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VIEWS FROM THE BLACKBOARD: EXPLORING PERSPECTIVES OF COTEACHING IN ELEMENTARY MATHEMATICS TEACHERS

Ashley Mounts-Gray

VIEWS FROM THE BLACKBOARD: EXPLORING PERSPECTIVES OF CO-TEACHING IN ELEMENTARY MATHEMATICS TEACHERS

By

Ashley Mounts-Gray

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ABSTRACT

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The purpose of this study was to investigate the perceptions and experiences of third and fourth grade elementary mathematics teachers and special education teachers regarding the co-teaching inclusion model. Views of general and special education teachers toward co-teaching in mathematics in elementary classrooms was investigated. This study sought to explore how (a) elementary mathematics teachers perceived Friend's (2008) co-teaching model, (b) which co-teaching models are most frequently used, and (c) to determine if there were similarities and/or differences between the co-teachers' perspectives.

Questionnaires, personal semi-structured interviews, classroom observations, and focus group sessions were used. Data were presented utilizing a case study approach.

Data collected during this study support the results of other studies and literature that identify the needs and perceptions of co-teachers. Additional results found in this study not found by other research included 1) most participants delivered mathematics instruction using the station teaching model, 2) the one-teach one-observe method was not used in any of the mathematics classrooms and was viewed negatively by some of the participants, 3) some teachers believe students are placed in co-taught classes because of poor student behavior, not due to a learning disability, 4) if the formerly mentioned is

teachers' realities, teachers believe that professional development in behavior management would improve their ability to create a productive learning environment.

Implications of this study support the understanding of co-teachers' needs for training and shared planning times. Co-teachers' expressed that planning time and professional development would help them in further development of their co-teaching knowledge and skills, improve instruction in their inclusive classrooms, and in managing misbehaviors. The results will benefit stakeholders in elementary schools including administrators, all students in inclusive general education classrooms, and particularly co-teachers.

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CHAPTER I

Introduction

Before beginning this study, if I had been asked about my previous co-teaching experience in mathematics, I would have identified the 2016 - 2017 school year as my first time in such a teaching model. However, in a recent conversation, a former co-worker reminded me that I had indeed practiced co-teaching in mathematics much earlier. The experience was so "mild" that it had not left an impression on my already shaky memory. It was in 2009 that I co-taught a third-grade math class with a woman whom I assume was very lovely. I say "assume" because beyond a brief meeting to structure the classroom experience, I did not interact with her much. We decided to structure the class in this manner: she would come into my classroom, move to a kidney table in the back of the classroom and teach the small group of children with special needs while I would make use of the rest of the classroom to engage the general education students in the lesson of the day. The other instructor and I never collaborated on lesson plans, nor did we discuss the students' progress. At the time, I did not notice any fallacies in our classroom collaboration except for the fact that we never actually collaborated.

Looking back, I realize I was never aware of the mathematics topics the other teacher would address on any given day. The disconnect was such that we could have easily been in different classrooms altogether. Without ongoing dialogue between the two of us, there was no way for me to reinforce any math skills the students in her group were learning. Since then, I have learned to refine and strengthen my co-teaching relationships, resulting in more improved co-teaching practices. I have co-taught two mathematics classrooms with two different special educators, and my experiences while different, were

both positive. My co-teaching experience in 2015 was a collaborative model, which required the students with disabilities to be in a general education mathematics classroom for half of the math segment, and they went to a self-contained classroom for the latter half of the mathematics period. The current model that my co-teacher and I are using is a fully incorporated co-teaching model, that requires the students with disabilities work alongside their peers in a general education setting 100 percent of the mathematics period. This is my most preferred method because I spend more time with the students, thereby increasing the amount of teaching and learning of grade-level standards. Still, the relationship between my current co-teacher and me is not without its faults.

One day, my co-teacher and I were trying to figure out why our students with disabilities were not showing as much growth in math as originally anticipated. Our current methods appeared to be ineffective. This challenged me. I had changed my behavior and approach to co-teaching only to be met with less than stellar results. I thought that by communicating with my co-teacher more and planning as often as we could together, that was enough to ensure success in our co-taught mathematics classroom. There must have been a variable that I had not considered. I wanted to know more about the experience of other co-teaching partnerships in terms of their methods, relationships, and opinions of co-teaching, so I sought out the perspective of other fifth grade math co-teachers.

I began to casually inquire about planning sessions, class structure, and teaching processes of others involved in co-teaching. I wanted to know what specific factors led to success and challenges of co-teaching mathematics. From these casual conversations, I learned that success was elusive and perhaps not worth chasing. The frustration was evident as teachers consistently discussed issues with the lack of planning and

collaboration. Many teachers expressed feelings of defeat regarding an inability to effectively address students' learning needs. What I found most shocking was that a number of general education teachers indicated that inexperience on the part of their special education co-teachers was an additional setback. The responses I had received made me wonder how widespread these stories might be, and eventually led to my research topic: What do teachers really think about the co-teaching method in mathematics?

Background for the Study

The United States has made strides toward providing all students with a fair and equitable education, particularly for students with disabilities (Boroson, 2017). Almon and Feng (2012) note that "with academic achievement and educating the whole child sitting at the forefront of today's educational system, we are making advances to revolutionize the traditional classroom model that once separated students with disabilities from their same age peers through the development of inclusion classes and standards-based curriculums" (p. 2). The historical background of education and its transformation will be delved into further in the literature review; however, it is most important to note that this education transformation brought on a rise in rigor and instructional shifts with the newly adopted Common Core State Standards (CCSS). The Common Core State Standards Initiative defines the CCSS as a "set of standards drafted by experts and teachers from across the country that are designed to prepare students for today's entry-level careers, freshman-level college courses, and workforce training programs" (Common Core State Standards Initiative, 2017). The primary focus of the standards is to develop critical-thinking, problem-solving, and analytical skills that students will need for success academically as well as in the workforce (Common Core State Standards Initiative, 2017). The CCSS is

presenting educators, particularly mathematics teachers, with the challenge of meeting the different needs of students with diverse abilities (commoncorestandards.org). According to the Common Core State Standards Initiative (2017), teachers are now required to pursue three aspects of rigor to help students meet mathematics standards for each grade: conceptual understanding, procedural skills and fluency, and application. With the high expectations of the CCSS and the rising number of identified students with disabilities in general education settings, collaboration between mathematics teachers and special education teachers is imperative in order to ensure all students are reaching their maximum potential and mastering the state standards (National Center for Education Statistics, 2017).

History of Special Education

The history of special education in the United States dates back to the earlier part of the 20th Century, beginning with the Supreme Court case, *Brown versus Board of Education*, which desegregated schools and laid the foundation for preceding laws that mandated access to a free appropriate public education for all children with disabilities. Additionally, parents formed advocacy groups to help bring awareness to the educational needs of children with disabilities. These groups gained momentum mid-century (Esteves & Rao, 2008). In 1961, President John F. Kennedy created the President's Panel on Mental Retardation. President Kennedy used the panel's set of recommendations as a blueprint for his approach to provide federal aid to states that implemented programs, which emphasized the importance of special education, training, and rehabilitation to individuals with intellectual disabilities (John F. Kennedy Presidential Library and Museum, n.d.). In 1965, Lyndon B. Johnson signed the Elementary and Secondary Education Act (ESEA), which offered new grants to districts serving low-income students, federal grants for textbooks

and library books, funding for special education centers, and scholarships for low-income college students. The law also provided federal grants to state educational agencies to enhance the quality of elementary and secondary education (U.S. Department of Education, 2008).

Despite these two educational milestones, by the 1970's, only a small number of children with disabilities were being educated in public schools (Moody, 2012). The two federal laws that drastically changed this reality were: The Education for All Handicapped Children Act (EHA), which was passed in 1975, and the Individuals with Disabilities Education Act (IDEA), which was passed in 1990. As Moody (2012) writes, "The EHA required all schools receiving federal funding to provide children with equal access to education and mandated that they be placed in the least restrictive educational environment possible" (para.1). IDEA replaced the EHA and was established to ensure children with disabilities had access to a Free Appropriate Public Education (F.A.P.E) with the help of services that meet their individual needs. These services give students with special needs access to the general education curriculum, with the intention of helping to prepare them for life as adults. As a result of this mandate, children with disabilities are provided the opportunity to receive intervention services in public schools related to their particular disabilities (Moody, 2012).

The EHA mandates a right to public education for all children irrespective of their disability, whereas the IDEA places a big focus on inclusion or providing students with an appropriate education with their non-disabled peers as much as possible. Since its inception in 1990, multiple reauthorizations of IDEA have refined, revised, and renewed the nation's moral and pedagogical commitment to providing an inclusive and appropriate education for

students with disabilities (Zigmond, et al., 2009). While these laws have helped this country make gains toward a more equitable education, achieving the objective of full inclusion for all students has proven to be difficult because special and general education have yet to establish an integrated system in which they collaborate to strengthen both entities (Allington & McGill-Franzen, 1989). Even though IDEA was passed almost 30 years ago, there still lacks integration between special and general education as noted by Allington & McGill-Franzen (1989). More recently, Zigmond, et al. (2009) noted that there has been major improvements with teacher preparation, student achievement and placement decisions, however, they contend that "access" and placement should not come at the expense of eliminating opportunities for intense, individualized instruction (p. 201). Co-teaching is one model that has the potential to connect the conventionally similar systems of special education and regular education as well as successfully deliver differentiated, individualized instruction within the general education classroom (Hunt, et al., 2003). Co-teaching is defined as pairing two or more teachers together to share responsibility and accountability for one group of special and general education students (Trites, 2017). Under the IDEA, any state that accepts public funds for education must provide special education to eligible children with disabilities. This education should be given with their non-disabled classmates as often as possible, rather than in a separate facility or classroom (U.S. Department of Education, 2018). Effective co-teaching could help to facilitate this process by simultaneously meeting the needs of students with disabilities and their classmates without special needs.

The History of Inclusive Education

The term inclusion, as it is used in education, refers to a movement seeking to ensure that schools meet the needs of all students by forming learning communities in which students with and without disabilities might be educated together, in a general education classroom (Ferguson, 1996). This would occur under the dual guidance of a general education teacher and a special education teacher (Ferguson, 1996). The gradual progression of inclusive education can be grounded in an understanding of the events which propelled the growth of the special education field and its transitional nature. Having a strong grasp of this history is critical to understanding the progress we have made, and most importantly, where we are now.

As late as the 1970s, approximately half of the 8 million children with disabilities in the U.S. were either being inappropriately educated relative to their needs or fully excluded from the public-school setting (Pulliam & Van Patten, 2006). In an attempt to resolve this situation, in 1975, President Gerald Ford signed the Education for All Handicapped Children Act (EHA), currently known as IDEA. The EHA required all students be guaranteed a free appropriate public education (F.A.P.E). However, it did not stipulate what F.A.P.E. entailed; this omission left room for the courts to determine the best way to educate children with special needs (Boroson, 2017). The EHA called for students with disabilities to be educated in the most normal environment as is possible per the capabilities of the child (Kirk & Gallagher, 1979), summarized as the least-restrictive environment (LRE). The placement of individual students is intended to be based upon the concepts of LRE and the Deno (1970) Cascade of Services (Zigmond, et al., 2009). The term “cascade” is used because the services identified describe the full range of placement

options available to students with disabilities, which range from the most fully integrated (i.e. the regular school system) to the least integrated (i.e. a fully segregated school or residential institution) (Zigmond, et al., 2009). These levels of integration also show the move from least restrictive to more restrictive environment. By the next decade, the Deno Cascade acted as a guide for student placement, thus providing a framework for student placement, where the EHA did not (Zigmund, Kloo, & Volonino, 2009).

The next major milestone came in 1982 with Board of Education of Hendrick Hudson Central School District v. Rowley, the first special education case to land in the U.S. Supreme Court. The court ruled that students who qualify for special education services must have access to public school programs that meet their unique educational needs, and that the programs must be supported by services that enable students to benefit from instruction (Yell et al., 2004). The high court further ruled that students with disabilities are entitled to an Individualized Education Plan (IEP) to help facilitate their learning (Yell et al., 2004). The ruling gave lower courts a standard to follow when deciding what constitutes free and appropriate public education.

In direct response to the growing inclusion movement, IDEA now required the IEP team to provide a rationale for pulling a student with disabilities from the general education classroom (Yell et al., 2004). It also mandated that a general education curriculum with supplementary aides and services must be considered before an alternative special education curriculum is instituted (Yell & Shriner, 1997).

In 2004, this law was revised to the Individuals with Disabilities Education Improvement Act (IDEIA). This version, together with other legislation, aims to ensure that the concepts of access and appropriateness are interpreted and applied consistently. All

students are now guaranteed an education that is not only accessible, but also free, appropriate, timely, nondiscriminatory, meaningful, measurable, and provided in the least-restrictive setting possible (Wright, 2004). As of 2007, close to 95 percent of students with disabilities are being educated in general education schools, and 75 percent receive either full inclusion or a combination of inclusive and pull-out resource-room services (U.S. Department of Education, 2006). Research on inclusive education increasingly speaks to how general education teachers and special education can use differentiated instruction to address variance in the general education classroom without the need for fully self-contained classes (Tomlinson et al., 2003). When this type of collaboration occurs in a general education setting, co-teaching takes place.

The initial implementation of IDEA brought about a lot of shortcomings, as many students with special needs spent most, if not all, of their time in separate special education classrooms with social and educational ramifications (Boroson, 2017). Although students with special needs now had access to special education services, many were taught in segregated settings that were not always in their neighborhood schools and had restricted access to general education students and learning environments. A call for reform ensued, which advocated for the merging of special and regular education through what is now known as the Inclusive Movement. Advocates of the Inclusive Education Movement demanded that many, if not most, students with disabilities be taught in the general education setting.

Inclusion is “a belief system that embraces the reality that diverse individuals are included within a positive learning environment” (Stein, 2016, p. 8). An inclusion classroom is often chosen as the least restrictive environment for students with special

needs since it allows students to receive the support they require as part of their Individualized Education Program (IEP), build a stronger social connection with their peers, and benefit from the general education curriculum. Co-teaching is the most popular inclusive educational model to meet the educational needs of students with disabilities previously enrolled in exclusive, segregated settings (Magiera & Zigmond, 2005).

Co-teaching is often implemented with the pairing of general and special education teachers as part of an initiative to create a more inclusive classroom. Co-teaching takes place in a general education classroom, and the teaching partners share the responsibilities of planning, instructing, and assessing students. The co-teaching pair simultaneously provide instruction to both general education students and special education students. It is one of the supportive structures to ensure an appropriate education for a student with disabilities in an inclusive setting. Students with disabilities who receive co-teaching services are educated with age appropriate peers in the general education classroom. Co-teaching, in theory, creates a classroom experience that provides an enriched teaching and learning environment for a diverse student population.

Defining Co-Teaching

Co-teaching is one of many titles given to the partnership between general education and special education teachers. Other titles that describe this relationship are cooperative teaching, teaming, or team teaching (Friend & Cook, 2007). A general definition for co-teaching is a service delivery model that uses two equally qualified professionals who may or may not have the same area of expertise jointly delivering instruction to a group of students (Cohen & Ferree, 2012). For the purpose of this study, co-teaching is defined as a teaching model that involves a general education teacher and a

special education teacher planning and delivering instruction and assessing the learning progression of special education and general education students in one classroom (Friend & Cook, 2007). Friend (2008) defines co-teaching as the collaboration between a "general education teacher and a special education teacher working as partners to teach a diverse group of students" (p. 9). Friend (2008) explains, "Co-teaching presumes that both educators actively participate in the delivery of instruction, share responsibility for all students, assume accountability for student learning, and acquire instructional resources and space" (p. 9). In accordance with Friend's (2008) explanation, co-teaching partnerships thrive when both teachers share an equal role in planning and implementing instruction.

The co-teaching educational model requires that "a special education teacher work with the general education teacher to provide needed supports, avoiding the need for students with disabilities to leave the classroom to receive specialized assistance" (Solis et. al, 2012, p. 498-499). This allows students to remain in the general education setting, gives students a more equitable education in the LRE, all while ensuring they receive the necessary instructional support from a special education teacher. Teachers using the co-teaching model will need to rely on each other to adequately teach special education students complex standards, to prepare them for rigorous standardized exams, and help to make them college and career-ready.

Overview of Co-Teaching Research

Murawski (2001) conducted a meta-analysis of the quantitative research on co-teaching. The results of the meta-analysis suggested that co-teaching could have a positive impact on student achievement. Murawski also found that there was some evidence that there were positive social outcomes for the students in co-teaching settings, and that there

was a definite need for further experimental research. Additionally, Scruggs (2007) also conducted a meta-analysis of the qualitative research available in co-teaching. His study concluded that teachers, students and administrators found co-teaching was generally beneficial to special education and general education students in both social and in academic areas. He also found that the one-teach, one-assist model was primarily used in co-taught classrooms, which led him to question whether or not collaboration was taking place. Friend and colleagues (2010) identified similar findings in that teachers have had little preparation for their co-teaching assignments, which is why they tend to over utilize the one-teach, one-assist model. It's the method that many teachers are most comfortable with, which also happens to be one that requires the least amount of pre-planning. The figure below provides the names and brief description of the six co-teaching approaches Friend (2010) believes are the most effective in a co-taught setting.

Co-Teaching Approaches and Descriptions	
Approach	**Description**
One Teach One Assist	One educator provides assistance to individual students while the other delivers instruction
Team Teaching	Both teachers instruct the class together
Parallel Teaching	each teacher teaches half of the class, teaching the same content
Alternative Teaching	a small number of students are selected for intensive instruction by one teacher, while the other teacher teaches the remaining students.
One Teach One Observe	one teacher teaches, while the other collects purposeful data
Station Teaching	Each teacher teaches a group (a 3rd group may be work independently

Co-Teaching in Mathematics

There is limited literature available on inclusion in math, and specifically co-teaching math (Rexroat-Frazier, 2017). Though, the issues, limitations, and benefits of co-teaching in mathematics are not that much different than in other content areas. DeSimone and Parmar (2006) noted, "many of the current studies report attitudes of teachers in general" (p. 99), rather than a focus specifically on one content area. However, the studies that are available are consistent with the findings in other general education content area co-taught classrooms (DeSimone & Parmar, 2006). These researchers also suggest that, "One of the first steps toward understanding successful instruction in inclusive mathematics classrooms is to understand general educators' beliefs and attitudes regarding inclusion and students with LD (Learning Disabilities)" (DeSimone & Parma, 2006, p. 98). The success of co-taught mathematics classrooms is closely tied to the bigger picture of what co-teaching practices are and the perspectives of the co-teachers.

Mathematics classrooms have not received as much attention in studies of co-teaching as have other disciplines. Perhaps because the concerns, practices, and advantages of co-teaching in other content areas also applicable to mathematics classrooms. The ultimate goal is including students with learning disabilities in general education mathematics classrooms and providing the necessary support for these students to show progress academically and socially with their peers. A major expectation of teachers is their use of research based instructional practices to teach mathematics (e.g. IDEA 2004; NCLB, 2001). Moreover, education literature includes many of these practices as well as instructional delivery models and structures (e.g. co-teaching) that are effective with students with disabilities (Friend & Reising, 1993; Gately & Gately, 2001; Kroesbergen &

van Luit, 2003; van Gardern, Scheuermann, Jackson, & Hampton, 2009). Careful planning by co-teaching partnerships will provide a positive, supportive learning environment for all students, and will provide the least restrictive setting for students with learning disabilities in mathematics classrooms.

Statement of the Problem

The current educational climate is one that promotes the co-teaching model and highlights its benefits of helping provide students with disabilities access to the general education mathematics curriculum, while providing the necessary accommodations from students' IEPS (Magiera, et. al, 2005). While there is no denying the advantages of this teaching model, there is little research conducted on understanding the beliefs, attitudes, collaboration, and challenges within co-teaching practices of mathematics and special education teachers. This brings about a strong need for exploring co-teachers' perspectives, relationships, and common teaching practices when implementing this teaching structure. Co-teaching has the potential to unify the general education teacher's expertise of subject matter and the special education teacher's background knowledge of differentiation and accommodations. In support of this, Majchrzak (2015) noted that:

> *Both the general education and the special education teachers bring their own knowledge and expertise to the classroom. The general education teacher brings knowledge and understanding that is subject-specific. The general education teacher sets the broad tone for the class. On the other side, the special education teacher brings knowledge and understanding that is student and learning specific. The special education instructor has a background on learning styles and specific interventions and accommodations (p.39).*

Researchers have examined the attitudes of general education and special educators with respect to adaptations and interventions used in teaching students in heterogeneous classrooms (Hang & Rabren, 2009). The prevailing literature on co-teaching is centered upon compliance with the Individuals with Disabilities Education Act (IDEA), and on the

benefits of the collaboration of two professionals in the classroom. However, very few have investigated these teachers' perceptions of collaboration in student learning (Cook, 2004; Gately & Gately, 2001; Idol, 2006; Kohler-Evans, 2006; Brown, Howeter, & Morgan, 2013). There is also limited research on addressing the perspectives of elementary mathematics teachers engaged in co-teaching (Rexroat-Frazier, 2017). Moreover, there are few qualitative, narrative studies addressing the perspectives of teachers engaged in co-taught mathematics classrooms as they work to meet the needs of students with learning disabilities (Cronis & Ellis, 2000). Because effective teaching is a vital component of the educational process for both students without, and particularly, with disabilities, it is incumbent upon collaborative teachers to provide quality instruction for all students. To ensure that this goal is achieved, these teams of teachers must *feel* that they are adequately prepared for collaboration.

Friend (2007) writes that teachers are often reluctant to volunteer to co-teach due to a fear of being judged by one another or their work being devalued. Regular education teachers may believe that the special educator will analyze their styles or methods of teaching, and the special educators may think their jobs will be taken away due to a lack of need. Friend (2007) goes on to explain that co-teachers who may have been participants of this model for several years may desire a break, and others with less experience may fear that they will not be as effective as the more veteran teachers. Additionally, it has been posited that the co-teaching arrangement is akin to marriage due to the amount of teamwork required. Specifically, researchers have likened the relationship to a forced marriage in which individuals must clarify roles and solidify relevant matters, such as:

assuring equality of the relationship, addressing issues feelings of territorialism; and equitable distribution of obligations (Kohler-Evans, 2006).

Given that the aforementioned issues directly affect the educational process (Cook & Friend, 1995), it is necessary to better understand how this relationship is perceived by those who will most likely need to incorporate them into the learning environments: the teachers. Additionally, these concerns need to be sufficiently analyzed and managed so that teachers' co-teaching efficacy may be increased.

Research has yielded promising findings with regard to the educational success of students with special needs, when exposed to co-teaching methods (Walther-Thomas, 1997), such as enhanced academic performance, improved classroom communities, and increased emphasis on cognitive strategies. However, according to other scholars "much more information is needed to better understand the exact nature of the roles and behaviors of both the regular education teacher and the special education teacher in inclusive classrooms" (Harbort et al., 2007, 14). Similarly, Bauwens and Hourcade (1991) suggested that when implementing the co-teaching model, one must address several concerns: the teachers should share a teaching philosophy regarding the inclusive classroom setting; the teachers should then reach an agreement regarding theory of inclusive settings; and finally, from the theoretical considerations, the co-teachers need to develop a plan of action to streamline co-teaching activities. The current study will attempt to address these concerns through the use of descriptive qualitative methods, allowing members of the co-teaching community to identify and define their own circumstances and related challenges.

Purpose and Objectives of the Study

Research on collaborative teaching is still developing and studies that have been conducted were found to be inconclusive, in terms of quantitatively measured student

results (Friend, et al., 2010; Hanover Research, 2012). For example, Friend et al. (2010) writes that most studies on co-teaching emphasizes co-teachers' roles or program logistics rather than demonstrating its impact on student achievement and other key outcomes, and even more literature exists describing the practice of co-teaching and offering advice about it than carefully studying it. This suggests that co-teaching is far more complex than teachers, administrators, and legislators may believe. There is not a substantial number of studies that analyze teachers' perspectives on co-teaching, but there is a plethora of studies that examine the benefits of the co-teaching model (Cook, 2004; Cramer, Liston, Nevin, & Thousand, 2010; Dieker, 2001; Friend, 2007; Kohler-Evans, 2006; Mastropieri, Scruggs, Graetz, Norland, Gardizi, & McDuffie, 2005). These findings indicate that there are benefits of utilizing the co-teaching model, even though researchers have yet to uncover a direct correlation between student performance and the co-teaching model. An example of one of the benefits of co-teaching is that students without disabilities have the opportunity to develop into more compassionate and caring individuals, while students with disabilities feel a part of the school learning environment (Kohler-Evans, 2006). Studies have also shown that strong co-teachers provide seamless instruction for their students (Almon & Feng, 2012; Friend, 2008; Friend & Cook, 2007; Kloo and Zigmond, 2008). A strong partnership is established when both teachers come to an agreement acknowledging that they are equals in the classroom. Additionally, when students perceive both teachers as invaluable members of the classroom community, student learning is maximized (Maryland State Department of Education, 2012). However, the problem occurs when teachers are not always aware of how to establish these collaborative partnerships; issues may also surface because teachers are not always confident in their ability to develop these relationships, to

effectively co-deliver instruction, or to find efficient ways to overcome obstacles that may arise (Rimpola, 2011).

This multiple case study examined the perspectives of mathematics teachers and special education teachers on co-teaching. Teachers' attitudes toward co-teaching were investigated. Methods were analyzed that reflected ways in which different teachers make these complex relationships work to meet the needs of all students in the classroom setting. Additionally, some of the challenges co-teachers may encounter in their collaborative journey were examined. Teachers are required to teach all students, based on more rigorous mathematics standards, regardless of their academic abilities, disabilities, and unique service needs. The focus of this research is to closely explore the perceptions of mathematics teachers and special education teachers currently working together to teach students with diverse needs in the general education setting. The study will examine co-teaching models that are often used in third and fourth grade mathematics classrooms, as well as the strategies educators find to be most effective when teaching learners from varying academic ability levels.

Research Questions

It is important to understand how teachers perceive their roles, responsibilities, and levels of preparedness in a co-teaching partnership. It is for this reason that the following research questions were developed:

1. How are the perspectives of third and fourth grade elementary mathematics teachers on co-teaching similar to and different from special education co-teachers?
2. How do partnering teachers perceive co-teaching as an instructional model for teaching mathematics?
3. Which co-teaching models are often used in third and fourth grade mathematics

classrooms?

Significance of the Study

Van Garderen (2008) wrote that we are living in an era in which students with special needs are being included with regular education students and the same standards are expected for both student groups. Students receiving special education services in inclusive environments may be taught using the same standards, required to pass the same exams, and expected to achieve these goals at the same rate as their general education peers. This reality appears to be an especially difficult task for mathematics teachers because many regular education students have difficulty with mathematics (Cole & Wasburn-Moses, 2010). Increasing math achievement for both general and special education students may prove to be an even bigger challenge. With the drive for more and more students being required to take standardized tests to determine whether they have mastered the CCSS, the stakes are high for both students and teachers (Murawski & Lochner, 2011). Kloo and Zigmond (2008) write that co-teaching is the natural way to teach students with special needs alongside students in general education settings. Both teachers and students can benefit from the positive effects of this teaching model. Students with special needs get the best of both worlds: they get the expertise of a content area teacher and the most appropriate accommodations from the special education teacher. Teacher instruction becomes more dynamic and the professionals can learn from one another and prepare lessons that address a variety of levels, such as knowledge, comprehension, and application (Dieker & Murawski, 2003; Friend & Cook, 2007).

General education teachers are not required to go through the extensive training in learning styles, interventions, and lesson modifications expected of special education teachers (Ripley, 1997). Conversely, special educators do not receive the same explicit

teachings in specific content areas as do regular education teachers (Ripley, 1997). Therefore, partnering a special educator with a general education teacher can improve the chances of students with disabilities reaching their full potential. Yet, teachers' perceptions of their roles and/or the model's effectiveness influence how well the co-teaching model is implemented (King, 2010). While the model may have intrinsic value, the way teachers define, perceive, and deliver instruction using this model will determine its effectiveness on student achievement.

Classroom instruction is a critical component of the educational system; some might say that it is the most critical component (Guerriero, n.d.). For co-teaching instruction to produce meaningful learning, the partnering teachers must clearly understand how to adjust and improve their practices to meet students' needs. Still, despite the critical role that teachers' understanding of the educational process play in helping teachers address student needs, we know very little about how and why general education and special education teachers do the things they do in co-taught classrooms, or about how to help them make the best decisions for their students.

Review of Relevant Terms

1. Alternative Teaching – One teacher takes responsibility for the large group while the other works with a smaller group.
2. CCSS - Common Core State Standards used in K-12 classroom settings
3. Collaborative Planning (co-planning)- general educator and special educator planning together in preparation to teach their co-taught class(es).
4. Co-Teaching - A teaching model that involves a general education teacher and a

special education teacher planning and delivering instruction and assessing the learning progression of special education and general education students in one classroom (Friend & Cook, 2007).

5. EHA - The Education for All Handicapped Children Act, which was passed in 1975
6. E.I.P.- Early Intervention Program that is designed to help students who are at risk of not meeting grade level standards.
7. F.A.P.E - Free Appropriate Public Education is made available to eligible children with disabilities and mandates services are provided that meet students' individual needs
8. General Education – The basic educational foundation of skills, knowledge, and practices that prepares students for success in society. This educational foundation is developed primarily through a core curriculum, which is a set of general education standards that all students, regardless of race, gender, or socioeconomic background, must master.
9. IDEA - Individuals with Disabilities Education Act passed in 1990
10. IEP- Individual Education Program is a written plan designed to meet the needs of student with a disability.
11. IDEIA - Individuals with Disabilities Education Improvement Act of 2004 authorized "grants to states and discretionary grants to institutions of higher education and other non-profit organizations to support research, demonstrations, technical assistance and dissemination, technology and personnel development and parent-training and information centers" (U.S. Department of Education, 2018).

12. i-Ready Math Computer Program- an online math program that differentiates lessons and quizzes it delivers to students based on their mathematics proficiency levels as measured by an online diagnostic the program pushes out three times a year.
13. Learning Disability - The IDEA defines a specific learning disability as "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 the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations" (Special Education Guide, 2018, para. 1).
14. LRE - least restrictive environment means that students with disabilities should spend as much time as possible with peers who do not receive special education
15. One-Teach, One-Assist – one person teaches the class, while the other teacher circulates through the room helping students as needed
16. One-Teach, One-Observe – Co-teachers decide, in advance, what types of specific observational information to gather during instruction and can agree on a system for gathering the data. Afterward, the teachers should analyze the information together.
17. Parallel Teaching – The teachers are both covering the same information, but they divide the class into groups and teach simultaneously.
18. Pull-Out Programs- Special educators work closely with students with disabilities outside of the general education classroom. Instructional support is provided in a small group setting.
19. Special Education - Special education includes uniquely designed instruction that may take place "in classrooms, at home, or in private or public institutions, and may

be accompanied by related services such as speech therapy, occupational and physical therapy, psychological counseling, and medical diagnostic services necessary to the child's education" (U.S. Department of Education, 2010).

20. Station Teaching – Teachers divide the content and students. Each teacher then teaches the content to one group and subsequently repeats the instruction for the other group. A third station could give students an opportunity to work independently.
21. Team Teaching – Both teachers are delivering the same instruction at the same time.

Organization of the Study

This chapter presented an introduction to the study as well as an overview of the background and status of special education and co-teaching in the United States. It also defined co-teaching in the general sense, and specifically in mathematics. The research problem, purpose and objective, as well as the research questions were also provided.

In Chapter two, I review the relevant literature and research pertinent to inclusive education and mathematics. Following that, I discuss the theoretical framework, Social Learning Theory, as it relates to co-teaching. Co-teaching methods and approaches will be reviewed. Finally, I will examine the benefits and challenges of co-teaching, and specifically, how these benefits and challenges exist in mathematics.

