislators passed NCLB with their hearts in the right place, but the legislation seems to have created more problems than it has been able to solve. (Smyth, 2008) Schools would have to show that they were attempting to provide SWD access to the same curriculum that students without disabilities had access to. SWD would also be taking the same types of assessments as their non-disabled peers (with the exception of a percentage of the school population with severe disabilities). NCLB also required that all teachers be highly qualified. Despite these good intentions, SWD will not be able to perform at the same level as their peers who do not have disabilities. (Quigney, 2008; Anastasiou and Kauffman, 2011).

In February of 2012, the state of Georgia developed a new accountability system called the CCRPI. CCRPI was developed to be a more inclusive system to give parents and others in the public a more complete view of how schools are performing and progressing in following the guidelines of NCLB. This new system is supposed to replace the previous pass/fail grading of AYP. According to the Georgia Department of Education website (2013), CCRPI should help

improve the teaching and leadership practices in all schools in the state, as well as provide more innovation to help improve schools that are considered low-performing.

The intent of CCRPI is to aid students in reaching levels of achievement that will enable them to attend college (two or four year institutions) and technical colleges without the need to take remedial classes once they enroll. The aim is to provide students with an education that is both rigorous in content and will help students to develop problem solving and apply the content as well. The CCRPI score is based on a possible 100 points. This score is based on the school's performance in three different areas. These areas include achievement (70 possible points), progress (15 possible points), and achievement gap (15 possible points). Other bonus points can be earned when a significant number of students from sub-groups such as SWD, English learners, and Economically Disadvantaged students meet expectations on the state mandated achievement test.

The more stringent requirements put forth by state and federal legislation have forced educators to start finding different service delivery models for SWD besides self-contained and resource settings. (Nichols, Dowdy, and Nichols, 2010). One of these approaches was called mainstreaming. Harkins (2012) discusses mainstreaming as the first type of inclusionary practice. Mainstreaming is not a new idea. Polloway, Lubin, Smith, and Patton (2010) write that the idea of having SWD being taught in the same classroom as general education students was considered in the 1960s.

As time and education progressed, so did the idea of what mainstreaming should be. Harkins (2012) states that leaders in education were supportive of the idea of mainstreaming to help students from disadvantaged backgrounds receive the instruction that would benefit them the most, students are now mainstreamed for different reasons. Mainstreamed students spend

part of their academic day in general education classes that have lower academic requirements for socialization and exposure to general education curriculum, and part of the day in special education classes. Mainstreaming students was a step in the right direction, but often times now students are in the regular classroom for socialization and not given the proper supports to achieve academically. (Smoot, 2011).

Mainstreaming was followed closely by the consultative model of special education. This model had the special education teacher working closely with the general education teacher to help with certain students. Special education teachers would pull students from time to time or actually come into the general education classroom to serve students. The consultative approach to special education became more prevalent as more students were served using mainstreaming and then inclusion. (Dinnibelli, Pretti-Frontczak, and McInerney, 2009).

Nichols, Dowdy, and Nichols (2010) tell us that special education and general education teachers started to realize that perhaps the most effective way to serve SWD would be for the special education teacher to be present in the general education classroom basically full time in order to better serve the students. This is when full inclusion and co-teaching started being viewed as the LRE. Special education policy makers felt that inclusion was the way to adhere to the Individuals With Disabilities Education Act (IDEA) call for school systems to provide SWD the LRE possible.

This change in service delivery model has some educators concerned about how this will affect achievement in mathematics. According to Slavin and Lake (2008) students in the United States score below international averages when it comes to math and problem solving abilities. Carnoy and Rothstein (2013) also reported similar findings. Findings such as these have some in

education concerned that students in the United States will continue to fall behind other countries in math achievement.

According to The Georgia Department of Education website, in 2010, in the state of Georgia, fifty-four percent of SWD and eighty-five percent of students without disabilities in the seventh grade met or exceeded the standard on the CRCT. These numbers are of concern to those who are proponents for the use of inclusionary practices such as co-teaching. There is still a gap in achievement in mathematics between SWD and general education students, even though inclusionary practices have been implemented in many school systems throughout the state of Georgia. Dimitrios, Georgia, Eleni, and Asterios (2008) describe the concerns voiced by parents and teachers. These concerns are whether or not students without disabilities who are served in the co-taught classroom are making the same kinds of gains as those who are served in more traditional classroom settings.

### **Problem Statement**

Dunn and Allen (2009) state that federal legislation (NCLB) holds schools accountable for the academic growth of their students as measured by standardized tests that are administered annually. This includes the performance of both students with and without disabilities. The results of the Criterion Referenced Competency Test (CRCT) in 2010 show that math is still an area of need in the state of Georgia. Even though inclusion is being implemented in school systems across the state and across the nation, math achievement continues to be an area of concern. (Boser, 2009). Parents and educators are worried that the presence of SWD in co-taught classrooms may have a negative impact on the performance of the general education students. (Kimbrough & Mellen, 2012).

In many cases teachers have been thrust into co-teaching without adequate training or understanding of how best to make this approach to educating students work. (Glazzard, 2012). In order to properly implement co-teaching strategies teachers will need more training and time to plan together in order to make sure that students make the minimum AYP on state mandated standardized tests. Students in co-taught classrooms where teachers have not had the proper planning time or training could experience academic difficulties. (Ruijs, Peetsma and van der Veen, 2010) Students in co-taught classrooms could also struggle with issues of self-esteem in addition to academic problems.

### **Purpose Statement**

The purpose of this quantitative study is to examine the achievement outcome; as measured by the CRCT, of the co-teaching model on general education students, specifically taught in a co-taught seventh grade math classroom. This will help educators find out if co-teaching strategies are being properly implemented, so that in the future better training and in service can be supplied to teachers in order to insure successful implementation of co-teaching strategies. Co-teaching should then be a valuable tool in helping schools achieve the maximum scores possible on state mandated standardized tests, and to insure that student learning is being maximized.

### **Significance of the Study**

Schools in every state, including Georgia, are now being held accountable for the achievement of all students. (Dunn and Allen, 2009) All students in the state, regardless of disability are required to perform at a certain level. Due to these pressures, teachers need to be utilizing research-based methods when instructing their students. This study will expand on research that has already been conducted in the field of co-teaching and mathematics instruction

in the middle school. The information gathered from this study will help teachers and administrators create classrooms where student learning is maximized and make an impact on state mandated test scores.

### **Research Questions**

**RQ1:** Does co-teaching in the seventh grade general education math classroom impact the achievement of general education students as measured by the math subtest of the Criterion Referenced Competency Test?

**RQ2:** To what extent does co-teaching in the seventh grade math classroom impact the achievement of general education students as measured by the math subtest of the Criterion Referenced Competency Test when comparing students based on gender?

**RQ3:** To what extent does co-teaching in the seventh grade math classroom impact the achievement of general education students as measured by the math subtest of the Criterion Referenced Competency Test based when comparing students based on ethnicity?

**RQ4:** Does co-teaching in the seventh grade general education math classroom impact the achievement of special education students as measured by the mathematics sub-test of the Criterion Referenced Competency Test?

### **Research Hypothesis(es)**

**H<sub>01</sub>:** There will be no difference in the achievement of seventh grade general education students taught using co-teaching and general education students taught in the traditional classroom.

**H<sub>02</sub>:** There will be no difference in the achievement of seventh grade general education students taught using co-teaching based on gender.

**H<sub>03</sub>:** There will be no difference in the achievement of seventh grade general education students taught using co-teaching based on ethnicity.

**H<sub>04</sub>:** There will be no difference in the achievement of special education students in the co-taught classroom on the mathematics sub-test of the CRCT as compared to the general education students in the 7<sup>th</sup> grade mathematics co-taught classes.

### **Identification of Variables**

**Independent Variable.** Seventh grade math class that is taught using the co-teaching service delivery model of special education. Traditional seventh grade math class that does not serve any special education students.

**Dependent Variable.** Student achievement as it is measured by the mathematics subtest of the CRCT.

### **Research Plan**

The research design that was chosen for this study is the Causal-Comparative Research (Ex Post Facto). According to Brewer and Kuhn (2010), causal-comparative research is a type of non-experimental investigation in which researchers try to find relationships between independent and dependent variables after a treatment or event has already occurred. In Causal-Comparative Research, the independent variable is hard to or unethical to control. In many cases the independent variable has already happened.

This Causal-Comparative design is well suited for this study since the researcher is seeking to discover if there is an effect caused by being taught in a certain type class structure. The researcher wants to investigate whether or not there is a difference in performance on the math subsection of the 7<sup>th</sup> grade CRCT between general education students who receive math

instruction in a co-taught classroom as opposed to general education students who receive math instruction in traditional classroom settings.

The researcher is investigating whether or not math classes that involve co-teaching provide positive achievement outcomes for general education students. The most appropriate way to design a study would be to investigate the achievement outcome for general education students taught in co-teaching environments and achievement outcomes for general education students taught in traditional classrooms.

Causal-comparative research does offer some of the elements of experimental design, but students are not randomly assigned to control and experimental groups. The researcher will provide evidence that controls are being offered in order to improve the control of any external variables that could possibly affect the dependent variables, (Lodico, Spaulding, and Voegtle, 2010) In this study, the independent variable of co-taught and traditional classrooms can be controlled. However, the dependent variable of math achievement as measured on the math sub-test of the 7<sup>th</sup> grade CRCT cannot be controlled.

The study will be comprised of several sets of co-taught seventh grade math classrooms serving as the experimental group as well as several sets of traditionally taught(classrooms that are not co-taught) classrooms serving as the control group. All students will be in the seventh grade and represent several elementary schools in a southeastern state. The researcher is proposing to look at student's academic achievement in math as it is affected by co-taught and traditional classrooms. The researcher wants to determine if there is a difference in the achievement of seventh grade math students who receive instruction in the co-taught classroom when compared to seventh grade math students who receive instruction in the traditional classroom.

## Definitions

1. *co-teaching* - The pairing of a general education teacher with a special education teacher for the purpose of providing instruction to both SWD and general education students without disabilities. (Friend, Cook, Hurley-Chamberlain, and Shamberger, 2010)

2. *inclusion*- The practice of teaching SWD full time in the same classroom as students without disabilities. (Idol, 2006)

3. *general education*- The program of education that is based on state standards and evaluated by a standards test that students who are progressing normally are expected to receive. (abouteducation, 2014)

4. *special education*- Educating students with special needs in a way that attends to the child's individual differences and needs. (U.S. Department of Education Website, 2014)

## CHAPTER TWO: LITERATURE REVIEW

### **Introduction**

Students designated as being special education students or SWD have been the subject of much debate and legislation in the United States. This debate originally focused on whether or not SWD should even be allowed to attend the same schools as students without disabilities. After settling the debate of allowing SWD the right to attend the same school as other students, educators and legislators began exploring the best ways to serve this population of students. Different service models have been explored and discarded and others have been kept. Presently, the achievement of SWD is being considered along with the achievement of general education students to determine whether or not schools are considered to have successfully reached what state and federal governments feel is acceptable achievement levels. This added pressure has finally led schools to educate SWD in the same classes as students without disabilities. Cole, Waldron, and Majd (2004) call this approach to education inclusion or co-teaching. Many in the field of education feel this approach is the most effective way to serve all students so that all students have an opportunity to achieve at similar levels.

### **Conceptual or Theoretical Framework**

Two theories of learning were important in guiding this research. This researcher felt that sociocultural and brain-based theories were the theories responsible for guiding the original development of special education and its subsequent evolution. Sociocultural theory is based on the work of Lev Vygotsky. According to Yang (2009), Vygotsky was born in Russia and grew up during the time of the Bolshevik Revolution. During this time he began developing his theory of how children learn. Vygotsky believed children learned better in a social setting. From this belief, he developed the zone of proximal development. This refers to tasks that students can

accomplish with the aid of adults or older peers. Students can only learn so much working independently. The IDEA is the basis for the inclusion model seen in school systems. The SWD are placed in the regular education classroom and allowed to work collaboratively with non-disabled peers and teachers. Cole, Watdron, and Majd (2004) tell us that through this process, both special education students and regular education students are able to learn from one another as well as the teachers.

The second theory guiding this research is Howard Gardner's theory of multiple intelligences. Gardner developed this theory after years of studying different types of students. Beam (2009) tells us these included students who were "normal", students with brain damage, autistic students, savants, and children with learning disabilities. From his research, Gardner developed his theory of multiple intelligences. This theory posits that all students process and learn information in a different way. The theory names seven different intelligences. These include linguistic (words), bodily-kinesthetic (movement), mathematical (reasoning), spatial (images and pictures), musical, interpersonal (learn well from others), and intrapersonal (learn independently). Multiple intelligences theory makes sense when working with all students not just the ones with special education needs. Special education students however do benefit a great deal from teachers who subscribe to the multiple intelligences theory because they may process different subjects using a different intelligence.

Any classroom is going to be made up of students who learn things differently from one another. Any inclusion classroom will be an illustration of multiple intelligences. According to Smith and Leonard (2005) students in an inclusion classroom are going to learn differently. This includes the special and regular education students. If students are to be taught effectively in an inclusion classroom, differentiated instruction is a must.

This research is focusing on inclusion classrooms, specifically a math inclusion classroom. The researcher is interested in looking at how the growth of the students (both regular education and special education students) compares to the growth of regular education students who are not taught in an inclusion classroom. Socio-cultural theory leads this researcher to believe that these students in the inclusive environment will show equal or greater growth than those in non-inclusion classrooms.

### **Review of the Literature**

#### **The Development of Special Education**

The United States of America has long made public education a priority. By the year 1918, all states in America had made school attendance compulsory. However, the education of students with special needs was not seen as essential as the education of their non-disabled peers. Yell, Rogers, and Rodgers (1998) tell us that many years would pass before SWD would be given the same rights to a free education as those without disabilities.

Many factors led to SWD eventually being given the same rights as students without disabilities. The passage of certain legislation led to the eventual passage of rights for special education students. The civil rights movement was responsible for changes in legislation that afforded more rights to minority groups and this eventually included SWD. One piece of important legislation was Section 504 of the Rehabilitation Act. Section 504 provided those with disabilities access to areas of public service, including education, they had been denied previously. The formation of advocacy groups also furthered the cause of students who needed special services in school. These changes in legislation and the push of advocacy groups eventually led to the passing of P.L. 94-142, the Education of All Handicapped Children Act of 1975. P.L. 94-142 sought to see to it that SWD had the same opportunity as other children to get

an education. P.L. 94-142 provided federal funding for school systems whose special education programs met their state's requirements for special education programming.

The passage of legislation aimed specifically at SWD led to schools trying to find the best and sometimes most convenient way to serve this special population of students. The early models included the special education students being educated in totally separate classrooms. This situation was called a self-contained special education classroom (Schoger, 2006). While placement in a self-contained classroom was a step in the right direction, many students in the self-contained classroom were capable of greater achievement and success in school and so new solutions for these students were required. Later resource placements for these students were thought to be the best answer. Resource placements came along at the same time as mainstreaming. The resource classroom was where students would go for more specialized instruction in certain areas such as math or reading. According to Volonino and Zigmond (2007), some in the field of special education started questioning whether or not resource placements were the most effective way to help SWD. The argument being that special education teachers were not trained to deliver content specific knowledge. That job was best accomplished by the general education teachers.

### **Push by the Regular Education Initiative (REI)**

In the 1980s a group educational reformers led by Madeleine Will, the Assistant Secretary for the Office of Special Education and Rehabilitative Services in the U.S. Department of Education, proposed that it was time to make some changes to the current special education program that had been brought about by P.L. 94-142. These reformers felt that the education system was failing to respond to the growing needs of all American students, not just those considered SWD. This group of reformers came up with the idea for the REI. The REI had as

its main proposed change to the current special education system the idea that SWD could receive services in the general education classroom. (Will, 1986) This service in the general education classroom was called inclusion or co-teaching.

