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# The Link Between Co-Teaching and Mathematics Achievement for Students with Disabilities

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The University of Southern Mississippi

THE LINK BETWEEN CO-TEACHING AND MATHEMATICS ACHIEVEMENT  
FOR STUDENTS WITH DISABILITIES

by

Lisa Sharble Word

Abstract of a Dissertation  
Submitted to the Graduate School  
of The University of Southern Mississippi  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Philosophy

December 2012

## ABSTRACT

### THE LINK BETWEEN CO-TEACHING AND MATHEMATICS ACHIEVEMENT FOR STUDENTS WITH DISABILITIES

by Lisa Sharble Word

December 2012

Co-teaching is an approach where general education teachers and special education teachers work together to meet the needs of all students in the general education setting. The purpose for this study was to examine the relationship between specific variables involved in co-teaching (preparation for co-teaching training, collaborative practices, selection process of co-teaching pairs, and use of specialized instruction) and student mathematics achievement as reported by a standardized test administered in the spring of each year. The study focused on the mathematics test results of fifth and eighth grade special education students in co-taught math classrooms.

The researcher conducted the study in a large suburban school district located in the southeastern United States. Participants were general and special educators in math co-teaching teams in Grades five and eight in 25 middle schools and 69 elementary schools. Sixty-five teachers completed the 34-item Perceptions of Co-Teaching Survey used to collect the data from the co-teaching teams. A correlation matrix was created to answer three of its four related hypotheses. The results indicated no significant correlations between three of the four hypotheses. However, a two-way chi square analysis was used to determine if passing a standardized math assessment was associated with the selection process. There was a significant relationship found.

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A Dissertation

Submitted to the Graduate School  
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## CHAPTER I

### INTRODUCTION

Throughout our history, education has been a very selective process and discrimination has been seen in many different ways (Hardman & Dawson, 2008). Education was only for those individuals who displayed the most capability to learn, and schools were not required to look at individual student needs. Even the United States Constitution was clear that education was the responsibility of each state (Hardman & Dawson, 2008). However, the United State Supreme Court case *Brown v. Board of Education* in 1954 helped establish the foundation for students with disabilities to be included in the public schools (LaMorte, 2008).

Since then, special education teachers have fought for their students to be educated alongside their general education peers (Kloo & Zigmond, 2008). Currently, legislation requires special needs children to be taught and evaluated on the same content areas as their general education peers. Co-teaching, according to Kloo and Zigmond (2008), appears to be a natural way to accomplish this standard. Co-teaching has other positive effects for both the student and the teacher. Teacher instruction becomes more dynamic and the professionals are able to learn from one another and prepare lessons that address a variety of levels (Dieker & Murawski, 2003; Friend & Cook, 2007).

#### Background of the Problem

Naturally, this movement towards co-teaching caused a paradigm shift for the education system and its teachers. No longer were the students with disabilities to be in a separate school, but they were to be educated alongside their general education peers. This transformation occurred in small increments in most school districts across the

United States. Generally, these students were educated in resource rooms that were self-contained in nature but located in the public schools. Unfortunately, the students in the segregated classrooms had very little interaction with general education students (Snyder, 1999). Hardman and Dawson (2008) acknowledged that the publication of *A Nation at Risk* by the National Commission on Excellence in Education (1983) heightened the discussion of the federal government's involvement in education. This commission made it clear that the education system was in crisis and that the federal government must become more active to guarantee that schools were held accountable for the achievement of students. With the involvement level heightened, the federal government offered rewards for states that agreed to raise the standards for both general education and special education students (Hardman & Dawson, 2008). The emphasis was placed on the reform of educational standards. There were other legislative actions initiated to address the Nation at Risk report, such as the Goals 2000: Educate America Act (1994) and the Improving America's School Act (1994) that provided incentives for districts if they increased student performance and included a responsibility component for their schools (Hardman & Dawson, 2008).

In 1990, the Education for All Handicapped Children Act of 1975, known as Public Law 94-142 (1975), was reauthorized and renamed The Individuals with Disabilities Act (IDEA) (LaMorte, 2008). More regulations pertaining to students with disabilities accessing general education were included at this time. The emphasis on inclusion of special needs students into the general education classroom was a major focus. Students must be educated in the least restrictive environment. In order to comply with the least restrictive environment requirements, LaMorte (2008) reported schools

must educate students with disabilities with nondisabled peers to the maximum extent appropriate. These placement discussions had to be based on a variety of information such as, the child's current functioning, observations, work samples, and information from the parent in order to meet the least restrictive environment requirements.

### *Mathematics Achievement*

As part of the No Child Left Behind Act of 2001 (NCLB) accountability, all students, including those identified as having special needs, must meet specific standards. The formula used to measure this progress is referred to as adequate yearly progress (AYP). One of the three areas evaluated is the academic performance in math (Georgia Department of Education, 2011a). The Criterion-Referenced Competency Test (CRCT) is mandated in the state of Georgia as one of the assessment components used to determine AYP. Fifth and eighth graders must pass the mathematics section of the CRCT in order to be promoted to the next grade (Large School District, 2011).

As Van Garderen (2008) stated, we are living in an era when special needs students are being included with regular education students and the same standards are expected for both student groups. However, all students have difficulty with mathematics (Cole & Wasburn-Moses, 2010). Increasing math achievement for special education students, particularly with fraction computation (Behr, Wachsmuth, & Post, 1985) and word problems (Cawley, Parmar, Yan, & Miller, 1998) is a difficult task. Maccini and Gagnon (2002) described the initiative of the National Council of Teachers of Mathematics (NCTM) (1989), to the current standards-driven reform. The NCTM (1989) established five goals to address weak math achievement among students. The NCTM goals stated that students need to

1. Become better problem solvers,
2. Learn to reason mathematically,
3. Learn to value mathematics,
4. Become more confident in their mathematic ability, and
5. Learn to communicate mathematically. (p. 326)

Anderson, Kutash, and Duchnowski (2001) reported that students identified as having a learning disability or emotional behavioral disorder share some similar academic and behavioral traits. One such difficulty consists of attending to major concepts (Kauffman, 2001). According to Kroesbergen, Naglieri, and Van Luit (2003), students diagnosed with a math learning disability have particular cognitive weaknesses. These deficits are typically in the areas of working memory, storage and retrieval of math facts from long-term memory, problem solving skills, and number processing weaknesses (Geary, Hanson, & Hoard, 2000; Jordan & Hanich, 2000). It is further stated that the performance IQ scores were lower when compared to the students' verbal IQ scores (Jordan & Hanich, 2000).

### *Co-Teaching*

Now, general and special education teachers are teaching special need students together in their classrooms. The federal mandates from NCLB called for teachers to work together to improve learning outcomes for all students. Students with disabilities must be learning, and their learning needs are to be based on grade-level standards. Lingo, Bartow-Arwood, and Jolivette (2011) stressed the importance of students with disabilities accessing the general curriculum and learning alongside regular education students. This has resulted in more collaboration between special and general educators.

*Co-teaching* is an approach where general education teachers and special education teachers work together to meet the needs of all students in order for them to achieve (Tilton, 2000). The advantage of co-teaching is that special needs students are exposed to the general education curricula with accommodations in place to help them meet success (Rice, Drame, Owens, & Frattura, 2007). This allows students not only to progress in grade-level curriculum, but co-teaching also addresses the weaknesses noted in the student's individualized educational plan (IEP). An IEP contains a description of a student's academic achievement and functional performance. Annual goals and objectives are created to address the student's deficit areas (Georgia Department of Education, 2011d). This may not have been the case if the student remained in the special education class. A variety of co-teaching models exist, but they involve both teachers designing lesson plans and actively participating in the instruction of the content.

#### Statement of the Problem

A limited amount of research has been conducted on the effectiveness of co-teaching on student achievement (Welch, 2000). Furthermore, at the elementary level, these findings are inconsistent as the data relates to student progress in the co-teaching setting. More studies need to be conducted on the relationship between co-teaching and student outcomes (Fontana, 2005). If student improvement and co-teaching can be linked, then this model of instruction would become a viable option for many students with disabilities (Bouck, 2007). Since co-teaching is being used as an option for special education students (Weiss & Brigham, 2000), it is recommended that teachers should collect data on the positives and negatives of the model. Variables that have been reviewed as important to the effectiveness of the co-teaching model are collaborative

practices (Dieker & Murawski, 2003; Kamens, 2007), the selection process (Murawski & Dieker, 2008), teacher preparation for co-teaching (Fontana, 2005), and providing specialized instruction (Snyder, 1999). Since co-teaching has become an alternative model to integrate students with disabilities into general education classrooms as stated by Weiss and Brigham (2000), there needs to be more research data outlining the strengths and weaknesses of this approach. Welch (2000) reported that the achievement gains for students with disabilities in co-taught classes produced mixed results.

### Purpose of the Study

This research study was designed to examine the relationship between specific variables involved in co-teaching (preparation for co-teaching training, collaborative practices, selection process of co-teaching pairs, and use of specialized instruction) and student mathematics achievement as reported by the yearly standardized test (CRCT) administered in the spring of each school year in Georgia. The researcher conducted the study in a large suburban school district with a student enrollment of 106,719 (Large School District, 2011). The study focused on the test results of fifth and eighth grade special education students in co-taught math classrooms.

### Hypotheses

The following hypotheses guided this study:

H<sub>0</sub>1: The preparation for co-teaching training of the co-teaching team is not significantly related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

H<sub>0</sub>2: The co-teaching team's collaborative practices are not significantly related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

H<sub>0</sub>3: The selection process of co-teaching pairs is not significantly related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

H<sub>0</sub>4: The use of specialized instruction by the co-teaching team is not significantly related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

### Definition of Terms

*Co-teaching.* Cook and Friend (1995) defined co-teaching as “two or more professionals jointly delivering substantive instruction to a diverse, or blended, group of students in a single physical space” (p. 1).

*Emotional behavioral disorder (EBD).* EBD is an emotional disability characterized by (a) “an inability to build or maintain satisfactory interpersonal relationships with peers and/or teachers; (b) an inability to learn, which cannot be adequately explained by intellectual, sensory or health factors; (c) a consistent or chronic inappropriate type of behavior or feelings under normal conditions; (d) a displayed pervasive mood of unhappiness or depression; and (e) a displayed tendency to develop physical symptoms, pains, or unreasonable fears associated with personal or school problems” (Georgia Department of Education, 2011c, para. 1).

*General education teacher.* A teacher certified to provide instruction in an elementary level classroom or a secondary level subject area (Austin, 2001).

*Learning disability (LD).* LD is “a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write,

spell, or do mathematical calculations” (Georgia Department of Education, 2011d, para. 1).

*Special education teacher.* A teacher certified to provide instruction to any student in Grades K-12 who is classified as having one or more disabilities (Austin, 2001).

*Specialized instruction.* The types of unique instructional services needed by a child or youth with a disability to accomplish IEP goals and objectives. These services include alterations, modifications, and adaptations in instructional methods, materials, techniques, media, physical setting, or environment (North Smithfield School Department, 2011).

#### Delimitations of the Study

The study was delimited to

1. Only one school district,
2. Co-teaching teams in the fifth and eighth grades, and
3. Only one subject area.

#### Assumptions of the Study

The assumptions of this study included

1. All respondents who received a survey were honest in their responses and completed the survey in a timely manner; and
2. The population surveyed was a fair and accurate representation of the general population.

### Significance of the Study

This study will give another option for educators to consider when trying to determine the most effective and efficient approach to help close the achievement gap for students with disabilities. The guidelines set forth by the federal government for educating students with disabilities are challenging, and co-teaching is a way to reach these standards. All stakeholders are affected by the urgency of the situation because it is the right of all students to progress toward grade-level standards. In addition, the government has made it clear that, unless school districts reach the criteria set forth, sanctions will be imposed on schools and districts. Special education students have been pushed aside for far too long, and now they must show progress in their education and learn the same standards as their general education peers.