Chapter 3 describes the methodology of this study as it relates to the research questions. This chapter details the research design, the selection of participants, instrumentation, data collection, and data analysis that will be used in this investigation.

In Chapter 4, I provide a detailed analysis of the data. Each individual case study is described to provide more insight on the uniqueness of the case studies. This chapter concludes with descriptions of common themes that emerged throughout the study.

Lastly, in Chapter 5, a summary of the research and a discussion of the conclusions are provided. Major findings from the study as well as implications for the field are addressed, and finally, recommendations and suggestions for further research are provided.

Chapter II

Literature Review

Co-teaching partnerships are sometimes compared to marital relationships since they can be contingent on flexibility, negotiation, and commitment (Friend, 2008). In order to be successful, co-teaching is reliant on two educators who are committed to reaching their students and work persistently to achieve that goal (Friend, 2008). The two teachers work collaboratively to solve problems and produce inventive strategies, resolve their differences of opinion, and try alternative solutions if the original ones are not effective (Friend, 2008). The two teachers have a shared commitment to the development of their professional relationship (Friend, 2008). Both educators work to bring out the best in the other individual, and the end result is improved outcomes for students and lasting teaching relationships (Friend, 2008).

According to the National Association of State Directors of Special Education (2009), states, such as New York, Oklahoma, Michigan, and Maryland, just to name a few, have adopted a co-teaching framework to enhance the instructional practices and provide greater access to the general education curriculum for students with disabilities. Maryland, specifically, has developed a vision statement calling for the accountability of general and special education teachers to collaborate in the planning, delivering, and assessment for students in the general education curriculum (Maryland State Department of Education, 2011). The mission of the program is to improve achievement of students with disabilities by supporting the professional growth of administrators and teachers by:

1. Giving teachers, system leadership, and administrators effective evidence-based co-teaching practices resulting in improved student achievement and

more inclusive opportunities for special education students

2. Encouraging administrators and teachers to exchange information and resources on social networking and learning communities to enhance professional growth in the Maryland model for co-teaching and collaboration
3. Establishing a co-teaching network to find techniques, strategies, and protocols to improve co-teaching with the goal of increasing student academic achievement and the number of students with disabilities in the LRE (Maryland State Department of Education, 2011).

Overview

Over the past several years, the shift in special education from self-contained special education classrooms to inclusive classrooms in the general education environment has improved (Murawski, 2009; Murawski & Lochner, 2011). Federal legislative mandates, such as IDEA-mandated programs, have emerged that place an emphasis on providing an equitable education for students with disabilities and their right to access the general education curriculum (Lipsky & Gartner, 1996; Wang & Reynolds, 1996). Because of researchers, policymakers, and educators advocating for including special education students in the regular education environment, a great deal of progress has been made (Lipsky & Gartner, 1996; Stainback & Stainback, 1992; Wang & Reynolds, 1996). IDEA federally mandated laws have also helped to reform the working relationships between the adults within schools (Griffin & Warden, 2006).

Consequently, co-teaching has been the focus of several recent studies (Gavish & Shimoni, 2011; Hwang & Evans, 2011). These studies have focused on the perceptions of general education teachers toward inclusion, their positive and negative attitudes regarding

inclusive education, and the problems they encounter while implementing inclusive practices (Berry, 2010; Horne & Timmons, 2009).

Theoretical Framework

Lev Vygoskty was a Russian psychologist and social constructivist. He contributed in many ways to the research on child development, but his main contribution was his Social Learning Theory (SLT). Vygotsky's SLT stressed the importance of the role of social interaction in the development of cognition. Vygotsky firmly believed that community played a central role in the process of "making meaning" (Vygotsky, 1978). He concluded that the environment children grew up in would influence how they think (Vygotsky, 1978).

Vygotsky's theory of cognitive development had two main concepts: the More Knowledgeable Other (MKO) and the Zone of Proximal Development (ZPD). He asserted that the interaction of an adult or MKO was necessary for a student to internalize information that would lead to learning. The MKO may model behaviors or provide verbal instructions for the student, which Vygotsky refers to as collaborative dialogue (McLeod, 2014). Children internalize the information from the MKO (parent, teacher, or peer), and then use it to take control of their own learning as they become more proficient and more capable of working independently. According to Vygotsky (1978), this type of social interaction, which involved cooperative give-and-take, promotes cognitive development.

Vygotsky (1978) defined the Zone of Proximal Development as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance, or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). The ZPD

is the difference between what a learner can do without assistance and what he or she can do with help (See Figure 1). Vygotsky believed the primary role of education is to provide children with experiences that are in their ZPD, thereby encouraging and advancing their individual learning. Vygotsky believed that when a student is in the ZPD, providing the appropriate assistance will give the student enough of a "boost" to achieve the assigned task. This zone is the most beneficial as it relates to learning because it is just outside of a student's independent level, but it doesn't quite reach his or her frustration level (Vygotsky, 1978). Students do not mind being challenged while in the zone, because they have the safety net of the MKO.

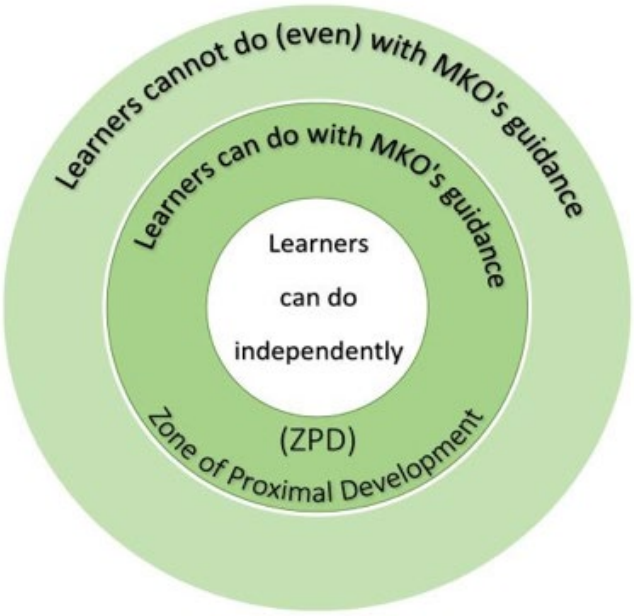


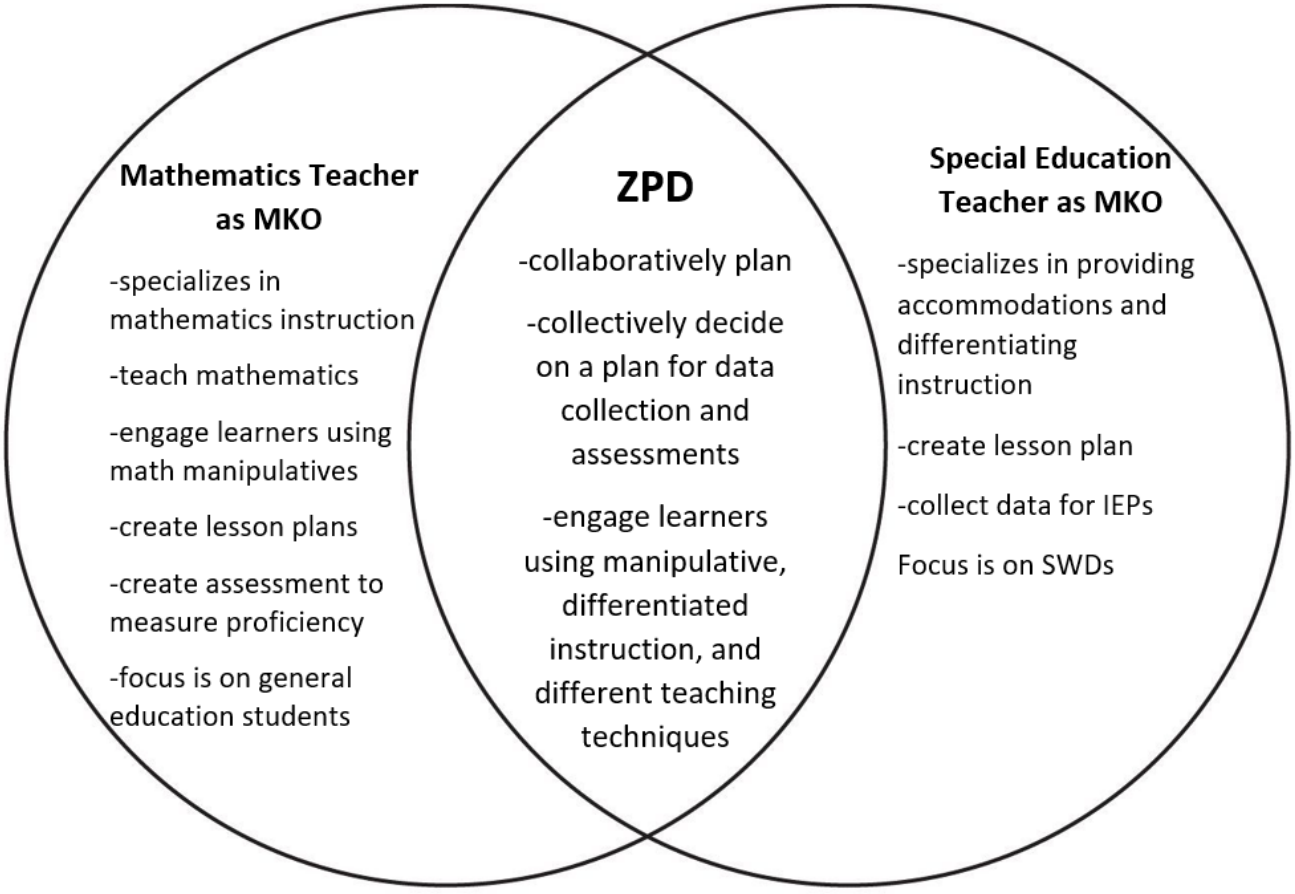
Figure 1 Vygotsky's Zone of Proximal Development (researchgate.net, 2016)

ZPD in Co-Teaching

Although Vygotsky's theory focused primarily on social cognitive development in children, it can have strong implications for learning environments where co-teaching exists. Vygotsky states cognitive development stems from social interactions and guided learning within the zone of proximal development as children and their partner's co-construct knowledge (Vygotsky, 1978). It shows that learning is an interactive process that can be assisted by someone who is more knowledgeable. In the case of co-teachers, special educators may be more knowledgeable in differentiation and scaffolding grade-level content, while the general educator may be

more proficient in the subject matter. When these teachers work collaboratively, they step into the ZPD, and can assist one another with considering how to best serve their students, this is when they experience maximum learning and deliver highly effective instruction (Doolittle, 1995). While in the ZPD, the special educator may feel more comfortable delivering mathematics instruction, with the assistance of the mathematics teacher, and the mathematics teacher may be more at ease with differentiating the content when the special educator is there to guide him or her. More can be accomplished in the ZPD, than when teachers are working independently (see Figure 2).

Figure 2



SLT in Mathematics

In the realm of mathematics, an essential role of teachers and other students is modeling or scaffolding when students are in the process of mastering math skills. Traditionally, students learn first by seeing the teacher complete problems but in small groups, modeling becomes a way students learn each other's strategies to complete tasks (Vygotsky, 1986). To learn, students may need the practice that is found within a community where they speak and act mathematically in discussions with the teacher and other students. True learning takes place when the student moves from acquiring knowledge through the Zone of Proximal Development (Gredler & Shields, 2007). This is where the student becomes competent in performing math functions independently and the scaffolding is removed leaving a student confident that they can be successful in the task (Goos, 2004).

This method can be applied in co-teaching mathematics as well. An example of this would be a mathematics teacher modeling the proper way to solve and think through a problem as a way of guiding the co-teacher through the process of effectively teaching a standard. Similarly, the special education teacher may want to model how manipulates may be used to solidify student learning, or by demonstrating ways to differentiate content and product. As either of the teachers become more comfortable with their roles and the knowledge these responsibilities entail, modeling may no longer be necessary.

Co-Teaching Approaches

To combine content knowledge from general education teachers and the expertise of differentiation from special education teachers, the concept of co-teaching evolved through collaborative partnerships between professionals (Bauwens, Hourcade, & Friend,

1989). Since co-taught classrooms provide access to general education, rigorous curriculum, and quality instruction for special education students through the collaboration of content-area and special education teachers, co-teaching has become a progressively pervasive approach for delivering special education services in inclusive environments (Conderman & Hedin, 2012; Fenty & McDuffie-Landrum, 2011). The realities of today's classrooms include a focus on inclusion, research-based instruction, accountability, diversity, differentiation, and continuous formative assessments. To meet these demands, some teachers are collaborating out of necessity, rather than obligation.

Friend and Cook have conducted extensive studies of co-teaching in classrooms. They have concluded that educators are most effective at meeting their instructional goals and are more professionally fulfilled when they use these six methods of collaborative teaching: one-teach/ one-observe, one-teach/ one-assist, team teaching, alternative teaching, parallel teaching, and station teaching (Trites, 2017) (See Figure 3).

Figure 3

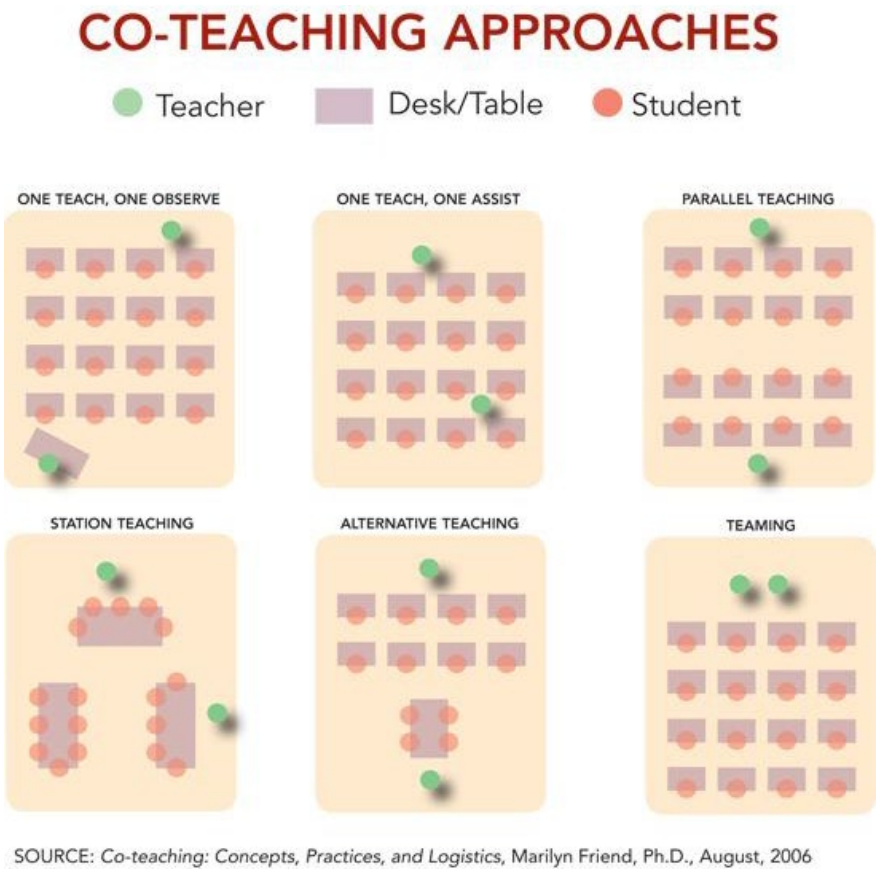


Figure 3: Permission from Marilyn Friend, Ph.D. to use chart.

The one-teach/ one-observe model allows one teacher to perform a more detailed observation of student engagement during the learning process. While one teacher is teaching, the other is looking for observational data to gather during instruction. Both teachers should decide exactly what to observe prior to the start of the lesson. Afterwards, both teachers review the information together and decide how students should move forward with their learning (Friend, 2015). One-teach/one-observe strategy is one of the most used approaches in schools. According to Mewald (2014), it should be used in new co-teaching situations, when students need to be observed or assessed or to monitor progress.

With the one-teach/ one-assist model, one teacher leads instruction while the other supports the students in various ways. The supporting teacher may circulate the room, introduce modified or adaptive materials, or assist students as needed (Friend, 2015). Friend (2015) recommends that this method be used the least often. Friend (2015) cautions

that if used too frequently with the same teacher taking the instructional lead, the students may perceive one teacher as being the authority over the other.

Friend (2007) explains that in teaming, both teachers work collaboratively to deliver the same instruction to the entire student group. Some teachers refer to this as having "one brain in two bodies" (para. 5). Most co-teachers consider this approach the most complicated, yet satisfying way to co-teach, but it is the approach that is most dependent on teaching styles. This model requires both teachers to spend time planning the lesson so that instruction may be delivered with a sense of intentionality. This model should be used when instructional conversation is appropriate and meaningful, or the goal is to demonstrate some kind of interaction to the learners (Mewald, 2014).

Friend (2015) writes that in most groups, occasions arise in which several students require specialized attention. When this occurs, alternative teaching is the recommended teaching model (Friend, 2015). With the alternative teaching, one teacher takes responsibility for the large group while the other works with a small group of students. While most of the class works with one teacher on a warm-up activity, the co-teacher leads a small group lesson to prepare them for the lesson in an alternative way. Alternative lesson deliveries may include using hands-on manipulatives to introduce the group lesson, reviewing a previously taught lesson, previewing vocabulary, or using higher order questions for advanced students to consider throughout the instruction. Mewald (2014) suggests using this model for remediation, pre-teaching, or for enrichment purposes.

Parallel teaching requires teachers to divide the class and teach the same content at the same time. Friend (2015) writes that lessons become more accessible to all students when the content is delivered to smaller groups. All students have a chance to share, and

students are more inclined to engage in the lesson. Some concerns with parallel teaching are the noise level in the classroom and the space constraints. Friend (2015) writes that these issues can be addressed through proper classroom management. Parallel teaching should be considered when a smaller teacher-learner ratio is needed or to provide more opportunities for active participation (Mewald, 2014).

The last model Friend (2015) describes is station teaching. Station teaching occurs when teachers divide the content as well as the students. This model is also beneficial when a smaller student-to-teacher ratio is necessary (Mason, 2018). Students can be divided based on learning preference, preference of math strategy, or math proficiency levels (Mason, 2018). All students rotate through each station, but at different times, and each teacher teaches the same content to one group and then repeats the instruction for the other group. If time permits, a third station could be provided to allow for independent practice. Station teaching should be considered when the new content can be organized in non-hierarchical stations, for independent practice, or when several topics are to be covered (Mewald, 2014).

Though there are several ways to teach collaboratively, such as complementary co-teaching, the consultant model, coaching model, peer teaching model, and the supportive teaching model (Rojas, n.d.; New Jersey Department of Education, 2016; Wilson & Blednick, 2012), for this study, I will use Marilyn Friend's (2013) six methods that she believes are the most effective and are supported by research. Co-teachers may use different models on different days depending on what their students need, but instruction will need to be thoroughly planned to boast effectiveness (Friend, 2013). When teachers

become skilled at practicing the co-teaching model, they can predict which method best suits a particular lesson.

Benefits of Co-Teaching

Friend (2008) outlines notable benefits and barriers of co-teaching. One of the greatest benefits of co-teaching is that students with disabilities are provided access to the general education curriculum and general education setting, while still receiving specialized instruction. Having two teachers in the room reduces the student-to-teacher ratio and increases the student and teacher interactions. Co-teaching is conducive to small group learning and individualized instruction, which increases opportunities to differentiate based on student needs.

In addition to students receiving greater instructional intensity and differentiated instruction, teachers will learn from each other's expertise, thereby expanding the scope of their teaching capacity. Kaplan (2012) proclaims the "co-planning process encourages two teachers to bounce ideas off each other in order to deliver the strongest, most creative lessons" (p. 7). Co-teaching brings about shared expertise among two or more teachers as well as mutual responsibility for instruction and management.

Challenges of Co-Teaching

Co-teaching certainly has its benefits, but it is important to note some of the challenges that come along with this teaching model as well. Many studies revealed that finding time to co-plan is one of the biggest challenges of co-teaching (Austin, 2001; Dieker & Murawski, 2003; Friend, 2007; Friend, 2013; Friend, Cook, Hurley-Chamberlin, & Shamberger, 2013; Kloo & Zigmond, 2008; Pugach & Winn, 2011). Unless teachers have the same planning period, it is very difficult to coordinate schedules to find time to

collaboratively plan. Co-planning usually occurs during teachers' personal time, which can be problematic because planning with another person can be time-consuming and teachers may become overwhelmed.

An additional challenge is the propensity for imparity in the classroom. Special education teachers may have a hard time presenting themselves as equals to the students. Co-teachers share a classroom for the limited time their students are being co-taught, but both the teachers and students are aware of whose classroom they are in, and this may make the special educator feel like a guest in a general education teacher's space (Kaplan, 2012). Kaplan (2012) recommends having conversations with the co-teacher surrounding these issues. Setting up the classroom together prior to the start of school can help build a stronger foundation for a more equitable partnership.

Another common concern in co-teaching partnerships is that it can be challenging to work with a co-teacher who has a different teaching style and philosophy (Kaplan, 2012). This can be problematic because these differences can be reflected in the classroom through a lack of consistency of how the classroom is managed, and it can create confusion for the students when there is not a balance between both teachers' teaching styles. Kaplan (2012) found that "success is less dependent on similar philosophies and more dependent on an open mind and willingness to compromise" (para. 9). Teachers partnering with a co-teacher who views learning and teaching differently, should talk about their differences in hopes of widening the scope of their practice by incorporating multiple teaching styles (Kaplan, 2012). If both teachers do not feel as though their teaching style or philosophy is valued, an inequitable teaching environment may begin to build.

Teaching Styles

Kaplan (2012) writes about the benefits and challenges of co-teaching. While doing so, she discussed the impact teaching styles may have on the relationship between co-teachers as well as their ability to productively perform their duties. Marston and County (National Education Association, n.d.) suggest that teachers identify their teaching styles and use them to create a cohesive classroom by finding a balance that leads to both teachers feeling comfortable.

Anthony Grasha (1994) defines teaching style as a particular pattern of needs, beliefs, and behaviors that teachers display in the classroom. He also wrote that styles were multi-dimensional and among other areas, it impacted the way information was presented, student-teacher interactions, and classroom management (Grasha, 1994). Educators develop teaching styles based on their beliefs about what constitutes good teaching, personal preferences, their abilities, and the norms of the particular discipline. Grasha (1995) identified five teaching styles: expert, formal authority, personal model, facilitator, and delegator (See Figure 4). A teacher may use either style at any given time depending on the lesson and the needs of his or her students.

Figure 4

Teaching Style	**Description**	**Preferred Teaching Method**	**Compatible Student Learning Style**
Expert	-The teacher possesses the knowledge and expertise that students need. -The teacher transmits information to students for mastery.	-Lectures -Presentations -Teacher-centered questioning/ answering sessions -Direct Instruction	Dependent Auditory Strong reading/ writing preference

Formal Authority	-The teacher possesses status among students because of knowledge and role as a faculty member. -The teacher provides feedback, establishes learning and behavior expectations. -The teacher focuses on the correct, acceptable, and traditional way of doing things.	-Teacher-centered discussions -Direct Instruction -Lectures -Presentations -Classroom discussions	Dependent Auditory Strong reading/ writing preference Solitary
Personal Model	-The teacher believes in modeling and provides examples for how to think and behave. -The teacher oversees, guides, and directs by showing how to do things, and then encourages students to observe, then mimic the teacher's approach.	-Demonstrations -Scaffolding	Visual Auditory
Facilitator	-The teacher emphasizes the personal nature of student-teacher interactions. -The teacher guides students by asking questions, suggesting alternatives, and encouraging them to develop criteria to make informed choices.	-Guided discovery -Inquiry-based -Brain-storming sessions -Student-led small groups -Coaching	Kinesthetic Verbal Independent Social
Delegator	-The teacher's goal is for students to function autonomously. -Students work independently on projects or as part of an autonomous team. -The teacher is available as a resource as needed by the students.	-Guided discovery -Inquiry-based -Project-based	Kinesthetic Independent Verbal

Adapted from Anthony Grasha's (1995) Five Teaching Styles Table 1 (p. 143)

Although it is ideal to work with someone with a similar teaching style and philosophy, a successful co-teaching partnership does not require it (Kaplan, 2012). In the event that one is paired with someone who may seem very different as it relates to philosophy and/or style, Kaplan recommends talking about the differences to build a mutual respect. Also, open dialogue increases one's willingness to compromise and explore different teaching practices by incorporating multiple styles into the classroom (Kaplan, 2012).

Co-Teaching in Mathematics

The Common Core Mathematics standards define what students should understand in their study of mathematics. One hallmark of mathematical understanding is the ability to justify, in a way appropriate to the student's mathematical maturity, why a mathematical statement is true or where a mathematical rule comes from (Common Core State Standards Initiative, 2017). There is a world of difference between a student who can recall a formula to find a product such as $\frac{□}{□} \times \frac{□}{□} = \frac{□□}{□□}$ and a student who can explain where the formula comes from. The student who can explain the rule understands the mathematics, and may have a better chance to succeed at a less familiar task such as $\frac{□}{□} \times q = \frac{□}{□} \times \frac{□}{1}$. In the CCSS, there is more emphasis placed on mathematical understanding rather than procedural skill. The math standards provide transparency and specificity as opposed to broad general statements. They attempt to follow the design imagined by William Schmidt, Richard Houang, and Leland Cogan (2002) by not only highlighting abstract understanding of key ideas, but also by consistently returning to organizing principles such as place value and the laws of mathematics to ground those ideas.

Elementary mathematics teachers have training in mathematics content, with a limited number of courses or trainings focused on how to meet the needs of students with learning disabilities (Yopp, Ellis, Bonsangue, Duarte, & Meza, 2014). Special education teachers, on the other hand, have a thorough knowledge of individual student learning but limited knowledge of mathematics content (Yopp et al., 2014). The elementary mathematics teacher brings content knowledge to the classroom while the special education teacher brings knowledge of how to differentiate to boost student learning. Mathematics co-teachers are tasked with blending their expertise in the mathematics classroom and

provide differentiated instruction to all students. This “marriage” should improve instruction for students with disabilities placed in general education classrooms (Friend, 2008).

Mathematics teachers are faced with the challenge of educating students with different learning abilities using the same curriculum, at the same rate, and helping them reach the same levels of proficiency. With the adoption of the CCSS and the rising number of students with disabilities (National Center for Education Statistics, 2017), collaboration between mathematics and special education teachers is essential to meet the diverse academic needs of all students. Schools are now implementing co-teaching so that teachers can share their expertise and work collaboratively toward the success of all students placed in the general education classroom.

Yopp et al., (2014) conducted a study piloting a co-teaching model for mathematics in a teacher preparation program. They found that although there is inadequate research on the effect of co-teaching on student learning and teacher candidate learning, elementary students in classrooms that employed a co-teaching model of student teaching, outperformed peers in other classrooms on measures of reading and mathematics achievement (Bacharach et al., 2010). Additionally, these researchers noticed high levels of gratification among cooperating teachers and district administrators, who valued the closer partnerships promoted by a co-teaching model. The study revealed that mathematics teachers, special education teachers, and student teachers found co-teaching innately appealing because it makes maximum use of the human resources in the classroom. It also allowed teachers to better meet the diverse needs of their students through a smaller student-to-teacher ratio and more individualized support and attention (Yopp et al., 2014).

Rimpola (2011) also conducted a study that examined the efficacy of secondary mathematics inclusion teachers. Findings from this study concluded that although the content area teachers lacked the knowledge on how to differentiate their lessons for their special needs students, they were much more efficacious than the special education teachers who lacked the content expertise to teach advanced levels of mathematics. To remedy this concern, teachers initiated collaborative planning.

Collaborative planning, or co-planning, is the act of co-teachers collectively deciding (a) what will occur in the lesson for the day, (b) who will teach which components, (c) the instructional models that will be used, and (d) any accommodations or modifications that will be given to particular students (Pratt, et al., 2017). The co-teaching learning environment runs much more smoothly when teachers work together to share their expertise and come to agreements about how the instruction will occur (Idol, 2006; Rice, Drame, Owens, & Frattura, 2007; Sileo, 2011; Tannock, 2009).

Co-planning became the tool used by special education teachers to feel more prepared to teach the general education mathematics curriculum, and it helped the general education teachers prepare differentiated instruction (Rimpola, 2011). While some studies mention the importance of co-planning and the use of co-teaching in mathematics and diverse learners, little research has been done to examine the perceptions of mathematics and special education co-teachers (Rimpola, 2011; Pratt, et al., 2017; Idol, 2006; Bacharach et al., 2010; Yopp et al., 2014). The researcher seeks to determine the similar and different perspectives of third and fourth grade elementary mathematics teachers and special education co-teachers, how they perceive co-teaching as an instructional model for

teaching mathematics, and which co-teaching models are frequently used in their mathematics classrooms.

CHAPTER III

Methodology

Purpose of the Study

The purpose of this study is to examine the perceptions and experiences of third and fourth grade elementary mathematics teachers and special education teachers regarding the co-teaching inclusion model. While there are research studies that have analyzed teacher perspectives on co-teaching (Austin, 2001; Van Garderen, 2008; Thielemann, 2011; Rimpola, 2011; Mastropieri, et al., 2005; King, 2010) and the different models of co-teaching implementation (Bauwens, et al., 1989; Brown et al., 2013; Dieker, 2003; Fenty & McDuffe-Landrum, 2011), there is very limited to no focus on co-teaching perspectives in elementary mathematics. To achieve this, I utilize a qualitative case study design (Stake,1998; Yin, 2003; & Merriam, 2009); this design helps to better understand the viewpoints of third and fourth grade mathematics teachers and special education co-teachers in their co-taught, elementary school classrooms. In this chapter, the following are presented: (1) the research questions that drive the study, (2) the research design, (3) data collection procedures, (4) data analysis, (5) limitations, and (6) ethical considerations.

Research Questions

Establishing the research questions around interests or concerns of key stakeholders is the foundation to create qualitative investigations (Farber, 2006). “Research begins with wonder” (Farber, 2009, p. 368), and this wonder can be derived from both the review of literature as well as the perceptions and interests of the subjects or researcher. The research questions were influenced by both the participants and the researcher as they were altered somewhat during the course of the case study. To maintain the flexibility and open nature

of the research design, the phrasing of the questions is also important to consider. When describing the qualitative research process, Creswell (2012), writes that primary research questions posed should begin with the word "how," to ensure that the questions are open-ended and broad. Originally the research questions began as:

1. How are the views of co-teaching similar and different for partnering fourth grade general education teachers and special education teachers?
2. How do partnering teachers perceive co-teaching as an instructional model for teaching mathematics?
3. Which co-teaching models are used in fourth grade mathematics classrooms?

The questions were purposefully designed to be broad and open-ended to promote keep maintain an exploratory story. The research questions were refined and modified to better accommodate the structure of the study, as suggested by Stake (1995). The original questions were modified to include third grade co-teachers and to specify the subject area of focus: mathematics. According to Stake, "issues are complex, situated, problematic relationships," and retaining questions that are stagnant to the relationships revealed by data may in fact limit the depth of analysis (p. 142, 1995). The researcher believed that extending the study to teachers of multiple grade levels would broaden the types of perspectives that were noted throughout the study.

Additionally, the questions were left open ended to avoid responses that fell into pre-determined or categorized answers that would limit an understanding of context and variables related to these contexts (Smith, 2004). Rigid questions would mute any complexities in social, learning contexts or the unique collaborations between teachers, categorically limiting them to only certain "types" (Smith, 2004). Interactions such as

these and the outcomes from them are variable and sourcing my very own "intrinsic" interest further justifies these open-ended questions. Stake, for example, emphasizes that an "intrinsic" interest in the research will be grounds for effective application of the findings and conclusion (p. 148, 1995). As one who did co-teach, I find it of value to retain this open-ended question format. The framework of a case study, after all, focuses on analyzing the perceptions of a specific group of people. And so, it is from the intrinsic interest of an educator by which the research is designed to be "reflective," especially when it comes to the meanings that can be derived from the research (Stake, p. 150, 1995).