One argument made by those in favor of inclusion or co-teaching was based on the idea that some students in the classroom struggled with learning difficulties but did not qualify for services in the special education program. These students were more likely than others to “fall through the cracks” so to speak. These low achievers or slow learners as they were termed by some in education were often left to struggle in school without any specialized attention or help from teachers. The supporters of REI felt that the special education system in its current circumstances actually precluded these slower learners from getting any sort of extra help that could improve their learning difficulties. (Will, 1986) One way that these students could be helped would be to change general education policies and practices in order to accommodate the needs of the special education students in the school. If the general education classrooms were set up to educate the SWD then those students who had failed to be recognized or placed in special education would also benefit from this change in how curriculum was taught. These reformers proposed to have SWD grouped with students who did not receive special education (the general education students), the slow learners who were not receiving extra services and the students who were non-English speakers. (Wang, Walberg, and Reynolds, 1992)

Another claim made by the REI was that school systems needed to do a better job recognizing and identifying students with learning problems earlier. It was believed that the earlier the problems are identified, the better chance students will have being successful in the classroom and overcoming their learning difficulties. Will (1986) stated that under the current special education system, teachers and specialists were limited in what aid they could offer

struggling students by the special education regulations. Educators had to see that these struggling students were showing severe enough difficulties to qualify for special education services. This process took time and the problems encountered by the students continued and sometimes when the qualification for special services was made the students had reached an age where the effectiveness of the program might be limited in its effectiveness.

Another issue the supporters of the REI pointed to was what they considered an defective way of classifying students with learning problems. They pointed to the growth of students classified as learning disabled in school systems during the 1970s and 1980s. According to Wang, Walberg, and Reynolds (1992), the number of students classified as learning disabled had grown by more than 100 percent. They also pointed out that these same students who had been classified as learning disabled could have been placed in one of a number of corrective special or remedial programs. The lack of concrete guidelines as to what program a student qualified for made it very difficult to provide them with the best possible support. Coles (1987) pointed out that the classification of “learning disabled” was based on a somewhat unreliable system. The author asserted that classifying children as learning disabled was being overused and that school systems and teachers were using this as an excuse to get students who had more difficulty learning out of their general education classrooms and into more segregated classes. This led to missed opportunities to make accommodations for these students in the general classroom that would have fixed what many consider an educational problem.

Reynolds, Wang, and Walberg (1987) asserted that there were too many classifications in the special education programs at the time for them to be reliable or effective, for that matter. At that time the school had to establish that there was a discrepancy between the student’s intellectual functioning and their academic achievement. This discrepancy was different from

state to state and even within states. In some cases students labeled as learning disabled or (LD) did not show any more discrepancy in achievement and ability than some other students who were not placed in a special program. This called into question the decisions made by the IEP teams as to why some students were placed and others were not. In some cases, the school would have to prove that the students had some issues with socially adaptive behavior. These adaptive behavior measures were based on checklists completed by teachers and parents. Sometimes these could be unreliable since the teachers were eager to see the student leave their classroom and the parents may have been operating with an educational level that precluded them from fully understanding the document. These procedures required a lot of time and cost that schools had to endure in order to get a child qualified for special education. This time and these funds would have been better spent addressing the deficiencies in the general education classrooms that made it necessary to place the students in special education in the first place.

Another assertion made by supporters of the REI was that separating out and labeling special education students from their general education peers was not an effective practice. Wang and Walberg (1988) stated that this practice of putting special education students in separate classrooms was not an effective means of educating SWD. The curriculum the students receive in their separate classrooms is considered to be “watered down” and the person providing the instruction is not a content specialist. Students notice that the assignments they have for the various subjects they are receiving services for are noticeably different and easier than the assignments their non-labeled peers receive. Reynolds, Wang, and Walberg (1987) asserted that the way schools were serving SWD made it more difficult for the educational system to attend to their learning difficulties.

Will (1986) stated that the labels we put on students in special education can become problematic for the students throughout the rest of their educational career. These students who receive the label and are then removed from the classroom, at least part of the instructional day, with their peers may start feeling there is something wrong with them and they are not capable of learning. In essence the teachers and the students start believing that the student's poor performance is due to the handicap they have been labeled with. In some cases this belief may have led to a lack of effort on the part of both the teacher and the student. Why try? The student will not be successful anyway because they have a learning disability. These placements made it difficult for the students to overcome their learning difficulties. Thus the label they had put on them stayed with them and the lowered expectations stayed with them from year to year.

Another problem noted by supporters of REI was that the school day for SWD and their teachers could be disordered and confusing. The student was expected to stay with the general education teacher for a certain amount of time and then go to their special class which often times was in a separate part of the school building from where their general class was located. This could cause confusion for both the students and their teachers as to when the students were supposed to be in which classroom and for what subject. (Reynolds, Wang, and Walberg, 1987) This confusion often leads to more frustration for both student and teacher and helps to perpetuate the belief that the disability is always going to cause these problems.

Due to these issues the supporters of REI began pushing for reform in the way students with special needs would be educated by the schools they attended. The REI wanted both special and general education to come together to serve SWD. The feeling was that this collaboration may alleviate the problems that had been noted regarding special education. This would allow for earlier detection and intervention of learning difficulties. It would also make it

so that principals and teachers would better be able to coordinate the services that were being offered in their buildings without the headache of keeping up with so many different schedules. This would cut down on a lot of confusion. If the SWD could stay in the general classroom longer then it would not be necessary to attach labels and the subsequent stigma that comes with the labels to students. Supporters of the REI believed this would help alleviate some of the helplessness and lowered expectations attached to these labels. (Wang, Walberg, and Reynolds, 1992; Wang and Walberg, 1988; Reynolds, Wang, and Walberg, 1987)

The IDEA was signed into law in 1990 and reauthorized in 2004 so that it would comply with the NCLB legislation passed by Congress. The IDEA and its reauthorization in 2004 did much to aid SWD in getting an appropriate education (Isherwood and Barger-Anderson, 2008). These pieces of legislation helped pave the way for SWD to get out of self-contained and resource settings. These settings were not always the most appropriate place for the students since they were not being exposed to the curriculum that all the other students were. The IDEA also states that SWD must participate in any standardized testing that their general education peers participate in. These changes associated with the IDEA legislation have changed the service delivery models the students can be offered. The model many schools are moving toward using is called inclusion.

### **Special Education Service Models**

An early form of inclusion was called mainstreaming. Mainstreaming can be defined as placing SWD into classrooms with students who do not have disabilities. Idol (2006) says that mainstreaming is generally considered the first type of inclusionary practice. Mainstreamed students spent part of their academic day in general education classes and part of the day in special education classes. Mainstreaming students was a step in the right direction, but often

times students were in the regular classroom for socialization and were not given the proper supports to achieve academically. Kavale and Forness (2000) tell us while mainstreaming was a step in the right direction, general education teachers were not properly prepared to serve SWD in the general classroom. The approaches they used in class were geared toward those who achieved at higher levels and often time the SWD not reached and became frustrated in this setting. As educators began to see the need for more specialized methods for serving special education students in the general classroom, special education departments began finding different ways to help these teachers.

The consultative model of special education was recognized as a way to get more specialized help in serving SWD. The general education teacher was still serving the students. The special education teacher was relied upon by the general education to teacher to supply them with any accommodations or other specialized strategies in order to more effectively serve the SWD in their classroom. Some forms of the consultative model had the SWD leaving the general education classroom for an hour or two hours a week to go to a resource setting to get some specialized instruction from the special education teacher. In other instances the special education teacher would come to the general education teacher's classroom for an hour or two hours a week to serve one or more students in the classroom. Carpenter and Dyal (2007) tell us that special education and general education teachers started to realize that perhaps the most effective way to serve SWD would be for the special education teacher to be present in the general education classroom basically full time in order to better serve the students.

Finally the terms mainstreaming and consultative were replaced by inclusion. Inclusion referred to including the SWD and support personnel such as a special education teacher or paraprofessional in the general education classroom whenever SWD are present. This seemed to

be the next logical step in the progression of special education. Special education legislation has been working toward getting students in the LRE possible, and inclusion gives SWD access to the same curriculum as general education students as well as the specialized instructional techniques and accommodations they received in the resource classroom. Currently inclusion is more commonly referred to as co-teaching.

Friend, Cooke, Hurley-Chamberlain, and Shamberger (2010) explored some of the different aspects of co-teaching, as well as the questions and concerns of co-teaching. Working in cooperation with other people and agencies has long been a characteristic of the special education program and the individuals employed by this program. The 1980's and 90's brought some changes to the how and where special education services were offered. These changes brought about an interest in providing services for SWD in the general education classroom as often as possible so that SWD could experience socialization and have access to the same curriculum as their peers who were considered typical students. This interest grew into what is currently referred to as co-teaching (where one teacher who is an expert in the content is partnered with a special education teacher who is an expert at the different instructional strategies that make content accessible for a more diverse population of learners), Friend, Cooke, Hurley-Chamberlain, and Shamberger (2010) state that the research on co-teaching focuses more on teacher expectations and concerns and the logistics of co-teaching than on how students in the co-taught classrooms are actually performing. The authors feel this lack of research on student outcomes should be addressed in order to effectively evaluate co-teaching as an educational model.

## **Different Models of Co-teaching**

The term co-teaching is used to describe how teachers in a school setting have started to provide services to SWD. Weiss (2004) summed up co-teaching as two professionals, most often a general and special education teacher, working together in a classroom to provide instruction to a group of students containing both general and special education students. In order for the instruction to be considered co-teaching, both the general and special education teacher must be contributing to the teaching of the lesson. There were six approaches or models of co-teaching that were identified by Nichols, Dowdy, and Nichols (2010). The first approach is called one teach/one observe. In this situation one teacher takes the role of delivering instruction and the other teacher's role is to observe the class and perhaps make notes about things like student behavior, how the students are reacting to instruction, and which students are "getting it" and which ones are not. Solis, Vaughn, Swanson, and McCulley (2012) noted that the one teach/one observe approach is the method that is most often employed in co-teaching partnerships. This approach requires the least amount of prior planning and coordination. It also allows the person who is stronger in content knowledge to deliver the instruction to the students. The weaker partner does not have to prepare as much and does not normally deliver instruction. This model does not use the strengths of both teachers in the classroom and tends to create discipline problems because students do not see the teacher who does the observing as being an authority in the classroom. This approach is prevalent despite findings that more effective approaches to co-teaching could be employed. Both special and general education teachers could require more training in the models in order for them to employ more effective methods. The second approach is referred to as one teach/one assist. This model is similar to the first. One teacher takes the role of giving instruction to the class. The other teacher circulates around

the classroom and offers support to students who may be struggling with the concepts and objectives being offered in the lesson. While a little more effective than one teach/one observe, this approach also limits the effectiveness of the partnership because only one teacher is delivering instruction. Sometimes the teacher doing the assisting can be seen as a distraction when assisting the students during lesson presentation. (Solis, Vaughn, Swanson, and McCulley, 2012) The third model mentioned is called station teaching. In this model both teachers take on the role of instructor. The class and the content are broken down into smaller groups and each teacher spends time with a group delivering a part of the content to each group. This allows teachers to work with smaller groups at a time and cuts down on the ratio of students each teacher will directly instruct. This approach not only makes use of both teachers as instructors, but they will also both be more involved in the management of the classroom as well. The only downside mentioned was students who are working independently will have to be monitored and this may be a problem. (Solis, Vaughn, Swanson, and McCulley, 2012)

Parallel teaching is the fourth model of co-teaching mentioned. In this approach the teachers divide the class into two groups and deliver the same content to both groups at the same time. This approach allows teachers to teach the same content on different levels. This approach is really good for reading instruction where so many students read on different grade levels. Parallel teaching is also a good approach that cuts down the student to teacher ratio and allows the teachers to give students more individual attention. This approach does require the teachers to plan together quite often and this planning time is a problem in some schools. (Cook, Friend, Hurley-Chamberlain, and Shamberger, 2010) Another approach to co-teaching is called alternative teaching. Alternative teaching allows teachers to organize the class into two groups, one large and one small. The small group is going to be the one that requires the most help.

This model allows the teachers to differentiate learning and remediate when needed. Alternative teaching can also be used as an approach to enrich and accelerate students who are picking up content faster than others. The final approach mentioned was team teaching. Team teaching is where both teachers are instructing the same group on the same subject matter. In team teaching, students get to see both instructors delivering content at the same time and they also get to hear a two different perspectives on the content. This does help build trust and respect between the teachers and the students. This approach does require a great deal of time to plan, as well as a rapport between teachers that is hard to fake. (Cook, Friend, Hurley-Chamberlain, and Shamberger, 2010)

### **Factors Associated with Implementing Co-teaching**

One obstacle that had to be overcome in regards to successfully implementing co-teaching was the attitudes of educators. With co-teaching came many different feelings and attitudes toward this new way of serving SWD. There was a lot of trepidation moving forward from the teachers of the general and special education students. The same feelings were also being felt by the parents of these same groups of students. Administrators were also unsure of what to expect and in some cases how to move forward or even if they should move forward with co-teaching.

Burke and Sutherland (2004) assert that teachers' attitudes can be influenced by their experience with working with SWD. In many cases, general education teachers who have been teaching the longest, tend to display negative attitudes toward working with students who are disabled. (Gal, E., Schreur, N., & Engel-Yeger, B.; 2010) These teachers are accustomed to teaching a certain curriculum in a certain way and the thought of having to change this process leads them to feelings of discomfort and doubt as to the possibility of success in teaching a co-

teaching class. While this is not always the case, it is more often the rule and not the exception. Snider (1999) also found that veteran teachers were more likely to display an attitude that was less than favorable toward the co-teaching of special education students in their general education classroom.

Research has shown that the attitudes of those working with the SWD are an important factor in determining whether or not co-teaching will be successful (Burke and Sutherland, 2004; Daane, C., Beirne-Smith, M., & Latham, D, 2000; Idol, 2006; Snider, 1999; & Stoler, R., 1992). In situations where the attitudes of the teachers are positive then the implementation has been a much smoother process.

There are some factors that are associated with different teachers' attitudes. Experience working with special needs children or participation in appropriate training programs can help change the attitude of both pre-service and in-service teachers. Pre-service teachers who had taken one class that focused on working with SWD were more willing to believe that co-teaching was going to be successful. The same was true of in-service teachers who had been given training in serving special education students in the general education classroom.

Teacher buy-in is also required in order to have a successful transition to co-teaching. In many cases, teachers have not been part of the process of implementing co-teaching in their particular school. In these types of situations teachers were just told at pre-planning that their school had decided to adopt the co-teaching service model to educate the SWD. Both general and special education teachers were thrown together with no discussion about who would be in which classroom or which teachers would be put together as partners. Isherwood and Barger-Anderson (2008) describe this as the least effective way to introduce co-teaching into a school. This type of implementation will lead to more negative attitudes and therefore a smaller success

rate of implementation. Teachers need to feel they are a part of the process in the adoption of co-teaching. When teachers are allowed to give their input on issues such as who will work together and who will be more suited to have special education students in their classroom then attitudes tend to be more positive. This makes it more likely that the program will be successful.

Being given the proper support is another factor that has been identified as being important when trying to successfully implement co-teaching in a school system. DeSimone and Parmar (2006) found that teachers needed the support of their school's administration. Many teachers do not feel that they receive the proper support from their administration because they do not have time to plan together with their co-teacher. The general education teachers often feel they are not qualified to work with SWD because they have not received any in-service training or college courses to prepare them for co-teaching. Teachers feel that their administrators do not know enough themselves in order to understand how much work and preparation is needed in order to teach an co-teaching class effectively.