From *Brown v. Board of Education* to the NCLB legislation, the courts have recognized the rights of children with disabilities to a free and appropriate public education. The doors of education have slowly opened for special needs students. As the years progressed, more rights and opportunities were extended to this population of students. Not only were schools required to educate these children, but they also must be included for the maximum amount of time, when appropriate, with their general education peers. Special needs students went from segregated schools, to segregated classrooms, to inclusion within the general education classroom. They also went from not being required to achieve grade-level standards to being included in the monitoring process of these standards like their general education peers. Being a part of the general education classroom is only the beginning. The challenge now comes in knowing how to

reach these students so they can achieve success alongside their peers. Co-teaching is the model that can address these issues.

### Summary

Since the passage of IDEA, participation in the general education curriculum for students with special needs is a priority (Smith, Frey, & Tollefson, 2003). In addition, the goal is for all students, those both with and without disabilities, to achieve to their potential based on a standards-driven curriculum. Duke and Lamar-Duke (2009) reported the political and social pressures felt by schools to produce positive achievement outcomes for students with disabilities. Smith et al. (2003) suggested it is not the willingness to execute co-teaching, but the ability to put into practice the concept that matters most.

In Chapter I, the researcher discussed the Background of the Problem as it related to individual court cases, the Statement of the Problem, Purpose of the Study, and the Hypotheses designed for the study. In Chapter II, the researcher will present literature related to this study and discuss the theoretical foundation for the study. Chapter III contains information on how the study was conducted and how data were analyzed. The results of the study are reported in Chapter IV. Chapter V comprises a discussion of the results in relation to related literature, as well as recommendations for future studies.

## CHAPTER II

### REVIEW OF THE LITERATURE

Typically, schools support students with disabilities through a pull-out system (Delmore, 2003). This approach has the special education student leaving the general education classroom and being instructed by a special education teacher in a separate classroom away from their peers. As a result, special education students had very little interaction with general education students. This created a void between the special education students and the school (Delmore, 2003). In addition, Delmore (2003) stated these classes may not be providing the quality of instruction that would be received in a general education classroom. Most preparation for the special education teacher does not focus on teaching standard-based curriculum. Schumm and Vaughn (1995) found that the preservice teacher preparation program needed to implement programs that focused on planning and collaboration between general education and special education teachers. Special education students must be a part of the general education curriculum setting. This emphasized the importance of increasing student achievement for all (Smith et al., 2003).

Dieker and Murawski (2003) stressed the urgency the country is facing with the focus on high stakes testing. The bar has been raised for all students, including students with disabilities. One solution to this situation is for schools to consider implementing the co-teaching model to help obtain the high standards being set for students with disabilities (Dieker & Murawski, 2003). Rea, McLaughlin, and Walther-Thomas (2002) reviewed two middle schools' approaches to teaching eighth grade special education students. Rea et al. (2002) found that students in the co-taught classroom received higher

scores, displayed fewer discipline referrals, and had better attendance than the students who were served in pull-out classes. They concluded that further investigation on the effectiveness of co-teaching was warranted. The current research study was designed to examine the relationship between specific variables involved in co-teaching and student mathematics achievement as reported by the standardized test administered in the spring of each school year in Georgia.

### Theoretical Framework

Vygotsky (1993) is considered the founder of cultural psychology. This theory emphasizes the cultural process of an individual, rather than the natural process. The result of these social relationships helps create an individual's makeup. Vygotsky's writings suggested the primary goal of special education should be to eliminate the negative social consequences aimed at individuals with a disability. Vygotsky's theory of cognitive development discussed the negative social consequences of a student's disability. This theory described the need to lessen any environmental effects of the disability rather than trying to fix the disability. This approach stressed the strengths of the disabled child, not the weaknesses. It tried to minimize the stigma of the disability by focusing on educating people to accept others who may be different and to respect them for their contributions to society (Vygotsky, 1993).

The secondary problems that may occur for students with disabilities can be far more damaging than the disability itself (Vygotsky, 1993). An alternative to this would be to change the environment and create one that is supportive and aligned with positive social development of children. Gindis (1999) reported that children can benefit from the help and guidance adults can provide through scaffolded learning. Vygotsky's ideas

regarding scaffolding do not support lowering expectations, diluting curriculum, or alienating students with disabilities. As Murawski and Dieker (2008) proposed, curriculum should not be watered down for the students. Instead, different ways to teach in order for the disabled student's needs to be successfully addressed is the objective. Vygotsky's theory of social development supports the inclusion model for students with special needs because it reduces the negative social stigma.

Maslow (1970), a humanistic psychologist, developed a hierarchy of five basic needs for humans. The implications of this theory has been experienced in a variety of fields, one being education. Safety and physiological needs consist of the very basic two levels. Physiological needs include oxygen, food, and water: basically, human survival. In order for a person to progress to the next level, these needs must be met. Next, people need to have a sense of security and to feel safe. Individuals require a sense of predictability in their world and a level of fairness (Maslow, 1970). The next three levels of Maslow's hierarchy of needs deal with fulfilling the needs of belonging, esteem, and self-actualization. Needs for belonging and esteem involve interaction with others, which can be related to co-teaching. Simons, Irwin, and Drinnien (1987) concluded that the sense of belonging is cultivated by friendships. Self-respect and the sense of acceptance is another level of needs, while the highest level is self-actualization, where individuals reach their full potential.

Glasser (1998) also recognized that after attaining our physiological needs, four basic psychological needs must be addressed. The first is love and belonging. These needs are fulfilled by caring for others and developing relationships with family and friends. The other three psychological needs are power, freedom, and fun. According to

Kloo and Zigmond (2008), students with learning disabilities enhance their social skills and social acceptance while participating in a co-teaching model. Findings by Vaughn, Elbaum, Schumm, and Hughes (1998) revealed that the amount and level of friendship progresses for students when leaving a self-contained special education classroom for a co-taught environment. Vaughn et al. (1998) also reported improved acceptance by peers in a co-taught classroom.

### Special Education

Special education has a very short history compared to general education (Martin, 1997). Martin (1997) reported that educating students with severe disabilities did not even exist in the United States for an extended period of time. The conception of separate programs for students with significant disabilities began in the early 19th century. These programs allowed learners to leave their homes and attend separate schools or a residential institution. Because individuals with learning disabilities were not identified until much later in history, they were educated alongside their peers in regular classrooms with little success (Martin, 1997).

Martin (1997) addressed the negative impact of the separate placements for special education students. Martin (1997) found there was a lower expectation for learning for special education students, so these learners did not achieve up to their maximum potential. Secondly, the separate classroom became a place for teachers to send students who had difficulty learning or had behavior problems. In addition, teachers' perspectives were affected negatively which resulted in teachers not wanting to work with special education pupils. Lastly, Martin (1997) suggested that placing students

with special needs in separate facilities only reinforced the notion of low expectations for this population of learners.

Martin (1997) referenced *Brown v. Board of Education* in 1954 and the Civil Rights Act of 1964 as they related to equal treatment for all students. However, one of the landmark cases for students with special needs was Public Law 94-142: Education of All Handicapped Act (1975). Before P.L. 94-142, approximately one million children with special needs were excluded from public schools, and around four million did not receive an adequate education program (Martin, 1997). This law is referred to as the mainstreaming of special education students.

Two more cases that had substantial impact for identifying educational rights for students with disabilities were the 1972 *Pennsylvania Association for Retarded Children (PARC) v. Pennsylvania and Mills v. Board of Education of the District of Columbia* (LaMorte, 2008). The findings of the PARC case established that children aged six through 21 must be given the opportunity to a free public education. It also stated that, when possible, students with disabilities should be placed in the regular education setting and only in special education classrooms when required. The *Mills* case ruled that all school age students with disabilities should be provided a free and adequate public education (LaMorte, 2008). Other legislation has drawn attention to the needs of the special education student. The Rehabilitation Act of 1973 stated that individuals may not be discriminated against in any federally funded program based on their disabilities (U.S. Department of Justice, 2005). It further required equal access to all programs, and under Section 504, schools are required to develop a plan to meet individual needs of these students (Civil Rights Legislation, 1973).

Since the enactment of the Education for All Handicapped Children Act of 1975 (EAHCA), also known as Public Law 94-142, the U.S. Congress guaranteed free appropriate public education for all students with disabilities in the least restrictive environment. Leafstedt et al. (2007) noted the passage of P.L. 94-142 was a huge conquest for students with disabilities, their families, and their supporters. If schools were to continue to receive federal and state funding, they had to develop and implement the policies that ensured free and appropriate public education (FAPE) for all students with disabilities. From this point forward, students with special needs were included in the public school arena. With FAPE, students with special needs gained access to public education (Hardman & Dawson, 2008).

Hardman and Dawson (2008) noted that the current educational reform, NCLB, emphasized that all students, including students with special needs, should acquire greater academic gains. In the past, these students were not always included in the reports that showed progress. However, with NCLB, students with disabilities must have access to the same standards as general education students, and they will take the same assessment measure. In addition, these scores are included in the process of determining if a school, district, or state reaches the performance criteria (Hardman & Dawson, 2008). Not all states were in agreement with this approach for standards-driven curriculum for each grade level and grade level testing (Gandal, 2007). Some states did not like the invasion of the federal government; however, many schools used this as a springboard to help improve student achievement (Gandal, 2007).

Each state had a different reaction to the federal government quest for establishing content standards and assessing student progress (Hardman & Dawson, 2008). Two

types of assessments were designed. Hardman and Dawson (2008) referred to them as “low stakes or high stakes” (p. 3). Low stakes assessments collect data on student performance that assists in determining student learning and stresses school and student accountability. High stakes assessments yield student and school consequences for not making adequate progress. The measure mandated by the NCLB legislation for student achievement was referred to as adequate yearly progress (AYP) for all students. The Georgia Department of Education (2011a) defined AYP as “the formula used to determine if schools and school systems are meeting standards” (p.1). In passing of the NCLB legislation, the U.S. Congress has communicated to the people that in order for education to move forward with standards-based curriculum and an increase in student performance, the government must remain involved (Hardman & Dawson, 2008).

According to NCLB, those schools and districts not meeting accountability standards will be subjected to sanctions and a plan for improving the failing schools must be developed by the school district. For example, the Michigan Department of Education (2009) reported that schools not making AYP for two to six consecutive years had a range of sanctions imposed on them. The schools that did not make AYP were identified for school improvement. Parents were notified of the school status, and they were allowed to apply for transfers within their district to a school that did make AYP. Transportation was also provided for students to attend the school of choice. The school could be eligible for federal funding in the area of technical assistance for school improvement (Michigan Department of Education, 2009). Similar sanctions and services were developed in all states as a requirement of NCLB.

Additionally, NCLB required that a two year plan for school improvement must be developed to address how a failing school's weaknesses will be improved. For each additional year a school does not make AYP, more sanctions are added. After four years of failing to meet AYP, the NCLB legislation requires that the faculty in the failing schools must be replaced, professional development provided for the new faculty, and a new curriculum be implemented to improve student achievement. At that point, individuals from outside the school and school district are contacted for assistance with the school improvement plan. If AYP is not met after all these interventions, the school has several restructuring options. According to the Michigan Department of Education (2009), schools may substitute the staff with all new individuals, identify an outside agency to operate the school, participate in a state takeover, or undergo a major restructuring projection (Michigan Department of Education, 2009).

#### Benefits of Co-Teaching

Partly due to the reauthorization of IDEA and the mandate of NCLB, co-teaching popularity has increased (Snyder, 1999). The necessity of teaching special education students with nondisabled peers and being held accountable for students learning general education standards are driving the popularity of the co-teaching models. Instead of special education students being removed from the general education setting for instruction, they are now staying in the general education classroom and receiving specialized instruction (Snyder, 1999).

Teachers are having difficulty meeting the requirements set forth by the NCLB federal legislation (Little & Dieker, 2009). Co-teaching or the combining of the general education teacher who has the content expertise with the special education teacher who

has the expertise with specialized training on learning strategies, helps meet the requirements of the federal legislation (McLaughlin & Thurlow, 2003). Dieker (2001) further noted that co-teaching created a unique blend of content and curriculum from the general education teacher with the special education teacher focusing on the learning process.

General education and special education teachers working together address all the needs of students, both with and without disabilities (Kloo & Zigmond, 2008). While general educators are more familiar with the content standards, the special education teachers are more familiar with the individual strengths and weaknesses of the students with disabilities and know how to accommodate their needs so they can achieve in the general education classroom setting. Murray (2004) found that the combination of these two disciplines has positive results for all students in the co-teaching model. This approach also allows students with disabilities to be educated in the least restrictive environment.