Before the data collection process began, the research questions were refined and modified to better accommodate the structure of the study, as suggested by Stake (1995). The updated research questions are:

1. How are the views of co-teaching similar and different for partnering third and fourth grade elementary mathematics teachers and special education teachers?
2. How is co-teaching perceived by teachers as an instructional model for teaching mathematics?
3. Which co-teaching models are used in third and fourth grade mathematics classrooms?

Research Design

The multiple case study design is the methodological framework used to implement this study and consists of in-depth examinations of people or groups of people. The framework of a case study focuses on analyzing the perceptions of a specific group of people by maintaining its intrinsic nature, whereas a multiple case study is one that looks comparatively at different cases that may be based in different contexts (Gustafsson, 2017).

These designs have been used across several disciplines such as social sciences, business, law, health, and education (Starman, 2013; Quelch, 2008; Institute for Healthcare Improvement, 2018; Pena, 2015). A multiple case study is one that allows the researcher to simultaneously study several cases to understand the differences and the similarities between the cases. Case studies are not used to test hypotheses, but hypotheses may be generated from case studies (Stake, 1998). Yin (1999) asserted that "the all-encompassing feature of a case study is its intense focus on a single phenomenon within its real-life context... [Case studies are] research situations where the number of variables of interest far outstrips the number of data points" (Yin, 1999, p. 1211; Yin, 1994, p.13). In contrast, Stake (1998) wrote that a case study is not a methodological choice, but a choice of what is to be studied "By whatever methods, we choose to study the case. We could study it analytically or holistically, entirely by repeated measures or hermeneutically, organically or culturally, and by mixed methods-but we concentrate, at least for the time being, on the case," lending to the ability to study the intimacies of that particular case in regard to its context, themes, and variables (1998, p.134).

These explanations of multiple case studies emphasize the researcher's ability to conduct analyses within cases and across cases, identify themes that may arise from the analyses, and note assertions about the cases as a whole. According to Stake, "A case study is both the process of learning about the case and the product of our learning," which is an appropriate approach given that educators treat their students on a case to case basis and must implement learning methodology that is relevant to the individual needs of the learner (1998, p. 237). In multiple case studies, the researcher can analyze the data both within each situation and across situations (Yin, 2003). In this study, each pair of teachers served

as one case. After interviewing and observing the teachers in their classrooms, the similarities, differences, and common themes were identified among the different cases.

In addition to factoring in the terminology surrounding the topic of learners, the value derived from a multiple case study approach would authenticate the findings to have broader meanings over this diverse learning group. According to Stake (1998) a multiple case study would afford the possibility of understanding and comparing various cases to not only honor these individual cases and their truths, but to also derive any meanings or identify any key variables that impact their results. This is particularly relevant to the discussion of the findings and the implications that this research may have on future practices.

Case Study Defined

For the last 40 years, case study research has undergone substantial development (Higgs, 2017). These advances include being used across an array of disciplines (Creswell, et al., 2007; Johansson, 2003; Stewart, 2014; Higgs, 2017), the introduction of grounded theory methodology (Glaser & Strauss, 1967), and the endorsement of case study research in the political sciences which brought a more integrated methodological approach with the aim of theoretical development and testing (George & Bennett, 2005). These changes may have stemmed from similar influences from historical approaches to research and individual researcher's preferences, perspectives on, and interpretations of case study research.

Le Play, is credited with first introducing the case study method in the mid-1800s (Higgs, 2017). Le Play was a mining engineer and sociologist who developed techniques for systematic research on the family (Higgs, 2017). He believed that social science conclusions should be determined inductively through the observation of human

experience, rather than deductively through reliance on preconceived theoretical orientations. Le Play's method of collating the data that was obtained through field research also influenced the development of statistical sampling.

Case studies have roots that date back to the 20th century when researchers working in the disciplines of sociology, psychology, and anthropology first began the practice (Higgs, 2017). According to McLeod (2008), "Case studies are in-depth investigations of a single person, group, event or community. Typically, data are gathered from a variety of sources and by using several different methods (e.g. observations and interviews). The research may also continue for an extended period, so processes and developments can be studied as they happen" (para. 1). A case study examines a person, place, event, phenomenon, or other type of subject of analysis to find key themes and results that help predict future trends, highlight previously hidden issues that can be applied to practice, and/or provide a means for understanding an important research problem with greater clarity (Merriam, 1998). Case study research usually examines a single subject of analysis, but it can also be designed as a comparative investigation that shows relationships between two or more subjects. Merriam (1998) wrote, a qualitative case study is "an intensive, holistic description and analysis of a bounded phenomenon such as a program, an institution, a person, a process, or a social unit" (Merriam, 1998, p.xiii).

To further differentiate case study method from casework, case method, case history, Merriam stresses its unique distinctive attributes: Particularistic (it focuses on a situation, event, program, or phenomenon); Descriptive (it yields a rich, thick description of the phenomenon under study); Heuristic (it illuminates the reader's understanding of phenomenon under study).

Stake (1995) writes that a "Case study is the study of the particularity and complexity of a single case… episodes of nuance, the sequentially of happenings in context, the wholeness of the individual (p. xi). While it seems comparatively that these definitions vary slightly, the central tenet is constant: there is a need to explore an event or phenomenon in depth and in its natural context (Stake, 1995; Stake, 1998; Merriam, 1998; McLeod, 2008; Higgs, 2017; Yin, 1999).

Qualitative case study researchers are interested in the meaning of experiences to the subjects themselves, rather than in generalizing results to other groups of people (Yin, 2003). Unlike Stake (1998) and Merriam (1998), Yin (2013) does not focus on data collection or fieldwork, his work is geared more towards design, analysis, and reporting issues. This research is more aligned with Stake's outline for case study, which suggests a sequence of required steps for completing the case method, including posing research questions, gathering data, data analysis, and interpretation. A notable distinction is Stakes' emphasis on a more naturalistic approach, the importance of the philosophical underpinnings of case method, and the importance of the description of contexts.

Stake (1998) points out that crucial to case study research are not the methods of investigation, but that the object of study is a case. Stake´s more inclusive definition, the a "case study is defined by interest in individual cases" was used for this study (pg. 134). Stake (1998) highlights designing the study to improve understanding of the case rather than generalization beyond. To emphasize this point, Stake (1995) writes:

> *The real business of case study is particularization, not generalization. We take a case and come to know it well, not primarily as to how it is different from others but what it is, what it does. There is emphasis on uniqueness, and that implies knowledge of others that the case is different from, but the first emphasis is on the case itself (pg. 8).*

Value of the Case Study

The value of the case study is sometimes measured by the degree to which the incidents discussed can be generalized to other situations (Schell, 1992). However, in this qualitative multiple case study, the purpose was to analyze the perspectives of a small group of participants within a specific context, therefore, the value of this research comes as the study "investigates a contemporary phenomenon in depth and within its real-life context." It is believed to be valuable because it is these real-life contexts, and not necessarily a quantitative summation of reality, that impact the learning and teaching interactions of the classroom (Yin, 2009, p.18). Yet the relationship between these phenomena and their impact are not necessarily clear, and the literature that is derived from this study will be of value to future study (Yin, 2009).

Research Methodology

This methodology is a non-experimental, descriptive, qualitative case study that aimed to gain an understanding of teacher's perceptions of co-teaching programs that exist in the formal school environment. The qualitative research design is the best fit for this study because its structure allows the researcher to develop a rich understanding of the teachers' experiences of using the co-teaching model in the classroom. Additionally, the qualitative data analysis is concerned with codes, themes, and patterns (Yin, 2009; Merriam, 2009) all of which emerged after analyzing the thick data collected from the one-on-one interviews, focus group sessions, and observations that took place throughout the study.

Case study design requires clearly determined parameters as a defining factor of case study methodology (Merriam, 2009). This case study focuses on descriptive and exploratory data gained from interviews with teachers. This method of data collection has

been shown to be a reliable way to evaluate the teachers' perceptions through their ongoing experience in co-taught classrooms (Merriam, 2009). The questionnaires that teachers completed prior to the interviews were used to reveal background information about the participants' history of using the co-teaching model and further defined the case studies. In conjunction with the interviews, the participants were observed teaching in co-taught mathematics classrooms.

Creswell, et al. (2007) discussed the value of the multiple bounded cases that incorporate the data collection from multiple sources of information such as observations, interviews, documents, and reports. In the current study, each of the four sets of participants is described as a separate case and data were gathered from multiple sources.

The research was conducted according to the regulations for human subject research as approved by the Institutional Review Board (IRB). Procedures included obtaining permission to conduct research through the school district's central office and then contacting principals in the two elementary schools within the district. I provided a written and verbal explanation of the investigation as well as an outline of procedures for interviewing teachers. Additionally, I informed the principals of the teachers I have identified who met the criteria of my study. These teachers were actively employed by the school district and they all agreed to participate in this case study. Neither of the schools' principals made any objections, and I was granted permission to contact each of the eight teachers. I emailed each of the teachers an introductory message that detailed my study (See Appendix A), attached a link for the questionnaire (See Appendix B), and attached a consent form (See Appendix C). Once I obtained a signed agreement from all teachers, the investigation began.

One-on-one interviews were used to answer Research Question 1, How are the perspectives of third and fourth grade elementary mathematics teachers on co-teaching similar to and different from special education co-teachers? Each teacher was asked about his or her perspective of co-teaching, and their responses were compared to their partnering teachers during the data analysis process. A questionnaire was used to answer Research Question 2, How is co-teaching perceived by teachers as an instructional model for teaching mathematics? Question 2 relates to teachers' perceptions of the co-teaching instructional model in mathematics. Teacher experience may impact their opinions, so it is important to have some insight on the amount and/or type of experience these teachers held. Classroom and planning observations were utilized to answer Research Question 3, Which co-teaching models are used in third and fourth grade mathematics classrooms? Observations are necessary to observe which co-teaching models third and fourth grade teachers employ, and why they find said models to be the most appropriate.

Setting

The participants in this study teach in the same county, which is one of the largest school districts in Georgia. This county has over 40,000 students and is a high-performing public-school district. The National Center for Educational Achievement (NCEA) identifies higher performing schools as schools that have greater success at preparing students toward college and career readiness than their comparable schools (2010). Within this district are 24 elementary schools, five of the 24 are Title I schools, and this study will be conducted in two of the five Title I schools. Convenience sampling was utilized which consisted of schools that were accessible to the researcher, convenient to the demands of the study, and had the phenomenon being studied. In addition to convenience, these two

schools were chosen because I have experience teaching at both schools and am aware that they have third and fourth grade teachers that implement the co-teaching model in mathematics.

The first school, hereafter referred to as School A, opened its doors in August of 2005, has a student population of over 900 students, and 19.2 percent of those students are identified as students with disabilities (SWD) (School District's School Improvement Plan, 2017). Eighty-six percent of School A's student population is eligible for free/reduced lunch, thereby making it a Title I school. School A employs 78 teachers; 16 of which are special education teachers (School S.I.P., 2017).

The second school, which will be referred to as School B, is also a Tile I school with 46 percent of the students receiving free/reduced lunch. School B opened in August of 2012 and has a student enrollment of 1,161. Ten percent of School B's students are identified as students with disabilities (School S.I.P., 2017). The faculty is comprised of 75 teachers; 11 of those are special educators.

Both schools opened after the amendments to IDEA in 2004, so they have been implementing the co-teaching model since their inception. At School A, 17.8% of the student population is identified as SWD, and over 50% of those students are placed in co-taught classes for one or more subject areas. At School B, 10.9% of the students are identified as SWD, and 58.9% of those students are served in co-taught classes. According to both schools' School Improvement Plans (S.I.P.) (2017), SWD data is reviewed each grading period to identify students who may be ready to transition to a less restrictive learning environment. The goal is to decrease the number of students identified as SWD by

transitioning them to the LRE and ultimately out of the special education program (School S.I.P., 2017).

Participants

According to Farber (2006), after identifying the research questions, qualitative researchers should "identify gatekeepers" (p.369). The gatekeepers are the participants that will take part in the study. The participants selected to be in this study were eight teachers, from two different Title I schools. Participants from each school included one third grade math teacher and the partnering co-teacher and one fourth grade math teacher and the partnering co-teacher for a total of eight teachers. One of the special education co-teachers from each school also served as their school's Special Education Department Chair. The selection of participants was limited to certified general education third and fourth-grade mathematics teachers and special education teachers who currently co-taught in inclusion classes in the selected schools and volunteered to participate in an open call to all teachers who qualified to participate.

Each mathematics teacher and the co-teaching partner acted as one case, therefore, if one or both teachers declined to participate in the study, I was prepared to ask a different set of third and fourth grade mathematics co-teachers at School B to participate in the study. School B has three co-taught mathematics classes in third and fourth grade, which totaled 6 teachers. School A has 2 co-taught mathematics classes, for a total of four co-taught teachers. I also considered the option of including additional grade level teachers, if necessary, to reach the desired participant number of eight. The eight teachers who were originally asked to participate were all randomly selected, and they all agreed to take part in the study, so no contingency plan was utilized. The number eight was selected because it

was believed to be large enough to gather contrasting perspectives, yet small enough to allow the researcher to be immersed in the research field, and through theoretical contemplation, address the research problem in depth. A small number of cases will enhance the value of fine-grained, in-depth inquiry in naturalistic settings.

Data Sources

Farber (2006) writes that the next stage in the qualitative research process is to develop and become familiar with one's research instrument. In a qualitative study, the researcher is the primary instrument for data collection and has direct contact with the participants of the study (Farber, 2006 & Merriam, 2009). The flexibility of the case study method allows researchers to utilize multiple sources of data such as surveys, interviews, documentation reviews, observations, etc. (Soy, 2006).

The case study focuses on data that was obtained from interviews with teachers who have first-hand experience using co-teaching strategies and models in their positions (Merriam, 1991). Trustworthiness was established by the use of triangulated data sources that include a questionnaire, personal interviews, classroom observations, and a focus group session. Additionally, a researcher's journal was used to document observations and reflections that appeared throughout the research process. The teachers' opinions, thoughts, feelings, perspectives, and behaviors provided invaluable data in understanding each of the cases (Erlandson, 1993).

Interviews, researcher's journal notes, focus group sessions and questionnaires were used in this study and primarily served as tools employed by the researcher for efficient and accurate documentation during the data collection process. As the primary data source, it

was my duty to ask questions, make observations, and note the occurrences that fueled additional questions that were later asked during the focus group sessions.

Interviews

Prior to beginning the interviews, I selected eight eligible teachers to ask to participate in the study. There were two co-teaching pairs of third and fourth grade teachers at School A, and three co-teaching partnerships at School B. I randomly selected eight out of the eligible ten teachers, and sent those teachers an email with a Sign-Up Genius link. This link was an invite that allowed the teachers to select a convenient interview day and time. I interviewed four teachers from each school, one at a time in their own classroom. One third grade math teacher and the partnering co-teacher and one fourth grade math teacher and the partnering co-teacher were interviewed. Each teacher was interviewed separately; for a total of eight interviews (4 from School A and 4 from School B). I asked a series of open-ended questions related to their perceptions of the co-teaching model and how they implemented and planned this model in their mathematics classes (See Appendix D). Although, I had a set of questions to ask the participants, the interviews were semi-structured in nature because I asked follow-up questions as the need arose. The interviews were recorded using an audio recorder, and later transcribed for data collection purposes. The length of the interviews ranged from 14 minutes to 43 minutes.

Observations

At the end of the mathematics teachers' interviews, I used Classroom Architect to create a floorplan of the mathematics teachers' classrooms (See Appendix E). This provided better visuals while writing my field notes during the classroom observations. For example, when documenting what was observed during stations, I was able to note teacher and student placements around the room, which helps to imagine the structure and flow of

station rotations. Additionally, the floorplans acted as visual representations that were later used when analyzing and reflecting on the classroom observations data.

A Sign-Up Genius was sent to teachers to schedule the classroom observations. Each co-teaching pair was observed teaching a math lesson three times. Initially, I had planned to observe each pair's planning sessions three times as well, however, after interviewing the teachers, I found that only one pair had actual allotted planning sessions, and even that pair had discontinued their sessions by the time the study was conducted due to it being the end of the school year.

The notes taken that were especially focused on these particular observation points: the co-teaching method that was used, instructional strategies utilized, interactions and conversations (teacher-to-teacher and teacher-to-students), and the overall classroom environment. These areas were observed at every segment of instruction: whole group lessons, small group lessons, and during transitions. I noted how teachers communicated with one another, as well as how they communicated with the students. Additionally, I wanted to determine if there was evidence of collaborative planning. For example, were both teachers aware of what was to take place during the lesson or did it appear that one teacher was providing the plans as the lesson progressed. The latter seemed to take place more often than the former.

Questionnaire

Questionnaires were used to gain insight on each teacher's co-teaching experience and to further define the case studies. The questionnaire asked for background information about the participants' history with using the co-teaching model (See Appendix B). General information was requested such as current teaching assignment, length of time teaching,

preparation and training to become a co-teacher. Preceding the interviews, teachers were able to access the questionnaire using a link that was sent to them in the initial email message and were asked to complete these prior to the interview. As a result, their responses informed the interview questions in order to gauge their own perceptions of the issue at hand. After all responses were submitted the data were combined in a chart for easier interpretation (See Table 2).

Pseudonym & School	**Position**	**Years in Current Position**	**Years as a Co-Teacher**	**How did you come to be a Co-Teacher**	**Co-Teaching Training**
Abigail/ School A	third Grade General Educ. Math	5 years or more	4 years or more	Asked to be placed in this position	Professional Development
Lisa/ School A	third Grade Special Educator	2 years	2 years	Administration placed her in this position	Workshops and Courses
Karolyn/ School A	fourth Grade General Educ. Math	2 years	2 years	Administration placed her in this position	Observing effective teachers
Charles/School A	fourth Grade Special Educator	5 years or more	3 years	Administration placed him in this position	Professional Development
Karen/ School B	third Grade General Educ. Math	3-4 years	Less than 1 year	Administration placed her in this position	Observing effective teachers
Kacey/ School B	third Grade Special Educator	1-2 years	2 years	Administration placed her in this position	Professional Development
Deborah / School B	fourth Grade General Educ. Math	5 years or more	Less than 1 year	Administration placed her in this position	Professional Development
Kallie/ School B	fourth Grade Special Educator	3-4 years	2 years	Administration placed her in this position	Observing effective teachers

Table 2

Researcher's Journal

Phillippi and Lauderdale (2018) write that note taking is highly recommended in qualitative research as a means of documenting needed contextual information. It has been a vital component of rigorous qualitative research since the 1900s (Phillippi & Lauderdale,

2018). As a way of documenting observations and noteworthy occurrences, field notes were collected in the researcher's journal. Throughout the study, I recorded classroom observations, made note of additional questions or thoughts that came about during interviews, and other notable occurrences that arose. These notes served as evidence that helped produce meaning and an understanding of the phenomenon being studied. The notes added an extra layer of data that I interpreted, analyzed, and used to construct thick, rich descriptions of the study's context, encounters, interviews, focus groups, and observations (Phillippi & Lauderdale, 2018). The notes were later typed so that a legible copy could be imported into the data management software, NVivo (https://www.qsrinternational.com/nvivo).

Observations

A Sign-Up Genius was sent to teachers to schedule the classroom observations. Each school had two pairs, and an observation of their classroom occurred three times each. Six such observations occurred at each school, meaning that the study included 12 total observations. Initially, I had planned to observe each pair's planning sessions three times as well, however, after interviewing the teachers, I found that only one pair had actual allotted planning sessions, and even that pair had discontinued these sessions by the time the study was conducted due to it being the end of the school year. This is significant to the study as it may reveal an underlying relationship between the ability to co-teach in relation to shared planning and strategy.

All the classroom observations were documented using an observation grid (See Appendix G) that served to keep me on track with answering my research questions and achieving my objectives. The observation grid kept me mindful of the key points of

observation as well as the topics of interest associated with each point. Prior to the start of the observations, I reflected on my research questions and objectives, and considered what factors or occurrences would need to be observed to address the questions and goals. This reflection acted as the impetus for the grid that helped me to maintain focus during each classroom observation, while also giving me the flexibility to reflect on the context associated with each observation. For example, the third research question asks, 'Which co-teaching models are used in third and fourth grade mathematics classrooms?' To ensure I kept this question in mind during the observations, I included co-teaching methods as a component in my grid as well as included each part of the lesson the teachers told me was included in a typical day of instruction (e.g. whole group, small group, stations). This allowed me to document which method of co-teaching was used during which specified time of instruction.

At the end of each observation, I went to the teacher's workroom closest to each class to reflect on the observation. I used that time to review my notes, jot down any thoughts I had about the observation, write any follow-up questions that may have arose, and filled in any areas on the grid I thought applied to that observation but had been unable to write down during the co-taught lesson.

Focus Group Sessions

Approximately one month following the last interview, the focus group sessions were held. The stretch of time between the observations and focus group sessions was due to the state testing being administered, and teachers wanting to focus on getting their students prepared. There was one focus group session held for each school. All teachers

from School A met together and the teachers from School B came together to answer follow-up questions that were devised after the data from the interviews and observations were compiled, transcribed, and partially coded. I was unable to fully code all my data because I hadn't yet completed the final portion of my study, the focus group sessions.

The information gathered was stored in the researcher's journal, and later analyzed to identify if any common themes existed. This process is discussed in more detail in Chapter 4.

Data Collection

I began collecting data after receiving consent forms from each participant. The start of the data collection process entailed emailing all participants a questionnaire that asked questions related to their background in mathematics and in the co-teaching setting. Then, the participants took part in one-on-one interviews (See Figure 5). The final phase of this process was a focus group session that was used to ask the follow-up questions that arose throughout the study. According to Breen (2006), the usage of a focus group can benefit all stakeholders of the study in generating ideas, reaching new realizations, and reflecting on the relationships between phenomena uncovered in the interviews. In alignment with Breen's claim, I was able to use the focus group sessions to ask clarifying questions that arose as I analyzed the data from the participants' interviews and observations.

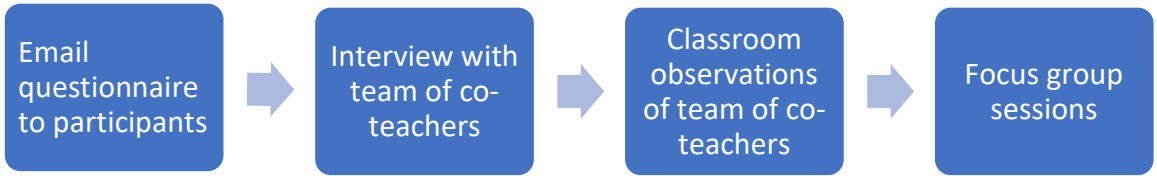


Figure 5, Data Collection Sequence

Summary of data collection

To summarize the breakdown of data collection, there were 12 teacher observations, eight initial interviews, and audio recordings of the teacher interviews. All interviews followed a semi-structured format that allowed for thought-provoking questions during the interview process. A follow-up focus group session was scheduled to clarify or ask other questions about themes that emerged.

Data Analysis Procedures

When analyzing the data, the interviews as well as the focus group sessions were recorded using an audio recorder. As the one-on-one interviews and focus group sessions took place, anecdotal notes were written when necessary. After each interview and focus group session, the recorded information was later transcribed. The different data gathered throughout the study was coded using NVivo. After importing all the transcriptions, I created a codebook. The codes used in the codebook were defined after doing an initial coding, which means I identified any themes that stood out in the data. After analyzing 54 pages of single-spaced transcripts, I initially came up with over 100 codes. The most prevalent codes were: attitudes about co-teaching, rapport, planning, communication, professional development, models of co-teaching, classroom management, and the benefits and challenges of co-teaching mathematics (See Appendix G). MindMap (See Appendix H) was utilized to organize the codes into themes. This process helped me to think about the meaning of the themes and how they are connected.

Once the codebook was completed, I used thematic coding to analyze the information, establish links and dissimilarities between cases, and identify common themes that emerged from the data. Data from the questionnaire, interviews, and the researcher's

journal was analyzed informally using constant comparison and triangulated to ensure trustworthiness.

Thematic Analysis

Thematic analysis is a method that is often used to analyze data in primary qualitative research (Scott, 2016; Braun & Clark 2006; Thomas & Harden, 2007). It is a form of qualitative analysis which involves recording or identifying passages of text or images that are linked by a common theme or idea allowing researchers to index the text into categories and therefore establish a "framework of thematic ideas about it" (Gibbs, 2007, para. 2). This method of analysis allows the researcher to move from a general reading of the data toward discovering patterns and themes that may lead to framing more specific research questions (Thomas & Harden, 2007). Thematic analysis allowed me to develop more insight into the way co-teachers perceive their responsibilities as well as their methods of implementation. By using thematic analysis to distill data, I was able to determine broad patterns that can be used to conduct more granular research and analysis.

Trustworthiness

In order for research to be of value and of use, it must be credible or trustworthy. Trustworthiness is a concept used for measuring bias and distortion. In any qualitative research project, four criteria of trustworthiness demand attention: credibility, transferability, dependability, and confirmability (Lincoln and Guba, 1985). In the coming paragraphs, I articulate how I met each of these criteria in my study.

Credibility

Credibility is the challenge to carry out the inquiry in such a way so that there is higher probability that the findings will be found to be credible (Lincoln and Guba, 1985). Credibility was determined through the triangulation of data using multiple types of data

(the questionnaire, interviews and observations), multiple sources (audio recordings), and researcher's field notes. Lincoln and Guba (1985) redefined the concept of validity as credibility or believability of the research. Guba and Lincoln subsequently formulated several procedures aimed to increase the credibility of qualitative research. Credibility is one of the key criteria addressed by positivist researchers, who seek to ensure that their study measures or tests what is actually intended. According to Merriam (1991), the qualitative investigator's equivalent concept, i.e. credibility, deals with the question, how congruent are the findings with reality? Throughout the course of this study, I systematically looked for alternative themes, divergent patterns, and rival explanations to enhance credibility. Additionally, disclosing my background, experience and methods of data collection may alleviate suspicion about the researcher shaping findings according to her predispositions and biases. To address potential bias, I did not share personal opinions about co-teaching with participants. Instead, I portrayed the thoughts and opinions of participants in such a way as to maintain accuracy and individualism. Finally, to reduce the effect of researcher bias, I used triangulation to crosscheck information or findings to ensure that a full and accurate understanding of the phenomenon was obtained.

Transferability

Transferability is the degree that findings can be transferred to other settings, contexts, or populations (Lincoln and Guba, 1985). The use of thick description and purposeful sampling invites other researchers to find similarities with their own cases and is used to encourage transferability. External validity primarily focuses on the extent to which the findings of one study can be applied to other situations (Guba, 1981). In positivist work, the concern often lies in demonstrating that the results of the work at hand can be applied to a wider population. Since the findings of a qualitative project are specific

to a small number of particular environments and individuals, it is difficult to demonstrate that the findings and conclusions are applicable to other situations and populations; as a result, qualitative researchers use "naturalistic generalization" (Stake, 2005).

Naturalistic generalization is a process where researchers develop a deeper understanding by closely examining and reviewing the details and descriptions that are obtained in case studies. Following Stake's philosophy, this multi-case study will use a cross-case analysis and aim toward naturalistic generalization (Stake, 1995). I reviewed relevant research and noted any differences and similarities that were found as it related to my study.

Dependability

Dependability is achieved when there is clear evidence that the documents, interviews and other sources of data are not corrupted (Lincoln & Guba, 1985). One way to demonstrate this point of trustworthiness is keeping a good audit process that leads from the documentation to the raw data. The audit trail is accomplished in this study by the use of a systematic approach to record the information gained from interviews, observations, and the field notes. Recorded interviews and observations were transcribed to more easily follow particular threads in the dialogue.

Confirmability

Confirmability is determined by the degree to which the results could be confirmed or verified by others. Erlandson, Harris, Skipper, & Allen (1993) wrote that the "conclusions, interpretations, and recommendations can be traced back to their sources" (p. 39). The use of an audit process, triangulating data, and keeping informal field notes met the criteria for confirmability in this study.

To ensure this study is a trustworthy qualitative investigation, I have thoroughly reported the processes within the study, thereby enabling a future researcher to repeat the work, not necessarily to gain the same results, but perhaps to examine similar phenomenon. Qualitative research is designed to reveal a target audience's range of behavior and the perceptions that drive it with reference to specific topics or issues. As a result of utilizing in-depth studies of small groups of people to guide and support the construction of theories, it is impractical to think that recreating the same study would yield the same results. Thus, the research design may be viewed as a detailed prototype model. Also, I used triangulation through the use of different methods, different participants, and different sites. The use of triangulation in multiple areas boasts the accuracy of themes and other findings that emerged in the study (Hancock & Algozzine, 2011; Hussein, 2009).

Role of the Researcher

The researcher's role in a case study may vary throughout the study; the roles may include teacher, participant-observer, interviewer, evaluator, and others (Stake, 1995). Throughout the course of this study, I took on different roles depending on where I was in the process of my research. During the one-on-one interviews, I took a more active role as an interviewer. I met with each participant one-on-one, and asked pre-determined questions that addressed all of my research questions. Although I had a set of open-ended questions to ask, the interviews were semi-structured, thereby allowing me to ask questions that may not have been considered prior to starting the interviews. The interviews were recorded so that they would later be transcribed and more closely analyzed,

During the classroom observations, my role shifted to a silent observer. While observing the co-teaching pairs teach their mathematics lessons, I sat in the back of the

classroom and watched the teachers' interactions with one another as well as how they interacted with their students. I watched to see the co-teaching methods that were used, how their actual instruction delivery aligned with how they described their instruction during their interviews, and how the co-teachers communicated and interacted with one another.

Context of the Researcher

In qualitative research, a single researcher in a particular environment at a particular time often collects data, and in the case of multiple case study, the context plays a significant role in a multiple case study, especially in relation to the researcher and the intrinsic interest they have in the study itself. To ensure the trustworthiness of the data, the researcher provides information on her own perspective and alerts the reader to the knowledge, experience, and potential biases that might influence the interpretation of the data through disclosure of the context of the researcher.

I am an African American woman, coming from a middle-class household with Westernized cultural norms. I grew up in an era where students were separated according to their learning abilities. The concept of inclusion did not exist. There were general education classrooms and classes in a different wing of the school for special needs students. Times have changed, and now we have special education students being taught alongside general education students.

I am a doctoral student in Early Childhood Education at Kennesaw State University. I currently teach mathematics and science to 5th graders in a Science Technology Engineering and Mathematics (STEM) Academy in suburban Georgia. I have experience teaching mathematics to third, fourth, and fifth graders. I have taught multiple subjects throughout the course of my eleven years of teaching, but mathematics has been the one

subject I have consecutively taught all eleven years of my career. It is my favorite subject to teach because I have a natural ability of engaging students in the curriculum. I find that students are just as excited about learning math as I am about teaching it.

Presently, I have two 80-minute math segments, and two 40-minute science segments. Of the two math classes, one is a co-taught class with nine inclusive education students and 14 general education students. For science, the co-taught class loses the co-teacher, but gains five additional students and a Supportive Instruction (S.I.) paraprofessional (parapro). The S.I. assists by providing many of the accommodations listed in the students' Individualized Education Plans.

The 2017-2018 school year serves as my first year of teaching at my current school, School B, but my second consecutive year of teaching a co-taught math class. Prior to this year, my previous ten years of teaching experience was at School A. Although both schools are Title I schools, and both classes were co-taught math classes, the experiences were very different. School A's students were previously served in a resource math class prior to last year. This was their first year learning in a co-taught math setting since being identified. The students in School B have been in co-taught math classes for at least three years.