According to Leonard and Smith (2005) common planning time is a key element to success with regards to teaching using the co-teaching service delivery model. A common planning time can help fill some needs in order to have a successful co-teaching program. The common planning time allows teachers the chance to work out the objectives they need to cover and what strategies and accommodations they feel will be successful in helping all students master the objectives. This includes identifying students who need more small group or individual instruction. Common planning also helps teachers to develop a sense of teamwork. Smith and Leonard found that teamwork and having shared goals were foundations that needed to be in place in order for co-teaching to work. Murawski & Hughes (2009) state that common planning time used properly can make co-teaching a very successful tool that will reach the

needs of all students. Time to plan together also helps alleviate another of the problems that can be encountered when using co-teaching in a school. Teachers are often unsure of the roles they are to fill during the time they will be working together. Isherwood and Barger-Anderson (2008) report that special education teachers feel they are being reduced to the role of paraprofessional in some cases. In other instances, they feel unqualified to help teach the subject matter being presented in class. The special education teachers become frustrated by being an assistant all the time and not knowing exactly what role they should play in the classroom. The general education teachers feel they do not have adequate training to effectively help the students who are in special education. In some cases the general education teachers start feeling like they are teaching the students and the co-teacher because they do not have enough content knowledge to be of any help.

### **Benefits of Co-teaching**

The benefits of using co-teaching as the service delivery model of special education extend to the SWD and the general education students as well. Special education students benefit socially and academically from the co-teaching situation. They benefit socially from being able to participate in classes with their general education peers. In this type of situation, they are able to find peers to work cooperatively with and to see appropriate behavior modeled by some of their peers. Special education students get exposed to the curriculum that the general education students are exposed to. This will serve them by helping them reach their full potential as students. Cole, Waldron, and Majd (2004) found that SWD made better grades on both class work and standardized tests than students served in a pull-out resource classroom. Waldron and McCleskey (1998) found that this higher achievement extended to both reading and math. Murawski (2006) also found that SWD showed an increase in achievement in reading and

mathematics. These students also demonstrated the social benefits of co-teaching in that they came to school more regularly and had fewer behavior problems when compared to SWD who were served in the resource classroom. Murawski and Swanson (2001) found that SWD served in the co-teaching environment had positive social interactions and displayed fewer behavior referrals.

Both special and general education students benefit from the situation in that they both have two certified teachers working with them in the classroom and this allows them more time for one-on-one interaction with a teacher. The general education students also benefit both academically and socially from the co-teaching experience. Fontana (2005) found that both students with and without disabilities made significant gains in reading and math. Welch (2000) also found that students without disabilities from a co-teaching environment made significant gains in reading skills. They are given the opportunity to experience working with a diverse population of peers which will probably serve them in the future when they are in an employment situation. Many times general education students peer tutor the SWD and this gives them an opportunity to gain a deeper understanding of the content by sharing and explaining their understanding of the content.

### **Co-teaching in Middle School**

Magiera and Zigmond (2005) conducted a study to examine instructional practices for SWD and students without disabilities in the middle school grades during a normal school day. Their study included four middle schools located in Western New York. One aspect of the educational day, the researchers were looking at was how much one-on-one time SWD received during the time the special education teacher was present and how much one-on-one time they received when the special education teacher was not present. SWD did receive more interaction

when the co-teacher was present, but not to a statistically significant level, and these interactions tended to be with the special education teacher and not the general education teacher (the content specialist).

Magiera and Zigmond (2005) state that in the classrooms they observed students, especially SWD, were not receiving more interaction with the teachers. A smaller student to teacher ratio with more one-on-one interaction is supposed to be one of the positive outcomes of co-teaching. This was not one of the observed outcomes in their study. The researchers did point out that their observations were taking place in schools where the teachers had not received training in the implementation of co-teaching. These researchers felt that according to their findings that co-teaching as they had observed it in these schools did not show any significant additive effect.

Conderman (2011) looked at a middle school co-teaching team that was working under ideal conditions. They had both received training in implementing co-teaching strategies. They met together as a team before the school year started and decided they would plan instruction together purposefully. Their planning included discussing each other's strengths and weaknesses. The teachers also talked about issues such as discipline and a schedule for both formative and summative assessment. As the school year progressed this team used a mixture of the co-teaching strategies and they both participated in the actual instruction of the students. The content teacher was not solely responsible presenting material. Under these ideal conditions, Conderman(2011) reports that students in this co-taught classroom enjoyed increased achievement. The students also reported that they enjoyed attending this class and they liked having two teachers who could answer questions and present content. The students were also positive about classroom discipline. Students indicated that having two teachers cut down on the

amount of discipline problems and that made the classroom more enjoyable. This seems to show that co-teaching at the middle school level can be successful in ideal conditions.

Dieker (2001) conducted a study in order to identify the characteristics of effective middle and high school co-teaching. The teams Dieker (2001) used in the study consisted of seven middle school and two high school co-teaching teams. These teams used a variety of the co-teaching models in their classrooms. The most used models were the one teach and one observe model and the team teach approach. Next, the author tried to identify what practices the co-teaching teams employed. These practices went beyond looking at the models the teams used. The researcher identified six practices that were common to each of these teams. The first practice was creating a positive climate. Dieker (2001) does stipulate that all the teams in this study did volunteer to co-teach and were not thrust into the role without any say so in the matter. It was noted that the positive learning environment was achieved through the use of peer support, use of positive words and attitudes by the teachers and by making a variety of special education services available in case SWD needed to be moved to a more restrictive environment temporarily.

The next practice noticed was a positive perception of co-teaching by the members of each team. Members of the team were considered to be the teachers and the students. Students in all of the teams who were interviewed expressed they were receiving positive benefits from having two teachers in the classroom. The teachers also felt that the students were benefitting from the use of co-teaching. They also expressed the feeling they were growing professionally as well.

Two other related practices noted were the use of active learning and using different methods to assess student learning. Observations showed that instruction was not just limited to

paper and pencil assignments. Hands-on student centered activities were used more often in these classrooms. While these types of activities require more planning to execute, the teachers felt it was easier to make accommodations using student involved active learning. The different methods of assessing learning were often based on both academic and social performance in the classroom. One concern in the area of assessment was that what was being assessed was not always directly linked to the IEP of the SWD.

The practice of having high expectations for academics and behavior was also noted in each of these classrooms. These expectations, both academic and behavioral, were posted in seven of the nine classrooms participating in the study. When students struggled to reach the expectations, the teachers worked to make sure that the struggling students were successful. It was noted that where more severely disabled students were included, a parallel curriculum was created in order to serve them.

Finally, common planning time was identified as one practice that all of the classrooms had in common. The average planning time for each team was 45 minutes per week. These teachers did indicate they would like to have more time to plan together. They also stated that other factors did get in the way of their planning time together from time to time and this made it more difficult to plan effectively. Dieker (2001) felt that when each of these areas of practice was addressed, there was a higher likelihood of success for both students and teachers in co-taught classrooms.

Students in the middle school grades (traditionally grades six through eight) place a great deal of importance on developing friendships and relationships with other students so they will have a feeling of being accepted by their peers. This applies to both SWD and students without disabilities. Co-teaching environments can help students meet a wider range of students and give

them a chance to develop their social skills and acceptance of others. The co-teaching environment also offers students the chance to develop more confidence in their academic achievement. SWD will benefit from being exposed to the general education curriculum as well as receiving help from peers who do not have similar learning problems. Students without disabilities are able to gain a deeper understanding of the content as they help the SWD understand and apply concepts. Finally, both groups, SWD and students without disabilities, will be exposed to different teaching methods. These methods include more hands-on learning and another perspective on the curriculum because they are working in a classroom with two teachers. (Orfano, 2011, and Katz & Mirenda, 2002).

### **Co-teaching in Math**

With the advent of NCLB, the development, the reauthorization of the IDEA, and finally the development of CCRPI, more pressure has come to bear on schools to find more effective ways to teach math. SWD are currently being included in the general education math classes and teachers need new approaches to reach these students. In middle and high school math instruction is more content specific and difficult to learn than math in lower grade levels. Due to the specialized nature of mathematics in these grades, teachers need more specialized knowledge in order to teach content. These teachers have not had much training in how to reach SWD. This is the ideal environment for the use of co-teaching since the general education teacher and the special education teacher will be able to blend their knowledge in order to help meet the needs of the diverse students in the class. According to Magiera, Smith, Zigmund, and Gebauer (2006), this partnership also allows more time for formative assessment and then analyzing the data gained from assessment. This will help the teachers to develop more effective lessons.

DeSimone and Parmar (2006) found that teachers in math classes that utilized co-teaching as the service delivery model were comfortable using co-teaching strategies presenting the students a number of different concepts. The teachers felt that the co-teaching models were effective ways of breaking down the workload and between the two teachers and using the smaller groups made it easier to instruct students who were at different levels of comprehension. Magiera, Smith, Zigmund, and Gebauer (2006), state that the co-teaching partnership is beneficial in mathematics education. The approaches to co-teaching that put students in smaller groups allow the two teachers involved to monitor student work more closely and provide more opportunities for one-on-one instruction. Breaking the students into smaller groups also will also allow the teachers to focus more on the concepts and language connected to math and not just the procedures used in math to solve problems. According to a study conducted by Fontana (2005), students in middle school co-taught math programs showed significant gains in achievement from seventh to eighth grade. The author noted that co-teaching is an effective way to improve the achievement of students with learning disabilities in the areas of math and reading.

### **Effectiveness of Co-teaching**

According to Hanover (2012), stakeholders in the educational field have been reluctant to embrace co-teaching based on the lack of empirical evidence showing that co-teaching is in fact an effective way to provide instruction to students. The studies on co-teaching have more often than not concentrated on the emotional outcomes that are linked to SWD being taught in a co-taught environment. There simply is not much quantitative data showing that co-teaching is an effective service delivery model. Hanover (2012) also states that co-teaching is not an educational concept that lends itself to uniform, consistent research. The implementation of co-teaching is done differently from state to state, district to district, and school to school.

Friend and Hurley-Chamberlain (2011) state that it is still not evident if co-teaching is a viable service delivery model for SWD. Practitioners in education have not even been able to come up with a definition of what co-teaching is. The term co-teaching has been assigned to situations where more than two educators are working together in a classroom. This could be a teacher working with a paraprofessional, speech teacher, special education teacher, or English as a second language teacher. These authors feel that much of the literature that has been written on co-teaching has focused on strategies for implementing co-teaching and explanations on what co-teaching is. The studies in the literature tend to look at the opinions of students and teachers on how effective they feel co-teaching is. The findings of these studies show that students generally have a positive attitude toward co-teaching. The teachers and administration who have participated in these studies have given mixed responses. Some feel that co-teaching is important and can be effective. However, these same teachers and administrators are concerned about how they will be able to implement co-teaching. The concerns that are noted have to do with planning time, implementation, and the roles that each teacher will play in the teaching of content. These concerns normally stem from the high-stakes testing that are used to evaluate school performance. There is a lack of research that shows whether or not SWD achieve on a level commensurate with or higher than their peers.

Murawski and Swanson (2001) conducted a meta-analysis of the research that looked at the effectiveness of co-teaching. These researchers did not find much in the way of compelling evidence that co-teaching might be an effective means of delivering instruction to students. Murawski and Swanson (2001) only found six studies out of 89 that gave enough information to help them form an effect size to study. The results of their meta-analysis showed that co-teaching was more commonly used in elementary and middle schools. They also found that

greater achievement was noted in the subject areas of language arts and reading. This was followed by moderate improvement in the area of mathematics. Their findings suggested that co-teaching has a low-effect size for helping students in areas regarding social interactions, self-concept, and acceptance of peers.

Hines (2001) states that even though legislation is pushing for the use of co-teaching in school settings, the foundation for co-teaching is not based in research. Rather the proponents for co-teaching push it because it is the right thing to do. Hines (2001) mentioned several positive outcomes for co-teaching. These included higher academic achievement for students without disabilities. These students also experienced positive social outcomes as well. However, these findings were based on more anecdotal evidence than quantitative studies that involve experimental and control groups.

### **Opponents of Co-Teaching**

Opponents of co-teaching or inclusion as some call it have pointed to many different problems that exist with this service delivery model. One of the most mentioned problems in the research is what roles the teachers play in the co-teaching partnership. (Weiss and Lloyd, 2002; Watlther-Thomas, 1997) The roles teachers play seem to differ from classroom to classroom. Weiss and Lloyd (2002) found that the role of some of the special education teachers in their study played was that of a classroom aid. The special education teachers do not take much of a role in the actual instruction in the classroom. The special education teachers felt they did not have the content knowledge in order to lead an effective classroom discussion and effectively answer questions on the subject. These teachers spent the majority of their time in the classroom circulating during direct instruction attempting to explain and answer student questions. One of the general educators described the role of one of the co-teachers (special education teacher) he

worked with was taking care of discipline problems, grading papers and not much more. The special education teacher eventually stopped showing up for class after awhile.

Weiss and Lloyd (2002) also described a situation in which the teaching partners decided it would be more effective if they taught the class in separate rooms. They described the arrangement as more beneficial for some different reasons. One reason given was the reduction of noise and distractions in the classroom. The teachers felt they could give more time and attention to individual students with this arrangement instead of having all students in the class at the same time. This seems to be moving away from the co-teaching model, but the teachers saw reported better results and higher student achievement with this arrangement. While this arrangement worked best for this pair, it may not be an option for other co-teaching pairs because one of the requirements of NCLB is that highly qualified teachers provide instruction to the students. (United States Department of Education website, 2005) Not all special education teachers are content experts who can take a class and provide them instruction in a setting away from the general education teacher. This is one of the reasons schools have started going to co-teaching. So that the special education teachers do not have to receive further training or take further classes in order to become content specialists so they are fulfilling the NCLB mandate to be highly qualified. Therrien and Washburn-Moses (2009) state that special education teachers who are teachers of record in content classes have to receive additional training and licensure.

The issue of the roles of teachers also brings forward another issue opponents of co-teaching feel is important. Are students getting the specialized instruction and individual attention they need in order for them to be successful in class? In their study, Magiera and Zigmond (2005), found that SWD in co-teaching environments had less interaction with the general education (content specialist) if the special education teacher was in the room. Their

study also showed that the majority of the interactions the students received with the special education teacher was when the special education teacher walked around the room during whole group lecture or instruction while the general education teacher was lecturing. Magiera and Zigmond (2005) did not find that the presence of the co-teacher in the general education classroom cut down the student to teacher ratio as it was supposed to since the majority of the instruction was actually supplied by the general education teacher in a whole group lecture format.

These findings lead us to wonder if co-teaching or inclusion is really giving students the specialized instruction they need in order to be successful. One of the strong selling points of co-teaching is that the classroom has two certified teachers working with students at the same time and therefore the students to teacher ratio should be cut in half and students should be getting more specialized instruction. Weiss and Lloyd (2002) did not find much evidence supporting the claim that the decreased student to teacher ratio was very effective. In their observations, they found the special education teacher was not very active in actually giving instructional assistance to the students when it came to questions about the content being presented. The special education teachers were more likely to be giving explanations about the expectations for assignments, rules to games about to be played. In some instances, the special education teachers gave instruction to the class, but this was not the norm. The authors noted that when students were broken into smaller groups they did not get a lot of communication with their peers or their teachers. The researchers also did not note a great deal of extra direct instruction by the teacher or a high incidence of student-teacher questioning. Scruggs, Mastropieri, and McDuffie (2007) also found evidence that the special education teachers in co-teaching settings spent more

time doing administrative tasks and maintaining discipline than they did actually providing instruction, so they did not find much evidence of the decreased student-teacher ratio.