Co-teaching focuses on the unique blend of strengths from the general education teacher and special education teacher (Kloo & Zigmond, 2008). With these two advantages in place, the student with a disability has access to general education curriculum within the classroom and receives the support needed to be successful. Having a special education teacher working collaboratively with the general education teacher will not only increase the number of instructional practices occurring in the classroom, but it will also benefit the special education student, as well as other at-risk learners who will prosper with the additional support and expertise of the special education teacher (Kloo & Zigmond, 2008).

Kloo and Zigmond (2008) discussed the impact of co-teaching on the number of students per teacher, known as the student-teacher ratio. They explained that co-teaching will increase the opportunities for interaction between teachers and students and the engagement level of students. Instead of isolating students for extra help, the support is built into the lesson for the whole class. This, in turn, reduces the stigma against students being pulled out of the general education classroom (Kloo & Zigmond, 2008).

Welch (2000) reported that general education students and students identified with learning disabilities all made progress in reading and spelling in a co-taught classroom. In addition, Welch (2000) also concurred with Kloo and Zigmond (2008) that an advantage of co-teaching is the removal of the negative connotation of moving to the special education classroom with the students with learning disabilities. Furthermore, this allows the special needs students more time with their nondisabled peers (Snyder, 1999). This approach also helps special education students to feel included with the class and make friends more easily (Mahoney, 1997). For high school classes, it was noted that special services can be included in the academic classes instead of an additional class that would address individual student weaknesses. In addition, this will provide the students with disabilities the opportunity to participate in more elective classes (Friend & Pope, 2005).

In a study by Austin (2001), general educators reported that co-teaching had a positive effect on their professional growth as their knowledge of behavior management and their ability to differentiate their lessons to accommodate all learners more effectively improved their classroom environment and student learning. The findings from special education teachers indicated a deeper understanding of the content areas.

Murawski and Dieker (2004) recommended that co-teachers share a lesson plan book to provide the opportunity for special education teachers to exchange different instructional strategies with their general education partners. Although the curriculum does not change, the way it is presented to all students is altered so it addresses the different learning styles of the students (Tomlinson, 2005). In order for special education teachers to be effective instructors, Kloo and Zigmond (2008) stated they must adjust their styles of teaching to “the instructional possibilities of the curriculum” (p. 17) and not to the desires of their general education teachers. Collaboration between the general education and the special education teacher will ensure student needs are being met (Tomlinson, 2005). Students in co-taught settings experienced success both academically and socially, and co-teaching helped improve their overall self-concept when compared to special needs students served in small-group settings (Murawski, 2006; Rea et al., 2002).

Villa, Thousand, and Nevin (2004) shared three reasons why special needs students can be effectively educated in the general education setting and improve both academically and socially. First, the co-teaching environment promotes collaboration between adults. The children not only experience this approach, but they also witness it every day. It helps them learn how to work with their peers in a more effective manner. Murawski and Dieker (2008) stressed that by students participating in co-teaching, they are learning how to work cooperatively with one another. Secondly, according to Villa et al. (2004), two teachers co-teaching in a given classroom provide for more flexible grouping, and students have a shorter wait time to receive feedback on their questions. Additionally, co-teaching creates greater on-task behavior and student engagement. Both factors are related to increased student achievement (Villa et al., 2004). Teachers and

students reported that they enjoyed their work in a co-teaching environment, thus contributing to a positive collaborative culture within the school. Lastly, Villa et al. (2004) also found that co-teachers were designing their lessons more effectively and using the research-based strategies required by the NCLB Act. Because this approach brings educators together to solve challenges that before were left up to only one person, barriers are now being removed for special needs students. Arguelles, Hughes, and Schumm (2000) reported that these positive outcomes have administrators and advocates looking at the co-teaching model as an appropriate model for student with disabilities.

Another reason co-teaching is beneficial relates to teacher satisfaction. Teachers feel empowered when they make decisions collaboratively (Villa et al., 2004). Glasser (1998) suggested that individuals choose to do what they do based on five basic needs. These needs are “survival, power over or control of one’s life, freedom of choice, a sense of belonging, and fun” (Glasser, 1998, p. 6). According to Villa et al. (2004), these needs can be met within the co-teaching environment. Now the teacher is not alone but can work collaboratively with a co-teacher to help assist in the needs of diverse learners. These teachers routinely share with one another and grow professionally because of the collaborative culture that can lead to a more positive teaching and learning environment (Villa et al., 2004).

From reports based on interviews with co-teachers, Villa et al. (2004) reported several reasons why co-teaching can address the five basic needs. In the area of survival, it increases the number of students who can receive help and decreases their wait time. The need for freedom of choice is related to sharing the responsibility for all the students, ability to work with a variety of students, and not requiring so much assistance from the

administration. In addition, teachers do not feel so alone, and there is support from people with different skill sets. Having another person to talk and share laughs with fulfills the need for fun (Villa et al., 2004). In addition, having laughter in your classroom can benefit everyone (Murawski & Dieker, 2008). It can help eliminate stress and assist with learning.

Rice et al. (2007) identified six characteristics that give support to effective co-teaching and contribute to a valuable co-teaching approach: (a) being professional, (b) demonstrating effective instruction, (c) evaluating student gains, (d) analyzing teaching styles, (e) helping all students, and (f) being invested in the subject area. After a structure has been established, both teachers and students begin to depend on each other. In addition, the general educator looks to the special educator for suggestions when it comes to strategies and interventions based on individual student needs (Rice et al., 2007). Both teachers need to have conversations about the content of the material and decide how it would be best taught knowing the strengths and weaknesses of the students in the classroom (Murawski & Dieker, 2004). Rice et al. (2007) stressed the importance of both teachers contributing their own expertise, which benefits all students in the classroom. The special education teacher needs to explain specifically how the students' deficits affect their abilities to learn and offer individual suggestions for each student.

In interviews with general educators, Rice et al. (2007) stated the need for assistance in the grading and assessment of students with IEPs. This is where the special education teacher can share knowledge by helping create appropriate ways to determine if the student is mastering the course standards. Rice et al. (2007) noted that the special educator must have knowledge of the curriculum in order to accomplish this. Murawski

and Dieker (2004) acknowledged that the special education teacher can also be the leader in designing lessons and taking charge in planning the instruction. Acting as peer coaches to each other can also be another important component (Rice et al., 2007). Observing the teaching styles and making recommendations on how to assist students with obtaining the material can be very helpful (Rice et al., 2007). The special education teacher's role is to help all students, not just the special needs students. This way the students are not stigmatized, and the special educator is seen as another teacher, not a paraprofessional. Rice et al. (2007) acknowledged that often the special education teacher is required to teach an unfamiliar content area. In order for the co-teaching arrangement to be successful, the special education teacher must study the content and be prepared to teach the lesson.

Co-teaching is a way to make available a quality education for all students. Co-teaching also influences the school culture (Barth, 2006). Sometimes referred to as collaborative teaching, co-teaching impacts school culture by encouraging the faculty to work together for the benefit of all students. To maximize the impact of co-teaching on the overall school culture, Barth (2006) also suggested that this model for teaching should be grounded in shared goals among the faculty. Friend (2007) added that a truly inclusive co-teaching model accepts all students, no matter what their strengths or weaknesses may be, and the faculty is committed to working with all students to ensure their success. Naturally, the co-teaching model is not beneficial for all students with disabilities. Some students need a more intense structure and require small-group instruction in order for them to increase their achievement level (Friend, 2007).

## Models of Co-Teaching

Cook and Friend (1995) defined co-teaching as “two or more professionals jointly deliver[ing] substantive instruction to a diverse, or blended, group of students in a single physical space” (p. 1). These two teachers are considered equal colleagues and both contribute to the instruction on a daily basis (Murawski, 2008). Fattig and Taylor (2008) added that co-teaching is more than two individuals teaching together. There must be collaboration occurring to have effective co-teaching, where the two co-teachers work together to determine the *what* and *how* of each lesson. One major plus for co-teaching is the smaller student-teacher ratio and, of course, the capability to group students in a variety of ways (Friend & Cook, 2007; Murawski & Dieker, 2008). As Kloo and Zigmond (2008) stated, because reading and mathematics are skills specific, using the co-teaching model allows for increased chances for student participation and active learning. Having two teachers should naturally create two instructional groups. Consequently, the teacher-student ratio is smaller in a co-teaching model, giving students an opportunity to respond more often, stay engaged, and receive frequent feedback. Kloo and Zigmond (2008) stressed that the norm for this type of class should be more small-group instruction. Parallel teaching, alternative teaching, and station teaching are other models for organizing collaborative teaching models that also reflect a smaller teacher-student ratio.

Kloo and Zigmond (2008) recommended that the special education teacher’s role should be as an active participant in the co-teaching model. In a co-taught math or reading class, the special education teacher is not just assisting or observing students; rather she is teaching the content knowledge to students collaboratively with the regular

teacher, which allows the students to participate and receive feedback more frequently.

In addition to the smaller student-teacher ratio, Fattig and Taylor (2008) noted several other advantages of the co-teaching model:

1. It is far easier to manage student behavior with two individuals;
2. Creating lessons that address an array of student needs is more manageable;  
and
3. The typical classroom responsibilities can be shared with another person. (p. 5)

Friend (2005) identified six co-teaching approaches: (a) one teach–one observe, (b) team teaching, (c) alternative teaching, (d) parallel teaching, (e) station teaching, and (f) one teach–one drift. The one teach–one observe model is a whole-group approach to instruction where one teacher is teaching the entire group and the other teacher observes the students (Cook & Friend, 1995). This approach allows the teachers to collect student data and monitor their success. These data can be helpful when writing IEP goals and objectives (Sileo & van Garderen, 2010).

Team teaching happens when both teachers equally plan and deliver the instruction to the entire class. The teachers are both in front of the class sharing the lesson. One advantage to this approach is the blending of both teachers' expertise (Friend & Cook, 2006). This ensures that all material has been covered and no important information has been left out. Cook and Friend (1995) described alternative teaching as one teacher with a smaller number of students while the other teacher has the rest of the group. Usually, with the alternative approach the teacher can focus on intense specialized instruction and individualized instruction for a smaller group of students.

Parallel teaching represents two equally divided groups of students with a teacher assigned to each group (Friend, 2005). The same content is covered but perhaps a different method of instruction is used. Again, this approach creates a smaller student-teacher ratio where the teacher can identify and customize the instruction to specific individualized needs and learning styles.

Dividing the class into groups and creating different centers through which students rotate and where the teachers share in the planning and implementation of the lesson is referred to as station teaching (Friend, 2005). These different centers all focus on the same standard being taught but use different instructional activities. Typically, one center is an independent rotation where students work on independent skills. Station teaching also reduces the teacher-student ratio. The last approach is one teach–one drift. While one teacher is teaching, the other teacher walks around and provides one-on-one instruction to students having difficulty understanding the material (Friend, 2005).

The models of co-teaching that Cook and Friend (1995) recommended, are approaches that deal with the grouping of students versus the traditional method of teaching whole-group instruction. Station teaching, parallel teaching, and alternative teaching represent ways to group students for effective learning. Combining students allows the use of specialized instruction within the classroom without pulling the special needs students away from their peers (Murawski & Hughes, 2009). Regrouping students becomes natural, and the teachers can use this approach as needed to address student weaknesses. This arrangement allows students to float in and out of specialized instruction whenever it is required without disrupting the class routine (Murawski & Hughes, 2009). Staying in the classroom keeps the lines of communication open between

the two teachers in these co-teaching models because they can actually see what the other is instructing.

### Professional Development

Friend (2007) reported that professional development becomes a necessary component of designing and sustaining co-teaching. Scruggs, Mastropieri, and McDuffie (2007) stressed the importance of teacher training for all co-teaching pairs, as faculty members need to have a clear understanding of what co-teaching is and how it should look in the classroom in order to implement the model successfully. Wasburn-Moses (2005) also recommended that the roles and responsibilities for each co-teacher should be established between the two individuals from the very beginning of implementation of the model. This can be accomplished through conversations during which decisions are made on how the co-teachers will actively participate in class instruction and support for all the students in the classes they share. If the special education teacher is not an expert in the content area, examples of what they will bring to the table need to be formulated. The focus should be on both teachers dealing with all students' different needs (Wasburn-Moses, 2005).