As the content area expert, I am responsible for planning the lessons and gathering the differentiated resources for all students. This decision was agreed upon prior to the start of school and was based upon three reasons: 1) It is challenging for me to relinquish that control. 2) I have a stronger foundation in mathematics content than the special education co-teacher 3) As a result of not having common planning, collaborative planning is nonexistent. I am interested to see how others share responsibility and how they find the time to plan together.

During this study, I interviewed and observed others who perform a job very similar to my own; this may have created a tendency to compare their experiences to my own, or draw conclusions based on my experiences. In order to avoid this, I made a concerted effort to utilize open-ended and probing questions to provide participants with the opportunity to share specific examples and stories without framing responses into preconceived assertions.

Limitations

Though this study was carefully planned and executed, some limitations may exist. Qualitative research focuses on a small number of participants, and this study is no exception with eight participants. From a positivistic standpoint, a small sample size may be a limitation, but having four identified cases is appropriate for a case study methodology. This relies on the epistemological assumptions of constructionism. To illustrate this point, Creswell (2012) notes that an increase in sample size "can become unwieldy and result in superficial perspectives" (p.209). Furthermore, Creswell (2012) observed that it is more common to study a few individuals or cases, but also not unusual to study one person or one site. Therefore, the smaller sample size of this study may have provided a more accurate picture of the workings of one site through the information provided by the participants.

The limited amount of time that was used to conduct the study may have potentially rendered certain findings. The research was conducted over the span of three months. Increasing the number of classroom observations and interviews over several months and extending the amount of time for each would create additional data, which could produce thicker descriptions. Furthermore, like many qualitative case studies, this investigation is limited by the understanding and integrity of the researcher. The investigator is the primary

instrument of data collection and analysis. This has its advantages, but training in observation and interviewing, though necessary, is not readily available. Therefore, I am left to rely on my own instincts and abilities throughout most of this research. To minimize this issue, I have studied information on proper interview protocol during a research study.

Also, in two of the four classes that were observed, a third adult was in the room at the time of my observations. In the fourth-grade class at School A, the E.I.P. teacher was also scheduled to push-in to work with a small group of students. In the fourth-grade class at School B, a parapro was in the room at the time of my observations. The E.I.P. teacher worked in the halls with the students each time I visited, but the parapro acted as one of the station leaders during the daily small group rotations. I was unaware of the classroom structure of these classes, so I did not receive permission to observe these teachers from the I.R.B. committee. However, including them in my study would have added additional perspectives on the co-teaching model and perhaps even more rich data.

An additional limitation is that this study was conducted with upper elementary school teachers only. A suggestion for future researchers would be to conduct the study with lower-elementary school teachers, such as those who teach Kindergarten through second grade. Extending the teacher population to lower-elementary teachers would allow researchers to compare and contrast the findings and provide another layer of data.

Ethical Considerations

Prior to beginning this study, ethical approval by Kennesaw State University's Institutional Review Board (IRB) was granted. The study is in accordance with IRB requirements, and was approved to be conducted. Teachers were sent a letter of consent (See Appendix C) that detailed my study and asked if they would like to be a part of it. To

prevent teachers from feeling pressured to participate, the consent forms were emailed to the potential participants.

Because observations were conducted within the setting of learning, it was important to not obstruct the original nature of the setting. My placement in relation to learners and teacher was non-intrusive to maintain typical interactions and avoid influencing them. In addition to being in control of the scheduling of the observations, teachers were reminded of my arrival in their classroom at least 2 days prior.

Additionally, while I observed students with and without Individualized Education Plans (I.E.P.s), the students' privacy was protected, as I was not privy to which students were identified as S.W.D.s. The teachers did inform me of the number of special education students they taught in the co-taught math class, however, students' identities were not revealed.

Finally, the voice, comfort, and ability to share freely was important to maintain in this study. In order for data to be reliable the interviews had to reflect a "safe place" where teachers could freely share and that their privacy would be respected.

CHAPTER IV

ANALYSIS, RESULTS, AND KEY FINDINGS

The purpose of this study was to examine how teachers perceive their position, roles, and experiences in an elementary mathematics co-taught classroom. This study investigated their perspectives of the co-teaching model, identified similarities and differences of these perspectives, and determined which models were often used and why. The study primarily focused on third and fourth grade mathematics co-teachers at two different Title I Schools.

Through semi-structured interviews and focus group sessions, I explored how teacher's perspectives view co-teaching as an instructional model for teaching mathematics. Teachers' views were investigated through one-on-one interviews, classroom observations, and focus group sessions. I used pseudonyms to protect the identity of each participant. By focusing on teachers' experiences and beliefs and triangulating the data using multiple sources, this study ensures the data reflects the most authentic understanding of the topic.

In this chapter, I first present individual descriptions of each case. Each co-teaching pair is identified as one case (See Table 3). Each case's description includes information about professional backgrounds and trainings, their views on co-teaching in mathematics, information about their classroom structure, and a discussion of the flow of their mathematics lessons. The purpose of these descriptions is to provide an overview of each case and to give the reader insight into the participants.

Individual Co-Teaching Case Descriptions

Case	School	Grade
Case 1 Abigail and Lisa	**A**	**third**
Case 2 Karolyn and Charles	**A**	**fourth**
Case 3 Karen & Kacey	**B**	**third**
Case 4 Deborah & Kallie	**B**	**fourth**

Table 3

In the second part of the chapter, I present a description of 16 influential themes which emerged from the data to answer each research question (See Figure 6). All eleven themes create an interwoven structural framework for co-teaching, which addresses the research questions posed.

Figure 6

Themes	Research Question Addressed
Conflicting Views in Role of Lead Mathematics Teachers	Research Question #1
Perspectives of Co-Teaching: Beneficial and Supportive to Student Learning	Research Question #1
Ability to Teach Diverse Learners	Research Question #1
Professional Development	Research Question #1
Professional Development in Co-Teaching Mathematics	Research Question #1
Support Students with Special Needs	Research Question #2
Provide Opportunities for Students with Special Needs to Express Themselves in Different Ways	Research Question #2
Challenges of Co-Teaching Mathematics (time management, student placement, large class sizes)	Research Question #2
Addressing Behavior/Classroom Management	Research Question #2
Planning and Sharing Ideas	Research Question #2
Adverse Effect of Pull-Out Programs	Research Question #2
One-Teach One-Assist was the Most Commonly Used Approach at School A	Research Question #3

Station Teaching was the Most Commonly Used Approach at School B	Research Question #3
Lack of Clarity Between Teaching Techniques and Co-Teaching Approaches	Research Question #3
Whole Group Instruction: Pros and Cons	Research Question #3
Small Group Instruction: Pros and Cons	Research Question #3

While it is impossible to present all examples observed during this study, the examples selected in both parts of this chapter are meant to be exemplars of the themes that emerged and support the data during data analysis.

Case 1, School A: Abigail & Lisa

Abigail is a third-grade general education teacher. Although she was only observed and asked questions related to her experience with mathematics instruction, she teaches all subject areas. She has been teaching for 17 years, teaching third grade for 5 years, and has been a co-teacher for 6 inconsecutive years. She has taught at School A for 11 years. Abigail asked her principal to place her in the role of a co-teacher because she believes students truly benefit from the co-teaching model. In our one-on-one interview she stated*, "Oh, I think all the kids benefit from the experience. I mean having one person, you get so much more out of two and just the ebb flow of it is, yeah. I really like it. I'm tired of doing it, but I like it."* When asked about other ways administration has supported her since being asked to be placed into this role, it was clear that she didn't feel supported because she replied*, "I have no idea."* (Abigail-School A, 2018). Abigail believes that professional development in co-teaching is important because "*when you first start* [teaching]*, you have no idea what you're doing*" (Abigail-School A, 2018); however, she has not received any professional training specifically related to co-teaching. Her perspective on the benefits of

co-teaching seem to be more focused on the teachers and how it aids their improvement as teachers, thus, benefitting the students.

Lisa is a third-grade dual-certified special education teacher. She seemed to feel more prepared for the co-teaching model, per her training through her degree. She stated,

> *"I had the opportunity to be dual-certified as part of my degree, so I took classes that pertained to it (Special Education) in college. So I was in a program where you ended up... It was an Early Childhood Education Degree, but you ended up being certified to teach pre-school through fifth grade General Ed. and pre-school through fifth grade Special Education. I'm not specifically for Sp. Ed. or specifically for Gen. Ed., I could do both, so all my courses in the program lent themselves to the co-teaching model"* (Lisa-School A, 2018).

She feels that this training along with a professional development session she attended last year on ESOL, has adequately prepared her for role as a co-teacher, "*but there's always room for improvement"* (Lisa, School A, 2018). During our interview, she also mentioned that she would be open to leading a professional training on co-teaching. Lisa was only observed in mathematics and was asked questions related to her experience with mathematics instruction, however, she co-teaches all subject areas with Abigail. She has been a special education teacher for 2 years and has co-taught third grade at School A for both years. Lisa was placed in this co-teaching position by her school's administration, but she raved about how welcomed she felt in the classroom. In our one-on-one interview she stated,

> *"This year, I definitely feel a part of the classroom because I am in there for every single subject, the entire day. The regular education teacher, she doesn't say to her class, "It's Ms. Abigail's class, we're doing this today." It's always the two of us. We're always labelled together. On the wall, outside the door, it's both of our names, schedule. The kids view it as there's almost two homeroom teachers, it's not her class and I pop in for a subject"* (Lisa-School A, 2018).

As opposed to Abigail, Lisa did seem to feel supported, though this seems to be due more to her relationship with her co-teacher than due to the administrative support available to these roles. Lisa's specific training, both through her degree and extracurricular endeavors, has likely contributed to this perspective. She may not feel as much need for support from the administration as Abigail might, whose experience in the education sphere has been more generalized.

When asked about her opinion of the benefits of co-teaching mathematics, Lisa identified the helpfulness of having multiple teachers, stating that *"The obvious one is that there is an extra teacher in the room, you've got some kids that have some needs and some challenges that, if they were in there without that extra set of hands, it would be really tough for the classroom to run smoothly."* She points out how helpful this is for students with particular needs, whether that is in their interactions or their learning style; "*Whether it's behaviors that need additional support, or if they're extra low or struggling in a specific skill area, so having the extra hands to remediate or to provide the behavioral support,"* a perspective likely rooted in her background of studying both general education and special education. Lisa summarizes her feelings towards the benefits of co-teaching when she states, *"I like the collaboration piece, you get to bounce ideas off each other and come up with a plan that is going to be the most beneficial for the kids.*" (Lisa-School A, 2018). Like Abigail, Lisa believes in the model and is certain of its potential benefits for student growth, though Lisa was more specific in how the co-teaching model helps students beyond the teachers being able to support each other.

Views on Co-Teaching in Mathematics

Both Abigail and Lisa viewed differentiation and the availability of two teachers as one of the biggest benefits of co-teaching mathematics. Abigail stated, *"I think it's good for the kids to see the different ways that we do things. When they have questions, they can come to me. If they don't get it from me they can go to Ms. Lisa"* (Abigail-School A, 2018). Similar to this view, Lisa believes that:

> *"Differentiation is such a big thing in a co-taught classroom, a regular classroom, any classroom. It's important. We're constantly coming up with ways to meet the needs of all the kids in our class and my focus is on those students that have the learning disabilities and who are eligible under a special education category. But Ms. Abigail does consider them when she plans too, and I consider the other students in the class that don't have special needs too."* (Lisa-School A, 2018).

Both co-teachers value differentiation, though Lisa mentions how intentional they must be in this differentiation to cater to the varying learning abilities and needs of the students.

At the core of teaching is the belief that teachers are the most important asset we have –far more important than classroom materials or any math program– and that developing and empowering teachers is the best resource schools have to offer. Both Abigail and Lisa mentioned that the act of having multiple teachers in the mathematics classroom benefits students because it allows them to see math concepts taught multiple ways, and it provides students with an option of teachers to go to when they need assistance. The research seems to indicate that co-teaching allows for two teachers in the classroom at once, thereby, potentially doubling the benefits that may be reaped from effective teachers. In evidence of this, Magiera, et al. (2005) writes, "Effective co-teachers in mathematics classrooms can make learning for all students, including students with disabilities, a dynamic process. By blending the content skills of the secondary mathematics teacher and the strategy skills of the special education teacher, students with a

variety of abilities can become more fully engaged in acquiring mathematical knowledge" (p. 24). The two educators in co-taught classes bring unique areas of specializations to the partnership (Dieker, 2001). The classroom teacher focuses on content and the curriculum. The special educator focuses on the learning process, helping students acquire, remember, and demonstrate knowledge and skills. Similar to the message conveyed and Abigail and Lisa's interviews, when two teachers are allowed to combine their expertise in one classroom setting, students benefit (Murray, 2004).

Effective teachers are constantly looking for new and inventive ways to help their students better understand new content, as well as find different avenues that will help them show their understanding. Differentiated instruction practices allow teachers to engage students by accommodating each of their various learning styles (Fenty & McDuffe-Landrum, 2011). These teachers seem to support the research and understand the importance of individualizing instruction as often as possible to meet the needs of their students. This was apparent during their interview sessions as well as during the times of their classroom observations.

Classroom Structure

Abigail and Lisa's classroom was very well organized in terms of the furniture being strategically placed so that the teachers could both freely walk around and assist any student, the learning centers were visible, and the student materials were all arranged similarly in their desk to cut down on having to search for items when needed. This reduces time off-task and has the potential to optimize student learning. Of the 21 math students, six were identified as students with Individualized Education Plans (IEPs). The teachers shared with me the number of special education students that were in the class, but the

students' identities were kept confidential. Each observation started a few minutes before the official start of their math period while students were taking care of their morning responsibilities, such as going to the restroom. During the interview, Abigail detailed how they structured a typical day in their math class:

> *"Typically we come in. We do Marcy Cook turn over for x, and then I go over what we're doing that day. We talk about our math lesson, what it's gonna be. We get our i-Ready books out. And today I led the lesson, I think? No. Yes, I did. But Ms. Lisa always comes in and some days it can be ... And then we go into small groups. We do ... For me it's Milestones practice and for her it's hands-on whatever, fractions or whatever. Oftentimes we run over and we're running out. It's pretty quick"* (Abigail-School A, 2018).

Lisa revealed that in a typical day Abigail will use the i*Ready Math* Instruction book with the students, while she (Lisa) does a hands-on activity during their small group rotations, similar to what Abigail outlined above. However, during the three classroom observations in this study, no small group rotations took place. During my visits, both teachers led the class in a whole group lesson. During all of my observations of Abigail and Lisa, I witnessed team teaching and the one-teach, one-assist approaches.

I later asked about this change after my last visit and was told that the structure was altered due to Milestones preparation. Preparing students for this standardized test not only changed the structure of their class, but it also altered the way they prepared their math lessons. While interviewing both teachers, they stated that they usually planned together with the other third-grade teachers on a weekly basis, but currently they were referring to the Ready Math curriculum for their plans, so they did not see the need to

> *"sit down and discuss every single page, every single lesson, because we know the flow of the book. We know the pacing of each day. You do about two pages, you break into small groups and do the remediation groups or the hands-on, according to those pages. And so, we're on track with each*

> *other, and so we can go separately into the book on those two pages"* (Lisa, School A, 2018).

Abigail and Lisa teach all subject areas together. The students in their room are co-taught the entire day, with the exception of students who were pulled out for additional services such as the English to Speakers of Other Languages (ESOL) or the Early Intervention Program (E.I.P.) In the interview, they informed me that both teachers work with all students as needed. Each teacher is responsible for certain types of instruction. For example, Abigail, the general education teacher, usually does more direct instruction lessons using the county mandated math curriculum resource, Ready Math, while Lisa's group rotations use math manipulatives and other hands-on activities. The kidney table near the front of the room (See Appendix E) is where Abigail holds her small group stations, and the student table in the back of the room is where Lisa's station meets. I was informed of this arrangement during Abigail's interview, however, I did not see this structure played out during any of the three observations. This structure supports concepts of co-teaching because it is clear they are able to utilize small groups, increasing opportunities to differentiate (Friend, 2008). The division of work between co-teachers Abigail and Lisa ties into the literature, which states that the general education teacher can bring knowledge of content, while the special education teachers can bring knowledge of differentiated student learning. This mixture of expertise makes for improved instruction in co-teaching contexts.

Mathematics Lessons

At the time of each observation, both teachers began the lesson at the front of the room by introducing the concept for the day. Two of the three days, a content and language objective as well as vocabulary words were written on the board that related to the skill of

the day. On all three occasions, Abigail, the general education teacher, started the discussion, but both teachers were constantly engaged in the conversation and both encouraged conversations and feedback from the students. The students appeared to be familiar with the flow of the lesson because whenever they transitioned from one activity to the next, the students knew exactly what to do. For example, during the first observation, Abigail started the lesson with discussing yesterday's lesson: counting backwards to find elapsed time. Shortly afterwards, she asked the students to take out a sheet of paper, divide it into fourths, and to draw the table that Lisa, the special educator, was drawing on the board in the top right corner of their paper. All students immediately pulled out a spiral notebook, folded it into four equal sections, and began drawing their chart. As Abigail and Lisa led a discussion about the example problem that was displayed on the Promethean Board and in the Ready Math Books they had opened on their desks, the students began organizing the information from the word problem into their chart in order to solve the problem. The students used their folded paper to work through four problems; they did two problems together with both teachers guiding them through it from opposite sides of the white board, and then two problems were done independently. As students worked independently, they were encouraged to ask a neighbor for help if needed, and both teachers walked around the room providing one-on-one assistance as needed and providing constructive feedback. This approach is in line with Magiera, et al.'s (2005) findings that monitoring independent assignments is one of the most commonly used practices by both teachers in a co-taught mathematics classroom.

Summary: Case 1

Abigail and Lisa seem to hold similar beliefs about co-teaching in terms of its perceived benefits for students, particularly in mathematics. Each teacher had the desire to be in a co-teaching scenario. This shared belief and desire also may have contributed to their ability to work together to maintain smooth and effective classroom time. The relationship between Abigail and Lisa was one of the most admirable because they appeared to be in sync with one another in terms of their expectations, classroom management styles, and their philosophies of how to co-teach mathematics. During their observations, I noticed they were consistently going back and forth with teaching the whole group, assisting students as needed, and writing or explaining answers to the math problems the class was working on. This connection may have been made due to the fact that they work together all day to teach every subject, not just mathematics, so this affords them more time to communicate and plan collaboratively.

Case 2, School A: Karolyn & Charles

Karolyn is a fourth-grade general education teacher. Although she was only observed in mathematics and asked questions related to her experience with mathematics instruction, she teaches Math, Science, and Social Studies. She has been teaching for two years and has co-taught fourth grade at School A for both years. Karolyn was placed in this co-teaching position by her school administrators. In our one-on-one interview, she expressed that administration shows its support by allotting time out of the week for Professional Learning Committee (PLC) meetings, but that it would be beneficial if they also considered teacher personalities when assigning co-teaching partnerships. She also considers fourth-grade mathematics teachers' attendance and participation in these PLC meetings as a way to develop professionally. Karolyn states that it encourages them to

analyze students' math data. When asked about her perspective of co-teaching mathematics, she explained, "*Oh, I love co-teaching, in general, so that was the way I was presented my student teaching was as a co-teaching model"* (*Karolyn-School A*). This not only reveals her confidence in this method of teaching, but also additional co-teaching training that she has received that she may not have identified.

Charles is a special education teacher who has taught at School A for four years, and currently serves as the lead of the Special Education Department. He has been a special education teacher for five years, co-taught fourth grade for 3 years. He co-teaches fourth grade math, reading, and language arts. He was placed in this co-teaching position by his administration and would like to go back to being a resource teacher next school year. During the focus group session, he revealed,

> *"As for me, next year, I really do enjoy the co-taught model, but this is my second year in a row co-teaching math, and I have done it in the past. I've also done resource. But I think next year, if I get to do what I choose, I would do resource. Just going back to a smaller classroom for a little while, just to vary up the years."* (Charles-School A, 2018).

Although he has a positive opinion of co-teaching, he prefers to diversify his experience by going back to a self-contained resource classroom. In a resource class, students with disabilities leave the general education class for a designated time-period to visit the resource room and receive specialized instruction in areas such as language, reading, and math (National Association of Special Education Teachers, 2015).

Views on Co-Teaching in Mathematics

In the beginning of her interview, Karolyn made it clear that she was a huge proponent of using the co-teaching model. She stated, *"I like having an extra set of hands, and an extra set of eyes, and a person in the classroom, that like I said, may say something*

different to help the kids understand in a different way than how I taught the material to them" (Karolyn-School A, 2018), vaguely referring to differentiation (Fenty & McDuffe-Landrum, 2011). Karolyn believes that because she and Charles have co-taught math together for the past two years, they seem to *"share the same common goals and the same common classroom management practices"* (Karolyn, School A, 2018). Karolyn ranks classroom management as the highest priority when establishing co-teaching practices because she feels,

> *"Once you have control of the classroom everything else falls into place. You can run your small groups more effectively and efficiently. You can establish, the kids automatically know the norms of the classroom and the teachers. I think the roles that are set in place whenever both teachers are onboard with classroom management. There's less distractions for everyone to learn"* (Karolyn-School A, 2018).

Karolyn's sentiments align with studies which widely-document the importance of classroom management (Evertson & Weinstein, 2006). Evertson and Weinstein (2006) found that teachers' effective managing of students' behavior and learning plays an important role in creating positive educational outcomes. Having a well-managed classroom can have a significant effect on students' concentration (McCaslin et al., 2006), students' achievements (Freiberg, Huzinec, & Borders, 2008), and attitudes toward schoolwork and their teachers (Lewis, Romi, Katz, & Qui, 2008).

Karolyn believes that co-teaching could be improved if administration considered teachers' personalities and relationship building when pairing teachers together. She explained,

> *"I think the co-teaching model as a whole could be improved by building a rapport between the teachers. I think that it would be important for the administration to take into consideration, even as adults, that personalities need to click. They can't have personalities that aren't clicking in the same classroom because that's just bad. Not only for the teachers, but it's bad for*

> *the students. And it just happens, it's real life, personalities don't always click together, so I think it's very important that the teaming of the co-teachers is thought through very carefully whenever they decide to do a co-teaching model."* (Karolyn-School A, 2018).

Similar to Karolyn's view, Charles also places establishing a rapport with the partnering teacher at the top of his list of effective practices of co-teaching. He states,

> *"First thing is you got to establish a rapport with a co-teacher. You can have two different teaching styles. You can even go about how you would handle discipline situations differently. But if you don't have that rapport where you can work with that person, nothing's going to work. Nothing's going to happen. Because really, if you bring your differences to the table, then that can help more of the students in the room."* (Charles-School A, 2018).

The interviews seem to support the fact that co-teachers believe that they are teammates, partners, collaborators, and under a set of circumstances, they could be each other's biggest allies or biggest inconvenience. Positive relationship building with one another can make a world of difference when it comes to improving their teaching practices and creating a more positive and engaging classroom environment for students. Marston (2017) supports this belief of positive relationship building. She writes that the first step that co-teachers should take is to establish a relationship. When co-teachers make a concerted effort to build rapport and get to know one another, they are building the foundation for a comfortable relationship with each other as well as creating a more inviting classroom where the students feel more comfortable (Marston, 2017).

Classroom Structure

Karolyn and Charles' math class has 21 students, 7 of whom are identified as having IEPs. This particular class uses a tri-teaching method, meaning, they have three teachers in the room at one time. During their math segment, they have Karolyn and Charles in the room the entire 90-minutes, and an E.I.P. teacher assigned to their room for

45 minutes. The views and perspectives of the E.I.P. teacher were not included in this study, which may have been a limitation to this portion of the study.

In Karolyn's interview, she described how they organize their classroom time in order to utilize all three teachers; "*We do station teaching because I have two Sp. Ed. groups that we run and then I have two EIP groups that we run. There's also an EIP teacher in here at that time. So basically, it's me and the EIP kids one day and the EIP teacher, and then the next day I switch, and I work with the co-taught kids and Charles' with them as well. So, every other day, the kids have two teachers in small groups."* Noting that this approach has the potential to make for an overly busy classroom, she states, *"I try to be accommodating, so I work in the hallway normally with my group, and Charles will take his group up front to the board, and then my EIP teacher has the back table, and then I normally have a group on the computers."* (Karolyn-School A, 2018). This may have been how they structured their classes prior to my observations, but, apart from the first observation, each time I observed their class, the E.I.P. teacher went into the hall with a small group of students. I believe they did this to accommodate me. With Karolyn and Charles in the room, I was able to observe the two of them simultaneously.

Charles and Karolyn's observations were one of the few instances where most of the teacher's description of a "typical" day in class matched the observation of what took place in class. Karolyn described how she and Charles work together in her interview:

> "*A lot of times we either do parallel teaching or I teach, and he assists. For example, if we're doing a math problem on the board, he is walking around, especially with his students, to make sure that they have set up their problem correctly. To look for simple mistakes that maybe he could catch early on whenever they're working on a problem. To help them get back on track. And then he'll also help the other students that have their hands up if they get stuck somewhere as I'm teaching. But then other times when you parallel teach, for example, if we're working a problem on the*

> *board maybe on one side he's drawing a number line to show a model and then on the other side with the whiteboard I may be solving it a different way. Just to show that there's multiple ways to solve a problem."*
> (Karolyn-School A, 2018).

While conducting my observations, Karolyn and Charles started off the lessons together in the front of the room to discuss the action plan for the day. Karolyn, the general education teacher, would continue the discussion as Charles, the special educator, walked around the room to ensure students were on task and paying attention. This observation supported their claim of one-teach one-assist. Afterwards, they broke up into small groups and they each taught a group of students while one group went to the computers to practice i-Ready lessons. The group that was working with the E.I.P. teacher went out into the hall before the lesson begun. They returned 45 minutes into the math period, and either joined the group of students on the computers or joined Karolyn's or Charles' group. One claim Karolyn had made in her interview was that they often did parallel teaching, though I did not observe this method during any of my observations.

During my observations of Karolyn and Charles, the co-teaching strategies used most often was one-teach, one assist and station teaching. The former method is found to be used more frequently in mathematics classrooms, typically with the general education teacher leading the instruction, while the special education teacher walks around to monitor or assist (Magiera, et al., 2005). Although experts believe it is a method that should be used sparingly because it gives one teacher more power in the classroom (Friend, 2005), this method was observed in two out of the four classrooms. In Charles and Karolyn's classroom, however, it was only used as a part of the initial instruction. The teachers transitioned into station after they delivered the initial instruction to the entire class.

Mathematics Lesson

My first observation of this class took place on the same day the county pushed out the i-Ready Growth Monitoring Assessment. This means that all students were required to log in to the i-Ready Program to take the assessment, which then provides a grade level equivalency and math skills proficiency score. Prior to the morning of the test, Karolyn and Charles were unaware that students would be required to take the test that day, knowledge which may have changed their approach and structure of the lesson. In the first 45-50 minutes of the class period, the three teachers walked around the room to ensure that students were answering the questions, using scratch paper, working at an appropriate pace, and they answered any questions students may have had. The latter part of the class, Karolyn led a whole group lesson on area and perimeter, while Charles walked around the room correcting students as needed, encouraging others, and drawing examples of the problems Karolyn discussed on the board.

At the time of the last two observations, the class followed a more normalized schedule because they were no longer testing. Both lessons I observed reviewed previously taught concepts: classifying two-dimensional shapes and angles. The lessons started out with Karolyn and Charles using the one-teach, one-assist strategy, with Karolyn teaching, and Charles walking around assisting students. Twenty-five minutes into the lessons, they transitioned to station teaching, with Charles taking a group to the back table, and Karolyn working with a group on the carpet in the front of the room (See Appendix E). During the whole group lesson, both teachers continuously engaged in conversation with the students, but minimal interactions took place between the two teachers. There were a lot of two-way conversations between the teachers and students while in small group, particularly in Charles' group. It appeared that students were very comfortable with asking questions,

although they were mainly asking for accuracy verification, “Is this right?” “Does this equal it?, “Can you give us a hint?” While teacher-to-student conversation was apparent in Charles’ group, it was dialogue of confirmation rather than of student engagement.

Summary: Case 2

Neither Karolyn nor Charles sought out their co-teaching position, however, they each seem to believe that time and experience has allowed them to grow in this type of position, as has their dedication to building rapport with one another. During their interviews, they both focused on the idea that having a positive relationship with a co-teacher promotes an effective co-teaching classroom, though that was not necessarily visible in the classroom observations due to their lack of interactions with one another. Karolyn and Charles, however, were always engaged in discussions with students, whether it was during whole group or small group lessons, this gave them the opportunities to provide the students with real-time feedback, which can deepen students’ understanding of mathematics content.

Case 3, School B: Karen & Kacey

Karen is a third-grade general education teacher. Although she was only observed and asked questions related to her experience with mathematics instruction, she also teaches all subject areas. She has been teaching for 11 years, teaching third grade for 1 year, and has been a co-teacher for less than 1 year. She has taught at School B for four years. Prior to Karen being placed in this role, there was only one third grade co-taught mathematics class at School B. Karen’s class started out as a general education classroom, but due to an increase of third graders being identified as having special needs, her class became a co-taught class. Karen stated, “*My co-teaching assignment started a couple*

months into the school year. I guess they had some extra students, so they needed to spread them out. I have other pullout students, so we have to restructure our small groups" (*Karen-School B*). In our one-on-one interview, Karen shared her perspective on being unexpectedly put into this situation, and her thoughts on co-teaching so far: *"Oh, I think all the kids benefit from the experience. I mean having one person, you get so much more out of two and just the ebb flow of it is, yeah. I really like it. I'm tired of doing it, but I like it."* (Karen-School B, 2018).

When asked about her current co-teaching experience, she stated that she loved having a co-teacher because they're "proactive." In terms of classroom management as well as building rapport with her co-teacher, Karen describes her experience as very positive. She stated,

> *"The kids are good because her (Kacey's) classroom management is very good, and I think that has a lot to play. And then, we play off of each other too because we'll hear each other. Because we'll be sharing the same things, and she'll say something like, 'Oh, I like how she did that.' And, she'll do it to me too, and it's so cool, and we're just parallel. If we know we're teaching the same thing, we'll try to share it the same way, and that's neat because we can hear each other sharing."* (Karen-School B, 2018).

After transcribing and analyzing the interview data, I noticed a pattern being formed from participants regarding building positive relationships and establishing effective classroom management. Similar to the other participants Karen boasted about Kacey's "good" classroom management, and that following this plan, allows them to "be successful." Karen seemed excited to describe their classroom structure and how smoothly the structure of their classroom flowed.

I later inquired about her opinion of professional development in co-teaching, Karen responded, *"I guess it's good. I don't know. Who has time for anything else besides*

what we do? I'm sorry. That's terrible" (Karen-School B, 2018). Karen's statement seems to imply that professional development has value, but due to time constraints, she is unsure of how she could fit it all in.

Kacey is the head of the Special Education Department at School B. She has taught at this school for seven years. The first eleven years of her career, she worked as a general education teacher, but then took a test to become certified as a Special Education teacher. She has been a special education teacher for four years, she has co-taught third grade for two years. She currently co-teaches third and 5th grade math as well as teaches a Reading Resource segment for second graders. She was placed in this co-teaching position by administration, and absolutely believes in the positive value of co-teaching. The subject of inclusion is very personal for her because she has a daughter with special needs, which became clear when she described how she entered the field of special education:

> "*I decided when my second child was born that I wanted to be a Special Ed. Teacher, but God has a sense of humor. I mean, he's a great God, but he has a sense of humor. He graced us with our second child who is autistic. Even though that was where my heart pulled me, I knew that I had to be a mom first and I kind of had the Gen. Ed. thing down. I was in a good routine and I didn't want to upset the apple basket at that time, so I stayed in Gen. Ed. for a little bit and then, once we kind of got her not figured out, but on a good path and going, that's when I took the test and said I wanted to do this. So, I was lucky that I got to stay in this building and do it."* (Kacey-School B, 2018).