SWD educational programs should be driven by an IEP. The IEP should state what specialized instruction they should be receiving and where the instruction should take place. The IEP calls for instruction in the LRE possible. Opponents of inclusion feel that school systems across the nation have started adopting the attitude that placing SWDs in the general education classroom and using the co-teaching model for instruction is becoming the only choice possible for in terms of the LRE. (Kauffman and Hallahan, 1997) In the current climate where co-teaching or inclusion is the model many educators are pushing for serving SWD, the LRE is not being considered. However, IDEA mandates that a full range of services should be offered and considered before choosing where the LRE is for SWD. These services range from placement in special schools to self-contained classes to the general education classroom. With the advent of co-teaching many services have stopped being considered or even offered. SWD who are considered to have learning disabilities or mildly intellectually disabled may have success in the general education classroom, but students with more complex problems such as emotional or behavioral disorders may not find as much success. Kauffman (2010), states that students who have been identified as having emotional and behavioral disorders need to be taught the curriculum and also they need to be taught how to behave properly. He feels that when students with emotional and behavioral disorders have success in one area such as academics it will lead to more success in other areas such as behavior and vice versa. Kauffman (2010) feels that it is not fair to these students to feel that they can receive the service they deserve in a general education setting with teachers who have had no special training to accommodate these students. Not only is it unfair to these students, it is also unfair to the general education students and the

teachers who have not been trained to educate this special population of the school. These students do not just need to be taught academics and behavior, but they need special instruction in both of these areas. If this were not the case then the general education teacher would be able to supply these students' with the appropriate instruction.

Even after years of serving SWD in the general education classroom, there is little evidence beyond interviews and surveys of teachers and students as to how effective they feel co-teaching is. Kavale and Forness (2000) state that the proponents of co-teaching SWD in the general education classroom pursued their vision for this change in how students are taught without any empirical evidence to go on. These authors also feel that there is still a lack of empirical evidence to continue co-teaching as a service delivery model. The proponents seem to be operating from the point of view that co-teaching is just the right thing to do. Kavale and Forness (2000) warn against continuing with inclusion just because it seems right and just. They suggest more research is needed because the small amount of research that has been conducted on student achievement in co-teaching situations has yielded mixed results. These authors state that we should make sure that the policy that guides co-teaching should be followed with care and evaluated in order to make sure co-teaching is the right direction to take in special education.

Kilanowski-Press, Foote, and Rinaldo (2010) point to the lack of uniformity of inclusive practices from state to state all the way down to the differences in schools in the same district or classrooms in the same school as a problem that needs to be addressed. Very basic questions need to be answered. How many students should be in a co-teaching environment? What should be the ratio of SWD to general education students? The authors state that the lack of uniformity in the implementation of co-teaching or inclusion make it hard to say with any certainty what the best practices actually are. This tends to frustrate the general education teachers that are

expected to implement co-teaching in their classrooms. This can lead to resentment from the general education teachers toward special educators and make it difficult for them to work effectively together in the co-teaching environment. These authors suggest that future research into co-teaching should focus on best practices so they can more easily duplicated from state to state and so on.

### **Summary**

Inclusion has become the service delivery model of choice that school systems throughout the state of Georgia are using to teach SWD. This has led to more and more general education teachers working in classrooms in that include SWD. This change in service delivery has also put many special education teachers in the general education classroom assisting the general education teacher. The joining of these two different disciplines in one classroom has left teachers with questions as to how effective this practice can be. These teachers also question how to best merge their expertise in order to effectively serve the students in their charge. As systems continue to employ co-teaching, more research needs to be conducted in order to find all the benefits that come from co-teaching for both the general and special education students. An increase in training also needs to come with the increase in the number of students who are served using the co-teaching model.

## **CHAPTER THREE: METHODOLOGY**

### **Introduction**

The passage of P.L. 94-142 and its reauthorizations in 1990, 1997, and 2004 have changed the way SWD are educated. These students can no longer be excluded from schools or general education classrooms because of their disabilities. According to the law, they must be educated in the LRE. (Hardman and Dawson, 2008) However, parents and educators are reticent about including SWD in the general education classroom, due to the fear that SWD may negatively impact the performance of the students without disabilities. (Kimbrough & Mellen, 2012) The purpose of this quantitative study is to examine the achievement outcome; as measured by the CRCT, of the co-teaching model on general education and special education students, specifically taught in a co-taught seventh grade math classroom. This chapter provides an explanation of the methodology utilized by the author in order to carry out the study. In this chapter the reader will find an explanation of the design of the study, data collection, and data analysis protocols employed to find the sought after information. The causal-comparative design used student test data from the CRCT math portion to help measure whether or not co-teaching had an impact on the students' math achievement.

### **Research Design**

The research design that was chosen for this study is the Causal-Comparative Research (Ex Post Facto). According to Brewer and Kuhn (2010), causal-comparative research is a type of non-experimental investigation in which researchers try to find relationships between independent and dependent variables after a treatment or event has already occurred. In Causal-Comparative Research, the independent variable is hard to or unethical to control. In many cases the independent variable has already happened.

This Causal-Comparative design is well suited for this study since the researcher is seeking to discover if there is an effect caused by being taught in a certain type class structure. The researcher wants to investigate whether or not there is a difference in performance on the math subsection of the 7<sup>th</sup> grade CRCT between general education students who receive math instruction in a co-taught classroom as opposed to general education students who receive math instruction in traditional classroom settings.

The researcher is investigating whether or not math classes that involve co-teaching provide positive achievement outcomes for general education students. The most appropriate way to design a study would be to investigate the achievement outcome for general education students taught in co-teaching environments and achievement outcomes for general education students taught in traditional classrooms.

Causal-comparative research does offer some of the elements of experimental design, but students are not randomly assigned to control and experimental groups. The researcher will provide evidence that controls are being offered in order to improve the control of any external variables that could possibly affect the dependent variables, (Lodico, Spaulding, and Voegtle, 2010) In this study, the independent variable of co-taught and traditional classrooms can be controlled. However, the dependent variable of math achievement as measured on the math sub-test of the 7<sup>th</sup> grade CRCT cannot be controlled.

One of the limitations of causal-comparative research is that since groups are not randomly assigned and variables cannot be manipulated, the researcher cannot often prove causality. The researcher can infer that one variable caused the effect, but without randomization and control of the independent variable, the researcher cannot say definitively there is causality. For example, if the researcher finds that students receiving instruction in the co-taught classroom

achieve higher than students who do not receive instruction in the co-taught classroom it could be found that the students in the co-taught classroom had a better support system at home or were more motivated in the first place. (Airasian and Gay, 2010).

The study will be comprised of several sets of co-taught seventh grade math classrooms serving as the experimental group as well as several sets of traditionally taught(classrooms that are not co-taught) classrooms serving as the control group. All students will be in the seventh grade and represent several elementary schools in a southeastern state. The researcher is proposing to look at student's academic achievement in math as it is affected by co-taught and traditional classrooms. The researcher wants to determine if there is a difference in the achievement of seventh grade math students who receive instruction in the co-taught classroom when compared to seventh grade math students who receive instruction in the traditional classroom.

### **Research Questions and Hypotheses**

The research questions posed for this project include the following:

**RQ1:** Does co-teaching in the seventh grade general education math classroom impact the achievement of general education students as measured by the math subtest of the Criterion Referenced Competency Test?

**RQ2:** To what extent does co-teaching in the seventh grade math classroom impact the achievement of general education students as measured by the math subtest of the Criterion Referenced Competency Test when comparing students based on gender?

**RQ3:** To what extent does co-teaching in the seventh grade math classroom impact the achievement of general education students as measured by the math subtest of the Criterion Referenced Competency Test based when comparing students based on ethnicity?

**RQ4:** Does co-teaching in the seventh grade general education math classroom impact the achievement of special education students as measured by the mathematics sub-test of the Criterion Referenced Competency Test?

In order to evaluate the achievement outcomes of the students, a causal-comparative group design has been chosen. The purpose of this study is to evaluate whether or not co-teaching is effective in seventh grade math classrooms, therefore the researcher has posed the following hypotheses for study:

**H<sub>01</sub>:** There will be no difference in the achievement of seventh grade general education students taught using co-teaching and general education students taught in the traditional classroom.

**H<sub>02</sub>:** There will be no difference in the achievement of seventh grade general education students taught using co-teaching based on gender.

**H<sub>03</sub>:** There will be no difference in the achievement of seventh grade general education students taught using co-teaching based on ethnicity.

**H<sub>04</sub>:** There will be no difference in the achievement of special education students in the co-taught classroom on the mathematics sub-test of the CRCT as compared to the general education students in the 7<sup>th</sup> grade mathematics co-taught classes.

### **Participants**

The number of schools that utilize co-teaching classrooms as a service delivery model continues to increase. This includes many different grade levels as well as many different subject areas. The widespread employment of co-teaching has led to a great number of students being served in co-taught classrooms. Since these numbers of students and subject areas would make a concise study very difficult, the researcher has chosen to focus on students being taught

math in co-taught classrooms in the seventh grade. The students will be chosen from a middle school located in southeastern Georgia. The middle schools have a population of approximately 3600 students. About 1000 of these students are in the seventh grade. The researcher proposes there will be 500 general education students in the sample for the study. 250 students will be chosen from the co-taught classrooms (experimental group) and 250 will be chosen from the traditional classroom (control group). For the fourth research question, the researcher will select a group of 50 SWD from the four schools and check the growth they achieve according to CRCT scores as compared to the growth achieved by 50 of their classmates that are considered general education students who do not have disabilities. The researcher will follow the appropriate steps in order to protect the privacy of the students, faculty, staff, and school involved in the study.

### **Setting**

The selection of the setting of this study is predicated on the need to find effective strategies to increase student achievement as measured by the CRCT. In the state of Georgia schools and school systems are required to make AYP. Adequate yearly progress has been measured by how the school as a whole and different individual sub-groups score on the CRCT. Mathematics has been a subject area on the CRCT that has prevented middle schools from making AYP. CCRPI will continue to use scores from the CRCT to evaluate the progress the schools are making in reaching educational goals. SWD have also been identified as sub-group in which the scores on the mandated standardized test fail to meet minimum passing criteria. These two factors are what led the researcher to choose a middle school in South Georgia that utilizes co-teaching as way of including SWD the general education classrooms. The seventh grade population and its CRCT achievement data will be used in this study. The researcher chose the participating schools based on their geographic location, as well as the uniformity in

curriculum development, curriculum presentation, and training for co-teaching for all teachers involved in the study.

### **Instrumentation**

The Georgia CRCT will be used to measure student achievement for both the pre and posttest in this study. The CRCT is administered once a year in the state of Georgia to students in grades one through eight to determine students' knowledge of concepts and skills as set forth in the state's curriculum. Presently this curriculum is known as the Georgia Performance Standards. The test provides educators with information on each student's progress on the Georgia Performance Standards each school year. In third grade, CRCT results on the reading section of the test are used as a means of either promoting or retaining students. In the fifth and eighth grade, the results from the reading and mathematics sections of the CRCT are used as a criterion for either promoting or retaining students (Georgia Department of Education, 2010).

According to the Georgia Department of Education website (2010), development of the CRCT began in 1998. The Georgia Department of Education originally developed criterion referenced tests for the subjects of reading, math, and English/language arts. These tests were administered to fourth, sixth, and eighth grade students. Two years later the Department of Education (DOE) had a test developed that would evaluate students in grades one through eight. The test also included the subjects of science and social studies.

Test items are designed by professional test item writers and then go through a review process. According to the DOE website (2010), each item is reviewed by a committee of teachers and administrators to determine its appropriateness. Each item is reviewed at least once and some as many as three times. After going through the committee review process, items are field tested by being placed on a test that is actually being administered. Field test items do not

count for or against the student's actual score on the test. Following the field test, each item's effectiveness is reviewed again by a committee of educators to determine its appropriateness. Items that pass each level of review and field testing can then be added to the CRCT.

The CRCT is administered once per school year in the spring (April/May). The DOE determines a testing window for the state. Each school district then chooses an eight day period in which to administer the test. Certain situations allow for retesting of students outside this window. Each subject area test of the CRCT is divided into two subtests. The CRCT is administered using a scripted manual. Scores for the CRCT are determined based on the number of questions answered correctly in each subject area (raw score). The raw score is then converted into a CRCT scale. Scale scores are equivalent across different forms of the test within the same content area and grade. Therefore students who get the same score are showing the same level of performance with respect to the Georgia Performance Standards. Scale scores are classified in the following manner. A scale score of below 800 would indicate the student Does Not Meet the Standard (Level 1) set for the test. A scale score in the range of 800-849 would indicate the student Does Meet the Standard (Level 2) set for the test. A scale score of 850 or greater would indicate the student Exceeds the Standard (Level 3) set for the test. The minimum score to meet the standard for the test is a score of 800 (Georgia Department of Education, 2010).

According to Ary, Jacobs, Razavieh, and Sorensen (2006) validity is the most important factor to consider when creating a measuring instrument. If the instrument does not measure what it is supposed to measure it is useless. Validity is also important when it comes to interpreting the scores one acquires from a measure. Reliability focuses on how consistently an instrument measures what it is supposed to measure. The developers of the CRCT worked hard

to insure the test was both valid and reliable. According to the Georgia Department of Education website (2010), the reliability of the math subtest of the CRCT ranges from .89 to .90, which would seem to indicate the test is a reliable measure. Items for the CRCT are written by professionals who are trained in the process of writing standardized test items. Items also go through a review process before they are added to a test for actual administration. (see the Instrumentation section).

### **Procedures**

The researcher will need to obtain IRB approval before conducting any research. The researcher will then need to obtain permission from the involved school systems in order to conduct the proposed research. The researcher will gain permission from the school administration in order to review class rosters and each student in the classes' CRCT results for the 2011-2012 and 2012-2013 school years. The researcher will use the CRCT results and find a sample of 100 students from the co-taught classes to use as the experimental group, and 100 students from the traditional classes to use as the control group. These 200 students' 2011-2012 CRCT math test scores will be used as a pre-test measure. Data from the 2012-2013 CRCT math test scores will then be analyzed and the results of the findings will be reported in chapters four and five of this dissertation. To insure that the students in each group are similar in math achievement, the researcher will make sure the two groups have similar means on the math section of the CRCT. Any scores that are considered outliers that affect the mean will be thrown out to achieve more closely matched groups. All test scores that are obtained will be kept strictly confidential. CRCT scores that are received will be assembled in an anonymous format since the researcher does not need individual student names attached to statistical measures.

## Data Analysis

The initial step in the data analysis will be the computation of descriptive statistics such as means and standard deviations for the math CRCT scores of each comparison group (seventh grade general education students taught using co-teaching, seventh grade general education students taught using traditional, and seventh grade special education students taught using co-teaching). The second step in data analysis will be to conduct a Levene's test on the means of the selected students' CRCT scores to check for homogeneity of variance. The third step will be to perform t-tests to determine 1) if the true mean CRCT scores differ between seventh grade general education students taught using co-teaching and seventh grade general education students taught using traditional (hypothesis 1); 2) if the true mean CRCT scores differ between the male and female general education students taught using co-teaching (hypothesis 2); 3) if the true CRCT mean scores differ between the African American, Hispanic, and Caucasian students taught using co-teaching (hypothesis 3) and 4) if the true mean CRCT scores differ between seventh grade special education students taught using co-teaching and seventh grade general education students taught using co-teaching (hypothesis 4). The third step will be to use an analysis of covariance (ANCOVA) to adjust the differences in the group means for extraneous differences among the participants. The covariate used for the analysis will be sixth grade CRCT math scores. The researcher hopes that using sixth grade CRCT scores in the ANCOVA will make the two groups as equal as possible. This examination will give the researcher information needed to accept or reject the null hypotheses.