Friend (2007) recommended that co-teachers discuss basic classroom procedures, such as classroom discipline and grading, before they implement the model. Acceptable student behavior and the consequences of any inappropriate behavior must be established between the co-teaching pairs. Consistency in grading is also another important component. An example of shared responsibilities for grading students' work in a co-teaching model may be that each teacher could grade the same paper to check for

consistency (Friend, 2007). Reviewing IEPs for any grading accommodations will also need to be considered.

Allowing teachers to observe in other co-teaching classrooms can benefit both teachers implementing a co-teaching model (Friend, 2007). Teachers may give each other feedback and ask questions on classroom practices. Support through developing teacher groups is another helpful way for teachers to share concerns, success stories, and challenges they may be having. Co-teaching provides support, for not only the special education student, but also for the struggling student who has not been evaluated for special education (Friend, 2007).

Rea et al. (2002) reported that teachers who co-teach claim they benefited in many different areas. Friend and Pope (2005) found co-teaching helped create a sense of camaraderie between the general education and special education teachers. Not only did their instructional skills increase, but they also acquired more strategies and became stronger teachers. For the co-teaching model, as for all teaching models under the supervision of NCLB legislation, all instructional strategies and behavior management interventions in the co-teaching model should be research based. A major advantage of the co-teaching pair is to have two people implementing strategies that cannot be accomplished with only one person in the classroom (Friend, 2007). Having the opportunity to discuss successes and evaluate progress with another colleague is a major benefit to co-teaching. Co-teaching does not occur by chance (Kloo & Zigmond, 2008). It needs to be specific and well thought out. It combines specialized instruction and pedagogy that allows the special education student access to the general curriculum alongside their general education peers.

## Challenges

Many concerns and challenges face co-teaching teams (Mastropieri et al., 2005). At the high school level, teachers are to be experts in their content areas; however, at the elementary level, teachers are more global. Special education teachers are usually certified in all grades and are not subject-specific, but they have more knowledge pertaining to characteristics of the different special education exceptionalities. This can cause problems between the two teachers. Some general education teachers believe they do more than the special education teacher does. Mastropieri et al. (2005) concluded that the majority of the lesson planning and instruction often falls on the shoulders of the general education teacher.

The special education teacher is usually the one who does the remediation and implements the accommodations for the special needs students. At times, this is looked upon as unfair distribution of responsibilities, and the special education teacher is viewed more as a paraprofessional. In order to balance this situation, special education teachers need to increase their knowledge of the subject areas, and general education teachers need to learn more about accommodating diverse learners. Although the models of co-teaching promote two teachers actively involved with instruction, Magiera, Smith, Zigmond, and Gebauer (2005) observed the special education teacher's role as one who assists in independent work. The general education teacher is usually identified as the primary instructor in the classroom. Often the role of the special educator appears to be helping the students and participating in some of the planning, but the majority of the time they are assisting the general education teacher, not the disabled student (Anita, 1999).

Again, this is not the intent of the co-taught classroom. In a study conducted by Rice and Zigmond (2000), 17 secondary teachers were either interviewed or observed to determine the level of teacher engagement. All results indicated that none of the teachers was implementing co-teaching as defined by Cook and Friend (1995). Rice et al. (2007) agreed that the special education teacher must actively learn the curriculum, and the general educators must learn how to make accommodations and differentiate their instructional approaches. It was difficult for the two teachers to maintain equal roles because it was obvious that the special education teacher did not display the knowledge of the content (Rice & Zigmond, 2000). Anita (1999) suggested that this role of the subordinate is not limited to high school but is also prevalent in the primary schools. Friend and Pope (2005) reported that co-teaching can be more time consuming and requires effort from both teachers. Some teachers have difficulty giving up some of their power to the other teacher. Some teachers often feel their role is more similar to a paraprofessional than to a certified teacher.

Because there are many co-teaching structures (Sileo & Van Garderen, 2010), it is suggested that the co-teaching pairs initially try one structure at a time. The two individual teachers will need some time to get to know one another and each other's style of teaching. It takes time to develop a professional relationship and to reach a comfortable working rapport. Select one model, then as the comfort level increases, add another model until all structures have been implemented (Sileo & Van Garderen, 2010). Different approaches can be selected for different instructional goals (Cook & Friend, 1995).

Friend (2007) suggested other reasons why co-teaching may fail and why educators may be resistant in implementing this approach to improving student achievement. First, the special education teacher may not be familiar with the curriculum and may, therefore, be reluctant to participate in the instruction of the material. This results in the general education teacher not knowing what the co-teacher should be doing. Secondly, some general education teachers instruct the special education teacher not to interact with the students until the lesson is finished, and then assist the special needs students, causing the special education teacher to feel more like a paraprofessional. Thirdly, due to time constraints and other commitments, both teachers may find it difficult to plan together. Sileo (2003) stressed the importance of ensuring that teachers have time to plan together. If this does not happen, it no longer feels like a partnership between the two educators. Friend (2007) reported that teachers want at least some time during the week to co-plan. Administrators can assist with this by looking creatively at the school schedule and, when substitutes are in the building, trying to accommodate some extra planning time for the pairs of teachers. Murawski and Dieker (2008) recommended that administrators openly discuss any needs the co-teachers may have and supply them with any resources required. In order for co-teaching teams to be successful (Magiera et al., 2005), teachers must discuss together the standards that need to be addressed and the instructional strategies that need to be in place so all students can achieve.

Other aspects may interfere with the successful implementation of the approach. Friend (2007) reported the general education teacher may think that the special education teacher will judge their teaching ability. Special education teachers may feel that general

education teachers will question their contribution to the process. Often, after a few years of working together, a co-teaching team may request a break to do something different. Finding a new teacher to take the place of a more experienced co-teacher may be difficult. One of the new co-teaching pairs may fear that she will be compared to the previous co-teacher. Principals could assist in the process by making it an expectation that all teachers will be asked to co-teach at some point (Friend, 2007).

The support of administrators is critical for the success of co-teaching (Salend et al., 1997). Teachers need to know their administration staff is available if problems arise. Endorsement of the co-teaching model must be upheld by the entire faculty. Administrations need to be careful when scheduling co-taught classes. A balance must be reached. If a class has too many students with severe issues, the co-teaching model is destined to fail (Walter-Thomas, 1997). Fontana (2005) reported that, although central office personnel allow the implementation of the co-teaching model, very little support was provided to the teachers. This same level of involvement was displayed by the principals at the teachers' local school buildings. In order for this delivery model to be effective, administrators at all levels need to show their endorsement (Fontana, 2005).

Method that administrators use when selecting co-teaching teams is another component teachers express strong feelings about (Fontana, 2005). Trent's (1998) study emphasized participation for both teachers should be voluntary. If participation does not occur, teachers feel their opinions do not matter and the co-teaching experience is often negative. Fontana (2005) indicated when teachers are forced to participate, feelings of uneasiness can develop about the situation. Student improvement could be affected because of this apprehensiveness. Compatibility can be an essential characteristic of an

effective co-teaching endeavor (Rice & Zigmond, 2000). Rice and Zigmond (2000) reported co-teaching is like a professional marriage. Wood (1998) conducted a study with six elementary co-teachers. The general educators admitted having some turf issues. They were not open to the suggestions or ideas made by the special education teachers. Fontana (2005) stressed the importance of teachers having open and honest discussions with each other. However, it was noted that even after having these discussions about one's philosophy, the actual implementation in the classroom may look completely different (Fontana, 2005).

Scheduling is often another area that can cause problems with co-teaching (Friend, 2007; Sileo & Van Garderen, 2010). To prevent the special education teacher from traveling from classroom to classroom, a more effective method is to place the same grade-level special education students together in one classroom. However, Friend (2007) reported that placing too many special needs students together can also be inappropriate and ineffective. The distribution in elementary classes should be one-quarter of the class with special needs, and in middle and high schools no more than one-third of the students should have special needs. In high school, assigning the special education teacher to one specific content area rather than to multiple subjects helps with the effectiveness of the co-teaching model (Friend, 2007).

Parmar and DeSimone (2006) identified an area that may also be a challenge for co-teachers. Teaching philosophies of instruction may differ between the general and special education teacher. Differences of opinion about what practices are the most appropriate for students with and without disabilities may exist within the co-teaching team. This may cause some tension between the two professionals. Hudson and Miller

(2006) reported many special education teachers maintain that explicit teaching methodologies should be used instead of inquiry-based or reform-based approaches. Instead of limiting oneself to a single approach, Karp and Voltz (2000) suggested trying to blend the practices to help ensure gains on the goals and objectives in each student's IEP. No one approach will address all the different student needs.

The best co-teaching scenario is two teachers assigned to one classroom and working together all day (Kamens, 2007). Due to budget restraints, special education teachers often serve more than one classroom each day. General education teachers can no longer close their classroom doors and ignore the diverse needs of all the students. The same holds true for the special education teacher who only wants to provide services through using a self-contained model. Both teachers must work together in the same setting to acquire new skills that will allow them to be more effective and efficient with a wide variety of learners (Waters & Burcroff, 2007). As the roles of these teachers change, training must be prepared to address these areas so the teachers can grow in their new responsibilities.

Weiss and Brigham (2000) studied 23 different qualitative and quantitative reports on co-teaching during a 12-year span. Their findings demonstrated that the primary role of the special educator dealt with modifying instruction, classroom management, and checking growth of student learning. Conversely, the regular education teacher provided the instruction for the class. Several components were identified as important elements for successful co-teaching: (a) appropriate amount of planning time, (b) teacher attitude, (c) support from the administration, and (d) a common philosophy of education and classroom management.

The effectiveness of the research pertaining to the different components of co-teaching impacting student achievement is not sufficient (Weiss & Brigham, 2000). When looking at high school, Dieker and Murawski (2003) noted the value teachers place on having enough planning time, teacher preparation, understanding of the specific content by the special educator, the level of the high stakes testing in certain subjects, and class sizes as challenges to effective co-teaching. In a study by Dieker (2001), co-teachers voiced concern about the lack of planning time. Most were able to secure approximately 45 minutes weekly, but needed three times that amount. Most teachers were pleased with their co-teaching arrangements, but cited lack of support from their administration in regards to enough planning time with their partner (Austin, 2001).

With the authorization of NCLB, all children should be able to reach their full potential (Vaughan, 2002). President H. W. Bush in 1989 met with the governors of the 50 states at the first National Education Summit. The emphasis was placed on academic standards, improved student learning, and states being responsible for developing their own standards (Vaughan, 2002). During the second National Education Summit in 1996, governors supported the efforts to design state standards (National Governors' Association, 1996). At the third National Education Summit in 1999, President Clinton also stressed the importance of standards and accountability (National Education Summit, 1999). Duke and Lamar-Duke (2009) agreed that schools are being held more accountable for both academic and social progress of their students.

#### Role of the Universities

Due to the specific federal mandates, the role of college professors must change so that future teachers will know how to provide special education students access to the

general education curriculum (Smith, Robb, West, & Tyler, 2010). The universities are studying their own practices as they relate to teacher preparation for inclusive education (Hoppey, Pullen, & Yendol-Silva, 2004). Colleges and university professors are charged with preparing future educators to address all student needs. All teachers must know how to accommodate the curriculum and change their teaching styles to reach all learners (Smith et al., 2010). Less than half of all special educators and less than one third of general educators have received instruction on collaboration in their preservice training (Griffin, Jones, & Kilgore, 2006). There has been an attempt to include more collaboration experiences within the coursework for teacher education programs (Gerber & Popp, 2000; Welch, 2000).

McKenzie (1995) reported that 39% of students with disabilities in grades one through eight were receiving 80% of their instruction in co-taught classes as compared to 66% of secondary students. However, as these classes increased, there was no standard definition of co-teaching. Because of this, there continues to be confusion on what exactly the special educator's role is. The special education teacher spent a disproportionate amount of time serving as a paraprofessional (Mastropieri et al., 2005). Another frequent model seen was one teach–one assist (Weiss & Lloyd, 2002). Much of the research conducted by Harbort et al. (2007) showed duties ranging from monitoring tasks to prompting students as a major responsibility of the special education teacher. Unfortunately, these duties are an inefficient use of certified personnel. Kamens (2007) concluded that this misuse of special education teachers was a direct result of not having a universal definition of the co-teaching model.