The close connection she has on this topic seems to ignite a fiery passion in her to be the best co-teacher she could be and inspire others to do the same. Her passion runs so deep that she asked the school's administration if she could lead a beginning of the year training session with all of the co-teachers in the building. They agreed, and she spear-headed a one-and-a-half-hour workshop on co-teaching models, implementation strategies, and ways to get to know your co-teacher, highlighting the difference between her thoughts on

professional development in the area of co-teaching and those of her co-teacher, Karen. Kacey emphasizes the importance and need for further training in co-teaching when she stated,

> *"I agree that PD is important – an in-depth PD, not a glazed over… At the beginning of the year, I gave you guys a glazed over version. I would not call that a PD. I would call that "a brief introduction," but we could've spent a couple of hours on that"* (Kacey-School B, 2018).

As opposed to Karen, even after giving the start of year training session, Kacey believes more could be done as teachers to develop their skills.

Views on Co-Teaching in Mathematics

Both Karen and Kacey agree that the ability to work with smaller groups of students more frequently is one of the biggest benefits of co-teaching. Karen believes co-teaching is "*very effective for us just because we're able to focus on smaller groups of students to give them that individualized attention"* (Karen-School B, 2018).Kacey concurs with the idea that small group learning is helpful for student focus and learning outcomes. Small group instruction is a major part of co-teaching, in fact, half of the co-teaching models involve breaking students into smaller groups to increase the student to teacher engagement ratio and to improve the level of specialized instruction (Vygotsky, 1986, Friend, 2015). For example, with station teaching, teachers can find ample opportunities to create discourse and increase student engagement (Friend, 2015).

Karen boasted about another advantage of having a second teacher in the classroom; she believes that "*having another adult in the room,"* is similar to having *"two mamas in the room that are looking out for you, and it does make the kids a little more focused because they know we're very close to you. We care about you. We want you to learn and our objectives for them are all to follow the classroom management plan and to*

be successful" (Karen-School B, 2018). It seems Karen believes the co-teaching model is what is helpful for student's focus, not only because it allows for small groups, but perhaps also because they have more supervision.

Kacey mentions ways in which having two teachers and being in smaller groups may help to improve students' learning outcomes, but in her opinion, it does not alleviate the issue of inattentiveness. *"I think if you generalize our population as a whole, they learn better in small group and that is 110% true for our Sp. Ed. kids."* However, she goes on to say,

> *"They don't have the attention to maintain… I don't know what these kids are thinking about. It's shocking to me. Even in small group, I am having problems. I am sitting right in front of you with a whiteboard and I'm pointing to your paper and I'll ask them a question and they're like, 'Huh?' I'm like, 'Tell me what I said to you,' and they have no clue"* (Kacey-School B, 2018).

This highlights some differences in what Karen and Kacey have noticed; Karen chose to highlight how they achieve better focus from the students when in small groups, and the fact that having two teachers allows for students to feel more comfortable and cared for in that space. On the other hand, Kacey does note the benefits of small group learning, but she chooses to highlight the issues of inattentiveness that small group work and co-teaching does not circumvent, in her opinion. She made it very clear that her student population needed small group instruction to be successful in mathematics, and that the co-teaching model allowed teachers to provide this benefit, but she also was clear that the co-teaching model itself, as it was presently implemented, was not a perfect approach.

Classroom Structure

Karen and Kacey's classroom was organized in such a way that both teachers had their own space to work with students in small groups. Karen's group sat at the kidney

table near the front of the room (See Appendix E), and Kacey's group sat at the student table in the back. Each time I observed this class, they were doing a mixture of station and parallel teaching. I use the term mixture because they never divided the class in half, as with parallel teaching, but they created stations, and sometimes taught the same content at both teacher stations.

Karen teaches the same group of students all subjects, but Kacey comes in at the start of the math period. They begin their math segment in small group and complete the lesson wrap-up at the end of the lesson, in whole group. Karen informed me that they structure their class this way because some students leave the class at the start of the math period to go to their E.I.P. Math class, so if they start with small group, those students go straight to a teacher station upon their return and will not miss any small group instruction. Karen continues by explaining,

> "*They mostly work in small groups. We will do a little bit of whole group towards the end of our 90 minutes just because we teach our i-Ready Instruction Book, our workbook, our enrichment, our whatever remediation, and then we send them off with seatwork. And so, the way that works is, it's just… our kids that need enrichment, they get a lot of one-on-one time. It's like 35 to 40 minutes a day and that's just the way we're rolling because when we go back whole group, it's the end of the day, and they're like (waves hands erratically) but if we're right here with them, we can keep pulling them in."* (Karen-School B, 2018).

This approach highlights the ways in which they are structuring classroom time to cater to the focus issues that each teacher identified in their interviews.

They begin their rotations with Karen, the general education teacher, working with the students who are performing above grade level and Kacey the special educator, working with the Special Education students on a spiral review page, and an activity that relates to the skill for the week. There is an independent group at this time also, working on

the spiral review page and then logging on to i-Ready. After about 35 to 40 minutes, they switch groups, the students who left for E.I.P return, and they work with Karen, and the students who were on the computers, work with Kacey. During the second observation, they ended the class period with a 5-minute wrap-up, but each time after that, the period ended with students packing up to leave.

Mathematics Lesson

Each day I observed their class, they did station rotations. There was little to no communication between the teachers, but there were lots of teacher-to-student interactions. In two of the three observations, students were chanting and doing Math Talks with Kacey and using manipulatives with Karen. In two observations, both teacher stations worked on the same assignment, an area and perimeter page, but the lesson delivery was very different. For example, during the first observation, both teachers worked on an area and perimeter page in their small groups. Kacey had the students outline the perimeter of a rectangle with their fingers, then trace the perimeter with a highlighter, before having them ultimately find the perimeter of the shapes. They also chanted “Perimeter: Outside.” Karen’s group first discussed the meaning of area and perimeter, wrote equations to find the perimeter on the kidney table, and ultimately found the perimeter of the rectangles on the page. A third group worked on i-Ready on the computers.

This was similar to the flow of each lesson, each time I observed. The only difference was that the second observation ended with a Karen leading the class in a wrap-up, however, it was not directly related to the lesson. The wrap up seemed to simply be a fun homeroom activity, which Karen had expressed she felt was important; however, Kacey seemed to be confused by this. Each time before or after that, the class period ended

right at dismissal. This is the scenario Karen was referring to in her interview when she explained,

> *"Yeah, we have to stop at least… we've been teaching until 2:05. And it just made packing up crazy so hard. I told Ms. Kacey today we've got to stop at 2 because just the end of that day rushes, we don't need to go out of here frazzled. We got enough time. We're getting enough Math in."* (Karen-School B, 2018).

I ended my observation around 2:05 each day, and they were usually teaching up to the last second.

Summary: Case 3

Karen and Kacey were placed into this particular co-teaching situation by administrators further into the school year, which may have explained some of their differences in how they perceived their co-teaching arrangement. Karen blissfully reported how much she enjoyed her current co-teaching assignment, and how she and Kacey were on the same page in terms of behavioral expectations and teaching styles. Kacey raved about Karen's extensive knowledge in mathematics, and how Karen is a very strong teacher. Kacey also spoke a lot about the frustrations she has had with the co-teaching model. While listening to Kacey's interview and reading the transcriptions, I initially thought she was working from deficit model, meaning she focused on the students or students' work ethic as the primary problem, rather than looking at the environment or the instructional practices. However, after reviewing her transcriptions several times over, it became clear that it was not the students she took issue with, but rather the flawed model she felt obligated to implement. Overall, both teachers seemed to agree that much of the value in co-teaching lies in the ability to teach in small groups, which was evident in how they organized classroom time.

Case 4, School B: Deborah & Kallie

Deborah is a fourth-grade general education mathematics teacher. She has been teaching for 19 years, she has taught fourth grade for seven nonconsecutive years, and has had experience teaching three co-taught classes; she has taught at School B since it opened in 2012. Deborah started the year as an Early Intervention Program (E.I.P.) teacher, but when a fourth- grade math teacher decided not to return from maternity leave, she was moved to this position after the Thanksgiving Holiday Break. Deborah revealed that she was the students' third general education teacher for the year. When providing me with background about her class, she revealed,

> *"Being that I started after Thanksgiving, being their third teacher, their first teacher, she was on maternity leave and was here for the month of August. I'm not sure what happened when she was here, she had them until Labor Day and... they had no real routines in place. And they had not even started in their math books. So we are extremely behind. Mrs. Second Teacher was doing the long-term sub for their original teacher, but she's a retired teacher and she is very much a whole group teacher. So I teach a lesson. You sit down and do your worksheet and I grade papers and they were used to being silent all the time. I think coming in and just having a little bit of flexibility that I had to get, a little classroom management. They had their perceived... fourth grade as a whole changed their... They were changing their discipline as I came in because it wasn't working for this group of kids. The checkbook situation, and we just went to the Dojo points. So I came in at an awkward time"* (Deborah-School B, 2018).

Deborah informed me that the first few months of teaching the co-taught math class she focused more on discipline and learning routines than on academics. During the focus group session, she talked about the benefits of co-teaching for general education students:

> *"Even those kids who might not either have co-teaching nor have an IEP. They could be some of those kids who are 'bubble kids' who don't get any support in EIP or any other service. They also benefit by having that extra adult in the room. And sometimes they might be able to understand what I'm saying over what the co-teacher's saying or vice-versa. The teacher or co-teacher might be able to explain it in a different way, then it clicks"* (Deborah- School B, 2018).

Her statement revealed that she believes co-teaching's benefits extends beyond the realm of the special education students, and that she shares the sentiments of the previously discussed teachers that boasted about the advantages of having more than one teacher in the room.

Kallie is a special education teacher. It was her first year at School B as well as her first-year teaching in an elementary school. She had previously been a special education teacher in middle school for four years. She co-teaches fourth-grade math, reading, and language arts. She also taught a first-grade resource mathematics segment. She was placed in this co-teaching position by administration and believes that this year required a lot of adjusting for her as well as the students because they had to learn the personalities, teaching styles, and expectations of three general education teachers. In evidence of this, she states,

> *"And then, when Ms. Deborah started, then we were kind of starting over again from scratch, and getting to know each other, and her style of teaching. Because I kind of feel like, as a co-teacher, even though we're supposed to be equals, you still kind of defer to that teacher whose classroom you're in. I mean, they don't refer to them as the lead teacher, or anything like that, but it's easy to do so, because, you know, I kind of defer to her way of discipline, or her way of handling things in the class. So it takes... It took a little bit of a third transition. So, this was a unique year"* (Kallie- School B, 2018).

Kallie's perspective of her role in the classroom was interesting because she seems to view herself as second-in-command, rather than an equal partnership. This differed from the perspectives of other Special Education co-teachers who felt they had an equal status in the co-taught class. Upon further inquiry, she revealed that she felt more like the lead teacher while the long-term sub was there, elaborating on this by saying it was "*Because you're the*

one that knows the kids. You're the one that knows what they have been doing, and how they've been doing, and the process, and all of that. So, that was a little different" (Kallie- School B, 2018).

It became apparent to me that this year's co-teaching experience was not the easiest for her because in addition to the lack of parity she felt, she also mentioned multiple behavior issues in the classroom. At the time of her interview, she revealed,

> *"I kind of feel like, as a co-teacher, even though we're supposed to be equals, you still kind of defer to that teacher whose classroom you're in. I mean, they don't refer to them as the lead teacher, or anything like that, but it's easy to do so, because, you know, I kind of defer to her way of discipline, or her way of handling things in the class"* (Kallie- School B, 2018).

Kallie's sentiments gave me the impression that she was aware of the lack of parity but had accepted this reality. She began the interview by telling some of the challenges that she faced, but later on in the interview, she reflected on her positive past experiences in Middle School when she and the general education teachers did everything together such as planning, professional developments, meetings, etc.… When asked about the significance of professional development, she said it was important that both teachers receive professional development in co-teaching because it helps to bridge the gap between the General Education world and the Special Education world.

Views on Co-Teaching in Mathematics

In the focus group session, Deborah said that the co-teaching model is good for:

> *"…those kids who might not either have co-teaching...and don't have an IEP. They could be some of those kids who are bubble kids who don't get any support in EIP or any other service, they also benefit by having that extra adult in the room. And sometimes they might be able to understand what I'm saying over what the co-teacher's saying or vice-versa. The*

> *teacher or co-teacher might be able to explain it in a different way, then it clicks."* (Deborah- School B, 2018).

Kallie stated in her interview that co-teaching helps students who are performing below grade level, *"not get lost in the shuffle, because they have a Special Education teacher who can [give them extra support]"* (Kallie School B, 2018). It seems to me that Kallie also believed that co-teaching alleviated some of the burden of the general education teacher. To emphasize this point, she stated,

> *"Because the teacher can't teach all 28 students, and then worry about those that have special accommodations, or those that have a difficult time understanding whatever their disability is, you know? I think somebody else has to be able to do that. And I think it's wonderful to be able to have a certified teacher that can devote their time and energy to servicing or serving those students"* (Kallie-School B, 2018).

This led me to believe that she viewed her role as a co-teacher as an assistant to the General Education teacher, rather than a partner.

When interviewing the two teachers separately, it was clear that they both felt overwhelmed by behavior issues, which were mentioned several times during each interview, as well as the multiple transitions that took place throughout the school year for them as well as their students. Both interviewees were eager to share their experiences, but their responses were laden with the happenings or dilemmas of their past and current classroom experiences. For instance, when asked about her views on co-teaching as an instructional model for teaching math, Deborah replied, "*I think it can be successful,"* but then provided an anecdote about a previous co-teaching experience that was quite negative. "*I have had a train wreck of a co-teaching before and literally she was a couple years before retirement. I mean literally, she would come in my room and fall asleep, and then asked me for the stuff that I was doing with my class to give her resource students when she*

left my room. Yeah, that was, that was interesting." However, she followed this up by saying,

> *"I've had a good co-teacher and it worked really well. Sometimes she would begin the lesson teaching whole group or I would and one of us is monitoring and making sure that they're on task and doing what we need them to do. And then if we did split off into small groups it worked really well. So if you have a good one that you're planning well… like Kallie and I work really well together"* (Deborah-School B, 2018).

When asked how she and her co-teacher's perspective of co-teaching are different, Kallie responded,

> *"Well, I think the whole teaching thing. With every teacher I've co-taught with in Math, that has been the thing, in that they want to teach whole group, they don't understand that it has to be small group. With certain kids, it has to be small group. They're just not... They're not able to pay attention, and it's not necessarily just because they choose to be defiant. They just really can't pay attention."* (Kallie- School B, 2018).

Neither participant truly answered the questions that were asked, so I asked it a different way during the focus group session by asking them about their positive thoughts about co-teaching. Both respondents were able to provide a more concise response. In the focus group session, Kallie followed Deborah's response by replying,

> *"Exactly. That's what I was going to say. I think it, especially in a math setting; it allows them to see the same concept from two different perspectives or in two different ways. And to also have that second body that can be right next to them if they need it. Or answer their own personal question while the class is going on, or if they're falling behind or something."* (Kallie-School B, 2018).

To gain insight on how they perceived co-teaching mathematics, I asked them if they felt co-teaching mathematics supported general and special education students. I phrased it as follows: Do you feel co-teaching in math supports the success of Gen. Ed. and Sp. Ed.

students? And if so, what can be attributed to this success? And if not, why do you think it's not working? Deborah responded by saying,

> *"I think it does as long as it's being done in a way where you're communicating, and their needs are being met. I mean, it could be a situation, where my co-teacher actually fell asleep in the back of the room. So, that was not beneficial because it really wasn't... Yeah, I don't know. But if that wasn't done right, [you have to] absolutely deal with it. Because there are several kids in our class that are not co-taught kids that benefit from having the both of us in there… There are several [teachers] I would absolutely know that would be a no-go because they don't... No, these are my kids. I make all plans. I don't need your input, but I can tell you what I want you to do. I mean, I have had that, even as an EIP teacher, trying to push into rooms before it was more like they wanted to plan everything, including my groups, for me. And I'm, "That's not how this works. More it has to be a situation where you kind of...we both have to work together on that."* (Deborah-School B, 2018).

Deborah's opinion was that co-teaching was beneficial for all students involved if both teachers were active participants in the teaching process and worked together, provided equal input, and shared the responsibility of the students.

Kallie's response to this question focused on teacher personalities and the special education teacher assisting the general education teacher as needed. She began with *"It's certainly personalities…*" She goes on to say,

> *"Well see, I think I come from more of that background [general education teacher making all of the decisions], because that's kind of what I'm used to, is I'm coming into that teacher's world. And they're saying, 'This is what we're doing.' And then I have to take and adapt that. I mean, I have to now take that and teach it or do it or whatever. I've never... That's kind of what I've always experienced."*

Kallie and Deborah's responses revealed one of the biggest disconnects within a case. Deborah emphasized the importance of both teachers taking an active role in planning and carrying out lessons. Kallie revealed that she's used to the general education teacher

making all of the decisions as it relates to student learning. It makes me wonder how this difference in views of teacher roles and responsibilities manifests itself in their classroom and in their relationship.

Contrary to their views on how co-teaching benefits both the general and special education students, both teachers' responses also revealed that they viewed co-teaching as an approach to expose students to a variety of teaching techniques and multiple ways of learning concepts. They also both felt that it provides an extra layer of support for students who may otherwise get left behind if there were not an additional teacher in the room.

Classroom Structure

Deborah and Kallie have 27 math students, 15 of those students have IEPs. Although this is below the state of Georgia's maximum class size of 28 for fourth-grade classes, it is quite a high number compared to the other cases. I was informed during the interview that they begin their math period with a 10-20-minute whole group lesson, and then they begin station rotations. Each time I arrived, they were already in their stations, so I was unable to see how they began their class. This was a limitation to my ability to assess the classroom structure from start to finish. Deborah led a group at the kidney table, Kallie led a group at the student table on the opposite side of the room, and the parapro was in charge of a group at a cluster of student desks toward the back, but in the middle of the room (See Appendix E). On the Promethean Board, there was a chart that listed four different colors, an activity beneath each color (e.g. math game, meet with the teacher, i-Ready), and a 15-minute timer. At the end of 15 minutes, the timer would sound, and the students had 1 minute to transition to their next station, and the timer would start again.

On a typical day, Deborah and Kallie's groups will work on an assignment from the Ready Math Curriculum. Deborah and Kallie will teach the same concept or skill, but Kallie would "*teach it out of the Ready Instruction Book, and Deborah will teach the concept using something else, kind of a hands-on thing. And then the parapro will do, like, an activity, or a game, or something, with them, reinforcing that concept"* (Kallie-School B, 2018). The parapro will usually work with the students on a more engaging math activity, spiral review page, or an assignment that Deborah's other two math periods may have completed independently. There is a fourth group of students on the computers doing the i-Ready Computer Lesson.

This class follows the tri-teaching method as well because the parapro is in the class most of the class period. She is there for 60 minutes out of the 90-minute block. This alleviates the need for students to work independently, because according to Deborah, they *"cannot handle that,"* and they *"weren't succeeding working independently."* I was told that adding the parapro has cut down on some, but not all, of the behavior issues they have had in the past (Deborah & Kallie- School B, 2018).

Mathematics Lesson

Upon entering Deborah and Kallie's classroom during the first observation, I noticed that the assistant principal was also there for observing Kallie, the special educator, as a requirement for her teacher evaluation. They had four small group rotations: one group with Deborah working on adding and subtracting fractions, one group with Kallie watching an introductory fractions video from i-Ready, another group at the back, and another group on the computers. When I entered the classroom, the parapro was not there, so the group she was supposed to be working with was completely off-task. It was so distracting that the

assistant principal looked in their direction six times during the 8 minutes the parapro was out of the room. When the parapro returned, the noise level decreased, and each group that was working with a teacher was mostly on task.

Other Issues

When I entered Deborah and Kallie's room, it was loud and 11 of the 27 students were off task. Several students on the computers were tagging each other, and Deborah had to redirect three students eleven times during three group rotations. One would think that the presence of the assistant principal would positively influence students' behaviors, however, several students did not seem to be deterred. While conducting the observation, I recalled the struggles Deborah and Kallie said they have had with behavior, but this came as a bit of a surprise. These students required a lot of attention from the teachers, and the tri-teaching method was a step in the right direction toward remedying this situation. That being said, the number of students with IEPs in the class is much too high; this ratio likely contributed to the difficulty of managing the class that I observed, and that both Deborah and Kallie reported when discussing behavioral issues.

After the initial observation, the remaining two observations were a lot calmer. The three teachers each had a small group, and there was a group on the computers. The parapro had to step out for five to ten minutes during the first two observations to print a student's worksheet on a larger sheet of paper per his IEP accommodations. Each time the parapro left, it caused that parapro's small group to get off-task, which sent a domino effect to the fourth group on the computer.

Upon further reflection of the three observations, I realized that many of my notes were on the classroom structure and the student-teacher interactions. I also noticed that

many of the student-teacher interactions revolved around redirection of behavior. In fact, I spent a lot of time distracted by behavior and how much class time was spent redirecting off-task behaviors. Earlier, I wrote that Deborah and Kallie spoke mostly about their experiences with co-teaching, largely due to the challenges they have faced. It seems that they are aware of the issues that I was able to observe when I visited the classroom.

Summary: Case 4

Deborah and Kallie's classroom had a large number of students with I.E.P.s. They both cited that behavior is one of the biggest classroom struggles, something that I also noted in my classroom observations. The two teachers' perspectives on their roles in the classroom showed a large disconnect. One of the biggest disconnects stemmed from their difference in opinions about a whole group approach. During her interview, Kallie was very vocal about her opposition to whole group lessons because she felt that method of teaching did not benefit the students with disabilities. Deborah also stated that anything she delivers in whole group is a "waste" because the students "don't understand it." However, she reported that she delivered whole group mathematics instruction, but for no more than 15-20 minutes. This difference of opinions in instructional delivery may explain some of their lack of cohesiveness.

Thematic Analysis

In the first section of this chapter, I have provided demographic information and background knowledge about each case to provide some understanding of the history and experiences of the participants. In the following section, I discuss six themes that have developed from the data and describe how they address each research question.

This analysis is organized by the three research questions. I begin by presenting the research question. Then, I identify three to four themes that have emerged from the data that relate to the posed question. I detail how those themes relate to the questions and provide evidence from the data I have collected. The data shown comes from the participants' interviews, focus group sessions, and the researcher's field notes.

Research Question 1: How are the views of co-teaching similar and different for partnering third and fourth grade elementary mathematics teachers and special education teachers?

Theme 1: Conflicting Views in Role of Lead Mathematics Teacher

In many of the interviews, the participants spoke about how they believed that their students viewed them as equals, or that parity was established within their co-taught classes. The teachers declared that parity is a critical component of co-teaching. It is important that both teachers feel valued for their contributions and that students perceive each teacher as an equal and valued participant in their education. Establishing feelings of being valued combined with parity in the classroom appears to be an essential component in the building of positive professional relationships as Friend (2008) calls for, resulting in improved outcomes for students and lasting teaching relationships.

Charles noted that he felt that the students do understand that he is a teacher, but that he holds a different role as the special education teacher, stating,

> *"The kids do view me as a teacher, just as [they view] the gen ed teacher, but they do know that there's a difference between the two of us. They do know that there's ... You know, I'm there to support everyone, but they do know that I have to give some special attention to certain students sometimes"* (Charles-School A, 2018).

Deborah believes that the students see her and her co-teacher as equals, though she also notes that some students perceive a difference between her and her co-teacher, and respond to them differently because of it, perhaps adding to the behavioral issues they had identified in their classroom.

> *"I think they see us as equals. But there are a couple of those kids that really don't belong in here, that if Ms. Kallie corrects their behavior or something, they don't feel like they should obey it. And I'm like, whether she is, I mean, she's a teacher, she's an adult. And if an adult asks..."* (Deborah- School B, 2018).

Interestingly, Kallie does not mention this behavioral issue in terms of how the students perceive each of the co-teacher's roles, and actually mentions that she believes the administration has worked to dispel any notion of that:

> *"I think they do view me as a teacher. But I think they do a good job here of telling them that we're a teacher. You know? That you have two teachers in this class. I think that makes a difference"* (Kallie- School B, 2018).

Karolyn describes a similar feeling of parity, inferring that it may because of the fluidity that her co-teaching team has in the classroom and interacting with all students, without deferring to one teach over another for a particular student:

> *"We both have free range over the classroom. We don't feel like one person takes charge over the other person, and I think that's beneficial mostly because the kids feel comfortable with both of us, not just the Sp. Ed. students, but the Regular Ed. students as well, feel very comfortable approaching either one of us if they need help and asking questions. And both of us are good to respond. And sometimes it's helpful because I may respond one way and he might respond another way that can, I guess, help explain or help change the answer so that they can understand better"* (Karolyn- School A, 2018).

Similarly, Lisa seems to assert that the classroom structure and relationship between her and her co-teacher is partially what creates this level of parity between them in the classroom. Because the general education teacher never notes the difference between them, creating that image of equality for their students, as well:

> *"I definitely feel a part of the classroom because I am in there for every single subject, the entire day. The regular education teacher, she doesn't say to her class, "It's Ms. Abigail's class, we're doing this today." It's always the two of you, we're always labelled together. On the wall, outside the door, it's both of our names, schedule. The kids view it as there's almost two homeroom teachers, it's not her class and I pop in for a subject"* (Lisa- School A, 2018).

Several of the general education teachers conveyed an attitude that they were the leader of the classroom but maintained that they did not treat their special education teacher with less professional respect. An example of this is when Abigail, the general education teacher, stated, "*Typically I'm the main"* (Abigail- School A, 2018).This conveyed that Abigail felt she had dominion over the classroom, but mentioned that the students often lean on the special education teacher for an outlet and gentle approach; *"I've been pretty hard on them and I think they need a soft place to fall so they're heading to Ms. Lisa right now"*(Abigail- School A, 2018). Although she addressed the important role that her co-teacher played in the teaching dynamic, it did not indicate feeling a sense of parity.

Kacey indicates a similar feeling as the general education teacher; when asked if one person is the 'main' teacher, she stated, "*I think I'm definitely."* However, she goes on to describe that she feels equal to her co-teacher when they are in co-teaching mode. She states,

> *"This is of course my home, turf, but she's well respected. If they need something, they're very eager to ask her. So, it's an equal relationship because they know this is where she… she belongs here, and you know, in the afternoons. So, I see that as*

> *an equal. It's like when she's not here, well, "Where's Ms. Kacey?"* (Karen – School B, 2018).

This feeling likely comes from the fact that they do not co-teach throughout the whole day, but only for math.

As opposed to the other special education teachers, Kallie talked about how she relinquishes control to the general education teacher in some ways. She stated that she feels a part of the class, yet she sometimes refers to the general education teacher as the "lead" teacher, highlighted when she explains,

> *"As a co-teacher, even though we're supposed to be equals, you still kind of defer to that teacher whose classroom you're in. I mean, they don't refer to them as the lead teacher, or anything like that, but it's easy to do so, because, you know, I kind of defer to her way of discipline, or her way of handling things in the class…you kind of just defer to whatever they have already established. Because they have those students... Especially in elementary, they have those students three times as long as you have them. You know?"* (Kallie- School B, 2018).

In the focus group session, more information was revealed about Kallie's relationship with her co-teacher in terms of how instructional activities are executed. Kallie exhibits a little frustration with what has become the norm in her co-teaching arrangement. Deborah told Kallie she heard how she felt and told her she is welcome to her thoughts, and it seems like they may both be open to altering their current structure. In terms of the lack of power she feels in the co-teaching relationship, Kallie feels she is often told, *"This is what we're doing," expressing that then "I have to take and adapt that. I mean, I have to now take that and teach it or do it or whatever. I've never... That's kind of what I've always experienced"* (Kallie- School B, 2018).In response, Deborah conceded, *"I was going to say, I'm not saying I'm the best at that. But I just know there's some that don't even want to entertain your thoughts on it. Or whether you think that this is the way it should go"*

(Deborah- School B, 2018). Kallie initiates an openness to discussion on their co-teaching relationship and approach, responding, "*Yeah, I see what you're saying"* (Kallie- School B, 2018). Kallie's perception of the lack of parity is something that Kaplan (2012) discusses as a potential challenge; Kaplan recommends setting up the classroom together at the start of the year to build an equitable partnership, something which Kallie and her co-teacher were not able to do due to the timing of their respective hiring processes.

Several of the teachers mentioned how they split up instructional responsibilities equally. However, several of the participants talked about the clear division in the responsibilities the general educators have compared with the special education teachers. Abigail notes this as a characteristic that has naturally arisen within their co-teaching relationship: "*I mean, sometimes she'll jump up and do it and other times. Most of the time I start the lesson, and she comes in. But that part of it was never really defined. It was just the natural occurrence of how it flows"* (Abigail- School A, 2018). Charles had a similar experience within his co-teaching dynamic; *"She does most of the whole group instruction, but then we still have that back and forth a lot"* (Charles- School A, 2018), however, it differs a bit in that he feels as if that dynamic is built in to the expectations of the two job roles of general education teacher versus special education teacher, seeming a bit more intentional. He posits,

> *"I think with the Gen. Ed. teacher, the still primary focus is teaching the grade-level content, and with the Special Ed. teacher, still, one of the primary focuses is making sure that we are giving the correct accommodations to kids according to their IEPs, just to make sure that we're giving every kid what they need"* (Charles- School A, 2018).

Lisa also gives nod to the intentionality of each teacher's role, though hers seems to be more collaborative with her co-teacher, and notes that each co-teacher still considers the needs of every student in their planning:

> *"We're constantly coming up with ways to meet the needs of all the kids in our class and my focus is on those students that have the learning disabilities and who are eligible under a special education category. But Ms. Abigail does consider them when she plans too, and I consider the other students in the class that don't have special needs too. We're really looking at all the needs of our learners and planning accordingly"* (Lisa- School A, 2018).

The special education teachers spoke about their role as a co-teacher and how they face challenges with their duties given that they are not the "main teacher." Charles revealed the challenge he faces with accomplishing his duties as a special education teacher and data collector:

> *"Sometimes the only issue that kind of comes up is the data collection as a special education teacher. As a Sp. Ed. teacher, you have to collect data not only the students' benchmark scores and maybe standardized test scores, but you also have to collect data on their individual IEP goals. Sometimes whatever their IEP goal is doesn't necessarily matchup with what we're doing in class. Considering we're starting a new lesson every week, they might have a goal that only corresponds with one lesson or two lessons within a nine-week grading quarter, so then I have to give them some supplemental stuff"* (Charles- School A, 2018).

Kacey identified similar issues, noting the difficulties of competing objectives within the general education curriculum and the expectations within IEPs:

> *We have to find those skills that they're missing. Those gap skills, and kind of try to shove those in as quickly as we can, while keeping the other stuff going. Because they all have at least one objective or goal that they have to [INAUDIBLE 00:04:32]. And that doesn't always match what we're doing in the classroom. So, we're having to do that anyway, but then there's still many gaps, usually. So, you kind of play that specialist*

> *role, like trying to find... Okay, zone in on what their weakness is and try to support that while keeping them motivated to do class work, homework, grade-level work*. (Kacey- School B, 2018).

Kallie faced similar issues in not being the 'main teacher' and the lack of control that has the potential to bring. She talks about this in the context of classroom structure and management:

> *"You can't have a teacher that says, "Oh, you don't need to take them small group, I'm just going to read it to the class". And I've had that. And I'm like, no, you can't do that. I need to take them out of this environment, into a smaller room, you know..."* (Kallie, School B, 2018).