## **Chapter Four: Findings**

### **Introduction**

The purpose of this quantitative study is to examine the achievement outcome; as measured by the CRCT, of the co-teaching model on general education students, specifically taught in a co-taught seventh grade math classroom. This study also examined the achievement of SWD compared to the achievement of the general education students who were instructed in co-taught settings. This will help give educators quantitative data in order to evaluate the effectiveness of co-teaching. This will help stakeholders in education decide if co-teaching is an effective tool in delivering math instruction.

This chapter contains information on the data collected from four southeast Georgia middle schools. The data came from the archived CRCT scores from approximately 600 seventh grade students. The participants selected for research questions one, two, and three consisted of 502 students who were compared based on grade level and scores they achieved on the 7<sup>th</sup> grade math subsection of the CRCT in 2013. Statistical analysis was used to insure that the variance for both groups was equal. Following the test of variance, the data were analyzed using an independent, two-tailed t-test to examine the differences between the observed means from the 2013 CRCT scores. Next, an analysis of covariance was used to adjust for differences in the groups that could bias the comparison. The 2012 sixth grade CRCT score was the covariate used in the ANCOVA analysis. The participants selected for research question number four consisted of 50 general education students who received math instruction in the co-taught environment who were matched one-to-one with 50 special education students who received math instruction in the co-taught environment based on their scores from the 6<sup>th</sup> grade math subsection of the 2012 CRCT. These groups' 2013 CRCT scores were used to determine if one group scored

statistically significantly higher than the other group. This analysis was accomplished using a two-tailed t-test assuming equal variances followed by an ANCOVA.

### **Research Questions**

**RQ1:** To what extent does co-teaching in the seventh grade math classroom impact the achievement of general education students as measured by the math subtest of the CRCT?

**RQ2:** To what extent does co-teaching in the seventh grade math classroom impact the achievement of general education students as measured by the math subtest of the CRCT when comparing students based on gender?

**RQ3:** To what extent does co-teaching in the seventh grade math classroom impact the achievement of general education students as measured by the math subtest of the CRCT based when comparing students based on ethnicity?

**RQ4:** To what extent does co-teaching in the seventh grade math classroom impact the achievement of special education students in 7th-grade co-taught mathematics classes when compared to general education students in the co-taught classroom?

### **Hypotheses**

**Ho1:** There will be no difference in the achievement of seventh grade general education students taught using co-teaching and general education students taught in the traditional classroom.

**Ho2:** There will be no difference in the achievement of seventh grade general education students taught using co-teaching based on gender.

**Ho3:** There will be no difference in the achievement of seventh grade general education students taught using co-teaching based on ethnicity.

**Ho4:** There will be no difference in the achievement of special education students in the co-taught classroom on the mathematics sub-test of the CRCT as compared to the general education students in the 7th grade mathematics co-taught classes.

### **Data Analysis**

#### **Research Question One**

*To what extent does co-teaching in the seventh grade math classroom impact the achievement of general education students as measured by the math subtest of the CRCT?*

#### **Descriptive Statistics**

Research question number one included results from 502 seventh grade students (263 students from the control group and 239 students from the experimental group). In order to answer Research Question 1, it was necessary to statistically analyze the CRCT scores for the general education students taught in the traditional classroom (control group) and the general education students in the co-taught classroom (experimental group). The independent variable was the classroom setting and the dependent variable was student achievement as measured by the math subtest of the CRCT. The initial analysis was to calculate the mean and standard deviation for the control and experimental groups' 2012 CRCT scores. The observed mean for the control group was (Mean=849.6, SD=28.94) and the experimental group (Mean=830.85, SD=23.23). See table 4.0 below.

**Table 4.0**

*Observed Mean and Standard Deviation-Spring 2012 CRCT*

| <b>Class</b> | <b>Number</b> | <b>Mean</b> | <b>Standard<br/>Deviation</b> |
|--------------|---------------|-------------|-------------------------------|
|              |               |             |                               |

|                    |            |               |              |
|--------------------|------------|---------------|--------------|
| <b>Traditional</b> | <b>263</b> | <b>849.6</b>  | <b>28.94</b> |
| <b>Co-taught</b>   | <b>239</b> | <b>830.85</b> | <b>23.23</b> |

### **Analysis**

Before further analysis on the 2013 CRCT mean scores was completed, Levene's test for homogeneity of variance was used to determine if the variances between the 2012 6th grade scores were equal. The original Levene's test yielded  $F_{.05}(2, 500) = 9.55, p < .0021$ . This finding led the researcher to believe that further statistical analysis on the samples would not be feasible since less than 1% of the variance could only be attributed to chance. In such cases the literature suggests that trimming the sample of any outliers may be an acceptable solution depending on the judgment of the researcher. (Warner, 2013) According to Osborne and Overbay (2004):

Outliers can have deleterious effects on statistical analyses. First, they generally serve to increase error variance and reduce the power of statistical tests. Second, if non-randomly distributed they can decrease normality (and in multivariate analyses, violate assumptions of sphericity and multivariate normality), altering the odds of making both Type I and Type II errors. (p.1)

The literature suggests one method for removing outliers is to trim a certain portion of the top and bottom of the sample. (Warner, 2013; Osborne and Overbay, 2004) In this case scores that were two standard deviations above and below the mean were trimmed from the samples. This changed the size of the overall sample and the individual samples. The overall sample was trimmed from 502 students to 476 students. The control group was trimmed to 247 scores

(Mean-846.77 and standard deviation-24.04) and the experimental group was trimmed to 229 scores (Mean-830.34 and standard deviation-20.98) See Table 4.1 below

**Table 4.1**

*Trimmed Mean and Standard Deviation-Spring 2012 CRCT*

| <b>Class</b>       | <b>Number</b> | <b>Mean</b>   | <b>Standard<br/>Deviation</b> |
|--------------------|---------------|---------------|-------------------------------|
| <b>Traditional</b> | <b>247</b>    | <b>846.77</b> | <b>24.04</b>                  |
| <b>Co-taught</b>   | <b>229</b>    | <b>830.34</b> | <b>20.98</b>                  |

The second Levene's test on the trimmed samples showed there was still a statistically significant difference in the means of the two groups. The Levene's test on the trimmed samples yielded the following results:  $F_{.05}(2, 474) = 6.43, p < .0115$ . The p statistic of .0115 showed that equal variance could not be assumed, so the researcher chose the independent two-tailed t-test assuming unequal variances. The t-test was conducted using an alpha level of .05. The independent variable was the classroom setting and the dependent variable was student achievement as measured by the math subtest of the CRCT. The observed t-statistic was 7.96 and the p-value was  $< 0.0001$ ; providing evidence that the means differed, specifically that the mean CRCT scores for the traditional environment were greater.

The t-test was followed by a one way ANCOVA to adjust for differences in the traditional and co-taught groups that could bias the comparison. The sixth grade CRCT score was the covariate used in the ANCOVA analysis. The adjusted mean for the control group was 840.06 and the adjusted mean for the experimental group was 837.58. The results of this

analysis show that there was not a statistically significant difference between the adjusted means of the two groups at  $\alpha = .05$  level,  $F(2,473) = 2.44$  and  $p = .118$ . See table 4.2 below.

**Table 4.2**

*ANCOVA-Spring 2012 CRCT-Adjusted Mean with F-statistic and p-value included*

| <b>Class</b>       | <b>Number</b> | <b>Adjusted Mean</b> | <b>F-statistic</b> | <b>p-value</b> |
|--------------------|---------------|----------------------|--------------------|----------------|
| <b>Traditional</b> | <b>247</b>    | <b>840.06</b>        |                    |                |
| <b>Co-taught</b>   | <b>229</b>    | <b>837.58</b>        |                    |                |
|                    |               |                      | <b>2.44</b>        | <b>.118</b>    |

The p-value yielded by the ANCOVA indicated that there was not a statistically significant difference between the 2013 CRCT mean scores for the traditional and co-taught groups. Based on these findings the researcher decided that the first null hypothesis (Ho1: There will be no difference in the achievement of seventh grade general education students taught using co-teaching and general education students taught in the traditional classroom.) should not be rejected.

### **Research Question Two**

*To what extent does co-teaching in the seventh grade math classroom impact the achievement of general education students as measured by the math subtest of the CRCT when comparing students based on gender?*

### **Descriptive Statistics**

Research question number two included results from 239 seventh grade students from the co-taught classrooms (137 female students and 102 male students). In order to answer

Research Question 2, it was necessary to statistically analyze the CRCT scores for the female students and the male students. The independent variable was gender and the dependent variable was student achievement as measured by the math subtest of the CRCT. The initial analysis was to calculate the mean and standard deviation for the female and male groups' 2013 CRCT scores. The observed means for the female group were (Mean=829.51, SD=23.11) and the male group (Mean=832.64, SD=23.37) . See table 4.3 below.

**Table 4.3**

*Observed Mean and Standard Deviation-Spring 2012 CRCT (Male and Female)*

| <b>Gender</b> | <b>Number</b> | <b>Mean</b>   | <b>Standard<br/>Deviation</b> |
|---------------|---------------|---------------|-------------------------------|
| <b>Female</b> | <b>137</b>    | <b>829.51</b> | <b>23.11</b>                  |
| <b>Male</b>   | <b>102</b>    | <b>832.64</b> | <b>23.37</b>                  |

### **Analysis**

Before further analysis on the 2013 CRCT mean scores was completed, Levene's test for homogeneity of variance was used to determine if the variances between the 2012 6th grade scores were equal. Levene's test was used to evaluate the students' 6th grade math sub-section CRCT scores for the male and female groups. Levene's test did not suggest a statistically significant difference in the means of the two groups. Levene's yielded the following results:  $F_{.05}(1, 237) = 1.22, p = .26$ . The p statistic of .26 showed that equal variance could be assumed, so the researcher chose the independent t-test assuming equal variances. A t-test (assuming equal variances between the groups) was used to compare the true CRCT means for male co-

taught and female co-taught students. The observed t-statistic was 1.09 and the p-value was 0.276; providing evidence that the observed means between the male and female groups did not differ.

The t-test was followed by a one way ANCOVA to adjust for differences in the male and female co-taught groups that could bias the comparison. The sixth grade CRCT score was the covariate used in the ANCOVA analysis. The adjusted mean for the male group was 831.33 and the adjusted mean for the female group was 830.49. The results of this analysis also suggested that there was not a statistically significant difference between the adjusted means of the two groups at  $\alpha = .05$  level,  $F(1,239) = 0.14$  and  $p = .708$ . See table 4.4 below.

**Table 4.4**

*Male and female-ANCOVA-Spring 2012 CRCT-Adjusted Mean with F-statistic and p-value included*

| <b>Class</b>  | <b>Number</b> | <b>Adjusted Mean</b> | <b>F-tatistic</b> | <b>p-value</b> |
|---------------|---------------|----------------------|-------------------|----------------|
| <b>Female</b> | <b>137</b>    | <b>830.49</b>        |                   |                |
| <b>Male</b>   | <b>102</b>    | <b>831.33</b>        |                   |                |
|               |               |                      | <b>0.14</b>       | <b>.708</b>    |

Based on these findings the researcher determined that the second null hypothesis (Ho2: There will be no difference in the achievement of seventh grade general education students taught using co-teaching based on gender.) should not be rejected.

### Research Question Three

*To what extent does co-teaching in the seventh grade math classroom impact the achievement of general education students as measured by the math subtest of the CRCT based when comparing students based on ethnicity?*

#### Descriptive Statistics

Research question number three included results from 218 seventh grade students from the co-taught classrooms ( 67 African American, 31 Hispanic, and 120 Caucasian students). In order to answer Research Question 3, it was necessary to statistically analyze the CRCT scores for the African American, Hispanic and Caucasian students. The initial analysis was to calculate the mean and standard deviation for the African American, Hispanic, and Caucasian groups' 2013 CRCT scores. The independent variable was ethnicity and the dependent variable was student achievement as measured by the math subtest of the CRCT. The observed means for the African American group were (Mean=829.11, SD=21.94), the Caucasian group (Mean=834.71, SD=23.89) and the Hispanic group (Mean=832.61, SD=20.55). See table 4.5 below.

**Table 4.5**

*Observed Mean and Standard Deviation-Spring 2012 CRCT (African American, Hispanic, and Caucasian)*

| <b>Ethnicity</b>        | <b>Number</b> | <b>Mean</b>   | <b>Standard Deviation</b> |
|-------------------------|---------------|---------------|---------------------------|
| <b>African American</b> | <b>67</b>     | <b>829.11</b> | <b>21.94</b>              |
| <b>Hispanic</b>         | <b>31</b>     | <b>832.61</b> | <b>20.55</b>              |
| <b>Caucasian</b>        | <b>120</b>    | <b>834.71</b> | <b>23.89</b>              |

## Analysis

Before further analysis on the 2013 CRCT mean scores was completed, Levene's test for homogeneity of variance was used to determine if the variances between the 2012 6th grade scores were equal. Levene's test was used to inspect the students' 6th grade math sub-section CRCT scores for homogeneity of variance among the three groups. Levene's test showed there was not a statistically significant difference in the means of the three groups. Levene's yielded the following results:  $F_{.05}(2, 215) = 1.002$ ,  $p = .368$ . The p statistic of .368 showed that equal variance could be assumed. An ANOVA was chosen over the t-test assuming equal variances since there were three samples to be compared at the same time. A t-test is not suitable for the analysis of three samples simultaneously. The ANOVA yielded a p-value of .11. This did not suggest a statistically significant difference between the three groups.

The initial analysis was followed by a one way ANCOVA to adjust for differences in the African American, Caucasian, and Hispanic groups that could bias the comparison. The sixth grade CRCT score was the covariate used in the ANCOVA analysis. The adjusted mean for the African American group was 830.47, the adjusted mean for the Caucasian group was 833.95, and the adjusted mean for the Hispanic group was 832.64. The results of this analysis show that there was not a statistically significant difference between the adjusted means of the groups at  $\alpha = .05$  level,  $F(2,214) = 0.94$  and  $p = 0.392$ . See table 4.6 below.

### Table 4.6

*African American, Hispanic, and Caucasian- ANCOVA-Spring 2012 CRCT-Adjusted Mean with F-statistic and p-value included*

| <b>Ethnicity</b> | <b>Number</b> | <b>Adjusted Mean</b> | <b>F-statistic</b> | <b>p-statistic</b> |
|------------------|---------------|----------------------|--------------------|--------------------|
| <b>Ethnicity</b> | <b>67</b>     | <b>830.47</b>        |                    |                    |
| <b>Hispanic</b>  | <b>31</b>     | <b>832.64</b>        |                    |                    |
| <b>Caucasian</b> | <b>120</b>    | <b>833.95</b>        |                    |                    |
|                  |               |                      | <b>.94</b>         | <b>.39</b>         |

Based on these findings, the researcher determined that the third null hypothesis (Ho3: There will be no difference in the achievement of seventh grade general education students taught using co-teaching based on ethnicity.) should not be rejected.

#### **Research Question Four**

*To what extent does co-teaching in the seventh grade math classroom impact the achievement of special education students in 7th-grade co-taught mathematics classes when compared to general education students in the co-taught classroom?*

#### **Descriptive Statistics**

Research question number four included results from 100 seventh grade students from the co-taught classrooms ( 50 students with disabilities and 50 general education students). In order to answer Research Question 4, it was necessary to statistically analyze the CRCT scores for the SWD and general education students. The students' were matched based on 6th grade scores (meaning for example a SWD with a score of 811 was matched with a general education student

with a score of 811 etc...) The initial analysis was to calculate the mean and standard deviation for the SWD and general education groups' 2013 CRCT scores. The independent variable was classification as SWD or not and the dependent variable was student achievement as measured by the math subtest of the CRCT. The observed means were as follows: the SWD group had a mean score of 808.04 and a standard deviation of 15.89 and the general education students group had a mean score of 812.46 and a standard deviation of 20.49. Following the initial analysis, a two-tailed t-test (assuming equal variances between the groups) was used to compare the observed CRCT means for the SWD group and the general education students' group. The observed t-statistic was 1.2 and the p-value was .23; providing evidence that the observed means do not differ. See table 4.7 below.