In addition, performance expectations have not been made clear, and there is limited training on collaboration. There was a high degree of equality at the elementary level due to the level of content (Mastropieri et al., 2005); however, at the secondary level, where the content complexity increases, the special education teacher took on more of a paraprofessional role than an instructional role. Research revealed that differentiated instruction was not consistently occurring for students with disabilities in the co-taught setting (McKenzie, 1995). Large-group instruction seemed to be the most prevalent method of delivery (Harbort et al., 2007).

Due to the special educator's sense of lesser importance and performing more like an assistant, collaboration was even harder to accomplish (Griffin et al., 2006). The importance of developing collaboration strategies and the skills to co-teach is evident in the professional literature (Welch & Brownell, 2002). Therefore, significant changes in teacher preparation programs must occur (Shippen, Crites, Houchins, Ramsey, & Simons, 2005). How to collaborate will need to be explicitly taught in the universities. Cook (2002) reported that many preservice training programs integrate collaboration into existing curriculum. Unfortunately, this approach is widely criticized for preservice training programs' inability to incorporate these skills directly (Stayton & McCollum, 2002). Accountability for all future teachers to receive the necessary skills needed to be able to collaborate effectively with their colleagues is lacking from the current preservice programs. This type of infusion model requires a high degree of collaboration in the preservice curriculum between the special education and the general education departments. Currently, this lack of collaborative skills training is viewed as a major barrier for prospective teachers (Otis-Wilbon, Winn, Griffin, & Kilgore, 2005).

With the increase in the number of co-taught classrooms and the careless approach to incorporating collaborative skills in schools of education, there has been a movement to reorganize teacher preparation programs (Shippen et al., 2005). Kamens (2007) emphasized the importance not only of future teachers being taught collaboration skills directly, but also for the universities' curriculum to support it. In order for collaboration to be valuable, precise instructional skills must be taught and opportunities to practice these skills must be incorporated into teacher preparation programs (Kamens, 2007). It is not enough to have a common philosophy; there must be action behind the concepts.

#### Summary

Many issues affect the co-teaching model in schools (Dieker & Murawski, 2003). Friend (2007) stressed the importance of preparation training, collaborative practices, selection process, and specialized instruction when implementing co-teaching. It is clear that this country must address the movement to increase the achievement outcome for all students, including students with disabilities. In the area of math improvement, students with disabilities face a difficult challenge. Co-teaching can be an option that confronts these problems with the expertise of both a general education teacher and a special education teacher working together (Friend, 2007).

## CHAPTER III

### METHODOLOGY

The present research study was designed to examine the relationship between specific variables involved in co-teaching (preparation for co-teaching training, collaborative practices, selection process of co-teaching pairs, and use of specialized instruction) and student mathematics achievement as reported by the yearly standardized test (CRCT) administered in the spring of each school year in Georgia. The study focused on the mathematics test results of fifth and eighth grade special education students in co-taught math classrooms. The following Hypotheses guided this study.

H<sub>0</sub>1: The preparation for co-teaching training of the co-teaching team is not related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

H<sub>0</sub>2: The co-teaching team's collaborative practices are not related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

H<sub>0</sub>3: The selection process of co-teaching pairs is not related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

H<sub>0</sub>4: The use of specialized instruction by the co-teaching team is not related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

#### Design

The study used a quasi-experimental research design to examine the following independent variables as they relate to the mathematics achievement of students with disabilities in grades five and eight: (a) preparation for co-teaching, (b) collaborative practices (and the related subdomain of school-based supports that facilitate collaborative

teaching), (c) selection process of co-teaching pairs, and (d) the use of specialized instruction.

### Setting

The researcher conducted the study in a large suburban school district located in the southeastern region of the United States with a student enrollment of 106,719 (Large School District, 2011). As of October 2010, students with disabilities comprised 11.42% of the school district student population. It is the second largest school system in the state of Georgia and the 26th largest school system in the United States. Ethnicity of the students in this school district consists primarily of White (45%) and Black (31%) students (Large School District, 2011). However, the Hispanic population was 16.5%, Asian 4.8%, and Multiracial 2.7%. The percentage of students qualifying for free/reduced lunch for 2009–2010 school year was 43%. In the 2009-2010 school year, the transiency rate was 24.2%. The U.S. Census Bureau (2011) reported that the median household income for the Large School District in 2009 was \$62,893 and the percentage of persons living below the poverty level in 2009 was 11.4%.

### Participants

After receiving permissions from the University of Southern Mississippi Institutional Review Board (Appendix A) and the school district (Appendix B), participants were selected to take the survey. In order to test the Hypotheses of the study, participants were teachers in co-teaching teams in 25 middle schools and 69 elementary schools of the school district. The initial step was to identify all math co-teaching teams in grades five and eight, both the general educators and the special educators. Each school has at least one co-teaching team, for a total of 94 teams and 188 teachers.

However, only 156 teachers were in schools where the principals allowed the study to be conducted. These 156 teachers were asked to complete a survey during the spring of 2012. All participation was on a volunteer basis.

Sixty-five general education and special education teachers in elementary and middle school responded to the survey (see Table 1). Not every teacher responded to every item on the survey. Most of the middle school teachers (88%) co-taught in math classes, while elementary general and special education teachers reported co-teaching in reading (74% and 96%), social studies (68% and 78%), science (79% and 78%), ELA (74% and 93%), and math (95% and 96%). The majority of teachers had a master's or higher degree and was female.

The responding teachers, on average, had 11 to 13 years of teaching experience and had co-taught for approximately three years (Table 2). All teachers had taught with their co-teachers for more than one year. Both elementary and middle school special and general education teachers reported an average of at least two co-taught classes. A majority of the middle school teachers (64%) reported they were assigned to co-teach by their principals without input from them. Elementary general education teachers (72%), elementary special education teachers (59%), and middle school special education teachers (71%) indicated that co-teaching pairs were assigned by the principals with teacher input. More than half of all teachers volunteered to co-teach (Table 2).

Only the 35 special education teachers reported the percentage of students with disabilities (SWDs) they taught in co-taught classrooms who passed the CRCT math test. Special education teachers at the elementary level reported an average of 70% of their

fifth graders passed the CRCT math test. Middle school special education teachers reported an average of 77% of their eighth graders passed the CRCT math test (Table 2).

Table 1

*Description of the Sample*

Characteristic	Elementary school				Middle school			
	Regular education ( <i>n</i> = 19)		Special education ( <i>n</i> = 27)		Regular education ( <i>n</i> = 11)		Special education ( <i>n</i> = 8)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Content areas in which co-teach								
Reading	14	73.7	26	96.3	1	9.1		
Social studies	13	68.4	21	77.8			2	25.0
Sciences	15	78.9	21	77.8			1	12.5
English/language arts	14	73.7	25	92.6			2	25.0
Math	18	94.7	26	96.3	10	90.9	7	87.5
Other					1	9.1	2	25.0
Area of certification (multiple responses possible)								
Special education (K–12)	1	5.3	25	92.6	2	9.1	8	88.9
General education (K–6)	19	100.0	7	25.9				
General education (7–12)			1	3.7	10	90.1	1	11.1
Level of education								
Bachelors	7	36.8	10	37.0	2	18.2	3	37.5
Masters	7	36.8	13	48.1	5	45.5	4	50.0
Masters+	5	26.3	3	11.1	4	36.4	1	12.5
Doctorate			1	3.7				
Gender								
Male			2	7.4	2	18.2	2	25.0
Female	19	100.0	25	92.6	9	81.8	6	75.0

Table 2

*The Co-Teaching Experience in the Elementary and Middle Schools*

Characteristic	Elementary school				Middle school			
	Regular education ( <i>n</i> = 19)		Special education ( <i>n</i> = 27)		Regular education ( <i>n</i> = 11)		Special education ( <i>n</i> = 8)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Years of teaching experience	11.42	3.95	11.59	7.61	11.27	7.75	13.25	10.05
Years as a co-teacher	3.84	3.25	5.74	3.99	5.00	2.87	6.62	3.07
Years taught w/co-teacher	1.84	1.17	1.58	1.03	1.91	2.77	2.88	3.04
Teachers co-teach with each day	1.28	0.46	1.70	0.72	1.30	.48	1.50	.76
Classes co-teach each day	2.19	1.76	3.31	1.74	3.10	.88	3.75	.71
Subjects co-teach each day	3.27	1.53	4.56	.89	1.20	.42	2.00	1.69
Percentage special education students co-taught by you who passed the 2011 CRCT in mathematics (only asked of the special education teachers)			70.74	23.31			77.00	16.11
Volunteered for co-teaching experience								
Yes	12	63.2	22	81.5	6	54.5	5	62.5
Design of co-teaching process (multiple responses possible)								
Assigned by principal without teacher input	4	22.2	10	37.0	7	63.6	1	14.3
Assigned by principal with teacher input	13	72.2	16	59.3	3	27.3	5	71.4
Co-teaching pairs rotate each year	1	5.6	2	7.4	1	9.1		
Special ed teacher asked general education teacher	1	5.6	1	3.7				
Other	1	5.6	1	3.7			1	14.3

## Instrumentation

Two instruments were used to collect data for the study. The two teachers in each co-teaching team were asked to complete a questionnaire. The percentage of students with disabilities passing the mathematics achievement test in grades five and eight was collected.

### *Perceptions of Co-Teaching Survey*

The instrument used to collect the data from the co-teaching teams was the Perceptions of Co-Teaching Survey (Austin, 2001). This survey was chosen because it best represented the variables the researcher was evaluating and has been cited and used in more than 20 studies since its publication in 2001 (Appendix C). Austin granted permission to use this instrument (Appendix D).

The survey is divided into two sections. Part I consists of four categories pertaining to the teachers' perceptions of co-teaching, and Part II contains questions related to demographics. The categories of interest in this study were (a) teacher preparation for co-teaching, (b) school-based supports that facilitate collaborative teaching, and (c) specialized instruction.

Sixty-five general education and special education teachers in elementary and middle schools responded to the survey. Not every teacher responded to every item on the survey. In the interest of preserving the sample size, all cases are provided in each table. The first domain, teacher preparation for co-teaching, focuses on what type of teacher preparation the teacher experienced related to co-teaching (Table 3).

Table 3

*Item Analysis of the Teacher Preparation for Co-Teaching Subdomain by Group*

Item	Elementary school				Middle school			
	Regular education ( <i>n</i> = 19)		Special education ( <i>n</i> = 27)		Regular education ( <i>n</i> = 11)		Special education ( <i>n</i> = 8)	
	<i>M</i> *	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Student teacher placement in a co-teaching class	1.71	.85	1.52	.85	2.00	.78	1.86	.69
School district inservice on alternative assessments	2.22	1.11	2.30	.99	2.45	.69	2.00	1.16
School district workshops/minicourses on facilitating co-teaching	2.00	1.16	1.89	.93	2.55	.82	2.13	.64
Mentoring by experienced co-teacher(s)	1.71	.69	1.42	.76	1.82	.98	1.38	.52
Preservice courses	2.00	.84	1.69	.79	2.55	.69	2.38	1.19
Preservice special education courses for general education teachers	1.53	.80	1.69	.93	2.27	.65	2.13	1.25
Preservice general education courses for special education teachers	1.47	.51	1.96	1.00	2.27	.47	2.29	1.25

\* Scale ranges from 1 (*very useful*) to 4 (*not useful*)

The related subdomain, school-based supports that facilitate collaborative teaching, deals with the type of support provided at the local school. These descriptives are found in Table 4. Table 5 provides descriptives regarding the specialized instruction that is implemented in the co-teaching classrooms.