Theme 2: Perspectives of Co-Teaching: Beneficial and Supportive to Student Learning

Generally, participants had positive attitudes about co-teaching as an instructional model for teaching mathematics. In all of the interviews, each teacher mentioned that the co-teaching model benefitted student learning because it provided students with more support than they would receive in a classroom with just one teacher. Teachers may have differed on how they delivered instruction, how they managed their classrooms, but one consistency amongst all of the participants, was that they all believed the co-teaching model was useful in mathematics, particularly because it allowed for teachers to pull students into smaller groups, and provide more differentiated instruction. Below, I have included a few quotes from each teacher that describes their views on how co-teaching mathematics supports student learning:

> *"We figure out how to work with them* (students who are more than 2 grade levels *below in mathematics). Like now, she pulls a group of the kids that are really behind"* (Abigail-School A, 2018).

> *"We're constantly coming up with ways to meet the needs of all the kids in our class and my focus is on those students that have the learning disabilities and who are eligible under a special education category. But*

Ms. Abigail does consider them when she plans too, and I consider the other students in the class that don't have special needs too. We're really looking at all the needs of our learners and planning accordingly" (Lisa-School A, 2018).

"Okay, what works, we both have free range over the classroom. We don't feel like one person takes charge over the other person, and I think that's beneficial mostly because the kids feel comfortable with both of us, not just the Sp. Ed. students, but the Regular Ed. students as well, feel very comfortable approaching either one of us if they need help and asking questions. And both of us are good to respond. And sometimes it's helpful because I may respond one way and he might respond another way that can, I guess, help explain or help change the answer so that they can understand better" (Karolyn-School A, 2018).

"During small groups, she normal will have a small group where she might be working on the current skill or remediating on whatever the most previous skill was that we did in class. I will primarily work with small groups, usually that have the Sp. Ed. students in it. Sometimes I'll work with the groups that don't have any special ed students in there. But, I primarily work on scaffolding and kind of breaking it down even to a lower level so that some of the special ed students can get the support they need to approach the different standards and skills" (Charles-School A, 2018).

"I think it's very effective for us just because we're able to focus on smaller groups of students to give them that individualized attention. We do. We have done whole
group in the past where it would be the last 25 minutes, and it was more challenging because we were having to get attention. So, like, "Come back and pay attention." We're working up here on the board. We're not two feet from each kid. So, I think it's effective the way it has evolved and it definitely has evolved, and it's gonna continue to evolve just depending on the needs of the kids. In a group… the kids with groups, it's like, "Oh, this kid needs to go to you because they are causing strife here or this kid feels more comfortable in another group" (Karen-School B, 2018).

"I think if you generalize our population as a whole, they learn better in small group and that is 110% true for our Sp. Ed. kids. They don't have the attention to maintain… We break up, I'm taking this group, we're teaching the same topic in a similar style, but in a smaller group. I think that lends itself to the demand of our time-frame that we've got to move, move, move, but still, meets the small group needs of the kids" (Kacey-School B, 2018).

"The model is good for, especially for some of those kids who either are, I call them, they're like right on the cusp. They don't quite qualify for E.I.P. but could use some support. Having a second person in the room and them

> *getting a different perspective or a just different style of teaching or even just having that extra adult in the room. I think is very beneficial for some of those kids"* (Deborah-School B, 2018).

> *"Well, we do rotations, and we do group rotations, almost every day, to reinforce. And so, I do a group, she does a group. And in my particular class, because it has such a high sped population and ESL population, and just terrible behaviors, we were really struggling, so we just recently, in the last week or so, they gave us a parapro. So, now we have three bodies in there. Because those students weren't really succeeding in working independently. So, now we have... So, we each do a small group. So, what we've been doing, probably, since we've gotten that third body, is, she'll teach a concept. I'll teach it out of the ready book, out of the instruction of the other book. She'll teach a concept using something else, kind of a hands-on thing. And then the parapro will do, like, an activity, or a game, or something, with them, reinforcing that concept. And that's worked great"* (Kallie-School B, 2018).

All of the quotes above were spoken during the interviews with each teacher. It was gratifying to hear that 100 percent of the teachers believed that co-teaching mathematics helped their students, particularly through the use of station teaching, which was often referred to as "small group" instruction. Furthermore, during the focus group session, many teachers talked about how they would co-teach again because they loved co-teaching.

School A's teachers in particular all seemed to share an enthusiasm for the co-teaching model, saying things such as:

> *"...I'll do it again. I like it. I enjoy it. I think it's productive. I think it's good for the kids..."* (Abigail- School A, 2018).

> *"I personally asked for the co-taught class for next year. I enjoy the challenge of having those kids, and I love seeing how much they can grow from the beginning of the year to the end of the year..."* (Karolyn-School A, 2018).

> *"...I really do enjoy the co-taught model..."* (Charles- School A, 2018).

> *"I am also going to continue co-teaching next year. I want to do it. I think I really enjoy having two teachers in the room, two teachers to lead small groups..."* (Lisa- School A, 2018).

This sentiment was shared by most of the participants in the focus group session at School B, however, it is important to note that when they were asked if they would co-teach again, Kallie was silent. Perhaps she did not mention anything because of the tension with Deborah.

Theme 3: Ability to Teach Diverse Learners

The teachers talked about their perceived ability to teach diverse learners. Several of the participants talked about how differentiating the student's ability was key to teaching diverse learners. This participant spoke about how he accounts for several issues when thinking about the diversity in learners:

> *"Well, we have to take a lot of things into account, because besides the special ed students in the room, about half of the students in the class are also ESOL. That overlaps with some of the special ed students, making them twice exceptional. We also have students that deal with poverty. We have some students that have to meet with the counselors regularly because they are having some issues. We also have some discipline issues in the room with certain kids' behaviors. We have to monitor how we group certain students, how we do positive reinforcement with certain students, and make acknowledgements of certain students to make sure that they're on task and on focus"* (Charles- School A, 2018).

Another teacher echoed his sentiments but thought that she had difficulty with differentiating students based on their learning ability, stating that she is able to determine this "*most of the time. Not one hundred percent, but most*." (Abigail- School A, 2018). Other teachers believed they were well prepared to teach diverse learner through previous work experience or through their training, circling back to another theme, professional development.

> *"I think I'm able to do it, but I'm used to working with different levels being... I've worked in E.I.P., started E.I.P. I don't know…been with Ms.*

> *First Grade Teacher since first grade is the first year I was in E.I.P. four years, I guess five years, however many years that is. This would be year five, so I'm used to working with different levels of kids and I think that has been beneficial. As an E.I.P. teacher, I got far more professional development than I ever did as a classroom teacher because of the different levels. And I think that some of those trainings should be offered to Regular Ed. teachers or, regular classroom teachers whereas some things they don't allow them to attend"* (Deborah- School B, 2018).

> *"I am confident that I was trained well in my courses and that I've got great hands on experience here now and whether or not it's the big buzzword or not, you know, differentiation is such a big thing in a co-taught classroom, a regular classroom, any classroom. It's important. We're constantly coming up with ways to meet the needs of all the kids in our class and my focus is on those students that have the learning disabilities and who are eligible under a special education category"* (Lisa- School A, 2018).

One teacher spoke about her experience first as a general education teacher who then decided to go into special education shortly after her child with special needs was born. She therefore had professional and personal experiences that lent to her ability to teach diverse learners. Another special education teacher said that she did not feel adequately prepared to teach diverse learners because she felt like the needs of special education students were constantly changing. She describes how she is constantly trying to learn to meet the needs of her students:

> *"I don't think I ever feel like that, no. Because there's always some that don't get it. And you're always constantly going to other teachers, or going to books, or going to whatever you can find, whatever resource you can find, and say, you know, how can I teach this topic? Or, why isn't this student getting it? Or, this is what's going on in my class, and I just can't seem to get them to understand this. Or, even, should there be some other accommodation, like the multiplication table, to get them over the hump, so that they don't continue to get left behind"* (Kallie- School B).

This perhaps speaks to how professional development opportunities, or lack thereof, is inextricable from the perceived ability to teach diverse learners.

Theme 4: Professional Development in Co-Teaching Mathematics

As also identified in theme 3 due to the related nature of the themes, during some interviews, several participants mentioned that they believed professional development was critical to being an effective co-teacher. Some professional development opportunities that participants had included "*a workshop and it was those ladies from California that came. It was really an ESOL thing and how that works together" (Abigail- School A),* as well as "*professional developments, say with arts now, with fine art activities that can relate to math"* (Charles- School B, 2018).

In many instances, teachers did not receive any professional development in this area, and for some that did, they discussed that the professional development they received was not relevant or inadequate. Charles noted that he had not had the opportunity to attend anything like this, and in particular, not with his co-teacher: "*"Her and I have not been sent any professional developments that are specifically geared toward co-teaching and working with two teachers in the room at once, or multiple teachers"* (Charles- School B, 2018).

Deborah, who previously identified that professional development had been related to her feeling of ability to teach diverse learners, highlighted this concern, particularly in the context of how the administration was requiring they use their time:

> *"I don't know if we've had enough relevant professional development this year. From the things that we have received in terms of professional development, I think that time could have been better used with other things. Like things that really are necessary"* (Deborah-School B, 2018).

Co-teachers thought that professional development specifically about co-teaching or about teaching special needs students would be most suitable for them. Some participants believed that professional development is essential to sustaining co-teaching because it

could enhance their abilities to teach students with diverse learning needs. Participants have stated they believe that professional development opportunities would

> "*Improve my ability to co-teach students with special needs. I think it would be beneficial if we could go to a professional development that focused on a co-teaching model rather than just certain activities from the other ones that we normally go to. It might also be more beneficial if the curriculum that the district used had more suggestions for small group activities for these priority standards where students might be performing a grade level below"* (Charles-School B, 2018).

Charles' focus on small group activities and methodology as potential content for professional development is echoed in Karolyn's statement,

> *"I think I personally could stand to do more research. I struggle with breaking it down, breaking the content down to their understanding sometimes. I think I take for granted the fact that what I feel like comes naturally doesn't come natural to some of the co-taught children. That they really have to have everything presented in chunks, small chunks"* (Karolyn-School A, 2018).

Others maintain that not only should they be given professional development opportunities in terms of co-teaching, but they should be doing them with their co-teacher: *"Professional development, if we both go to the same one, it can be helpful, but we haven't been sent to one that is specifically geared toward co-teaching" (Charles- School B).* Participants thought that professional development could potentially help the co-teaching dynamic. It can create a sense of common purpose and extend the creativity and skills of both educators. Kacey elaborates more about the importance of professional development in co-teaching*:*

> *"If you're paired with the wrong person, it can make your teaching life miserable… I think if we had PD and we had a way to communicate that, and we respected that relationship, then some of that would hopefully go away. I agree that PD is important – an in-depth PD, not a glazed over"* (Kacey-School B, 2018).

Some people viewed the professional learning communities (PLCs) as personal development or a replacement for professional development. PLCs are grade-level or department meetings. Their purpose is to gather data that teachers may use to inform their instruction. After analyzing student data and identifying strengths and weaknesses, teachers collectively create action plans to remediate and extend learning.

> *"With the new PLC teams that we have together, I think it is very important that we meet to discuss what's working well and what isn't working well. As far as classes that we've taken together, we haven't taken any outside the school educational classes on the co-teaching model. But our professional development as far as looking at the kid's data together, we do all that"* (Karolyn-School A, 2018).

> *"You know, we don't really do professional development, we just do it... PLC. Yeah. So, I don't... I don't really understand how we do professional... I feel like professional development went away when we went to PLC"* (Kallie-School B, 2018).

Though these participants did clearly view PLC as a replacement to professional development, it is unclear if Kallie viewed it as equal to it, or filling the gap, as much as Karolyn seemed to.

Research Question 2: How is co-teaching perceived by teachers as an instructional model for teaching mathematics?

Theme 1: Provide Opportunities for Students with Special Needs to Express Themselves in Different Ways

During both focus group sessions, the participants spoke about the benefits of having two teachers in a math class. In addition to catering to the needs of those who are struggling and those who need a challenge as noted above, the interviewees described how co-teaching mathematics provide students with alternative ways of solving problems. In a

co-taught setting, students have the benefit of seeing mathematics taught from the perspectives of two different teachers. Even if the mathematical content is the same, teachers may differ in their styles and delivery methods. This gives students the opportunity to decide which best suites their styles and gravitate toward their preferred methods of learning or strategies to implement. During her interview, Karen mentioned that this reality is more prevalent in math than in other subject areas, such as reading:

> *"Well, I think in most math concepts, there's more than one way to do it or to explain it or to understand it. So, with co-teaching, you automatically have two people that can give two totally different perspectives or examples or way of doing something. I think co-teaching in math really lends itself to your personal experiences more so than any other subject. I mean, a verb is a verb is a verb however those teachers explain it. But in math, it can be two completely different processes to get to the same answer"* (Karen-School B, 2018).

Co-teaching also means that students have options of different personalities to connect with:

> *"One co-teacher might have more of a connection with a kid that they actually can reach them better. Because you really have to know them before you can teach them anyway. So, you might already have a connection with this kid so it lends itself to doing whenever you're working in those groups. So, I think yes"* (Deborah-School B, 2018).

In addition, co-teaching in mathematics was touted as an approach which provides the opportunity for special needs students to expand their abilities in a different way than might happen in a strictly resource class:

> *"I also like the fact that being a Sp. Ed. teacher and a Sp. Ed. mom, it allows these kids access to the General Education, especially when… I know some of them are a year behind and we're toeing that line, but the difference between resource Math and co-taught Math is so different! Unfortunately, what we see is that most times when kids go to resource Math, they never come back into the Gen. Ed. classroom, ever, either in a co-taught setting or to Gen. Ed. It gives those kids who are on the borderline that chance to continue to learn and hopefully, with support*

> *and as they mature and grow, to be able to go to college because you're not going to go to college if you're in resource Math"* (Kacey-School B, 2018).

Theme 2: Challenges of Co-Teaching Mathematics (time management, student placement, large class sizes)

Despite the effectiveness and benefit of co-teaching mathematics, the participants encountered several challenges, including the issues of placement of students, lack of time, and class sizes that are too large.

Several teachers mentioned the issue of appropriately identifying students for co-taught services. They deemed this as a concern because when students are misidentified, it is a struggle to get those students to meet the standards for the grade level, especially those who are more than two grade levels below their peers. The following quotes describe the challenge co-teachers have with misplaced students:

> *"Well, I think if you're gonna have children in here for Sp. Ed. they need to be true co-taught kids, like one year behind. Not two and three years behind, and not have good numbers since that is ineffective. That is a struggle…Your instruction changes dramatically, and you can't go as quickly or whatever when you have a child or children who are two and three grade levels below where you are. Your group time is eaten up, and before you know it, you look up and it's like "Oh. It's time to go to specials. I didn't see these two groups"* (Abigail-School B, 2018).

Deborah describes the struggle of trying to teach students who are not yet at the level they are required to teach them, citing this as a reason that "*those 15, quite a few of them are failing."* She calls for a more level-appropriate approach, stating, *"You know, I don't understand why resource math can't either differentiate or can this middle group not do, Do the Math and do something else on their level versus having them be exposed to*

fourth grade standards that they can't do." She took action with her administration hoping to change this, because she feels it would help the learning outcomes of the students:

> *"That was the reason I had the meeting with Ms. Assistant Principal because I was just like, "I see them trying. Not all of them. Some of them are at the point where they already know they're behind and they don't care anymore. You know, when you get to fourth grade, you kind of realize that everybody's above me and they stopped caring. So you're saying I can't modify the work, but how do you get there, if the ones who are really trying, if they're trying and they still have a 57 average, what do you do with that kid? Because eventually they're going to stop trying"* (Deborah-School B, 2018).

The misplacement of students into co-taught classes remains a huge challenge for both students and teachers alike.

Kacey mentioned that not only are students misplaced intellectually, but that additionally, students who have behavior issues are often placed into co-taught classrooms as a solution to their behavior issue. This then impacts the teacher's ability to provide mathematics instruction because now they are trying to teach students who are below grade while simultaneously managing disruptive behaviors.

> *"And that's what we're seeing more and more on the Sp. Ed. side, I would say. Is that kids are placed in a co-taught setting more because of not the intellectual inability to do something, rather because of behaviors repeating. And so, that's a frustration on our end. Because, I mean, we have a student in our class that it's... He has the ability. I mean, he's got one of the highest i-Ready scores ever. But nope, he just got a 59. Because he will not do. And it doesn't matter, he has no will. And that to me, that's something I can't teach in a year"* (Kacey-School B, 2018).

Deborah and several other brought up the issue of time. Some teachers believe that they do not have enough time to support the needs of co-taught students. The challenge is trying to close the gaps for the students with disabilities while trying to also help the

general education students understand the skills and concepts they need to master grade level standards.

> *"Well, one of my struggles is the other two fourth grade math classes. They're going to be ahead anyway because they're a different population of kids, but they also have 30 minutes longer in math than I have in math…They have two hours for math, and I have 90 minutes"* (Deborah-School B, 2018).

Some participants felt like they did not have enough time to dedicate to their special education students because most of the class time was focused on grade level standards. These Special Education teachers felt very strongly about this because they feel most responsible for the Special Education students on their roster. They know that those students need more individualized instruction than their general education peers, but often times, there is not enough time in the day to teach them grade level standards, and target pre-requisite skills to bridge those learning gaps.

> *"Every now and then I feel like I don't get as much time as I would like to pull small groups that target some of the lower skills because there is such the push to, you know, with the time crunch you get as much of the grade level standards for the most stands and that sort of thing. So, I do sometimes feel like I don't get the pull for some of those lower skills and skills that pertain to their IEP goals. I don't always get to do groups that target those as much as I would like to"* (Lisa- School A, 2018).

Karolyn relates how the lack of time affects not only the students and their ability to succeed, but also the morale of the teachers, because it can seem an impossible task:

> *"Can I say something like the pressure for your students to perform on level? I feel like a lot of times because the kids are so significantly behind the other Gen. Ed. children, that we feel the extra pressure to push the Sp. Ed. kids forward and sometimes defeated because there's only so many hours in a day and there's only so much you can do in the timeframe that they're with you"* (Karolyn-School A, 2018).

Another challenge that co-teachers were facing was the large class sizes. Deborah said that she had 27 students in her class, 15 of those students have IEPs, and several out of the 15 were students with behavior issues. She and Kallie were struggling with teaching the standards while trying to manage classroom behavior. Karolyn talked about a similar struggle with limited space given the number of students, co-teachers, and other support staff that come into the classroom to address student needs. These fourth-grade mathematics teachers felt additional barriers because of larger class sizes and limited space. Deborah and Kallie were ultimately able to get a parapro to assist them with behavior management in their class, however, issues arise when the parapro frequently leaves the room to make additional copies of assignments or to enlarge a copy of an assignment to adhere to the accommodations on a student's IEP.

> *"It's really not the best situation when you have that many in one room. There's too many in this room to really truly meet the needs of every other kid. So those kids who are motivated already to do good. You could push those kids higher if you didn't have so many other needs in the room. So that is one of my worries. I don't really feel like they're getting what they need from me because it's too many other ones that actually need 100 percent of me and I don't have 100 percent to give 'em"* (Deborah- School B, 2018).

Referring to classrooms that have co-teachers and a parapro in them, Karolyn states,

> *"I think that can be beneficial for the EIP teacher that comes into my classroom, because she also works with those same kids in reading. So, that part is beneficial. However, I think it's a disservice sometimes to have three teachers in the room, because our rooms are small, and our school is full, and there's not an adequate place for the teachers to pull their small groups and work with them. So, sometimes, it can seem a little chaotic when all three of us are trying to lead a small group on something different, and we're all trying to talk over each other. And just that: the space and not having a place for the EIP teacher or the co-taught teacher to pull a small group to work"* (Karolyn- School A, 2018).

Karolyn describes how she has to attempt to circumvent the lack of space:

> *"Well, I try to be accommodating, so I work in the hallway normally with my group, and Charles will take his group up front to the board, and then my EIP teacher has the back table, and then I normally have a group on the computers"* (Karolyn- School A, 2018).

Theme 3: Addressing Behavior/Classroom Management

Some teachers mentioned that co-teaching provides an effective way to teaching math because the structure allows one to manage behavior issues more effectively than if there were one teacher. This decreases the likelihood of a disruptive learning environment and increases students and teachers' time on task.

Deborah and Kallie described the different levels at which their students were, and how that related back to the behavioral issues. "*We had kids who were totally getting it, but they were also still behavior problems."* (Deborah- School B, 2018). "*And that class had gotten so just out of control in terms of being behind, developing more and more issues"* (Kallie-School B, 2018).

Both Deborah and Kallie stated about co-teaching, "It's a lot more manageable" (Deborah & Kallie-School B, 2018). They were the classroom that also added a parapro, which they touted as even more beneficial to the behavioral issues they had faced; "*You could tell, honestly, after one week of adding the para. We initially might have had kids getting zeros on weekly assessments. I was celebrating the fact that the lowest grade we got was a 30.* (Deborah-School B, 2018). Karen added another potential benefit of both co-teaching and having a parapro. in the classroom; *"I think it's good for them to get used to a different personality, too. Just the presence of another adult. Some of them just need that extra, just that social support.* (Karen-School B, 2018).

Teachers also stated co-teaching mathematics is a model that provides additional support to teachers who may not be able to manage the number of students in the class or

manage the behaviors of some students. Having the extra responsibility of addressing special needs accommodations may be overwhelming for some, and a co-teacher can help alleviate some of that feeling by dividing responsibilities:

> *"Well, obviously, it gives additional support to the students that need it. And it allows somebody... Because the teacher can't teach all 28 students, and then worry about those that have special accommodations, or those that have a difficult time understanding whatever their disability is, you know? I think somebody else has to be able to do that. And I think it's wonderful to be able to have a certified teacher that can devote their time and energy to servicing, or serving those students. I mean, without it, they would just get lost in the shuffle"* (Kallie-School B, 2018).

Theme 4: Planning and Sharing Ideas

During the interviews, some teachers spoke about how they planned for mathematics instruction. Typically, the general education teacher planned the lessons and the special education teacher was either given the lesson plans with or without the opportunity for input. In some instances, the special education was not made privy to the plans until he or she arrived in the classroom.

> *"Sometimes I don't get lesson plans at all for Math. Generally, I get them, if I'm going to get them, I'll get them maybe Tuesday of that week. Like, so, there's not really an opportunity for me to say, this is where I'm going to insert myself. I kind of show up, and go, okay, this is it, we're in it, you know, and then... I know. That's how it happens. We joke because... Well, not we, but like, some of the Special Ed. teachers joke, because I get my... And I can show you. I get lesson plans for my other class at 10pm on Sunday night. And I used to, like, wait for them to come, and start doing an upload. Now, nobody seems to care whether I get lesson plans or not. I don't even complain anymore. I don't even have that anxiety about not having them anymore. Because what am I supposed to do?"* (Kallie-School B, 2018).

Kallie was very displeased about how planning took place between she and her co-teacher, Deborah. Planning seemed to be informal because many of the co-teachers discussed plans

impromptu. Most teachers stated they collaboratively planned "informally," "in passing," or not at all. Abigail describes how this style of planning as well:

> *"This afternoon we stood up at my desk and we looked and we said, 'Well, this is what we need to do for tomorrow.' And we talked through how we would do it. And she says, 'I will do this hands-on activity.' And I say, 'Well, I'm gonna work on Milestone stuff.' I'll catch you later'* (Abigail-School A, 2018).

Kallie describes a bit more organization in her and her co-teacher's approach, though she notes that there is a lack of long-term planning:

> *"Well, we do it... I think we get it in once a week. But it's hard. It's hard. It's kind of... Sometimes it's in passing. Sometimes it's when, at the beginning of class, when they're transitioning. And it's kind of like, okay, this is what we're going to cover, look at these groups, do you think this makes sense? We don't get a lot of the sit-down and think, big picture"* (Kallie- School B, 2018).

Lisa's description of her and her co-teacher's planning approach is very similar in that it is quite informal and inconsistent, however, she does not identify it as an issue because she asserts that the book essentially does the planning for them, leaving less to discuss:

> *"Because we don't sit down and discuss every single page, every single lesson, because we know the flow of the book, we know the pacing of each day you do about two pages, you break into small groups and do the remediation groups or the hands-on, according to those pages. And so, we're on track with each other, and so we can go separately into the book on those two pages"* (Lisa-School A, 2018).

That being said, special education teachers tended to be excluded from the planning process. They made separate plans that modified grade level activities to make the standards accessible to the special education students.

> *"We do not share the same lesson plan template, but we do have a common planning. We try to sit down together and talk about what we're going to do for the week as a whole. And then sometimes even in the middle, especially the co-taught class, if we see that the kids are just struggling, we will meet again to revise what needs to be done to help them really understand all the material that they need"* (Karolyn- School A, 2018).

One special education teacher, however, mentioned that she makes an extra effort to stay in the planning loop, an approach which may help circumvent the issues identified by other special education teachers.

> *"We both, pretty much, write up our own separate plans but keeping on the same page with each other, so it's not that that's being split really. ..So, the collaboration piece, I stay with the team for planning, weekly planning, because I think sometimes that the Special Ed. teacher could get excluded from a lot of that. And so, I make sure to stay when they plan, and specifically for math, I know some of the teachers on the grade level are at different places. So, myself and the co-teacher, we talk to each other, we both are good at making sure we're staying on pace with the curriculum that we've been given. And we don't necessarily say, "Today we're doing pages 21 and 22," because we're both on top of what's been done and where we're headed, if that makes sense. We don't sit down for the week and say, "These days we're doing these pages," because we've got the flow of how the structure of the math goes"* (Lisa- School A, 2018).

Some co-teachers did have formal planning activities, but it seems like it was inconsistent, or it was a practice they say was started but was not maintained. The following quote illustrates this situation.

> *"During the year, we used to plan a separate time during the week. But as you know, with meeting, it gets hard to. But, we would plan one day during the week that her and I, and the other fourth grade teachers that teach math and the other support staff teachers that teach math, we would all get together and collaborate on what was the priority standard, how did it relate to the resources and lessons we had, and what small group activities we would do. Now, primarily, we just plan maybe during our PLC time, also, collaborating on what strategies work and what*

> *don't work, or what time we get before or after school"* (Charles- School A, 2018).

Some of the participants thought they could do a better job at co-planning. For instance, Kacey admitted that they typically plan over text and email, and she acknowledged that other methods of planning may be more beneficial.

> *"That's part of the time. A lot of it is done over text messages, emails – "Hey, this is what we're going to do," – and I think, unfortunately… Could we do a better job of that? Of course. Honestly, if I could change one thing, that would be the first thing to change. If I could change one thing, that would be the thing that I would change. I would have the time built into my schedule where it was one of their plannings"* (Kacey-School B, 2018).

Several of the co-teachers mentioned sharing plans with other co-teachers or teachers that teach the grade level subject.

> *"The way our grade level works. We divide and conquer. So, a certain section of people plans the Math curriculum for the week and then I take the Math curriculum, and I apply it to make it fit my class, our class. And, I send it, I share it, and then we decide if there's things that we want to add or limit or tweak, we kinda tweak together. We tweak on the fly"* (Karen-School B, 2018).

> *"The way third grade does it is they meet altogether, they do the same thing and we just kind of change it up based on what we need. There is another co-taught classroom in that grade level as well and so, we also share planning with them, too. Sometimes, the other teachers already made something and I'm like, "Oh, I like that! Can I steal that?" Sometimes, I'll make something and send it to her Saturday afternoon or Sunday morning and she's like, "Oh, I'm going to steal that!" We just kind of steal each other's things. That's a lot like Gen. Ed. "Oh, I like that! Oh, that works!" – a lot of trial and error"* (Kacey-School B, 2018).

Scheduling planning time was a major challenge for the co-teachers given that they may be teaching multiple classes with other teachers or juggling personal responsibilities. Several studies have identified this as one of the biggest challenges of co-teaching, as outlined in

the literature (Austin, 2001; Dieker & Murawski, 2003; Friend, 2007; Friend, 2013; Friend, Cook, Hurley-Chamberlin, & Shamberger, 2013; Kloo & Zigmond, 2008; Pugach & Winn, 2011). Karen noted, *"So, just… I don't know, maybe more planning time together because that planning time is only limited by our schedules" (Karen-School B),* a sentiment which was echoed by Kallie and Kacey. Kallie attributed this issue to the consistent switching that happened for her class at the beginning of the year:

> *"The problem is, we don't always have time to plan together. So, I have a planning time. I plan with Ms. Reading Teacher for Reading/Language Arts, and then, I obviously plan for my class, my Resource class that I teach, and I don't always get a chance to plan for Math. Math kind of got pushed to the back, I think mainly because we had so many transitions. So, we never got, in the beginning, established a planning time"* (Kallie-School B, 2018).

Kacey discusses the issues of juggling multiple classes as well as her own family life:

> *Scheduling is hard, especially with two, because both of the teams work with meet on Monday afternoons. Well, Monday afternoons also happen to be the day that my daughter has therapy, so it's like I'm pulled in three different directions. It's what happens for this year. It's annoying, it's frustrating, but I think we do a lot of solo planning"* (Kacey-School B, 2018).

She goes on to suggest a way around this issue of scheduling that many of the teachers brought up:

> *"I would say we do solo planning and we come together or we divvy it up like, 'You're going to do this, I'm going to do this. I'll be in charge of this group, you'll be in charge of this group,' and we just own it"* (Kacey-School B, 2018).

Despite all the challenges of lesson planning together, research asserts that this is essential to the success of co-teaching (Idol, 2006; Rice, Drame, Owens, & Frattura, 2007; Sileo, 2011; Tannock, 2009).

Theme 5: The Adverse Effects of Pull-Out Programs

During the focus group session with the teachers from School B, Karen and Deborah brought up the issue of dealing with other support staff pulling students out of the classroom. When students are pulled out of the classroom, their learning is disrupted and the amount of time students have with their core math teachers is infringed upon. It seemed that teachers whose co-taught mathematics classes were impacted by pull-out programs viewed it more as a burden than an added benefit to their mathematics instruction. Their discussions are accounted here:

> *"We did have an EIP pull-out during that segment, so there were 4 or 5 kids that would leave. And we had to structure our groups around this group leaving because the way we had it at the beginning, they would leave right when they got to us. And that was whole group, that was the instruction for the day. And we can't do that because these are almost my lowest strugglers and they're missing it. So, we had to flip-flop our groups where the higher kids we'd see first then we would come and we'd basically be reteaching, teaching the lesson twice. Both of us teaching the lesson twice. But we could teach it on a different level, depending on the students that were at our table at the time. We could take them a little farther; we could add some enrichment to it. So, it was a good... It added some good flexibility"* (Karen- School B, 2018).

Karen noted some difficulties of the pull-out program, such as first, having to deal with the students that were struggling missing entire lessons, and second, having to reteach things. However, the way she ended up structuring it with her co-teacher ended with some positives, such as flexibility, or being able to cater more to specific group's needs. In comparison, Deborah discussed similar issues of disruption, without providing a redemptive positive:

> *"We did have two EIP that time and I couldn't understand why they were not getting it. "Oh, wait a minute; I have to change my groups." I didn't realize, I guess because they weren't with me when it was that time, didn't*

> *realize that I was not having them. Or they would miss them...the co-teacher. It just totally... Yeah. And so, just with two being pulled out was enough to throw things off a bit. Because before Christmas, our EIP teacher pushed in and after just kind of a suggestion, maybe agree, "Yeah, this is a bit much, so I will probably pull out," but did not pull out. It's just like, "Okay, when we come back from Christmas you're gonna have to pull them out." Because she brought behavior problems with her to the room. And that was a nightmare"* (Deborah-School B, 2018).

Based on this, pull-out programs are not perceived as a helpful approach to co-teaching mathematics, even if co-teaching, in general, is positively perceived as instructional model for teaching mathematics.

Research Question 3: Which co-teaching models are used in third and fourth grade mathematics classrooms?