**Table 4.7**

*Observed Mean and Standard Deviation-Spring 2012 CRCT (General education and SWD in co-taught environment)- t-statistic and p-value included*

| <b>Class</b>  | <b>Number</b> | <b>Mean</b>   | <b>Standard<br/>Deviation</b> | <b>t-statistic</b> | <b>p-value</b> |
|---|---------------|---------------|-------------------------------|--------------------|----------------|
| <b>Co-taught<br/>general<br/>education<br/>students</b> | <b>50</b>     | <b>812.46</b> | <b>20.49</b>                  |                    |                |
| <b>Co-taught<br/>SWD</b>                                | <b>50</b>     | <b>808.04</b> | <b>15.89</b>                  |                    |                |

|  |  |  |  |            |            |
|--|--|--|--|------------|------------|
|  |  |  |  | <b>1.2</b> | <b>.23</b> |
|--|--|--|--|------------|------------|

### Analysis

The t-test was followed by a one way ANCOVA to adjust for differences in the SWD and general education groups that could bias the comparison. The sixth grade CRCT score was the covariate used in the ANCOVA analysis. The adjusted mean for the SWD group was 808.04; the adjusted mean for the general education group was 812.46. The results of this analysis show that there was not a statistically significant difference between the adjusted means of the groups at  $\alpha = .05$  level,  $F(1, 97) = 2.43$  and  $p = 0.12$ . See table 4.8 below.

**Table 4.8**

*Co-taught SWD and general education students- ANCOVA-Spring 2012 CRCT-Adjusted Mean with F-statistic and p-value included*

| <b>Class</b>                                | <b>Number</b> | <b>Adjusted Mean</b> | <b>F-statistic</b> | <b>p-value</b> |
|---|---------------|----------------------|--------------------|----------------|
| <b>Co-taught general education students</b> | <b>50</b>     | <b>812.46</b>        |                    |                |
| <b>Co-taught SWD</b>                        | <b>50</b>     | <b>808.04</b>        |                    |                |

|  |  |  |      |     |
|--|--|--|------|-----|
|  |  |  | 2.43 | .12 |
|--|--|--|------|-----|

Based on these findings, the researcher determined that the fourth null hypothesis (Ho4: There will be no difference in the achievement of special education students in the co-taught classroom on the mathematics subtest of the CRCT as compared to the general education students in the 7th grade mathematics co-taught classes.) should not be rejected.

### Summary of Results

Research question number one focused on the impact co-teaching has on the achievement of 7th grade general education students in math as measured by the math subtest of the CRCT. The researcher used a one-way ANCOVA to control for extraneous variables. The ANCOVA yielded a p-value of .118. This finding seemed to indicate that the 2013 CRCT math scores for the experimental group were not statistically significantly different from the 2013 CRCT math scores for the control group. This finding led the researcher to not reject the first null hypothesis: **H<sub>o1</sub>**: There will be no difference in the achievement of seventh grade general education students taught using co-teaching and general education students taught in the traditional classroom.

Research question number two focused on the difference between males and females in the co-taught classroom. The researcher used a one-way ANCOVA to control for extraneous variables. The ANCOVA yielded a p-value of .708. This finding seemed to indicate that the 2013 CRCT math scores for the female group were not statistically significantly different from the 2013 CRCT math scores for the male group. This finding led the researcher to not reject the second null hypothesis: **H<sub>o2</sub>**: There will be no difference in the achievement of seventh grade general education students taught using co-teaching based on gender.

Research question number three focused on the difference between African Americans, Hispanics and Caucasians in the co-taught classroom. The researcher used a one-way ANCOVA to control for extraneous variables. The ANCOVA yielded a p-value of .39. This finding seemed to indicate that the 2013 CRCT math scores for the African American, Hispanic, and Caucasian groups were not statistically significantly different. This finding led the researcher to not reject the third null hypothesis:  $H_{03}$ : There will be no difference in the achievement of seventh grade general education students taught using co-teaching based on ethnicity.

Research question number four focused on the difference between SWD and general education students receiving instruction in the co-taught environment. The researcher used a one-way ANCOVA to control for extraneous variables. The ANCOVA yielded a p-value of .12. This finding seemed to indicate that the 2013 CRCT math scores for the SWD group were not statistically significantly different from the 2013 CRCT math scores for the general education students. This finding led the researcher to not reject the fourth null hypothesis:  $H_{04}$ : There will be no difference in the achievement of special education students in the co-taught classroom on the mathematics subtest of the CRCT as compared to the general education students in the 7<sup>th</sup> grade mathematics co-taught classes. Findings for the four null hypotheses are summarized in table 4.8 below.

**Table 4.9**

*Findings for the four null hypotheses*

| <b>Null hypothesis</b>    | <b>p-value</b> | <b>Rejected</b> |
|---------------------------|----------------|-----------------|
| <b>Null hypothesis #1</b> | <b>.118</b>    | <b>No</b>       |
| <b>Null hypothesis #2</b> | <b>.708</b>    | <b>No</b>       |

|                           |            |           |
|---------------------------|------------|-----------|
| <b>Null hypothesis #3</b> | <b>.39</b> | <b>No</b> |
| <b>Null hypothesis #4</b> | <b>.12</b> | <b>No</b> |

The findings suggest there is no difference in any of the groups based on the math subtest of the 2013 CRCT. These findings, their implications and their importance will be discussed in chapter five.

## **Chapter Five: Discussion**

### **Overview**

Special education has been a part of the American educational landscape since the passage of P.L. 94-142 in 1975. This law was reauthorized and changed in 1990, 1997, and 2004. (Hardman and Dawson, 2008) Since the passage of P.L. 94-142, the education of SWD has taken many different forms. At its inception, special education was viewed as an unwanted requirement by school systems around the country because it was mandated by law, and these schools were not really prepared to handle these new and challenging special education students. To meet the challenge schools placed the SWD in self-contained and resource classrooms in order to receive their education. (Schoger, 2006) As time passed, proponents for SWD began to assert that self-contained classrooms were not the LRE possible, so educational leaders began including these students in the general classroom. These placements often focused more on social skills training more than academic skill training. Students still received the majority of their academic training in resource classrooms. (Volonino and Zigmond, 2007.) The reauthorizations of P.L. 94-142 (later it came to be known as IDEA) led educators to put SWD in the general education classrooms more frequently.

In addition to IDEA, education has also been impacted by the passage of NCLB. This piece of legislation made schools responsible for the performance of all students on criterion referenced standardized tests. This mandate includes SWD. In response to IDEA and NCLB, educators started moving SWD into more general education classes, and eventually special education teachers began assisting general education teachers in their classrooms. This arrangement came to be known as co-teaching or inclusion.

Co-teaching or inclusion was thought to be the best answer to the problem of how to serve SWD and make sure they performed at the same level as their non-disabled peers. The problem with adopting this approach is the lack of research to support inclusion as a viable answer to the question of helping SWD academically. The majority of the research in the literature focuses on how to best implement co-teaching, teachers' perceptions of the effectiveness of co-teaching, and students' perceptions of the effectiveness of co-teaching. Only a small percentage of the research focuses on how co-teaching impacts the academic performance of both SWD and students without disabilities.

The purpose of this causal-comparative study was to evaluate the impact of co-teaching on students without disabilities who were educated in a co-taught environment. A secondary purpose of this study is to look at the growth of SWD as compared to the growth of students without disabilities who were educated in the co-taught environment.

### **Research Questions**

**RQ1:** To what extent does co-teaching in the seventh grade math classroom impact the achievement of general education students as measured by the math subtest of the CRCT?

**RQ2:** To what extent does co-teaching in the seventh grade math classroom impact the achievement of general education students as measured by the math subtest of the CRCT when comparing students based on gender?

**RQ3:** To what extent does co-teaching in the seventh grade math classroom impact the achievement of general education students as measured by the math subtest of the CRCT based when comparing students based on ethnicity?

**RQ4:** To what extent does co-teaching in the seventh grade math classroom impact the achievement of special education students in 7th-grade co-taught mathematics classes when compared to general education students in the co-taught classroom?

## **Findings**

### **Findings for Research Question One**

Research question number one focused on the impact that co-teaching had on the achievement levels of general education students in co-taught classrooms. The experimental group was comprised of general education students who received instruction in the co-taught classroom and the control group consisted of general education students who received instruction in the traditional classroom. Descriptive statistics were used to begin the investigation into question number one. The observed means for the experimental and control group did show there was a statistical difference between the two groups. The observed means had a t-statistic of 7.92 and a p-value of  $<0.0001$ . A one way ANCOVA was used to analyze the differences between the experimental and control group based on their 6<sup>th</sup> CRCT math subtest scores. The ANCOVA results suggested there was not a statistically significant difference between the experimental and control group based on their adjusted means. The adjusted mean for the control group was 840.06 and the adjusted mean for the experimental group was 837.58. The p-value yielded by the ANCOVA was .118 which suggests there is not a statistically significant difference between the two groups, so the null hypothesis was not rejected.

The findings from research question one could be interpreted as contradicting previous research on the achievement of general education students. Previous research in the literature showed that general education students in co-taught math classrooms, showed these students achieving better than students in the traditional classroom. (Fontana, 2005; Hines, 2001) While

contradicting other studies, these findings are similar to other research that show little to no benefit for general education students in the co-taught classroom based on achievement.

(Murawski and Swanson, 2001)

### **Findings for Research Question Two**

Research question number two focused on the difference between males and females in the co-taught classroom. Descriptive statistics were used to begin the investigation into question number two. The observed means for the female group were (Mean=829.51, SD=23.11) and the male group (Mean=832.64, SD=23.37) did not suggest statistical significance. The observed means had a t-statistic of 1.03 and a p-value of .30. The t-test results also did not suggest a statistically significant difference between the two groups. A one way ANCOVA was used to analyze the differences between the experimental and control group based on their 6th CRCT math subtest scores. The ANCOVA results suggested there was not a statistically significant difference between the male and female groups. The adjusted mean for the male group was 831.33 and the adjusted mean for the female group was 830.49. The p-value yielded by the ANCOVA was .708, which suggests there is not a statistically significant difference between the two groups, so the null hypothesis was not rejected.

### **Findings for Research Question Three**

Research question number three focused on the difference between African Americans, Hispanics and Caucasians in the co-taught classroom. Descriptive statistics were used to begin the investigation into question number three. The observed means for the African American group were (Mean=829.11, SD=21.94), the Caucasian group (Mean=834.71, SD=23.89) and the Hispanic group (Mean=832.61, SD=20.55) did not suggest statistical significance. To analyze the differences in the observed means of the three groups an ANOVA was used. The ANOVA

was chosen since there are three samples to be compared at the same time. This type of analysis could not be accomplished with a t-test. The ANOVA yielded a p-value of .11. This did not suggest a statistically significant difference between the three groups. A one way ANCOVA was used to analyze the differences between the groups based on their 6th grade CRCT math subtest scores. The ANCOVA results showed there was not a statistically significant difference between the groups. The adjusted mean for the African American group was 830.47, the adjusted mean for the Caucasian group was 833.95, and the adjusted mean for the Hispanic group was 832.64. The p-value yielded by the ANCOVA was .39 which suggests there is not a statistically significant difference between the groups, so the null hypothesis was not rejected.

The findings for research questions two and three do not seem to support co-teaching as an effective practice to increase the achievement scores of general education students. Males and females both scored below the mean CRCT for the control group as well as the state mean CRCT score for 7<sup>th</sup> grade math students. This was also the case for each ethnicity included in the study. These findings could be interpreted to show that the presence of the special education teacher in the co-taught classroom is not a benefit to the general education students. The literature shows that one of the problems experienced in co-taught classrooms is what role each teacher should play in the class. (Magiera and Zigmond, 2005; Weiss and Lloyd, 2002; Walther-Thomas, 1997) Other problems noted with co-teaching could have also played a role in the findings for questions two and three include the presence of SWD causing distractions and taking away from the general education students (Kauffman, 2010), special education teachers taking more of their time working on paperwork and grading papers instead of actually aiding in the instruction of students (Scruggs, Mastropieri, and McDuffie, 2007), and the lack of uniformity of practices based on evidence of which practices are the most effective in the co-taught classroom

in schools from the same state or even the same district (Kilanowski-Press, Foote, and Rinaldo, 2010)

#### **Findings for Research Question Four**

Research question number four focused on the difference between SWD and general education students receiving instruction in the co-taught environment. Descriptive statistics were used to begin the investigation into question number four. The observed means were as follows: the SWD group had a mean score of 808.04 and a standard deviation of 15.89 and the general education students group had a mean score of 812.46 and a standard deviation of 20.49. A one way ANCOVA was used to analyze the differences between the groups based on their 6th grade CRCT math subtest scores. The ANCOVA results showed there was not a statistically significant difference between the groups. The adjusted mean for the SWD group was 808.04, and the adjusted mean for the general education group was 812.46. The p-value yielded by the ANCOVA was .12 which suggests there is not a statistically significant difference between the groups, so the null hypothesis was not rejected.

This finding seems to support assertions made by the REI. SWD are best served in the general education classroom. (Reynolds, Wang, and Walberg, 1992; Reynolds, Wang, and Walberg, 1987; Coles, 1987; Will, 1986) Additionally, the finding for this question should also help add quantitative data to the literature. Friend, Cooke, Hurley-Chamberlain, and Shamberger (2010) asserted that the majority of what is published about co-teaching focuses on how teachers and students feel about the effectiveness of co-teaching on SWD instead of focusing on the achievement of SWD in a co-taught environment. Similar findings that SWD made gains in math when placed in a co-taught environment for math instruction also seemed to be supported by the

statistical analysis of this question (Murawski, 2006; Cole, Waldron, and Majd, 2004; Waldron and McCleskey, 1998)

### **Discussion**

How to best serve SWD has been a question educators have been trying to answer since the inception of special education when P.L. 94-142 was passed back in 1975. Different service delivery models have been attempted with mixed results. Schoger (2006) discusses self-contained classes where SWD received instruction away from general education students. This model was preferable to no service at all for SWD, but supporters of special education questioned whether or not SWD were really receiving the same quality education as their non-disabled peers. Later SWD were placed in certain general education classrooms for a portion of the day, but still received the majority of their academic instruction in a separate setting called a resource class. (Volonino and Zigmond, 2007) Special education has since progressed to where it is preferable for the SWD to spend their entire day in the general education classroom with support from a certified teacher or paraprofessional. This model of service has come to be called inclusion or co-teaching. (Weiss, 2004)

The benefits of co-teaching are supposed to be that SWD are exposed to the same curriculum as their non-disabled peers and they receive social interactions with peers who are classified as not having a disability or general education students. Data from various studies have had mixed results when trying to determine if co-teaching is really effective at helping SWD academically and socially. (Murawski, 2006; Cole, Waldron, and Majd, 2004; Murawski and Swanson, 2001; Waldron and McClesky, 1998) What seems to be missing from the literature is how co-teaching impacts the general education students in the co-taught classrooms. This is an area of concern voiced by parents and teachers. These concerns have led educators to continue

to question whether co-teaching is a viable service delivery model for providing instruction to all students, not just SWD. (Hanover, 2012) Research on co-teaching's effectiveness for all students has been focused on the opinions and feelings of students and teachers instead of quantitative data. (Friend and Hurley-Chamberlain, 2011; Hines, 2001)

This study was conducted in order to add quantitative data to the literature regarding the effectiveness of co-teaching for students without disabilities. The findings of this study do not seem to support or oppose co-teaching as a more effective service delivery model for students without disabilities. This study focused on seventh grade students from four schools in southeastern Georgia. These schools are all Title 1 schools; they all use the Common Core Georgia Performance Standards and their ethnic make-ups are similar. The data utilized in this study was ex post facto data. The control group for the study consisted of the seventh grade general education students who received math instruction in the traditional classroom setting. The experimental group for the study was made up of the seventh grade students who received math instruction in the co-taught setting. In addition to demographic data (gender and ethnicity), data for the control and experimental group was taken from each groups' math CRCT results from Spring 2012 (previous year's test results) and Spring 2013 (post math achievement).