Table 4

*Item Analysis of the Value of and Access to School-Based Supports That Facilitate Collaborative Teaching Subdomain by Group*

Item (scale ranges from 1( <i>very useful</i> ) to 4 ( <i>not useful</i> ))	Elementary school								Middle school							
	Regular education ( <i>n</i> = 19)				Special education ( <i>n</i> = 27)				Regular education ( <i>n</i> = 11)				Special education ( <i>n</i> = 8)			
	Value		Access		Value		Access		Value		Access		Value		Access	
	<i>M</i> *	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Provision for scheduled mutual planning time	1.06	.24	1.76	1.25	1.07	.27	1.88	1.09	1.60	1.08	2.00	1.33	1.00	.00	1.29	.49
Administrative support of collaboration	1.11	.32	1.59	1.06	1.11	.32	1.69	1.12	1.50	.97	1.80	1.23	1.25	.71	1.38	.74
Adequate teaching aids and supplies appropriate to learning levels	1.00	.00	1.50	.71	1.07	.27	2.08	.89	1.70	.95	1.89	1.05	1.13	.35	1.71	1.11
Inservice training opportunities provided	1.59	.62	2.53	1.06	1.78	.80	2.60	.96	2.90	.74	2.67	.71	2.00	1.20	2.00	1.00
Summer planning time allocated	2.00	1.00	2.64	1.03	2.43	.98	3.31	.79	2.20	.92	2.89	.78	1.75	1.17	2.67	1.21
Opportunities to modify classroom configuration	1.59	.87	2.27	1.03	1.56	.80	2.38	1.25	1.90	1.29	2.90	.99	1.14	.38	1.86	1.22

Table 5

*Descriptives for Perceptions of Co-Teaching Survey Subdomain: Specialized Instruction Implemented in Teachers' Co-Taught Classrooms*

	Elementary school				Middle school			
	Regular education ( <i>n</i> = 19)		Special education ( <i>n</i> = 27)		Regular education ( <i>n</i> = 11)		Special education ( <i>n</i> = 8)	
	<i>M</i> *	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
The special education teacher provides specialized instruction.	1.74	1.24	1.62	1.14	2.60	1.35	1.86	1.22
Instructional strategy	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Differentiated instruction	19	100.0	27	100.0	10	90.9	8	100.0
Scaffolding	17	89.5	27	100.0	10	90.9	8	100.0
Previewing	16	84.2	20	74.1	6	54.5	8	100.0
ILP	16	84.2	22	81.5	7	63.6	7	87.5
Universal design	3	15.8	11	40.7	4	36.4	7	87.5
Specific program	3	15.8	10	37.0	0	0.0	2	25.0

\* Scale ranges from 1 (*strongly agree*) to 5 (*strongly disagree*)

The teachers' responses to the items in the subdomains of interest were subjected to a test of internal consistency using Cronbach's alpha coefficient. All subdomains were found to have sufficient reliability. The values ranged from .88 to .69 (Table 6).

Table 6

*Reliability of Subdomains of the Perceptions of Co-Teaching Survey*

Subdomain	# of items	Cronbach's alpha coefficient
Value of collaborative practices	5	.81
Employ collaborative practices	5	.81
Teacher preparation for co-teaching	7	.69

Table 6 (continued).

Value of school-based supports that facilitate collaborative teaching	6	.75
Access to school-based supports that facilitate collaborative teaching	6	.70

Means and standard deviations were calculated for each subdomain. The analysis of the Hypotheses in Chapter IV used these means and standard deviations. Table 7 contains a description of the subdomains of interest by type of teacher and school level.

Table 7

*Subdomain Means and Standard Deviations of the Perceptions of Co-Teaching Survey*

Scale	Elementary school				Middle school			
	Regular education ( <i>n</i> = 19)		Special education ( <i>n</i> = 27)		Regular education ( <i>n</i> = 11)		Special education ( <i>n</i> = 8)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
The special education teacher provides specialized instruction.*	1.74	1.24	1.62	1.14	2.60	1.35	1.86	1.22
Value of collaborative practices†*	1.53	.58	1.70	.68	2.13	.95	1.00	.
Employ collaborative practices†	2.47	1.10	1.95	.44	2.80	.92	1.00	.
Teacher preparation for co-teaching‡	1.76	.46	1.76	.54	2.27	.40	1.98	.55
Value of school-based supports that facilitate collaborative teaching‡	1.36	.30	1.46	.36	1.97	.81	1.39	.44
Access to school-based supports that facilitate collaborative teaching‡	2.03	.69	2.22	.63	2.30	.63	1.46	.41

\* Scale ranges from 1 (*strongly agree*) to 5 (*strongly disagree*)

† Only 11 teachers responded to items on this scale

‡ Scale ranges from 1 (*very useful*) to 4 (*not useful*)

*Criterion-Referenced Competency Test*

Adequate yearly progress (AYP) is used by the federal government to determine if schools and school systems are meeting academic standards (Georgia Department of Education, 2011a). States are required to set high expectations and develop a testing program that aligns with standards. The CRCT evaluates how students obtain, learn, and progress in a designated curriculum across the state of Georgia. In the spring of 2000, a Georgia law was implemented that required students in grades four, five, and eight to take the CRCT in reading, English/language arts, and math. Then, in the spring of 2002, all students in grades one through eight were included, and the social studies and science tests were added for grades three through eight. The content standards of the Georgia Performance Standards are measured by the CRCT. There are approximately 60 questions on each subject test. Scores on each CRCT subject area have three performance levels: (a) exceeds the standards, (b) meets the standards, and (c) does not meet the standards (Georgia Department of Education, 2011b).

The intent of the CRCT is to see if students are learning the state's curriculum. The CRCT also provides information on areas where students may have weaknesses. This information allows all stakeholders to understand how students are progressing on the state standards and how the state is achieving the guidelines set forth by NCLB. In this way, the stakeholders can judge the global effectiveness of education in Georgia (Georgia Department of Education, 2011b).

Curricular specialists and Georgia educators are included in the selection process of skills to be evaluated on the CRCT (Georgia Department of Education, 2011b). After

the subject matter and the method to evaluate have been selected, this information is posted on the Department of Education's website for all stakeholders to review. Next, a review team checks each item for association with the Georgia standards or any potentially biased questions that may exist. All items are then field tested to guarantee they are not puzzling to the students. After the field test, a team of Georgia educators analyzes the questions again and studies the data. This team has the authority to accept, revise, or reject any test items.

The Georgia Department of Education (2011b) undergoes a process of ensuring that the tests are of equal difficulty. The final step deals with reporting and posting the results. CRCT scores are reported as scale scores. To make sure all stakeholders can understand the results, the Georgia Department of Education provides a guide to assist with the interpretation of the scores. At every step of the test development, Georgia educators are a part of the process, helping to ensure the validity. The reliability for the mathematics CRCT in the fifth grade is .93 and in the eighth grade, .92, using the Cronbach's alpha coefficient (Georgia Department of Education, 2011b).

Calculation of adequate yearly progress uses a three-part formula. It consists of participation and academic performance in the areas of reading/English language arts and math. The other indicator is the graduation rate in high school and attendance rate in elementary and middle school. The key factor is accountability for schools. In addition, fifth and eighth grades are gateway years in which students must pass the CRCT in math and reading in order to advance to the next grade level (Georgia Department of Education, 2011b).

### Procedures

Letters explaining the purpose of the study were given to each principal to receive their approval and support. Upon receiving the principals' agreement to participate, the surveys were hand delivered to each potential teacher participant. A letter explaining the purpose of the study and asking the teachers to participate in the study was included. A 34-item survey was administered to the math co-teaching pairs in grade five and eight. The completed surveys were secured and remain confidential. Teacher names will not be used in any report of the results.

### Analysis

A quasi-experimental research design was used to examine the relationship between the characteristics of a successful co-teaching team and the mathematics achievement of students with disabilities in grades five and eight.

### Summary

The purpose of this study was to examine the relationship between the characteristics of a successful co-teaching team and the mathematics achievement of students with disabilities in grades five and eight. The researcher collected data and compared the results from the teacher survey to student standardized test results on the CRCT in math for grades five and eight. This study will add to the current body of literature concerning the impact of co-teaching on overall student achievement progress. This information will be helpful, as the nation is striving to develop a method for special education students to progress in the general education curriculum while staying in the least restrictive environment.

## CHAPTER IV

## RESULTS

The research study was designed to examine the relationship between specific variables involved in co-teaching (preparation for co-teaching training, collaborative practices, selection process of co-teaching pairs, and use of specialized instruction) and student mathematics achievement as reported by the yearly standardized test (CRCT) administered each spring. This chapter contains the analyses of the data collected using the Perceptions of Co-Teaching Survey. Specific Research Hypotheses designed to examine the relationship between co-teaching variables and mathematics achievement are answered.

## Analysis of Research Hypotheses

In order to test Hypothesis 1, relating preparation for co-teaching training to math achievement, Pearson's  $r$  values were computed between the preparation for co-teaching subdomain score and CRCT math scores for all teachers and separately for elementary and middle school teachers. Correlations are located in Table 8. No correlations were significant.

Table 8

*Pearson Product Moment Correlations Between Preparation for Co-Teaching and Mathematics Achievement by Total and by Grade Level*

	Total		Elementary		Middle School	
	# of cases	Correlation with % SWDs passing CRCT	# of cases	Correlation with % SWDs passing CRCT	# of cases	Correlation with % SWDs passing CRCT
Factors of co-teaching						

Table 8 (continued).

Teacher preparation for co-teaching‡	33	-.30	26	-.43	7	.33
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‡ Scale ranges from 1 (*very useful*) to 4 (*not useful*)

In order to test Hypothesis 2, regarding the relationship between the co-teaching teams' collaborative practices and math achievement, Pearson's  $r$  values were computed between CRCT math scores and the value of school-based supports, as well as access to those supports that facilitate collaborative teaching. Correlations are located in Table 9. None of the correlations was significant.

Table 9

*Pearson Product Moment Correlations Between Collaborative Practices of Co-Teaching and Mathematics Achievement by Total and by Grade Level*

Factors of co-teaching	Total		Elementary		Middle School	
	# of cases	Correlation with % SWDs passing CRCT	# of cases	Correlation with % SWDs passing CRCT	# of cases	Correlation with % SWDs passing CRCT
Value of school-based supports that facilitate collaborative teaching‡	35	-.08	27	-.11	8	.10
Access to school-based supports that facilitate collaborative teaching‡	29	.07	23	.09	6	.57

‡ Scale ranges from 1 (*very useful*) to 4 (*not useful*)

In order to test Hypothesis 3, relating the selection of co-teaching pairs process to math achievement, a two-way chi-square analysis was used to determine if the proportion of classrooms with  $\geq 70\%$  versus  $< 70\%$  of students with disabilities (SWD) passing the CRCT was associated with the selection process used to create the co-teaching pairs

(Table 10). The analysis was significant ( $\chi^2 = 10.8, p < .01$ ), indicating a different pattern of CRCT pass rate for teachers assigned to co-teaching without input versus for teachers who were assigned to co-teaching with input. In the 13 classrooms where the principal made the co-teaching pair selection *without* teacher input, 9 (81.8%) of the classrooms had fewer than 70% of SWDs passing the CRCT. However, in the 17 classrooms where the teachers had input into the selection process, 15 (88.2%) of the classrooms had 70% or more of SWDs passing the CRCT.

Table 10

*Relationship Between Student Math Achievement and Selection Process of Co-Teaching Pairs*

Percentage of students passing the CRCT in each co-teaching pair	Type of selection process				$\chi^2$	<i>p</i>
	Assigned by principal <i>without</i> teacher input		Assigned by principal <i>with</i> teacher input			
	<i>n</i>	%	<i>n</i>	%		
Classrooms where fewer than 70% of the students passed the CRCT	9	81.8	4	21.1		
Classrooms where 70% or more of the students passed the CRCT	2	11.8	15	88.2	10.48	< .01

In order to test Hypothesis 4, regarding the relationship between the use of specialized instruction by co-teaching teams and math achievement, Pearson's *r* values were computed between one item assessing the use of specialized instruction and CRCT math scores for all teachers and separately for elementary and middle school teachers (Table 11). None of these correlations was significant.