Theme 1: One-Teach One-Assist was the Most Commonly Used Approach at School A

Across all the participants, four of the six co-teaching models were mentioned or described during their interviews: one-teach one-assist, team teaching, parallel teaching, and station teaching. The two models not mentioned nor described was alternative teaching and one-teach, one-observe. The participants seemed to use a variety of models for each lesson or throughout the academic year. When asked which model they used the most often, the participants often stated or describe more than one co-teaching model. For instance, Karolyn replied, *"A lot of times it's either parallel teaching or I teach, and he assists."* The choice of model was based on the objective the teachers were trying to achieve.

Based on my observations, one-teach, one-assist was the model most often used at School A. The third-grade co-taught classroom used this method interchangeably with team

teaching, while the fourth-grade classroom started its mathematics lesson using the one-teach one-assist model, but during the latter part of the lesson, the teachers utilized the station teaching method.

It is important to note that while one-teach, one-assist was the most frequently used method at School A, it was not the method used the most often in both classes. To clarify, in Abigail and Lisa's room, the teachers utilized this method approximately 50-60 minutes out of their 90-minute math block, with both teachers taking turns leading the whole group discussion. In Charles and Karolyn's room, the one-teach one- assist approach was used, on average, the first 25-30 minutes of instruction, and the remaining 60 minutes or so was dedicated to station-teaching with two teacher stations and a group of students on the computers. So out of the 180 minutes shared between the two classes at School A, approximately 90 minutes was used to deliver instruction using the one-teach one-assist method.

Theme 2: Station Teaching was the Most Commonly Used Approach at School B

At School B, most participants used the station teaching model, almost the entire mathematics period. During their interviews, most teachers mentioned they used station teaching often, but they referred to it as "small group." The participants mentioned they preferred station teaching over a whole group model, such as one-teach one-assists, or one-teach one-observe because the students are more likely to stay engaged when working closely with a teacher. In evidence of this, I have noted some of the teachers' remarks from School B regarding their use of small-group instruction:

> *"So, we do mostly small groups. We will do a little bit of whole group towards the end of our 90 minutes just because we teach our i-Ready Instruction Book, our workbook, our enrichment, our whatever remediation, and then we send them off with seatwork. And so, the way that*

> *works is, it's just… our kids that need enrichment, they get a lot of one-on-one time"* (Karen-School B, 2018).

> *"That small group naturally becomes one that we use a lot – the station teaching – and also, parallel teaching which is like small group, but obviously, we are teaching the same thing. We break up, I'm taking this group, we're teaching the same topic in a similar style, but in a smaller group. I think that lends itself to the demand of our time-frame that we've got to move, move, move, but still, meets the small group needs of the kids"* (Kacey-School B, 2018).

> *"Sometimes she would begin the lesson teaching whole group or I would and one of us is monitoring and making sure that they're on task and doing what we need them to do. And then if we did split off into small groups it worked really well"* (Deborah-School B, 2018).

At least one teacher from each co-teaching pair discussed a different method that was used during their mathematics class time, but while observing their classes, I only observed them delivering instruction using the station teaching model. It is possible that Deborah and Kallie delivered their whole group instruction within the first few minutes of their mathematics class time, as my observations began approximately 10 minutes after their math class started. I observed Karen lead a small group discussion during the last five minutes of class, but it was not related to their mathematics lesson for that day, it was a wrap up to an activity the students were doing during their homeroom class time.

In an article that relayed information about the power of co-teaching, Mozinga (2017) writes, "Station teaching inevitably increases instructional intensity because students are working in small groups and teachers are closely engaged with them" (p.2). This speaks to the usefulness of engaging both teachers as active participants in the teaching process, and breaking students into smaller groups. The following are quotes that exemplify why the participants thought that small group instruction, such as parallel teaching was an effective model for co-teaching mathematics:

> *"Yeah. And I think another big thing is, you've got the opportunity to provide the hands-on*
> *using a lot of the manipulatives in the small groups, and making sure that you have those concrete representations, and you can really differentiate in that way, too"* (Lisa-School A, 2018).

> *"If a student didn't do well on this lesson, whereas I might have done the mini-lesson introduction, and I'm going to continue with that lesson. When in a small group, you can make sure they're getting it, whereas the co-teacher might be going back to review the previous day's lesson while the other is doing remediation"* (Deborah-School B, 2018).

Kacey was the only teacher to speak about the effectiveness of station teaching. She also mentions one of its drawbacks:

> *"My go-to, and I just don't know if this comes from being a first-grade teacher for so long, is I love the station teaching. I think that it engages our kids, it allows them to really hone in on what they need and ask questions. They seem to be more free to ask questions when they're in a smaller group. And I know timewise it's not the most effective to get through a lesson, but I think if we're focused on really the nuts and bolts in getting them to learn, that's my go-to. And I think it's... It does take some planning, it's not easy, but I love it"* (Kacey-School B, 2018).

Most teachers used station teaching at some point during their math class time, but not many of them articulated why they used it or its effectiveness.

Theme 3: Lack of Clarity Between Teaching Techniques and Co-Teaching Approaches

With the exception of a few, most teachers did not seem familiar with the proper names and descriptions of the co-teaching approaches. After interviewing, the teachers and observing them in their classrooms, they were using different methods of co-teaching, but the ways in which they described their delivery of instruction made it apparent that the names of the co-teaching methods, descriptions, and in some cases, the benefits of each

model was unknown. For example, when describing an example of team teaching, Karolyn stated, *"When you parallel teach, for example, if we're working a problem on the board maybe on one side he's drawing a number line to show a model and then on the other side with the whiteboard I may be solving it a different way. Just to show that there's multiple ways to solve a problem"* (School A, 2018). Additionally, when describing station teaching, Abigail stated, *"I would day the parallel. Cause it just works. I mean we didn't sit down and say 'we're gonna parallel teach.' It just sort of evolved. Like this afternoon we stood up at my desk and we looked and we said, 'Well, this is what we need to do for tomorrow.' And we talked through how we would do it. And she says, 'I will do this hands-on activity.' And I say, 'Well, I'm gonna work on Milestone stuff.' I'll catch you later"* (School A, 2018).

While some teachers attempted to name the methods they used during mathematics instruction, others just placed the different methods under one of two umbrellas: whole group or small group instruction:

> *"And there was no independent, so... Anytime it came for any type of...you did a weekly grade on something, it had to be they did it whole group before we split up to the small groups or we just didn't do a small group that day"* (Deborah-School B, 2018).

> *"It kept putting them farther and further behind and they were not able to handle whole group. They were not... Whole group was just a waste of breath. So, if you weren't able to manage small enough small groups…"* (Kallie-School B, 2018).

> *"During small groups, she normal will have a small group where she might be working on the current skill or remediating on whatever the most previous skill was that we did in class. I will primarily work with small groups, usually that have the Sp. Ed. students in it"* (Charles-School A, 2018).

Some teachers were familiar with some of the methods and was able to properly name and describe how it was used in their co-taught mathematics classrooms:

> *"We do station teaching because I have two Sp. Ed. groups that we run and then I have two EIP groups that we run. There's also an EIP teacher in here at that time"* (Karolyn-School A, 2018).

> *"That small group naturally becomes one that we use a lot – the station teaching – and also, parallel teaching which is like small group, but obviously, we are teaching the same thing. We break up, I'm taking this group, we're teaching the same topic in a similar style, but in a smaller group. I think that lends itself to the demand of our time-frame that we've got to move, move, move, but still, meets the small group needs of the kids"* (Kacey-School B, 2018).

> *"A lot of times it's either parallel teaching or I teach, and he assists. For example, if we're doing a math problem on the board, he is walking around, especially with his students, to make sure that they have set up their problem correctly. To look for simple mistakes that maybe he could catch early on whenever they're working on a problem. To help them get back on track"* (Karolyn-School A, 2018).

> *"With us, we did…we pretty much had a routine where our whole group would be pretty well into the team teaching. We were both up there… And we were both speaking, bouncing off each other, and then, it got into the station teaching, where we had our rotations, we each led a group, and the kids moved through"* (Lisa-School A, 2018).

Most participants did not elaborate on what the pros and cons were of each model, but the overall consensus was when co-teaching mathematics, engaging students in smaller group settings was the instruction delivery method most frequently mentioned throughout the interviews and focus group sessions.

Theme 4: Whole Group Instruction: Pros and Cons

Often, the participants mentioned using either whole group or small group instruction rather than one of the six co-teaching models during mathematics instruction. Whole group instruction was used by all the co-teaching partnerships except for Karen and

Kacey. While observing the four classes, I came to realize that teachers were referring to one of two methods when they mentioned 'whole group:' one-teach one-assist and team teaching. Teachers rarely referred to these co-teaching approaches by name, but they may have described them or displayed them during their mathematics instruction. I observed the teachers at School A using these methods, but all teachers stated they used whole group teaching at some point in their instruction. During the interviews, some of the participants explained how they perceived the effectiveness of whole group instruction for co-taught mathematics. During the focus group session, Karolyn mentioned a reason why whole group instruction is effective for co-teaching mathematics. Her reasoning is…

> *"I think the whole group instruction is a big part of both teachers, that both teachers are…during whole group instruction, are finding a way to demonstrate the content, so that all the kids understand what's going on"* (Karolyn-School A, 2018).

Several teachers discussed the drawbacks of whole group instruction for co-taught mathematics. Some teachers believe that students are not engaged and struggle with focusing on the teacher or teachers leading the lesson. While some teachers opposed whole group instruction, no one was as adamant about their opposition as Kallie, who problematized what she perceives as a tendency to value one type of co-teaching over another:

> *"As a Sp. Ed. teacher, you start to think, I could care less about teaching a whole group lesson, because my ten are not getting it. I got to focus on this. And then, on top of that, I got to collect data on stuff that we're not even doing, so that's additional work I got to figure out how to get to them. And I know, there are many models of co-teaching. And I know, when they come in and do an observation, I've learned here that they're hung up on, they want to see the co-teacher actually teaching whole group. Like, I could care... I feel like, one teacher in front of the whole class, like when one of my... On one of my observations, it was the one that I knew they were coming in for. And my teacher, this was in Math.*

> *But one of my teachers was like, "Okay, so you're getting your observation. You do this and this, and let's sit down and figure out what you're going to do." And so, it was very out of character, because I hadn't addressed the whole class in that manner during this year. But that's what I guess they wanted to see. I mean, I got a good review, but it wasn't what I do on a day-to-day basis. And there was nobody back there making sure that my ten got it. But I felt like I was putting on a show for my observation, I got a good observation in the end. And I think that that's only one model of co-teaching. And I don't feel like there's much respect for anything else"* (Kallie-School B, 2018).

Karen identified the issues of maintaining group focus in whole group instruction, discussing instances when "*We have done whole group in the past where it would be the last 25 minutes, and it was more challenging because we were having to get attention"* (Karen- School B, 2018). Deborah notes that in whole group instruction, her students have been less likely to understand the material as opposed to other teaching methods, and therefore tries to keep it to shorter time periods, stating, "*Nothing I teach whole group, they don't understand, it's a complete waste of time…If I do, it's no more than 15 or 20 minutes because they can't handle any more than that"* (Deborah-School B, 2018). Deborah mentions doing whole group instruction, but it is clear that she believes it is an ineffective method. However, because she does do some whole group instruction, her co-teacher Kallie seems to think that Deborah believed whole group instruction is effective, stating in her interview that "*With every teacher I've co-taught with in Math, that has been the thing, in that they want to teach whole group, they don't understand that it has to be small group. With certain kids, it has to be small group."* Kallie asserts the same argument outlined above, that *"They're just not... They're not able to pay attention, and it's not necessarily just because they choose to be defiant. They just really can't pay attention."* Her frustration with the main teacher emerges in regards to situations where they have not decided to forego whole group instruction after seeing its ineffectiveness, stating "*And so then, that*

makes you feel like, why isn't this teacher getting it? You know? And then I'm sure that teacher's saying... I mean, and I think, that, too, has to do with that teacher being confident in her co-teacher. So, with me being new, her being new, she doesn't know me, and whether or not I have the ability to teach that subject" (Kallie-School B, 2018).

During the focus group session, Kallie and Deborah both mention the drawbacks of whole group instruction, but Kallie does not seem to realize they agree on this. This may be because, although Deborah is does not seem to be sold on the idea of delivering instruction during whole group, she still uses this method of teaching on a regular basis. *"Whole group was just a waste of breath. So, if you weren't able to manage small enough small groups…"* (Kallie-School B, 2018)*; "Absolutely"* (Deborah-School B, 2018).

Theme 5: Small Group Instruction: Pros and Cons

As with the umbrella term 'whole group instruction,' teachers did the same with the phrase 'small group instruction.' As a result of teachers being unfamiliar with the specific names of the co-teaching approaches, they referred to station teaching as small group instruction. Several of the participants provided explanations for why they felt that small group instruction was either effective or ineffective. Most of them thought that small group instruction was effective for mathematics because it remedied the attention and comprehension issues associated with whole group instruction:

> *"I will primarily work with small groups, usually that have the Sp. Ed. students in it. Sometimes I'll work with the groups that don't have any special ed students in there. But, I primarily work on scaffolding and kind of breaking it down even to a lower level so that some of the special ed students can get the support they need to approach the different standards and skills"* (Charles- School A, 2018).

They also believed that small group instruction allowed the co-teachers to deliver more individualized instruction and provided a more efficient use of teacher and

student time; *"I think it's very effective for us just because we're able to focus on smaller groups of students to give them that individualized attention"* (Karen-School B, 2018). Some teachers discussed the drawbacks of small group instruction; above, it was noted Kallie's individual interview that she believed that small group instruction takes longer. During the focus group session, Kacey mentions other drawbacks to this approach, identifying some issues that may arise during small group stations, including behavioral issues. During here station-teaching rotations, she described dealing with "*behavior after behavior, issue after issue, so many incompletions; it was just a constant battle to get them. And we felt we were doing more corrections, redirections and all that than actual teaching…I mean, we were bribing them with behavior tickets, the behavior bucks. We were doing all sorts of things and it was just barely working"* (Kacey-School B, 2018), showcasing the different perspectives on the multiple approaches of co-teaching mathematics.

Summary

This chapter summarized the findings of the study. This study employed a case study research methodology using qualitative research methods. The design of this study was exploratory and descriptive and utilized a naturalistic inquiry approach to explore the perceptions of eight teachers serving elementary-aged regular and special education students in a co-teaching setting. The research participants and their experiences and perceptions were the focus of this study.

Data from various sources was collected from co-teachers and were analyzed to more clearly define the perspectives and experiences of third and fourth-grade mathematics co-teachers. Data analysis, specifically open coding, was used to identify emerging themes

in the data, as well as patterns and relationships, through a process of discovery. The following chapter presents the conclusion, implications, and recommendations for future studies relating to co-teaching mathematics.

CHAPTER V

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

In this final chapter, I summarize my study on co-teaching mathematics in third and fourth grade classrooms. I also describe the findings of my data analysis discussed in Chapter 4. I will also share the implications of the findings and their impact on the field of elementary mathematics and co-teaching. Lastly, I articulate the limitations of the study, and the study's implications for research.

Summary and Conclusions

Co-teaching practices are becoming increasingly common as schools try to meet the extensive needs of diverse learners. According to the National Center for Education Statistics (2016), approximately 12.9 percent of students in the United States have specific learning disabilities, and 95 percent of those students are served in regular schools. Nearly half of the students who have an identified disability spend 80 percent of their school day in general education classrooms and nearly all students with disabilities spend at least part of their day being educated alongside children without disabilities (U.S. Department of Education, 2007; 31st Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act, 2009). It has been reported that "95% of all general education teachers currently teach students with disabilities or have done so in the past, with an average caseload of 3.5 students with disabilities" (Pugach, 2006, p. 549).

The purpose of this study was to examine the perspectives of current mathematics general and special education co-teachers in an elementary school setting. More specifically, how teachers perceived their roles, positions, and experiences in a mathematics co-taught classroom. This study investigated the perspectives of the co-

teaching model, identified similarities and differences of these perspectives, and determined which models were used most often by third and fourth-grade mathematics teachers. Although previous research has focused on various models of co-teaching (Bauwens & Hourcade, 1991; Cook & Friend, 1996; Magiera, et al., 2005; Friend, 2007); effective ways to co-teach (Zigmond and Magiera, 2001; Wilson & Blednick, 2012; van Garderen, 2008; Brown, Howeter, & Morgan, 2013); the compliance with IDEA (Wright, 2010; Duncan & Posny, 2010); and the benefits of having two educators in the room (Gately & Gately, 2001; Musrawski & Hughes, 2009), this study is unique because it is a qualitative case study that investigates the perspectives of teachers involved in co-taught mathematics classes as they meet the needs of elementary-aged students with learning disabilities. The existing literature on co-teaching reveals very few studies of this nature (Cronis & Ellis, 2000). Co-teaching research studies and literature focused on issues such as: limited co-teacher planning time, unclear co-teacher roles and responsibilities, and the lack of school administration support throughout the co-teaching arrangement. While this study includes data on these topics, it also addresses a gap in the literature related to identifying and describing elementary mathematics teachers' views on what they believe to be factors that contribute to effective co-teaching relationships and the implementation of the model. This study addressed this gap by focusing on the perspectives of elementary teachers who co-teach mathematics. Overall, I found that while the aforementioned concerns are prevalent among elementary co-taught mathematics classrooms, teachers also believe that misbehaviors are increasingly becoming a norm in co-taught classrooms. Additionally, teachers believe that they could be better suited to teach general and special education students simultaneously if they received specialized training in this area.

Findings

I used the research questions as a framework for analyzing the data gathered during this study. Chapters 4 offers in-depth responses to each of the research questions which focus on teachers' perspectives of co-teaching mathematics and investigated which co-teaching models that are often used in co-taught third and fourth grade mathematics classes. Following is a discussion of the findings that emerged from my analysis.

Teacher Perspectives

This study sought to explore teachers' views on co-teaching mathematics in an elementary school setting. I found that there was not much discrepancy on the benefits of co-teaching itself, however, teachers had varying views on factors that contribute to the utilization of this method not reaching its maximum potential. For example, six out of the eight participants mentioned behavior issues being an obstacle to fulfilling the needs of all students in this type of teaching environment. In a focus group session, one special education teacher stated that because behavior issues are becoming more prominent in classrooms, students are being placed in co-taught classrooms for behavior issues rather than for intellectual competency. It is assumed that students' behaviors will be better managed in a room with two teachers rather than just one. Several teachers expressed frustration over this reality because they have found that the frequent misbehaviors encourage other students to emulate the behaviors, and it sometimes overshadows a child's actual academic ability.

As a result of teachers having to manage behaviors more frequently than in the past, one teacher brought up the idea of receiving professional development in this area. This

will allow her to increase the number of "tricks in her bag" as it relates to responding to misbehaviors.

In addition to professional development in behavior management, many teachers also revealed that they would feel more equipped to teach in a co-taught setting had they had some or additional training related to co-teaching. Most teachers were assigned this position by their administration and were not provided any formal training on how to effectively implement this model of teaching. Mathematics co-teachers were often informed of their assignments shortly before the beginning of the school year, and most received very little to no training on how to effectively co-teach mathematics. One of the most effective practices administration can use to maximize the effect of co-teaching is "providing substantive information about this collaborative arrangement and encouraging teachers to proactively prepare for this change... before they actually start the process" (Murawski & Dieker, 2004, p. 53). According to Friend and Cook (2007), subsequent individual, team, or group training should include sustained coaching and accountability measures for all participants (p. 190-199). The sentiments conveyed by these authors were similar to the concerns expressed by several participants. Professional development in co-teaching is not only desired by those currently using the model, but it is necessary for teachers to know how to collaborate, manage behaviors, teach diverse learners, and build productive relationships.

These findings suggest that teachers believe in the benefits of the co-teaching method but feel that they could be much more efficient and well versed in implementing the model with training in co-teaching mathematics and managing behaviors in a co-taught classroom. A few ways this can be accomplished in the field of education is by

administrators incorporating ongoing professional development on co-teaching mathematics, and by researchers doing more in depth investigations on common factors that make successful mathematics co-teaching partnerships effective. Additionally, learning effective strategies for understanding, addressing, and reducing challenging behavior in the classroom could potentially reduce teacher frustrations and make teachers feel more supported in the classroom.

Frequently Used Co-Teaching Models

During my twelve observations, I found that teachers used two of the six methods most often: one-teach, one-assist, and station teaching. I observed other models being used, but of the 12 observations, these two models were used during eleven of the observations. There were times when teachers may have briefly used one of the other models to begin the lesson, such as team teaching, but one or both of the other two methods were usually incorporated into the lesson as well. In a research study conducted by Keefe and Moore (2004), they found that most teachers followed the model of one teach-one assist, with the general educator taking the lead for the whole group instruction in content and the special educator being responsible for modifications. This partially aligns with what I witnessed in my investigation. During most of the classroom observations, the teachers utilized either the station teaching model or the one-teach, one-assist model, however, most times the station teaching method was utilized. There were times when team-teaching took place, but most participants in this study used a method that required students being taught in smaller groups. I believe this is because all of the participants were working under the assumption that their population of students were more engaged during small group instruction.

At some point during my observations, all of the models were used at least once, with the exception of one-teach, one-observe. I got the impression that teachers shun this model. When asked about it, one teacher retorted "We definitely have not utilized that one." I believe teachers perceive this as one teacher teaching, while the other sits disengaged. I did not get the impression that teachers were aware of the benefits of this method for data collection purposes. Friend and Cook (1992) recommends that it be used sparingly, but it could be useful when used in the right capacity. For example, this method would be useful when trying to observe how students approach a specific task, lesson, or project, or even when taking observational notes for a student's upcoming Individualized Educational Program (IEP) meeting. One teacher leads the class in a whole group discussion, while the other teacher attentively observes using an observation grid that outlines the behaviors both teachers agreed needed to be observed.

Research Question #1

How are the perspectives of third and fourth grade elementary mathematics teachers on co-teaching similar to and different from special education co-teachers? This purpose of this question was to gain an understanding of how teachers viewed co-teaching mathematics, and how these views aligned with their co-teaching partners.

In all the interviews, the participants spoke about their most recent experience with co-teaching mathematics. Many participants discussed teachers' roles and expectations when asked about their opinions of the models. Most believed that parity had been established in their classes because, in their opinions, it was clear to the students that both educators had the same status in the classroom. The teachers also disclosed their views on the importance of splitting up responsibilities in a co-teaching partnership. This supports Friend and Cook's

(1992) belief that a readiness to share responsibility will reduce the workload and increase cooperation (Murawski and Dieker 2008). Teachers' perceptions of parity were conveyed through descriptions of how instructional activities were executed, differences in responsibilities of the special education teacher and the general education teacher, and teacher interactions with the students. Clearly defined roles and responsibilities prevent either partner from feeling the other has overstepped a boundary, shirked responsibilities.

Friend (2007) notes that co-teaching takes place when two professionals have specific areas of expertise. The general educator has a specialization in a particular content area, expertise in managing groups of students, and focus on instructional pacing. Depending on professional preparation and experience, the teachers may overlap in their knowledge and skills, but the partnership's power derives from teachers' complementary expertise that can be used to best meet the needs of students in diverse classrooms. Both professionals are credentialed professionals, although each may have his or her specific areas of expertise. Co-teaching relationships work best when there is no time at which one teacher seen as subordinate to the other (Scruggs, Mastropieri & McDuffie, 2007). Most of the general education teachers seem to agree with the sentiment of equality when they are asked about their positions and the special education teacher's position in the classroom. As I stated before, they all declared that both teachers were viewed as equals and were treated as such, but upon further questioning, one of the general educators referred to the co-taught math classroom as their "home/turf," and another stated she was "pushy" about

being the one to establish classroom management in the beginning. These feelings of ownership and authority made me wonder if these sentiments were apparent in the classroom. However, while observing both teachers with their co-teaching partners, I witnessed first-

hand that both the special and general educator shared teaching responsibilities equally and were equally involved in leading instructional activities.

The special educator's contribution centers on specialized instructional practices that are the core of special education; knowing and understanding each student's unique needs; the legal and technical details of the field; and a focus on mastery, regardless of pacing. One of the four special educators repeatedly expressed challenges that were faced as a result of not always agreeing with the instructional methods used but deferring to the general education teacher because she was the "main teacher." Friend (2007) writes, "When special educators function as co-teachers in the general education classroom, they have the same responsibility to provide specially designed instruction that they would have in a self-contained special education classroom. Specially designed instruction is what teachers must do to ensure that students reach their goals." This is a factor that some special educators struggle with. They feel overwhelmed by the need to assess IEP goals, individualize instruction to help students achieve mastery of grade level standards, all while sometimes relinquishing control to the general education teacher. This is consistent with Keefe & Moore's (2004) findings that revealed special education teachers find that the co-teaching model does not allow them to fully address the needs of all the students who require intensive remedial instruction outside of the general education classroom. One of the special education teachers also expressed feeling unequipped to take on all the responsibilities of a mathematics co-teacher on top of all her other duties as a special education teacher. This feeling of being overwhelmed or having unequal footing did not come up in all the interviews with the special educators, but it is not an uncommon sentiment amongst special education co-teachers. According to Scruggs, Mastropieri & McDuffie (2007), in most studies,

researchers find that the special education teacher has more of a supportive role in the co-taught classroom and is not treated as an equal educator. In an ideal co-teaching partnership, both teachers are viewed as equals and share the responsibility that go along with teaching both special and general education students in a regular education classroom (Cook and Friend, 1996).

Another common response that addresses research question one was the expression of participants' attitudes about co-teaching mathematics. Most of the participants had positive attitudes about utilizing co-teaching as an instructional model for teaching mathematics. In fact, during the focus group session, many of them stated they would be willing to co-teach again because they believed in the benefits of the model. This corresponds with a study conducted by Arvamidis, Bayliss, and Burden (2000) which found that teachers view the overall concept of co-teaching as favorable, however, their views sometimes change when they are asked to implement it. Although a favorable sentiment was shared by most of the participants, one special educator did not respond to the question during the group session; another stated he preferred going back to the resource classroom so that he may give the students the individualized instruction they need and he could diversify his work experience. Researchers suggest that teacher attitudes have a substantial impact on how day-to-day teaching practices are implemented in elementary school classrooms (Cook, 2001; Cunningham, Zibulsky, Stanovich, & Stanovich, 2009; Grieve, 2009; Scruggs, Mastropieri, & McDuffie, 2007; Vaughn, Schumm, Jallad, Slusher, & Saumell, 1996). Cook (2001) writes that attitudes have been shown to be precursors to teacher behavior. If teachers feel ill prepared, uncomfortable, or have a negative attitude towards to co-teaching, their discontent may be passed down to their students and will negatively affect student confidence and

academic success. There was no evidence of any negative impact on students during my observations, nor did any teacher suggest that students were adversely impacted as a result of their co-teacher's attitudes or behaviors.

In addition to how they felt about implementing the model, the participants also spoke about their perceived ability to teach diverse learners. Many participants revealed that differentiating came naturally to them, so they felt they were suited to co-teach learned with various academic needs. Teachers also mentioned that while they believe they are proficient at teaching diverse learners because of previous work experience, professional development on the practical implementation of co-teaching and administrative support would enhance co-teachers' proficiencies at developing a more inclusive culture.

Research Question #2

How do partnering teachers perceive co-teaching as an instructional model for teaching mathematics? This question related specifically to teachers' thoughts and views on using co-teaching in mathematics. The participants were asked questions during the interviews that related to their views on co-teaching mathematics. The participants' responses included their perspectives on the benefits and challenges of co-teaching in a general education mathematics classroom.

Several participants believed co-teaching to be an effective instructional model for teaching mathematics. They discussed that having two teachers, with different expertise, affords students the opportunity to learn math concepts from multiple perspectives and in multiple ways. Mathematics teachers have extensive knowledge of the grade level standards, but limited training on how to meet the needs of students with disabilities. Special education teachers, on the other hand, have in-depth knowledge of meeting the needs of students with

learning disabilities but limited knowledge of mathematics content. Co-teachers in mathematics are expected to blend their expertise in the mathematics classroom, and provide appropriate instruction to all students, including those with disabilities (Friend, 2008). Additionally, in both focus group sessions, the participants mentioned that co-teaching mathematics allows both teachers to manage behavior issues more effectively than if there were one teacher. This is similar to findings reported by Hang and Rabren (2009). These researchers conducted a study with students with disabilities who received co-taught services in reading and mathematics and found that general education and special education teachers in their study both reported that they took more responsibility for behavior management. In further evidence of this, Sweigart and Landrum (2015) stated that when teachers have adequate time to share responsibilities such as assessment, behavior management, teaching, and planning, co-teaching is a very effective teaching model.

Despite the effectiveness and benefit of co-teaching mathematics, the participants encountered several challenges. Several teachers reported the issue of working with students that they felt were misidentified as being a suitable candidate for co-taught resources. Teachers believed this misplacement may result from placing too much emphasis on behavior, or not enough focus on student achievement level. For example, one teacher reported that students with special needs in co-taught classes ought to be "true co-taught kids," meaning they are only "one year behind." She continued by stating that when students are at a level that is two to three years below the current grade level that makes for an "ineffective" co-taught model because it drastically changes one's instruction and pacing, thereby impeding the progress of the general education students. Some researchers illustrate this point by revealing that some experts believe that the general education setting is not

adequately prepared to meet the diverse needs of students with disabilities (Baker & Zigmond, 1990; Allbritten, Mainzer, & Ziegler (2004); Zigmond, 2003). Studies investigating co-taught classrooms have shown that while students with disabilities may receive the same treatment as students without disabilities by the general education teacher, instruction is rarely sufficiently differentiated to meet the needs of students and not enough modifications are provided (Baker & Zigmond, 1990; McIntosh, Vaughn, Schumm, Haager, & Lee, 1993). Vygotsky's (1978) theories of cognitive development, particularly the concepts of the MKO and the ZPD, identify that learning is an interactive process, which is certainly present in co-teaching models, but these further studies show that is perhaps not enough within special education settings if differentiation is not also sufficiently present. Although there is extensive research available on different co-teaching models, as well as perceptions students who have participated in co-taught classes (Bemish et al., 2006; Conderman, 2011; Friend et al., 2010; Magiera et al., 2005; Magiera & Zigmond, 2005), there is limited research that examines the impact co-teaching has on the achievement of general and special education students.

Research Question #3

Which co-teaching models are often used in third and fourth grade mathematics classrooms? The purpose of this question was to determine the co-teaching models these third and fourth grade teachers preferred using in mathematics. During the interviews, teachers were asked which co-teaching structures they found themselves using most frequently.; during the classroom observations, the researcher noted which models were used throughout the course of the mathematics lessons. In response to inquiries that addressed this research question, the participants revealed the co-teaching models frequently used in their

mathematics classrooms, and they also discussed their use of whole group and small group mathematics instruction.

When asked about the models used in their mathematics classrooms, all of the participants mentioned four of the six co-teaching models. However, it seemed as though not all of the participants were aware of what the models were. This is not in the sense that they did not utilize the models daily, but that they were not familiar with the proper terminology for them. None of the participants stated that they have used the alternative teaching method, and one teacher said that she and her co-teacher "have not utilized the one-teach, one-observe method as much recently and one-teach," but this was after I explained orally provided a list of co-teaching models. I did not include the latter method as one of the named methods used because upon further inquiry, she did not describe this method of teaching in her description of her daily routines, I did not witness this method being used in during any of the observations, nor did the partnering co-teacher list this method as one that they've used. Even though all the co-teachers seemed to be familiar with the implementation of the models after they were described, it was consistently noted throughout all of the interviews and observations that one-teach, one-assist, station teaching, and parallel teaching were the models used most often in the four classes observed. This correlates with the responses of most participants during their interviews. When asked which methods they used the most often, the participants often stated or described more than one co-teaching model.

There was a general consensus among the participants that small group instruction was definitely the preferred method of instruction. In cases where the teachers were unable to articulate a specific name for a model, such as station or parallel teaching, they referred to the instructional model as "small group." Similar to the participants' views on the benefit of

small group instruction, researchers consider individual and small group instruction to be the foundations of effective special education (Friend & Cook, 2017; Landrum, Tankersley, & Kauffman, 2003). Small group instruction reduces the student-teacher ratio and allows teachers to connect with individualize instruction, reinforce concepts, formatively assess retention of concepts, and instantly provide student feedback.