For null hypothesis number one: **H<sub>01</sub>**: There will be no difference in the achievement of seventh grade general education students taught using co-teaching and general education students taught in the traditional classroom; Levene's test revealed that the control and experimental groups had unequal variances on the 2012 CRCT for previous achievement. In order to account for the differences a covariate was used in order analyze the data. The one-way ANCOVA analysis on the 2013 posttest data yielded means of 840.06 for the control group and 837.58 for the experimental group. The adjusted means did not show a statistically significant

difference between the two groups. These findings would seem to suggest that any impact co-teaching had on the achievement of general education students was minimal at best. Fontana (2005) suggested that one of the positive aspects of co-teaching was that there would be two teachers in the classroom to assist all students. The presence of a second teacher does not seem to have affected the achievement scores of the general education students in this study either positively or negatively. There could be various factors associated with this finding, such the quality of the teachers in each classroom. The presence of SWD and the co-teacher could be distractions to the general education students instead of a positive. However it should be noted that the experimental group's score of 837.58 was comparable to the state average mean of 839.54.

For null hypothesis number two: **Ho2:** There will be no difference in the achievement of seventh grade general education students taught using co-teaching based on gender; Levene's test did not suggest a statistically significant difference in the means of the two groups' 2012 CRCT scores for previous achievement. The male group had a slightly higher mean (818.23) than the female group (815.51). The one-way ANCOVA did not produce statistically significant results between the male (831.33) and female groups (830.49). These scores were below the state average of 839.54 (Georgia Department of Education website, 2015) as well as the control group mean of 841.47. These findings seem to indicate that co-teaching does not make an impact on the achievement of general education students in the co-taught classroom when considering gender. This finding was expected since the co-teaching service model does have both teachers in the classroom working with both sexes in the classroom, so it would have been unexpected to see statistically significantly different findings between the two groups.

For null hypothesis number three: **H<sub>03</sub>**: There will be no difference in the achievement of seventh grade general education students taught using co-teaching based on ethnicity; Levene's test did not suggest a statistically significant difference in the means of the groups' 2012 CRCT scores for previous achievement. The Caucasian group (818.52) had a slightly higher mean than the African American (815.87) and Hispanic (817.54) groups on the 2012 measure. The one-way ANCOVA did not produce statistically significant results between the Caucasian (833.95), African American (830.47), and Hispanic (832.64) groups when analyzing the 2013 posttest data. These scores were below the state mean of 839.54 (Georgia Department of Education website, 2015) as well as the control group mean of 841.47. These findings also suggest that co-teaching, especially the presence of a second teacher, does not provide an advantage to the general education students in the co-taught classroom. This achievement data also shows these groups performing below the control group mean.

For null hypothesis number four: **H<sub>04</sub>**: There will be no difference in the achievement of special education students in the co-taught classroom on the mathematics subtest of the CRCT as compared to the general education students in the 7<sup>th</sup> grade mathematics co-taught classes; no variance in the previous achievement measures was noted because the SWD and general education groups both had the same scores on the 2012 CRCT for previous scores. Both groups had a mean score of 800.44. In order to check for any possible differences a covariate was used in order analyze the data. The one-way ANCOVA analysis on the 2013 posttest data yielded means of 808.04 for the SWD group and 812.46 for the general education group. The adjusted means did not show a statistically significant difference between the two groups. These findings would seem to suggest that co-teaching does not make an impact on the achievement of general education students. However, the SWD scores were comparable to the scores of their non-

disabled peers. It was suggested that one of the positive aspects of co-teaching was that there would be two teachers in the classroom to assist all students. The presence of a second teacher does not seem to have impacted the achievement scores of the general education students in this study. There could be various factors associated with this finding, such as the quality of the teachers in each classroom. The presence of SWD and the co-teacher could be a distraction instead of a positive for the general education students. Conversely, the SWD scores were comparable to the scores of their non-disabled peers. Having two teachers could be one of the factors associated with the closeness of the scores between the two groups.

The data gathered in this study seem to indicate that students without disabilities do not benefit more than students who are placed in the traditional classroom environment. Previous research into co-teaching has suggested some reasons as to why this may be the case. The attitude of the teachers providing the instruction toward co-teaching can affect the implementation of co-teaching and may therefore impact student achievement. If teachers are thrust into the roles of co-teachers without any choice, they tend to resent the placement and do not work well together. (Burke and Sutherland, 2004; Daane, C., Beirne-Smith, M., & Latham, D, 2000; Idol, 2006; Snider, 1999; & Stoler, R., 1992). Teacher buy-in is another factor mentioned in the literature that may have an effect on the successful implementation of co-teaching. If teachers feel they have a choice in who they teach with or even whether or not they co-teach, the results are more positive. The literature also showed that co-teaching is more effective when teachers have input on how co-teaching should “look” or the model of co-teaching they use. (Isherwood and Barger-Anderson, 2008) Having the proper support in the school was also mentioned as a reason that may be tied to the success of co-teaching. Teachers have reported that administrators in their schools do not have a working knowledge of what co-

teaching is or how it should be implemented. Without this knowledge, administrators are really at a loss as to how to best support their teachers. (DeSimone and Parmar, 2006; Leonard and Smith, 2005) Another factor related to student success in a co-teaching environment is the role that each teacher plays in the classroom. Research also suggests that co-teaching teams need to receive the proper training in order to have success. (Magiera and Zigmond, 2005; Weiss and Lloyd, 2002; Watlther-Thomas, 1997)

### **Limitations**

Co-teaching has been utilized as a way to insure SWD are educated in the LRE possible. Studies on co-teaching tend to focus on perceptions of teachers and students instead of actual student achievement by students in co-taught settings. (Hanover, 2012; Friend and Hurley-Chamberlain, 2011; and Murawski, Swanson, 2001) This study yields results that while not completely in favor of the effectiveness of co-teaching for general education students, the results seem to recommend further research perhaps on a larger scale.

This study was hampered by some limitations. It is difficult to generalize the findings of this data. First of all the data from this study came from seventh grade students' math scores. The four schools who participated in the study are from rural areas in southeastern Georgia. Therefore, these findings may not be applicable to schools and districts from urban and inner-city areas. Additionally, the four schools utilized in this study are all designated Title 1 schools and that designation is given to schools that have a high percentage of students who are from low-income families, so these findings may not apply to school systems that have higher income families. Also the standardized tests and curriculum in different states may differ to such a degree from the curriculum and standardized tests in the state of Georgia as to make this study not generalizable to other states.

Other issues that limited this study are that ex post facto data was used. Students were not randomly assigned to control and experimental groups, so convenience sampling had to be used which causes the study to be less rigorous than true experimental studies. Hopefully the findings of this study can be used in future research to design and conduct studies that have a higher rigor so the results can be more generalizable. The teachers in the schools did not all attend the same colleges and universities and so their program concentration on working with SWD could have been different. Teacher quality and teacher knowledge of the subject matter are also limitations associated with this study.

### **Implications and Recommendations**

Unfortunately co-teaching does not have a solid research base to recommend it. A lack of research into co-teaching does not mean that the service delivery model should be abandoned. This lack of research indicates a need for researchers to be given access to more classrooms in order to get more achievement data so they can truly evaluate the effectiveness of co-teaching for general education students. Based on the deficient amount of research in the literature and the findings of this study, there seems to be a necessity for more achievement based research into co-teaching. Replicating this study would be a step in the right direction. However the size and scope should be broadened and adequate sample sizes of different genders, ethnicities and socioeconomic status should be utilized. These studies should include different grade levels and different methods of measuring achievement than just state-mandated standardized tests. Additionally, if standardized tests are to be used in the state of Georgia as an achievement measure, the CRCT is no longer used as of the 2013-2014 school year. It has been replaced by the Georgia Milestones test. Finding a way to conduct true experimental research instead of convenience sampling would aid in a more comprehensive analysis of co-teaching and its

effectiveness for general education students. One suggestion for further research would be to find classrooms where general education students are achieving at a high level and collect achievement data from these environments. Perhaps this would help stakeholders in education gain an understanding of whether or not co-teaching is effective in raising the achievement levels of general education students. Finally the collection of achievement data from co-taught classrooms will provide teachers, parents, students, and administrators with a more clear understanding of the effectiveness of co-teaching.

### **Conclusion**

Legislatively based reforms to raise student achievement have been pushed on those who are actually responsible for implementing these policies. Co-teaching is an answer that has been proposed to the questions raised by these reforms regarding raising student achievement. Intuitively, co-teaching seems to be a very plausible answer to the question of how to raise achievement. The teacher-to-student ratio is in a sense cut in half. Each teacher in a co-teaching partnership also brings a set of skills that should insure that all students have the best possible opportunity for success. The co-teaching team consists of a content specialist and a learning styles specialist. This combination should assure that each student can achieve regardless of learning difficulties or levels. (Murawski and Hughes, 2009; Leonard and Smith, 2005) This study examined the impact that co-teaching made on the achievement of general education students who receive mathematics instruction in a co-taught environment. The results of this study did not show that co-teaching had neither a positive or negative impact on the achievement of general education students. The research indicated that students in the traditional and co-taught classes' achievement scores were not statistically different when subjected to statistical analysis. These findings could simply mean that co-teaching is not effective in raising the

achievement scores of general education students. The study did reveal that the students in the co-taught environment scored slightly higher (though not to statistically significant degree) than the Georgia state average for seventh grade students on the mathematics subtest of the CRCT. This finding is commensurate with previous research that demonstrated mild positive effects for general education students in co-taught environments. (Fontana, 2005; Welch, 2000) The findings also showed that the SWD and the general education students in the co-taught environment performed at similar levels. The general education students' achievement scores were slightly higher than the SWD but not to a statistically significant degree. These findings suggest that co-teaching could be a viable service delivery model for mathematics instruction to SWD.

## REFERENCES

- About Education. (2014). General education-The education everyone should get. . Retrieved 8/24/2010, from: <http://specialed.about.com/od/glossary/g/generaleducation.htm>
- Anastasiou, D., & Kauffman, J.M. (2011). A social constructionist approach to disability: Implications for Special Education. *Exceptional Children*, 77(3), 367-384.
- Airasian, P., & Gay, L. (2000). *Educational research: Competencies for analysis and application*. Merrill, WI: Merrill.
- Beam, A. (2009). Standards-Based Differentiation: Identifying the concept of multiple intelligence for use with students with disabilities. *Teaching Exceptional Children Plus*, 5(4), 2-13.
- Boser, U. (2009). Special education: A better perspective (full report). Retrieved from: <http://www.centerforpubliceducation.org/Main-Menu/Evaluating-performance/Special-education-At-a-glance/Special-education-A-better-perspective-full-report.html>.
- Burke, K., & Sutherland, C. (2004). Attitudes toward inclusion: Knowledge vs. experience. *Education*, 125(2), 163-172.
- Carnoy, M., & Rothstein, R. (2013). What do international tests really show about U.S. student performance? Retrieved from: <http://www.epi.org/publication/us-student-performance-testing/>.
- Carpenter, L., & Dyal, A. (2007). Secondary inclusion: Strategies for implementing the consultative teacher model. *Education*, 127(3), 344-350.
- Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education*. Routledge.
- Cole, C., Watdron, N., & Majd, M. (2004). Academic progress of students across inclusive and traditional settings. *Mental Retardation*, 42(2), 136-144.

- Coles, G. (1987). *The learning mystique: A critical look at "learning disabilities."* New York:Pantheon.
- Conderman, G. (2011). Middle school co-teaching: effective practices and student reflections. *Middle School Journal*, 42(4), 24-31.
- Cox, K. (2007). What Georgia educators need to know about Georgia's testing program Retrieved 7/22/2010, from <http://public.doe.k12.ga.us/DMGetDocument.aspx/Final%20-%20testing%20newspaper.pdf?p=4BE1EECF99CD364EA5554055463F1FBBF5D074D5FB1F2CAEB3B63B3ECB220CDD26C2114F3C57D8D2040FD88C56B817B3&Type=D>
- Daane, C., Beirne-Smith, M., & Latham, D. (2000). Administrators' and teachers' perceptions of the collaborative efforts of inclusion in the elementary grades. *Education*, 121(2), 331.
- DeSimone, J., & Parmar, R. (2006). Middle school mathematics teachers' beliefs about inclusion of students with learning disabilities. *Learning Disabilities Research & Practice (Blackwell Publishing Limited)*, 21(2), 98-110.
- Dieker, L. A. (2001). What are the characteristics of 'effective' middle and high school co-taught teams for students with disabilities?. *Preventing School Failure*, 46(1), 14.
- Dimitrios, K., Georgia, V., Eleni, Z., & Asterios, P. (2008). Parental attitudes regarding inclusion of children with disabilities in Greek education settings. *Electronic Journal for Inclusive Education*, 2 (3), 1-13.
- Dinnebeil, L., Pretti-Frontczak, K., & McInerney, W. (2009). A Consultative Itinerant Approach to Service Delivery: Considerations for the Early Childhood Community. *Language, Speech & Hearing Services In Schools*, 40(4), 435-445.

- Dunn, J. L., & Allen, J. (2009). Holding schools accountable for the growth of nonproficient students: Coordinating measurement and accountability. *Educational Measurement: Issues & Practice*, 28(4), 27-41.
- Dunn, L. M. (1968). Special Education for the Mildly Retarded—Is Much of It Justifiable?. *Exceptional Children*, 35(1), 5-22.
- Fontana, K. C. (2005). The effects of co-teaching on the achievement of eighth grade students with learning disabilities. *The Journal of At-risk issues*, 11(2), 17-23.
- Friend, M. (2008). Co-teaching: A simple solution that isn't simple after all. *Journal of Curriculum and Instruction*, 2(2), 9-19.
- Friend, M., Cook, L., Hurley-Chamberlain, D., & Shamberger, C. (2010). Co-teaching: An illustration of the complexity of collaboration in special education. *Journal of Educational and Psychological Consultation*, 20, 9-27.
- Gal, E., Schreur, N., & Engel-Yeger, B. (2010). Inclusion of Children with Disabilities: Teachers' Attitudes and Requirements for Environmental Accommodations. *International Journal of Special Education*, 25(2), 89-99.
- Georgia Department of Education. (2010). Adequate yearly progress. Retrieved 8/24/2010, from <http://www.doe.k12.ga.us/AYP/Pages/default.aspx>
- Georgia Department of Education. (2010). 2010 CRCT score interpretation guide Retrieved 7/22/2010, from <http://www.doe.k12.ga.us/DMGetDocument.aspx/2010%20CRCT%20Score%20Interpretation%20Guide.pdf?p=6CC6799F8C1371F6A3BF58DD7B4DCE1FC2CD95F62E9F39D3C696DDB652ED831C&Type=D>

- Georgia Department of Education. (2010). CRCT test briefing. Retrieved on 9/22/10 from:  
<http://www.doe.k12.ga.us/DMGetDocument.aspx/2010%20CRCTTesting%20Brief.pdf?p=6CC6799F8C1371F6E52BA248D8E8058367841995BC192BFF7795B6733F4BFC7B>  
 Consumer perspectives on the collaborative teaching model: Views of students with and without LD and their parents. &Type=D
- Georgia Department of Education. (2013). College and career readiness performance index. Retrieved on 9/23/13 from:  
[http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Accountability/Documents/CCRPI\\_onepager\\_Overview.pdf](http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Accountability/Documents/CCRPI_onepager_Overview.pdf) .
- Georgia Department of Education. (2015). CRCT statewide scores. Retrieved on 2/6/15 from:  
<http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/CRCT-Statewide-Scores.aspx>
- Gerber, P.J., & Popp, P.A. (1999). Remedial and Special Education, 20(5), 288-296.
- Glazzard, J. (2011). Perceptions of the barriers to effective inclusion in one primary school: Voices of teachers and teaching assistants. *Support For Learning*, 26(2), 56-63.
- Hanover research report: The effectiveness of the co-teaching model. (2012). Retrieved from:  
<http://www.hanoverresearch.com/wp-content/uploads/2012/05/Effectiveness-of-Co-Teaching-Membership.pdf>
- Hardman, M. L., & Dawson, S. (2008). The impact of federal public policy on curriculum and instruction for students with disabilities in the general classroom. *Preventing School Failure*, 52(2), 5-11.
- Hines, R. A. (2001). *Inclusion in middle schools*. Champaign, IL: ERIC Clearinghouse on Elementary and Early Childhood Education.