Table 11

*Pearson Product Moment Correlations Between the Specialized Instruction of Co-Teaching and Mathematics Achievement by Total and by Grade Level*

	Total		Elementary		Middle School	
	# of cases	Correlation with % SWDs passing CRCT	# of cases	Correlation with % SWDs passing CRCT	# of cases	Correlation with % SWDs passing CRCT
The special education teacher provides specialized instruction.*	33	.19	24	.33	7	-.53

\* Scale ranges from 1 (*strongly agree*) to 5 (*strongly disagree*)

### Summary

The responses to the Perceptions of Co-Teaching Survey from 65 elementary and middle school general education and special education teachers were used to answer the Hypotheses. The purpose of the research study was to determine relationships between the factors of co-teaching and mathematics achievement of fifth and eighth grade students with disabilities taught using a co-teaching mode. No significant relationships were found between three of the four factors of co-teaching (as measured by the Perceptions of Co-Teaching Survey) and mathematics achievement. However, the proportion of classrooms with 70% or more of SWDs passing the CRCT (mathematics achievement) was dependent on the selection process used to create the co-teaching pairs.

## CHAPTER V

### SUMMARY AND CONCLUSIONS

This research study was designed to examine the relationship between specific variables involved in co-teaching and student mathematics achievement as reported by the yearly standardized test (CRCT) administered in the spring of each school year in Georgia. This chapter will provide a brief overview of the study, which will include the purpose statement and Research Hypotheses. In addition, the findings of the study will be discussed as they relate to the literature. Any limitations of the study will be reported. Recommendations for policy or practice, along with suggestions for future research, will be incorporated.

#### Summary of the Study

Special education teachers have fought for their students to be educated alongside their general education peers (Kloo & Zigmond, 2008). Currently, legislation now requires the special needs child to be taught and evaluated on the same content areas as the general education child. Co-teaching appears to be a natural way to accomplish bringing both general education students and special education students together. A mixture of student ability levels within the classroom allows for the general education teacher to provide the expertise of the curriculum and the special education teacher to supply the specialized instruction so the special needs students can access the curriculum. The study was designed to examine the relationship between specific variables involved in co-teaching and the percentage of students with disabilities in grades five and eight

that passed the CRCT mathematics test administered in the spring of each school year in Georgia. The following Hypotheses guided this study.

H<sub>0</sub>1: The preparation for co-teaching training of the co-teaching team is not related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

H<sub>0</sub>2: The co-teaching team's collaborative practices are not related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

H<sub>0</sub>3: The selection process of co-teaching pairs is not related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

H<sub>0</sub>4: The use of specialized instruction by the co-teaching team is not related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

The study used a quasi-experimental research design to examine the following independent variables as they related to the mathematics achievement of students with disabilities in grades five and eight: (a) preparation for co-teaching, (b) collaborative practices, (c) selection process of co-teaching pairs, and (d) the use of specialized instruction. The researcher conducted the study in a large suburban school district located in the southeastern region of the United States with a total student enrollment of 106,719 (Large School District, 2011). Participants were selected based on the collaborative teaching model of a regular education teacher and a special education teacher teamed for mathematics instruction for general education and special education students in grades five and eight. They were asked to complete a survey during the spring of 2011. The participants varied in age, gender, and ethnic identify. All

participation was on a volunteer basis. Two instruments were used to collect data for the study. The two teachers in each co-teaching team were asked to complete a questionnaire. The mathematics achievement scores of the students with disabilities in grades five and eight were collected. Letters explaining the purpose of the study were given to each principal in order to receive their approval and support. Upon receiving the principals' agreement to participate, the surveys were hand delivered to each teacher participant.

A quasi-experimental research design was used to examine the relationship between the characteristics of a successful co-teaching team and the mathematics achievement of students with disabilities in grades five and eight. A correlation matrix was created using Pearson's Product Moment correlation procedure to show the univariate relationships between student mathematics achievement and the factors of successful co-teaching. An independent  $t$ -test was used to determine the relationship between the selection process of co-teaching pairs and student math achievement.

## Conclusions and Discussion

### *Preparation*

H<sub>0</sub>1: The preparation for co-teaching training of the co-teaching team is not related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

Although the analysis of Hypothesis 1 did not show a statistically significant correlation between math achievement and teacher preparation, it did present some differences between the two grade levels. The elementary teachers reported that

preservice courses were more useful than did the middle school teachers. One explanation for this difference is students with disabilities are often included more with the general education students at the elementary level than at middle school. Therefore, the elementary teachers have the opportunity to practice the information learned during their preservice years more frequently than the middle school teachers.

Smith et al. (2010) found that the role of college professors must change so future teachers will know how to provide special education students access to the general education curriculum. Universities are researching their own practices as they relate to teacher preparation in inclusive education (Hoppey et al., 2004). In addition, all teachers were in agreement with the usefulness of mentoring by experienced co-teachers. Friend (2007) stated the importance of allowing teachers to observe other co-teaching pairs. This type of support is helpful for teachers to share concerns, success stories, and challenges they may be experiencing. Teachers are able to provide feedback and ask questions. There was a difference between the teachers' value of the support and what the local school actually provided. As Fontana (2005) reported, administration allows the implementation of co-teaching, but often very little support is provided. In order for this model to work, Fontana (2005) further stated that administrators need to show their endorsement of the co-teaching model. This could be explained by the current economic status of the education system. Teachers want the support, but due to financial restraints the local school cannot offer it.

### *Collaboration*

H<sub>0</sub>2: The co-teaching team's collaborative practices are not related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

There was not a statistically significant relationship between co-teaching collaborative practices and mathematics achievement of students with disabilities in the fifth and eighth grades. However, teachers valued collaborative practices more than they practiced them. Elementary special education teachers reported a stronger agreement with the usefulness of collaborative practices than their general education counterparts. The teachers reported the actual supports provided by the school were less useful than the value they reported them to be. This may indicate a gap between the support the teachers want and the support they actually receive.

Middle school general education teachers did not support the need to meet daily to plan lessons. Conversely, Tomlinson (2005) expressed the need for general and special education teachers to collaborate regularly in order to ensure student needs are being met. Villa et al. (2004) found that when co-teachers designed their lesson plans together they were more effective and used the research-based strategies required by the NCLB Act.

Additionally, teachers feel empowered when they make decisions collaboratively. The teacher is no longer alone, but has the assistance of another teacher to help with the needs of the diverse learner (Villa et al., 2004). In the area of sharing classroom instruction, Murawski and Dieker (2004) acknowledged that the special education teacher can also be the leader in designing lessons and taking charge in planning the instruction.

Though the results did not indicate a strong agreement for co-teachers providing feedback to one another, acting as peer coaches to each other is another important component according to Rice et al. (2007).

### *Selection*

H<sub>03</sub>: The selection process of co-teaching pairs is not related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

There was a statistically significant relationship between classrooms with 70% or more of SWDs passing the CRCT and the selection process. In 13 classrooms where the principal made the co-teaching pairs selection without teacher input, 81.8% of the classrooms had fewer than 70% of SWDs passing the CRCT. However, in 17 classrooms where the teachers had input into the selection process, 88.2% of the classrooms had 70% or more of SWDs passing the CRCT. According to Fontana (2005), teachers had strong feelings about the method administrators used when selecting the co-teaching teams. Teachers wanted to have input in the process. Trent's (1998) study emphasized participation should be voluntary for all teachers involved in co-teaching. Otherwise, teachers feel their opinions do not matter and this can cause a negative reaction to co-teaching. Fontana (2005) indicated that forcing teachers to participate can cause them to feel uneasy about the situation. Student improvement could be affected by this apprehensiveness.

Rice and Zigmond (2000) reported that co-teaching is like a professional marriage. Compatibility can be an essential characteristic to an effective co-teaching

endeavor. As with most things, if individuals have a voice in their involvement, then typically they are more likely to accept the decision and be committed to the process.

### *Strategies*

H<sub>04</sub>: The use of specialized instruction by the co-teaching team is not related to the mathematics achievement of students with disabilities in the fifth and eighth grades.

The use of specialized instruction did not have a statistically significant relationship to the mathematics achievement of students with disabilities; however, some interesting results were found. Both the general and special education teachers at the elementary level did agree that the special education teacher provided specialized instruction to the special needs students, whereas the general education middle school teachers did not agree with their special education colleagues that they provided specialized instruction to the students. One explanation for this difference may be that the special education teacher is often working only with the special education students when implementing the specialized instruction, while the general education teacher is instructing the rest of the class. Therefore, since the data showed that the middle school teachers did not plan together often, the general education teacher may not be aware of what the special education teacher is doing.

Kloo and Zigmond (2008) established that, while general educators are more familiar with the content standards, the special education teachers are more familiar with the individual strengths and weaknesses of the students with disabilities and know how to accommodate their needs so they can achieve in the general education classroom setting. Murray (2004) found that the combination of these two disciplines had positive results

for all students in the co-teaching model. This approach also allows the student with disabilities to be educated in the least restrictive environment.

As Rice et al. (2007) reported, the general educator looks to the special educator for suggestions when it comes to strategies and interventions based on individual student needs. To support this idea, Murawski and Dieker (2004) found that team teachers need to have conversations with each other about the content of the material and decide how it would be best taught knowing the strengths and weaknesses of the students in the classroom. Results did indicate that all teachers used differentiated instruction in their classrooms. Furthermore, special education teachers at both levels reported the use of scaffolding as a strategy implemented for the students. McLaughlin and Thurlow (2003) stated that co-teaching, or the combining of the general education teacher who has the content expertise with the special education teacher who has the expertise with specialized training on learning strategies, helps meet the requirements of the federal legislation. Dieker (2001) further noted that co-teaching created a unique blend of content and curriculum from the general education teacher paired with the special education teacher's focus on the learning process.

#### Limitations

The findings of this study included data from only one large school district and may not generalize to other populations of the United States. Depending on the economic status of different districts, availability of extra personnel to co-teach may not be an option. In addition, some schools may already have set guidelines for the selection process of the co-teaching pairs.

The response rate was approximately 43%; a higher response rate could have shown more statistically significant results. Methods to ensure a higher response rate could be incorporated into the study, such as sending the survey to participants electronically.

Only two grade levels, fifth and eighth, participated in the survey. The researcher limited the grade levels, since these two grades are the gateway years for promotion. However, increasing the scope of grade levels may also increase the response rate.

Mathematics was the only subject area reviewed. This subject was selected because mathematics was a critical area for special education students and the subject with the overall lowest scores reported. In addition, with the implementation of the Common Core, math achievement will be a major focus for improvement in school districts.

Teacher perception surveys were collected from only co-teaching teams instead of from the entire faculty. Since the general education and the special education teachers were directly involved with the instruction of students, they were considered to be the individuals with firsthand experience. By including other faculty and staff members, a different perspective could be provided.

#### Recommendations for Policy and Practice

Teachers, of both general and special education, need to be open to the idea of working alongside their colleagues to provide the necessary support required for all students to demonstrate academic progress. Since the research shows the importance of asking teachers for their input in the selection process for co-teaching pairs, schools need

to establish a protocol that is universal for the entire school district. The blending of a content expert with someone with a specialized instruction background can create a positive experience for all students. Local administrators along with central office personnel must offer not only their verbal support, but they also need to combine that with financial support. In order to continue the practice of co-teaching, there must be data collected using a reliable and valid method. Central office administration would need to require the local schools to develop a method of formal data collection on the math achievement of the special education students in the co-taught classes. This data then needs to be analyzed by local administrators and central office staff for its effectiveness as it relates to student achievement. Stakeholders should receive yearly reports on the academic progress made by the students in co-taught classrooms. This information would also need to be shared with the school board. The school system can then make appropriate decisions on how this model can be sustained.

Training at the local level needs to be driven by the needs of the co-teachers and the analyzed data. Asking for teacher feedback is essential, since these are the individuals who will be implementing the approach. Working closely with the university system will ensure that new graduates obtain the skill set that is required for collaboration to be successful. Currently, most universities require general education teachers to take one special education course. This is not enough exposure for teachers to become proficient in understanding all the intricate details of co-teaching. More collaboration between general and special educators during the preservice time is critical.