Horne, P. E., & Timmons, V. (2009). Making it work: Teachers' perspectives on inclusion.

*International Journal Of Inclusive Education*, 13(3), 273-286.

Idol, L. (2006). Toward inclusion of special education students in general education. *Remedial*

*& Special Education*, 27(2), 77-94.

Katz, J., & Mirenda, P. (2002). Including students with developmental disabilities in general

education classrooms: Educational benefits. *International Journal of Special Education*,

17(2), 14-24.

Kauffman, J. M. (2005). Point of view: Waving to Ray Charles--missing the meaning of

disabilities. *Phi Delta Kappan*, 86(7), 520-523.

Kauffman, J. M., & Hallahan, D.P. (1997). A diversity of least restrictive environments:

Placement as a problem of social ecology. *Issues in educating students with disabilities*,

325-342.

Kauffman, J. M., & Konold, T. R. (2007). Making Sense in Education: Pretense (including no child left behind) and realities in rhetoric and policy about schools and schooling.

*Exceptionality*, 15(2), 75-96.

Kavale, K., & Forness, S. (2000). History, Rhetoric, and Reality: Analysis of the Inclusion

Debate. *Remedial and Special Education*, 21(5), 279-96.

Kavale, K. A., Kauffman, J. M., Bachmeier, R. J., & LeFever, G. B. (2008). Response-to-

intervention: Separating the rhetoric of self-congratulation from the reality of specific

learning disability identification. *Learning Disability Quarterly*, 31(3), 135-150.

Kimbrough, R., & Mellen, K. (2012). Research summary: Perceptions of inclusion of students with disabilities in the middle school. Retrieved from:

[http://www.amle.org/portals/0/pdf/research/Research\\_Summaries/Inclusion.pdf](http://www.amle.org/portals/0/pdf/research/Research_Summaries/Inclusion.pdf).

- Lodico, M., Spaulding, D., & Voegtle, K. (2010). *Methods in educational research: From theory to practice*. San Francisco, CA: Jossey-Bass.
- Long, T. J., Brown, C., & Nagy-Rado, A. (2007). Preparing special educators to assume collaborative and consultative roles. *Catholic Education: A Journal Of Inquiry & Practice*, 10(4), 490-507.
- Magiera, K., Smith, C., Zigmond, N., & Gebauer, K. (2005). Benefits of co-teaching in secondary mathematics classes. *Teaching Exceptional Children*, 37(3), 20-24.
- Magiera, K., & Zigmond, N. (2005). Co-teaching in middle school classrooms under routine conditions: does the instructional experience differ for students with disabilities in co-taught and solo-taught classes?. *Learning Disabilities Research & Practice (Wiley-Blackwell)*, 20(2), 79-85.
- Mintz, J. (2007). Attitudes of primary initial teacher training students to special educational needs and inclusion. *Support For Learning*, 22(1), 3-8.
- Malian, I., & McRae, E. (2010). Co-teaching beliefs to support inclusive education: survey of relationships between general and special educators in inclusive classes. *Electronic Journal for Inclusive Education*, 2(6).
- Murawski, W. (2006). Student outcomes in co-taught secondary English classes: How can we improve? *Reading & Writing Quarterly*, 22(3), 227-247.
- Murawski, W., & Hughes, C. (2009). Response to intervention, collaboration, and co-teaching: A logical combination for successful systemic change. *Preventing School Failure*, 53(4), 267-277.
- Murawski, W., & Lochner, W. (2011). Observing co-teaching: What to ask for, look for and listen for. *Intervention in School and Clinic*, 46(2), 174-183.

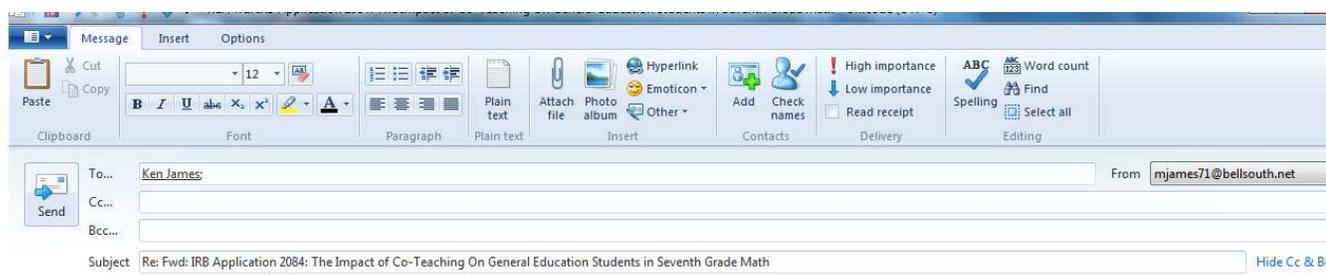
- Murawski, W., & Swanson, H. (2001). A meta-analysis of co-teaching research. *Remedial & Special Education, 22*(5), 258.
- Nichols, J., Dowdy, A., & Nichols, C. (2010). Co-teaching: An educational promise for children with disabilities or a quick fix to meet the mandates of no child left behind? *Education, 130*(4), 647-651.
- NIST/SEMATECH e-Handbook of Statistical Methods. (2010). Retrieved from: <http://www.itl.nist.gov/div898/handbook/>
- Orfano, F. (2012). The advantages of inclusion in the middle grades. Bright Hub Education. Retrieved on 10/12/2013 from: <http://www.brighthouseeducation.com/special-ed-inclusion-strategies/105043-social-and-academic-advantages-of-inclusion-in-middle-school-classrooms/>
- Osgood, R. L. (2005). *History of Inclusion in the United States*. Gallaudet University Press.
- Quigney, T. A. (2008). The reauthorization of the no child left behind act: Recommended practices regarding teaching students with disabilities. *Planning & Changing, 39*(3/4), 146-157.
- Reynolds, M., Wang, M.C., & Walberg, H. (1987). The necessary restructuring of special and regular education. *Exceptional Children, 53*, (5), 391-398.
- Roberts, M. (2008). The individuals with disabilities education act: Why considering individuals one at a time creates untenable situations for students and educators. *UCLA Law Review, 55*(4), 1041-1094.
- Ruijs, N., Peetsma, T., & van der Veen, I. (2010). The presence of several students with special educational needs in inclusive education and the functioning of students with special educational needs. *Educational Review, 62*(1), 1-37.

- Schoger, K. (2006). Reverse Inclusion: Providing Peer Social Interaction Opportunities to Students Placed in Self-Contained Special Education Classrooms. *Teaching Exceptional Children Plus*, 2(6), 1.
- Schulte, A.C., Osborne, S. S., & Kauffman, J.M. (1993). Teacher responses to two types of consultative special education services. *Journal Of Educational & Psychological Consultation*, 4(1), 1-27.
- Seese, L., Madaus, J., Bray, M., & Kehle, T. (2007). A State-Specific Survey of District Compliance with Section 504 Policies and Procedures. *Journal of Special Education Leadership*, 20(1), 3-10.
- Shuster, L. A. (2005). U.S. Students perform below average on international math and problem-solving test. *Civil Engineering*, 75(2), 25-26.
- Slavin, R., & Lake, C. (2008). Effective programs in elementary mathematics: A best evidence synthesis. *Review of Educational Research*, 78(3), 427-515.
- Smith, R. & Leonard, P. (2005). Collaboration for inclusion: Practitioner perspectives. *Equity & Excellence in Education*, 38, 269-27.
- Smoot, S. L. (2011). An Outcome Measure for Social Goals of Inclusion. *Rural Special Education Quarterly*, 30(1), 6-13.
- Smyth, T. (2008). Who Is No Child Left Behind Leaving Behind? *Clearing House*, 81(3), 133-137.
- Snyder, R. (1999). Inclusion: A qualitative study of in-service general education teachers' attitudes and concerns. *Education*, 120(1), 173-182.

- Solis, M., Vaughn, S., Swanson, E., & Mcculley, L. (2012). Collaborative models of instruction: The empirical foundations of inclusion and co-teaching. *Psychology In The Schools, 49*(5), 498-510
- Stoler, R. (1992). Perceptions of regular education teachers toward inclusion. *Clearing House, 66*(1), 60.
- Truscott, D. M., Swars, S., Smith, S., Thornton-Reid, F., Zhao, Y., Dooley, C., & Matthews, M. (2010). A cross-disciplinary examination of the prevalence of mixed methods in educational research: 1995-2005. *International Journal Of Social Research Methodology, 13*(4), 317-328.
- U.S. Department of Education. (2014). Sec. 300.39 Special education. Retrieved on 10/22/14 from: <http://idea.ed.gov/explore/view/p/,root,regs,300,A,300%252E39>,
- Volonino, V., & Zigmund, N. (2007). Promoting research-based practices through inclusion? *Theory Into Practice, 46*(4), 291-300.
- Waldron, N., & MCLESKEY, J. (1998). The effects of an inclusive school program on students with mild and severe learning disabilities. *Exceptional Children, 64*(3), 395-405.
- Wang, M. C., & Walberg, H. (1988). Four fallacies of segregationism. *Exceptional Children, 55*(2), 128-137.
- Wang, M. C., Walberg, H., & Reynolds, M. (1992). A scenario for better--not separate--special education. *Educational Leadership, 50*(2), 35-38
- Wang, Y. (2009). Impact of Lev Vygotsky on Special Education. *Canadian Social Science, 5*(5), 100-103.
- Weiss, M. (2004). Co-teaching as science in the schoolhouse: More questions than answers. *Journal of Learning Disabilities, 37*(3), 218-223.

- Welch, M. (2000). Descriptive analysis of team teaching in two elementary classrooms: a formative experimental approach. *Remedial & Special Education, 21*(6), 366-376.
- Welch, M. (2000). Descriptive analysis of team teaching in two elementary classrooms: A formative experimental approach. *Remedial & Special Education, 21*(6), 366-376.
- Will, M. C. (1986). Educating Children with Learning Problems: A Shared Responsibility. *Exceptional Children, 52*(5), 411-41
- Worell, J. L. (2008). How secondary schools can avoid the seven deadly school "sins" of inclusion. *American Secondary Education, 36*(2), 43-56.
- Yell, M., Rogers, D., & Lodge Rodgers, E. (1998). The legal history of special education. *Remedial & Special Education, 19*(4), 219.
- Yell, M. L., Ryan, J. B., Rozalski, M. E., & Katsiyannis, A. (2009). The U.S. Supreme Court and Special Education: 2005 to 2007. *Teaching Exceptional Children, 41*(3), 68-75.

## APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL



----- Forwarded message -----

From: **IRB, IRB** <[IRB@liberty.edu](mailto:IRB@liberty.edu)>  
 Date: Tue, Jan 20, 2015 at 1:44 PM  
 Subject: IRB Application 2084: The Impact of Co-Teaching On General Education Students in Seventh Grade Math  
 To: "Ken James ([kjames@atkinson.k12.ga.us](mailto:kjames@atkinson.k12.ga.us))" <[kjames@atkinson.k12.ga.us](mailto:kjames@atkinson.k12.ga.us)>  
 Cc: "McLemore, Amy J (School of Education)" <[ajmclemore@liberty.edu](mailto:ajmclemore@liberty.edu)>, "IRB, IRB" <[IRB@liberty.edu](mailto:IRB@liberty.edu)>, "Garzon, Fernando (Ctr for Counseling & Family Studies)" <[fgarzon@liberty.edu](mailto:fgarzon@liberty.edu)>

Dear Ken,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study does not classify as human subjects research. This means you may begin your research with the data safeguarding methods mentioned in your application.

Your study does not classify as human subjects research because your research involves de-identified archival data.

Please note that this decision only applies to your current research application, and that any changes to your protocol must be reported to the Liberty IRB for verification of continued non-human subjects research status. You may report these changes by submitting a new application to the IRB and referencing the above IRB Application number.

If you have any questions about this determination, or need assistance in identifying whether possible changes to your protocol would change your application's status, please email us at [irb@liberty.edu](mailto:irb@liberty.edu).

Sincerely,

**Fernando Garzon, Psy.D.**  
 Professor, IRB Chair  
 Counseling

(434) 592-4054

**LIBERTY**  
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## APPENDIX B: INVESTIGATOR AGREEMENT AND SIGNATURE PAGE

Liberty University Institutional Review Board | 4  
Application for the Use of Human Research Participants

## IV. INVESTIGATOR AGREEMENT &amp; SIGNATURE PAGE\*

## BY SIGNING THIS DOCUMENT, THE INVESTIGATOR AGREES:

1. That no participants will be recruited or entered under the protocol until the Investigator has received the final approval or exemption email from the Chair of the Institutional Review Board.
2. That no participants will be recruited or entered under the protocol until all key personnel for the project have been properly educated on the protocol for the study.
3. That any modifications of the protocol or consent form will not be initiated without prior written approval, by email, from the IRB and the faculty advisor, except when necessary to eliminate immediate hazards to the participants.
4. The PI agrees to carry out the protocol as stated in the approved application; all participants will be recruited and consented as stated in the protocol approved or exempted by the IRB. If written consent is required, all participants will be consented by signing a copy of the approved consent form.
5. That any unanticipated problems involving risks to participants or others participating in the approved protocol, which must be in accordance with the Liberty Way (and/or the Honor Code) and the Confidentiality Statement, will be promptly reported in writing to the IRB.
6. That the IRB office will be notified within 30 days of a change in the PI for the study.
7. That the IRB office will be notified within 30 days of the completion of this study.
8. That the PI will inform the IRB and complete all necessary reports should he/she terminate University Association.
9. To maintain records and keep informed consent documents for three years after completion of the project, even if the PI terminates association with the University.
10. That he/she has access to copies of 45 CFR 46 and the Belmont Report.

Principal Investigator (Printed)

Principal Investigator (Signature)

Date

## FOR STUDENT PROPOSALS ONLY

## BY SIGNING THIS DOCUMENT, THE FACULTY ADVISOR AGREES:

1. To assume responsibility for the oversight of the student's current investigation, as outlined in the approved IRB application.
2. To work with the investigator, and the Institutional Review Board, as needed, in maintaining compliance with this agreement.
3. To monitor email contact between the Institutional Review Board and Principle Investigator. Faculty advisors are cced on all IRB emails to PIs.
4. That the Principal Investigator is qualified to perform this study.
5. That by signing this document you verify you have carefully read this application and approve of the procedures described herein, and also verify that the application complies with all instructions listed above. If you have any questions, please contact our office (irb@liberty.edu).

Faculty Advisor (Printed)

Faculty Advisor (Original Signature)

Date

\*The Institutional Review Board reserves the right to terminate this study at any time if, in its opinion, (1) the risks of further experimentation are prohibitive, or (2) the above agreement is breached.