### Recommendations for Future Research

This study included only one large suburban school district in the southeastern region of the United States. Future studies could be conducted in rural areas, in smaller districts, and in other regions across the United States. The researcher would suggest expanding the directions on the survey to emphasize the importance of completing all sections of the survey. Although approximately 43% was an acceptable response rate, the researcher could have offered an incentive for returning the completed surveys. In addition, a follow-up with a second mailing or the use of an electronic survey, such as Survey Monkey, as an alternative method of collecting survey results could have been used. The study included only two grade levels in the area of mathematics. Expanding the survey to other grade levels and adding the subject of reading could have provided a larger scope to determine if there was a statistically significant correlation between the different co-teaching components and math achievement for students with disabilities. Instead of surveying only co-teachers for their perceptions, principals, parents, and students could also be surveyed.

This study was based on accountability outlined in NCLB. Presently, the state of Georgia has been granted a waiver of the requirements set forth by NCLB. However, Georgia will still be held accountable to continue to raise student achievement. Since the study ended, the Common Core standards have been adopted and will be implemented in fall of 2012. Though the standards that are being tested on the CRCT in this large school district are very similar to the Common Core standards, the instrument used to measure progress will be changed in the year 2014. Co-teaching is still an option for educators to

use as a method for special education students to have access to the general curriculum and make the same necessary growth as their general education peers.

## APPENDIX A

## INSTITUTIONAL REVIEW BOARD NOTICE OF COMMITTEE ACTION



THE UNIVERSITY OF  
SOUTHERN MISSISSIPPI

## INSTITUTIONAL REVIEW BOARD

118 College Drive #5147 | Hattiesburg, MS 39406-0001

Phone: 601.266.6820 | Fax: 601.266.4377 | www.usm.edu/irb

**NOTICE OF COMMITTEE ACTION**

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

The risks to subjects are minimized.

The risks to subjects are reasonable in relation to the anticipated benefits.

The selection of subjects is equitable.

Informed consent is adequate and appropriately documented.

Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.

Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.

Appropriate additional safeguards have been included to protect vulnerable subjects.

Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".

If approved, the maximum period of approval is limited to twelve months.

Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **12013102**

PROJECT TITLE: **The Link Between Co-Teaching and Mathematics Achievement for Students with Disabilities**

PROJECT TYPE: **Dissertation**

RESEARCHER/S: **Lisa Sharble Word**

COLLEGE/DIVISION: **College of Education & Psychology**

DEPARTMENT: **Educational Leadership & School Counseling**

FUNDING AGENCY: **N/A**

IRB COMMITTEE ACTION: **Expedited Review Approval**

PERIOD OF PROJECT APPROVAL: **04/11/2012 to 04/10/2013**

**Lawrence A. Hosman, Ph.D.**

Institutional Review Board Chair

## APPENDIX B

## LARGE SCHOOL DISTRICT LETTER OF APPROVAL

April 18, 2012

Dear Ms. Word:

Your research project titled, *The Link Between Co-Teaching and Mathematics Achievement for Students with Disabilities*, has been approved. Listed below are the school where approval to conduct the research is complete. Please work with the school administrator to schedule administration of instrument or conduct interviews.

Should modifications or changes in research procedures become necessary during the research project, changes must be submitted in writing to the Academic Division prior to implementation. At the conclusion of your research project, you are expected to submit a copy of your results to this office. Results cannot reference any District schools or departments.

Research files are not considered complete until results are received. If you have any questions regarding the process, contact our office.

Sincerely,

Chief Academic Officer

## APPENDIX C

## APPROVAL OF SURVEY USE

>>> "Vance L. Austin" <austinv@mville.edu> 4/8/2011 5:43 PM >>>

Dear Ms. Word,

I am writing to grant you permission to use and adapt my *Perceptions of Co-teaching Survey* as you deem appropriate to your research. In addition, although I was unable to locate the information regarding the precise reliability coefficient of the survey, I believe, from my best recollection, the overall reliability coefficient of the survey was .87; however, as I recall from the data, if you eliminate item # 3 from Part Two of the survey; specifically, "*In my collaborative experience, I do more than my partner,*" the reliability coefficient is improved significantly. The problem here is that I found that item to yield the most statistically significant results. So, whether you remove it to improve overall reliability or keep it to provide potentially beneficial data is a judgment call. Further, the instrument has been cited and used in over 20 studies since 2001 that have provided evidence to support its reliability, thus confirming its usefulness as a research instrument relative to the efficacy of co-teaching.

The face validity of the instrument as well its content validity was determined to be *very good* by an expert panel consisting of nine esteemed researchers in the area of "co-teaching" at the time of publication (2001). Unfortunately, that is all the statistical information I can provide relative to the survey instrument at this time. Again, I wish you every success with your research and hope that this instrument is helpful to you in that endeavor! I have attached copies of both the survey and accompanying interview script to this email, for your convenience.

My best regards,

Vance Austin  
Associate Professor  
Special Education Department  
914-323-7262

-----Original Message-----

From: "Lisa Word" <Lisa.Word@cobbk12.org>  
Sent 4/8/2011 3:09:20 PM  
To: Austinv@mville.edu  
Subject: co-teaching survey

Hello Dr. Austin,

Today I left you a voice message about asking if I could please get a copy of your co-teaching survey and use it in my dissertation. My dissertation is on the components that ensure a successful co-teaching model. I sent a request to Dr. M. Friend asking her if she could help me locate a survey. She contacted one of her students who recently finished her doctorate. She referenced your survey, and I wanted to see if I could receive a copy and use it in my study.

I just read your article *Teachers' Beliefs About Co-Teaching* and enjoyed it very much. It appears that the *Perceptions of Co-Teaching Survey* would be appropriate for my study.  
Thank you in advance for your consideration.

Lisa Word

## APPENDIX D

## PERCEPTIONS OF CO-TEACHING SURVEY

The purpose of this survey is to learn from your collaborative teaching experiences. The results of this survey will be used to help improve teaching practices. Your participation in this survey is voluntary. Your responses will be kept strictly confidential, no identifiers will be used, and all responses will be presented as aggregate data.

**Definition of Terms**

**Collaborative Teaching or Co-Teaching** refers to the assignment of a general education teacher and a special education teacher to work together, sharing responsibility for the planning and execution of instruction.

**Collaborative Teachers or Co-Teachers**, as defined for the purposes of this study, are general and special education teachers who are teamed for providing instruction to a heterogeneous class for one or more periods of instruction per day.

**General Education Teacher** refers to any teacher certified to provide instruction in an elementary level classroom or a secondary level subject area.

**Special Education Teacher** refers to any teacher certified to provide instruction to any student in grades K-12 who is classified as having one or more disabilities.

**Co-Teacher Perceptions of Current Experience**

Circle a number from 1 to 5 to indicate your level of agreement or disagreement with each statement below.

	<b>Strongly Agree 1</b>	<b>Agree 2</b>	<b>Neither agree nor disagree 3</b>	<b>Disagree 4</b>	<b>Strongly disagree 5</b>
1. My co-teaching partner and I work very well together.	1	2	3	4	5
2. Co-teaching has improved my teaching.	1	2	3	4	5
3. In my co-teaching experience, I do more than my partner does.	1	2	3	4	5
4. In my current setting, the special education teacher provides specialized instruction.	1	2	3	4	5
5. My partner and I use the co-teaching models that reduce student/teacher ratio (i.e., alternative, station, parallel).	1	2	3	4	5
6. Which specialized instruction is implemented in your co-taught classroom? Check all that apply.					
<input type="checkbox"/> Differentiated Instruction					
<input type="checkbox"/> Scaffolding					
<input type="checkbox"/> Previewing/Acceleration					
<input type="checkbox"/> Individualized Learning Plan (ILP)					
<input type="checkbox"/> Universal Design					
<input type="checkbox"/> Specific program (Example, Language!, FUNdations) Please specify _____					
<input type="checkbox"/> Other - _____					

Other Comments: \_\_\_\_\_

## Recommended Collaborative Practices

Indicate your level of agreement or disagreement with each statement below about co-teaching. You are asked to rate each statement according to:

(a) **your belief in the value of the practice (the column titled “value”),** and (b) **whether you currently employ the practice (the column titled “employ”).**

	Strongly Agree 1	Agree 2	Neither agree nor disagree 3	Disagree 4	Strongly disagree 5					
	Value					Employ				
7. Co-teachers should meet daily to plan lessons.	1	2	3	4	5	1	2	3	4	5
8. Co-teachers should share classroom management responsibilities.	1	2	3	4	5	1	2	3	4	5
9. Co-teachers should share classroom instruction.	1	2	3	4	5	1	2	3	4	5
10. Co-teachers should regularly offer feedback.	1	2	3	4	5	1	2	3	4	5
11. Co-teachers should establish and maintain specific areas of responsibility.	1	2	3	4	5	1	2	3	4	5

Please describe other collaborative practices you find effective.

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## Teacher Preparation for Co-Teaching

What kinds of academic preparation do you think would be beneficial to collaborative teaching? Indicate how useful each of the following academic preparations was to a collaborative teacher.

	Very useful 1	Somewhat useful 2	Of limited use 3	Not useful 4	Don't know 5
12. Student teaching placement in a co-teaching class.	1	2	3	4	5
13. School district in-service presentations on alternative assessments.	1	2	3	4	5
14. School district workshops/mini courses on facilitating co-teaching.	1	2	3	4	5
15. Mentoring by experienced co-teacher(s).	1	2	3	4	5
16. Preservice courses in co-teaching.	1	2	3	4	5
17. Preservice special education courses for general education teachers.	1	2	3	4	5
18. Preservice general education courses for special education teachers.	1	2	3	4	5

Comments

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## School-Based Supports That Facilitate Collaborative Teaching

What kinds of school-based services should be provided in order to facilitate collaborative teaching? For the purpose of this study, school-based services are defined as services including teaching materials/equipment, administrative support, and provision of adequate planning time.

Please circle a number from 1 to 5 to indicate the importance you place on each of the following school-based supports. You are asked to rate each statement according to

(a) **your belief in the value of the school-based service (column titled “Value”)** and (b) **whether you currently have access to or receive the school based service (column titled “Access”)**.

	Very useful 1	Somewhat useful 2	Of limited use 3	Not useful 4	Don't know 5					
	<b>Value</b>					<b>Access</b>				
19. Provision for scheduled mutual planning time.	1	2	3	4	5	1	2	3	4	5
20. Administrative support of collaboration.	1	2	3	4	5	1	2	3	4	5
21. Adequate teaching aids and supplies appropriate to learning levels.	1	2	3	4	5	1	2	3	4	5
22. In-service training opportunities provided (workshops, etc.).	1	2	3	4	5	1	2	3	4	5
23. Summer planning time allocated.	1	2	3	4	5	1	2	3	4	5
24. Opportunities to modify classroom configuration.	1	2	3	4	5	1	2	3	4	5

Comments

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1. Please mark the grade level of the collaborative class(es) you teach.

- Elementary
- Middle School/Junior High
- High School

2. Check the content area(s) of the class(es) you teach collaboratively.

- Reading
- Social Studies
- Sciences
- English/Language Arts
- Mathematics
- Fine Arts
- Physical Education/Health
- Foreign Language
- Business
- Technology
- ESL/Bilingual
- Practical Living/Home and Careers
- Other: \_\_\_\_\_ (please specify)

3. Please mark the area of certification in which you are currently employed.
- Special Education K-12
  - General Education (Elementary K-6)
  - General Education (Secondary 7-12)
4. Check the *highest* level of education you have achieved.
- Bachelor's
  - Master's
  - Master's +
  - Doctorate
5. How many total years of teaching experience do you have?  
\_\_\_\_\_ years
6. What is your gender?
- Male
  - Female
7. Please indicate the number of
- |   |               |
|---|---------------|
| years as a co-teacher                       | _____years    |
| years taught with this co-teacher           | _____years    |
| teachers with whom you co-teach daily       | _____teachers |
| <b>classes</b> you teach co-teach in a day  | _____classes  |
| <b>subjects</b> you teach co-teach in a day | _____subjects |
8. Did you volunteer for this co-teaching experience?
- Yes
  - No
9. How is your school's co-teaching selection process designed?
- Assigned by principal **without** teacher input
  - Assigned by principal **with** teacher input
  - Co-teaching pairs are rotated each year
  - Special education teacher asked general education teacher to co-teach together
  - Random selection
  - Other
10. Special Education Teachers ONLY: What percentage of the special education students in your co-taught math class met or exceeded the CRCT in math for Spring of 2011? \_\_\_\_\_

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