According to most participants, small group instruction usually followed whole group instruction. During whole group instruction, either both teachers would lead the instruction (team teaching) or the general educator would take the lead while the special educator would walk around the class assisting students as needed (one-teach, one-assist). While one participant seemed to be adamantly opposed to whole group instruction because she felt that the needs of the special education students were not being met, three out of the four classrooms used whole group instruction at some point in their mathematics lessons. One pair of co-teachers decided to do away with whole group instruction because it tends to be very distracting to the students and it leaves very little room for specialized accommodations.

In most instances, the choice of method was not pre-determined. Teachers selected the model that they felt best matched the objectives they were trying to accomplish for any given lesson. As previously stated, during the observations, parallel teaching and station teaching were the two models used most often. All teachers discussed ways in which they preferred or used small group instruction to deliver mathematics lessons, so it would make sense to employ models that lends itself to that method of teaching.

Co-teaching is a teaching model that requires the pairing of a general education teacher and a special education to create a more inclusive classroom. Teachers work together in a general education classroom to share the responsibilities of planning, instructing, making

accommodations, and assessing students with and without disabilities (Friend & Cook, 2010). In a co-taught environment, both teachers are considered equally responsible and accountable for the classroom (Friend & Cook, 2010). According to Beamish, Bryer, and Davis (2006), "co-teaching is well-placed to become a key process for the inclusion of all students in regular education classrooms for authentic, multi-leveled instruction in core curriculums" (p.4). Friend (2007) writes that co-teaching is not a general education classroom with one teacher and one helper. Nor should it be carried out as a pullout special education program that has been moved to the back of a general education classroom (Friend, 2007). Co-teaching is a method of teaching that allows students to learn from two or more teachers who may have different ways of thinking and teaching. It is an arranged "marriage" between a general educator and a special educator that has the potential to improve one's quality of teaching, encourages teachers to think beyond their own perspectives, provides someone to bounce ideas off of, and provides assistance with managing behavior.

Limitations

In Chapter 3, I presented anticipated limitations of this study, At the conclusion of the study, the following limitations are presented: the time of year the study was conducted and the inexperience of the individual researcher.

This study was conducted at a time of year when teachers were preparing their students for the major standardized test that affects teachers' evaluations and may affect students' promotion to the next grade level. In preparation for this major assessment, many teachers were reviewing previously taught standards, and had altered their normal classroom routines. For example, teachers who may have planned regularly, now resorted to strictly following the lesson plans from the county-mandated curriculum. One goal of this study was

to observe teachers in their ordinary classroom environment, to observe how they implemented the co-teaching model in mathematics. However, due to testing preparation, much of what was revealed during the interviews, were not observed at the time of the observations.

Another limitation of this study is the limited experience of the researcher. This research was completed as a requirement of my dissertation process. I acted as the only researcher and instrument of data collection. To put it differently, as the researcher, I was not only responsible for collecting data from the participants, but I also had to disaggregate the data and provide an informed analysis it (Morse, 1998, 2003b). The quality of the research is heavily dependent on my individual skills as the researcher and this was my first time I had the opportunity to apply all stages of the research process.

Recommendations for the Practice

The results of this study may be beneficial to other mathematics co-teachers as well as those in administrative positions who are responsible for selecting co-teachers delegating trainings and schedules. The practical significance may also be of interest to parents, prospective co-teachers, and those involved in the development of policy and procedures for students with disabilities. The results of this study are not intended to evaluate the effectiveness of co-teaching, but to understand how teachers perceive the model, their roles in implementing this model in mathematics, and to determine the models teachers use frequently.

Based on the research, it is recommended that Vygotsky's theory of cognitive development into professional development workshops on co-teaching mathematics could benefit co-teachers. This theory demonstrates how teachers' success is interrelated to the

partnering co-teachers. Vygotsky thought that education needed to provide children with experiences that are in their ZPD, thus encouraging and advancing their individual learning. This theory connects to co-teachers because it demonstrates the need for others when learning or trying to achieve a task that is outside of one's comfort zone. While Vygotsky's theory focused on how children's learning, one of the biggest overall tenets is that learning is an interactive process that can be progressed by someone who has more knowledge or is more skilled. With co-teachers, mathematics teachers are the more knowledgeable subject matter experts, and the special educators are the differentiation and scaffolding experts. If the two are taught how to effectively utilize their skills collaboratively, they have the potential to experience a maximal amount of learning and deliver highly effective instruction. Embedding this theory into co-teacher's daily practice can help teachers work together as well as teach them how to teach diverse children by using each other's expertise.

Based on the findings, it also recommended that more emphasis be placed on planning and building relationships in co-teaching. One way to help facilitate this relationship is to arrangE a meet and greet before the end of the previous school year. This requires that mathematics and special education teachers be informed of their co-teaching assignments and partner prior to the start of the year they will work together as co-teachers. This allows for teachers to make introductions, and perhaps engage in facilitated discussions about teaching philosophies and/or methods in mathematics. During this meet and greet, teachers should be encouraged to exchange contact information so that they may connect before the start of the school year. In regards to shared planning, this can be accomplished if the administrator in charge of scheduling arranges for this to occur.

The research data implied that teachers find co-teaching beneficial but face challenges such as classroom and time management. Managing time and behavior are one of the many things that can be addressed through professional development on co-teaching. Schools often provide professional development trainings throughout the year on county or school-wide initiatives. Making co-teaching a priority can be the first step to ensuring that adequate training is received. If it is made a county-wide initiative, schools and districts will feel more compelled to funding the proper training teachers need in the areas of time and behavior management.

The final recommendation relates to professional development in learning how to implement the different models of co-teaching, but specifically, training in using the one-teach and one-observe model. Many of the participants viewed this model as one to stray away from. I believe they viewed it negatively because it gives the appearance of one teacher not actively engaged in delivering instruction, however, this type of co-teaching can be a powerful tool if teachers understand its usefulness in the classroom. This model requires one teacher to lead the whole group, while the other teacher observes and collects data. The co-teacher who is observing is actively taking notes, observing children or one child, and will provide feedback to the team regarding future teaching. This method requires careful planning time and maybe an observational chart that will be used to ensure the observer is observing the behaviors the team intends to monitor. With the proper training, teachers can learn to see this method as another method of data collection and nullify the commonly held fallacy.

Recommendations for Future Research

Co-teaching is a model often used to provide education to students with learning

disabilities a fair and equal education in the least restrictive environments. In support of this, Austin's (2001) found that the co-teaching model is regularly recommended and practiced in inclusive classrooms. One would infer that the collaboration of co-teachers has been carefully examined and that the criteria or standards for an ideal model has been defined, however, this assumption is unsupported and only a few studies have evaluated current practices (Austin, 2001). Further research into what makes successful co-teaching partnerships effective would benefit the education community. More specifically, additional research on how to establish and maintain positive co-teaching relationships in among elementary mathematics co-teachers would help to move the education community forward by helping teachers who build the foundation for numeracy. This study provided data on teacher perceptions of mathematics co-teaching, but it did not evaluate the successfulness of the co-teaching partnerships. More research should be conducted on common factors that are found among successful co-teaching partnerships. This would give the education community more guidance and insight on how to make co-teaching relationships productive, positive, and beneficial to all students in an inclusive classroom setting.

In addition to analyzing criteria for ideal co-teaching models, researchers might employ a qualitative research design to locate and try to replicate co-teaching partnerships where shared planning is a common occurrence. Many researchers have studied co-teaching and through their studies they have identified issues that co-teachers had pointed out as problems within the co-taught model of instruction. Some of the problems were related to co-planning due to scheduling conflicts (Kaplan, 2012; Austin, 2001; Dieker & Murawski, 2003; Friend, 2007; Friend, 2013). Through my literature research as well as through my data collection, I have found that the lack of co-planning was one of the most talked about

concerns amongst mathematics co-teachers (Austin, 2001; Friend, 2007; Hang & Rabren, 2009; Magiera et al., 2005; Dieker & Murawski, 2003). Scruggs, et al. (2007) noted, "Co-teachers need a weekly co-planning period to discuss instructional issues, behavior management, teachers' roles and responsibilities, and students' Individualized Education Program (IEP) goals" (p. 20). Additional research should be conducted on ways in which administration can support the co-teaching model by ensuring that co-teachers are able to co-plan regularly.

To better prepare mathematics and special education teachers for co-teaching classrooms, the perceptions that they hold regarding co-teaching professional development and the readiness to co-teach must be explored. The information from this research could assist school leaders, administrators, and researchers create professional development and training opportunities that would adequately prepare general and special education teachers for elementary mathematics co-teaching classroom environments. Additionally, future researchers could expand upon the research findings of this qualitative study by establishing a relationship between mathematics co-teacher's perceptions of professional development and co-teaching readiness in mathematics.

Much of the literature on effective implementation of the co-teaching model highlights teacher preparedness and positive rapport among co-teaching teams (Friend et al., 2010). Other contributing factors, such as teaching experience and training (Magiera et al., 2006), a teacher's willingness to co-teach (Eccleston, 2010), and knowing how to keep both teachers actively engaged in an inclusive classroom have been shown to enhance the co-teaching experience for students and teachers. Additional research investigating these attributes could help develop a stronger research base to improve co-teaching practice.

Implications for Future Practice

In order to continue to improve co-teaching models in elementary mathematics classrooms, it is necessary for school districts to recognize the importance of planning and collaborating both between and within special education and general education. This necessity cannot be overlooked; it is a vital part of effectively delivering mathematics instruction. Co-teaching, although having been in practice for over twenty years, is still in its beginning stages in terms of education. Over time, teachers have been conditioned to think of their classroom as their personal domain, and many are reluctant to relinquish this role of absolute control. As schools start to rethink their purpose and look to the future of mathematics education, it is time to let go of the old mentality of isolation and embrace a more collaborative model.

Additionally, to properly implement co-teaching in such a critical subject area like mathematics, there is an urgent need to provide initial as well as ongoing professional development in the areas of co-teaching mathematics, and behavior management. Through ongoing professional development, teachers should be given the opportunity to share their successes and failures with their colleagues to learn from one another, expand their knowledge, and grow their professional practice. During these sessions, teachers can learn to teach mathematics reasoning skills to diverse learners, develop problem solving skills for all students, differentiate mathematics instruction, and manage classroom behaviors. Limited or no professional development related to co-teaching means that the teachers are unable to learn how to maximize its potential, and provide special and general education students with the best mathematics instruction possible.

Summary

The purpose of this narrative qualitative case study was to understand how teachers perceived their roles in co-teaching and to gain insight on how they viewed the co-teaching model. Additionally, the study sought to examine the co-teaching models that were frequently used in co-taught mathematics classes.

The participants in the study, consisted of two third and two fourth grade mathematics teachers and four special education co-teachers. The investigation took place in two different Title I schools within the same school district. The researcher interviewed the participants as well as observed them co-teaching in an inclusive mathematics classroom. At the conclusion of the study, it was found that all teachers believed that co-teaching benefitted special education students. Different participants provided different reasons why they believed this to be true, but the consensus amongst most teachers was that the presence of two teachers allowed for more individualized instruction and provided the different teacher perspectives allowed students multiple methods of learning and practicing different mathematics concepts. Additionally, the participants stated the one of the biggest challenges with using the co-teaching method is regularly planning with their co-teacher.

A thorough literature review was conducted about the history and legislation of special education, self-contained or resource models, co-teaching models, and inclusion in mathematics. This investigation yielded findings on the effectiveness of co-teaching mathematics and descriptions of how co-teaching should look in the classroom (Zigmond, 2001) as it relates to academic outcomes for students with disabilities. Limited qualitative data revealing co-teaching experiences from teachers' perspectives were found in the research.

This study adds to limited research that supports whether mathematics and special education teachers perceive co-teaching as a beneficial or ineffective method for teaching regular and general education students. Overall, the literature contains many references to best practices and benefits of co-teaching, as well as, challenges with co-teaching, however, not many studies reveal how teachers perceive their readiness to co-teach, or if they believe it is what is best for their students. This lack of data poses questions as to whether teachers believe they are properly utilizing co-teaching as a solution to meet the mandates of NCLB and IDEIA, or as an effective strategy to deliver instructional programs that adequately meet the individual needs of students with disabilities (Nichols, Dowdy, & Nichols, 2010).

This study researched mathematics co-teachers and sought to understand the implementation of this model from their perspectives. Teachers' responses were recorded, analyzed, data was triangulated, and themes were identified were to highlight important patterns or commonalities found within the data. These themes were used to address the three research questions and to better understand this phenomenon.

Closing Remarks

The existing educational climate is one that promotes inclusive classroom practices and emphasizes its benefits of helping provide an appropriate education for students with disabilities (Magiera, et. al, 2005). The Individuals with Disabilities Education Act (IDEA) requires that all students with disabilities have access to the general education curriculum and that their instructional programs be delivered in the Least Restrictive Environment. Co-teaching provides academic and behavioral supports and strategies to students with disabilities in general education classrooms.

The data observed in this study reinforced some of the advantages of using this teaching model, however, the focus of this study was to understand the beliefs, attitudes, collaboration methods, and co-teaching practices of mathematics and special education teachers. Co-teachers have the potential to combine the general education teacher's expertise of subject matter and the special education teacher's background knowledge of differentiation and accommodation. Researchers show considerable enthusiasm when writing about co-teaching and educators who implement it but investigating the thoughts and actions of co-teachers in the field truly demonstrates the complexity and nuances of such dynamic relationships. Most inquiry on co-teaching has emphasized descriptions of the co-teaching model and offer advice about it rather than carefully studying it. As the practice of co-teaching mathematics continues to grow and practitioners steadily find ways to teach the wide range of abilities in the classroom, we must find more effective ways to structure and develop co-teacher relationships, arrange co-teachers' schedules, and support or train co-teachers so that they believe they are adequately equipped to handle the task set before them.

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Appendix A: Introductory Email

Good Afternoon Mr./Ms. _____,

I am writing to you to request your participation in my dissertation research. The purpose of this study is to investigate the experiences of elementary mathematics teachers and special education teachers regarding co-teaching inclusion classes. My goal is to closely explore the perceptions of mathematics teachers and special education teachers currently working together to teach students with diverse needs in the general education setting. The study will examine co-teaching models that are often used in third and fourth grade mathematics classrooms, as well as the strategies educators find to be most effective when teaching learners from varying academic ability levels.

Should you decide to participate, I am asking that you electronically sign the consent form that is attached to this email and complete the 6-question questionnaire by clicking on the following link: https://ashleymountsgray.typeform.com/to/wZwH8a, and using the pseudonym Abigail. Your participation in this study is completely voluntary and your identity will be kept confidential and no personally identifiable information will be associated with any information provided by you. In addition to completing the initial questionnaire, your participation will also entail taking part in a one-on-one initial interview, being observed three times while teaching mathematics as well as participating in a closing focus group session. Kennesaw State University's Institutional Review Board has approved this study. Should you have any comments or questions, please feel free to contact me at amounts@students.kennesaw.edu or (305) 761-5366.

Appendix B: Questionnaire

**Questions will be typed on the Survey Monkey website.*

1) I am a _____

_____Special Educator

_____ General Education Math Teacher

2) How long have you been in this position?

_____ Less than 1 year

_____ 1-2 years

_____ 3-4 years

_____ 5 years or more

3) How did you come to be a co-teacher?

_____ I asked administration to place me in this position.

_____ My administration placed me in this position.

_____ Other (please specify)

_____

4) How long have you been co-teaching?

_____ Less than 1 year _____ 1 year _____ 2 years _____ 3 years

_____ More than 4 years

5) What type of training did you receive to prepare you for your co-teaching role?

_____ Professional Development/Workshops _____ Co-Teaching Courses

_____ Online Webinars _____ Observing effective co-teachers

_____ I did not receive any training to prepare me for co-teaching

_____ Other (please specify)

_____

Appendix C-Teacher Consent Form

Title of Research Study: Teachers' Perceptions of Mathematics Co-Teaching

Researcher's Contact Information: Ashley Mounts-Gray, (305) 761-5366, amounts@students.kennesaw.edu

You are being invited to take part in a research study conducted by Ashley Mounts-Gray of Kennesaw State University. Before you decide to participate in this study, you should read this form and ask questions if you do not understand.

Description of Project and Benefits
The reason for the research is to perceptions of co-teaching in a fourth-grade mathematics classroom. There are no direct benefits to you for participating in this research study. The study may, however, help the education community gain a better understanding of how teachers perceive their roles using the co-teaching model and commonly used the instructional practices that impact students with disabilities being served in a co-teaching setting.

Explanation of Procedures
Eight teachers will be selected to participate in this study; four mathematics teachers and the partnering 4 special education co-teachers. The teachers were selected based on their close proximity to the researcher's school, and a school the researcher was once employed employs them. Prior to beginning the study, I will send out a 5-question questionnaire that will provide a little background about you. The study requires that I interview each teacher (approximately 30-45 minutes), observe each co-teaching pair teaching a math lesson (approximately 60 minutes), and document information gathered during a focus group session toward the end of the data collection process. The dates and times of the interviews and observations will be determined based on the availability of the participants.

Time Required
This study will take place over the span of two-months.

Risks or Discomforts
Little to no known risks are anticipated to occur during this research.

Confidentiality
The results of this participation will be confidential and will not be released in any individually identifiable form without the prior consent of the participant unless required by law. Teachers' names will not be displayed or revealed in any way in the final product of this research report.

Use of Online Surveys
Yes, the questionnaire will be emailed through Survey Monkey and the sign-up sheet for interviews will be emailed using Sign Up Genus.

I, _____, am willing to participate in the study by completing the initial questionnaire, participating in an interview, and being observed during planning and math.

_____

Signature Date

Appendix D: Interview Questions

1) Describe your experience with your current co-teaching assignment. What works? What can be improved?

2) In what ways are your views on co-teaching and its implementation similar? How do these similarities benefit your relationship?

a. How do these similarities benefit your instruction?

3) In what ways are your perspectives of co-teaching different? How do these differences impact your teaching relationship?

a. How do these differences impact your instruction?

4) What are your perceptions regarding establishing clearly defined roles and responsibilities for one another? How and when do you establish these norms?

5) How important is professional development in co-teaching?

6) How are you, as co-teachers, supported by administration?

7) Which strategies are of the highest priority for collaborative success (i.e. establishing rapport, identifying teaching styles, creating a plan for managing the class, etc…)?

8) What are some of the co-teaching models you utilize during instruction?

9) Which methods of co-teaching do you find you use the most often? Why?

10) How do you decide which method to use for any given lesson?

11) What are some of the benefits of the co-teaching model?

12) What is the best thing about co-teaching?

13) How could co-teaching, as an educational model, be improved?

14) How do you perceive co-teaching as an instructional model for teaching mathematics?

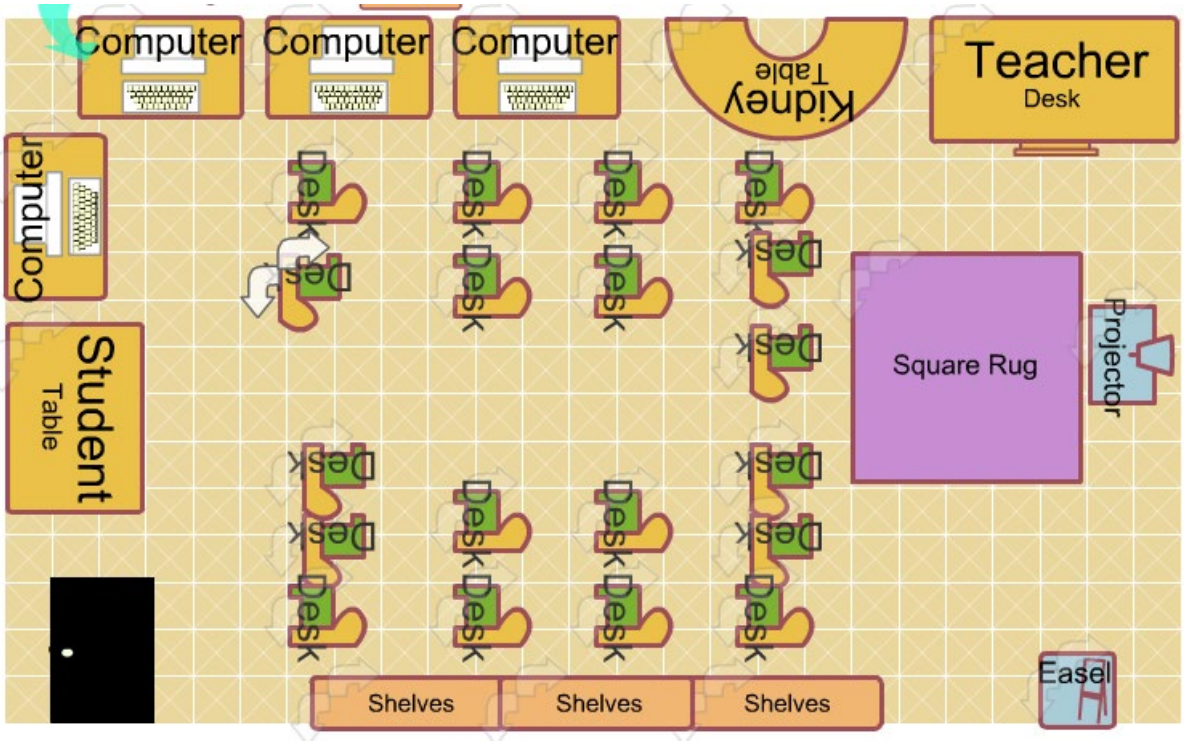
15) How do you perceive your ability to effectively co-teach diverse learners? What could help you to improve?

16) What does your planning process consist of?

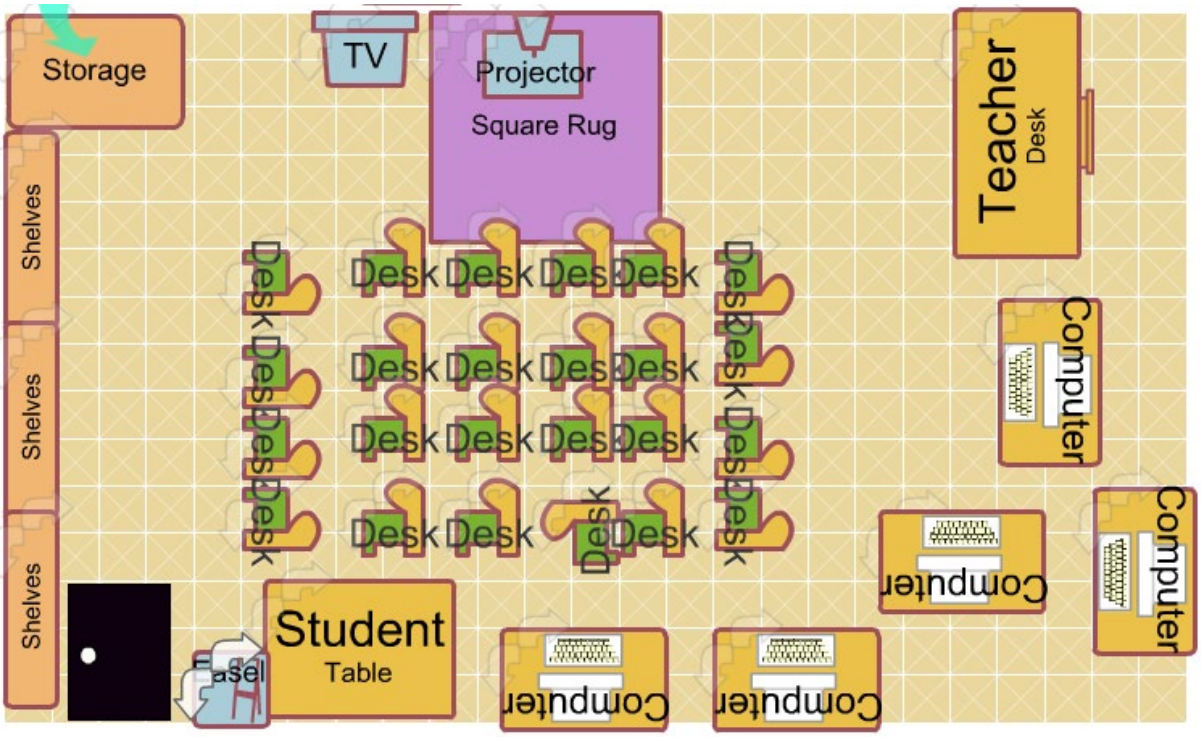
17) How do you think your students perceive your roles as co-teachers? What have they said about your roles?

Appendix E: Classroom Architect

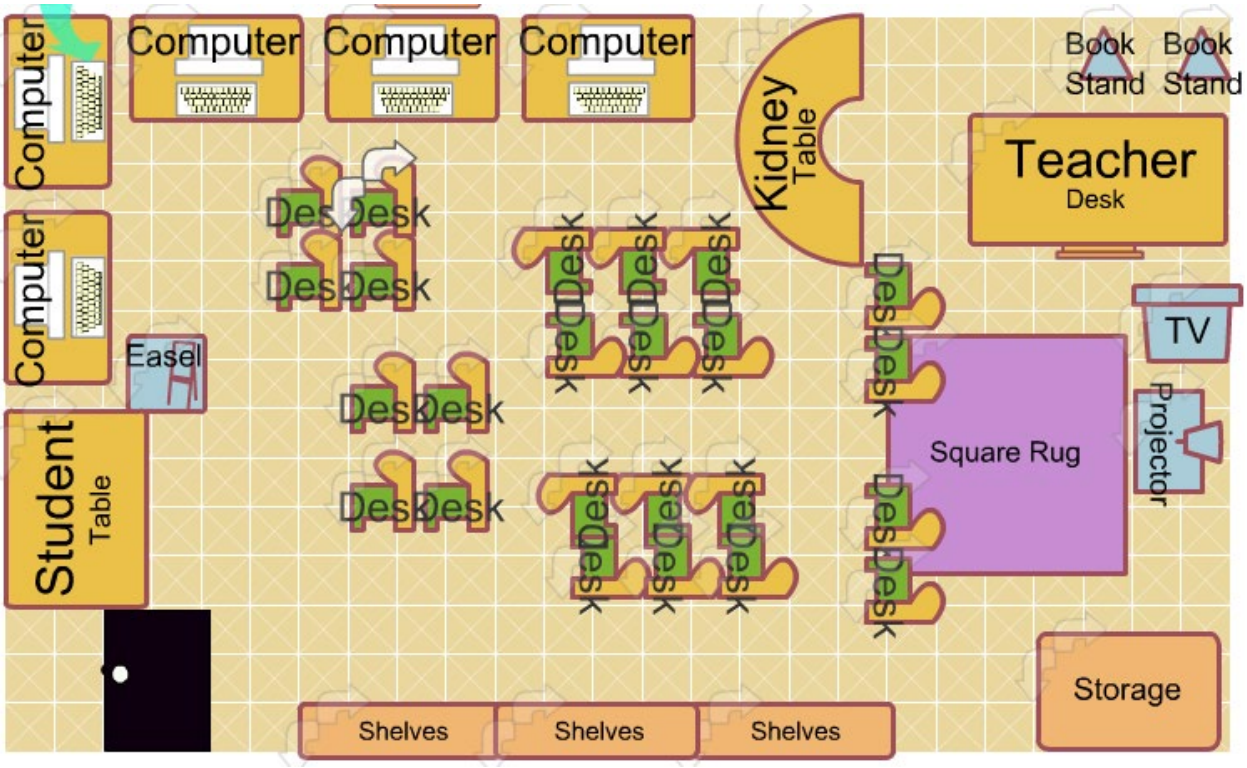
School A, third Grade Classroom, Abigail's Room



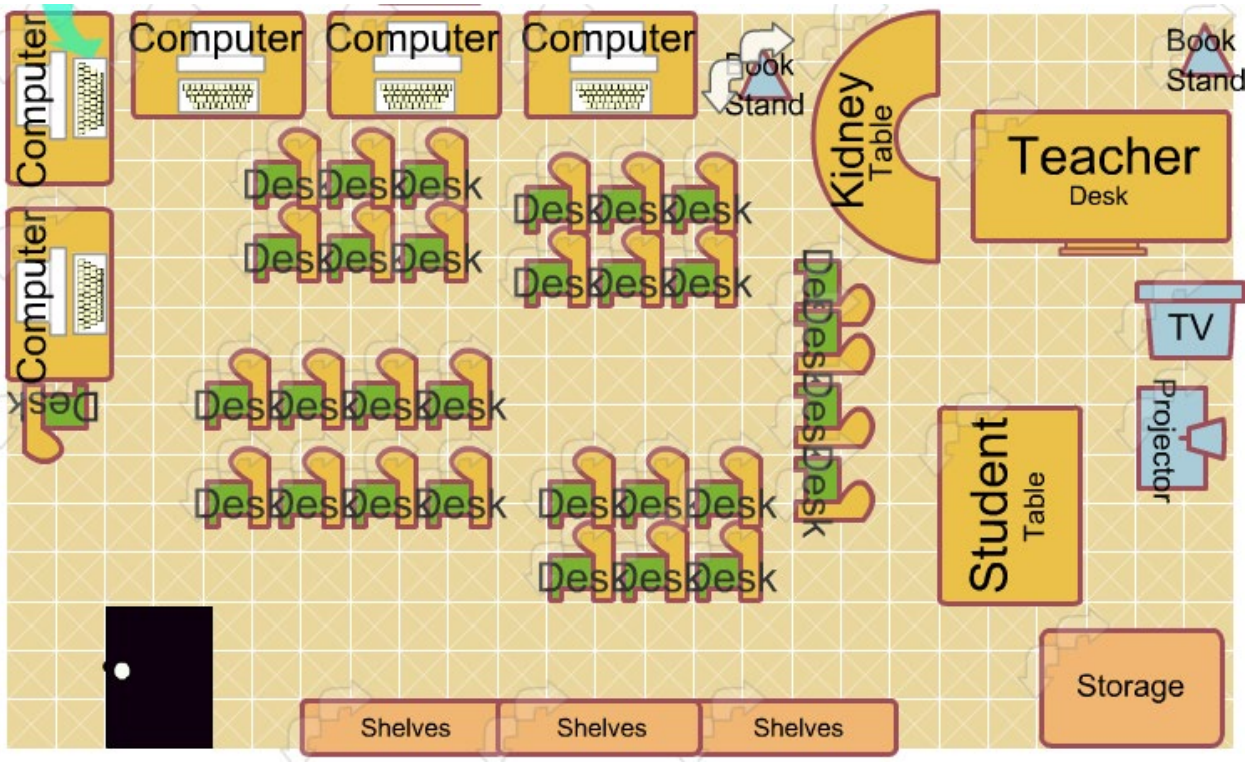
School A, fourth Grade Classroom, Karolyn's Room



School B, third Grade Classroom, Karen's Room



School B, fourth Grade Classroom, Deborah's Room



Appendix F-Interview Transcripts

Interview with Abigail, School A, third Grade Mathematics Teacher

Ashley G.: Be very open and honest.

Abigail M.: Oh, no problem.

Ashley G.: All right. This interview is related to your experience (and… um) with your co-taught math teacher right now in third grade.

Abigail M.: Okay.

Ashley G.: (Um…) Some of the questions are general questions, so you can reflect on your experience with your past experiences, but when I'm asking questions related to your current co-teaching experience, I'm referring to your math co-teaching experience.

Abigail M.: Okay.

Ashley G.: Alright. Describe your experience with your co-teaching assignment. What works, what can be improved?

Abigail M.: (Um) It's an excellent (um) ... We've got an excellent system going. I mean, we've got that chemistry, like we feed off each other, and sometimes it's like, you know, "No, Miss. Mitchell, I'll do it this way," and I step in. We feed off each other, you know, it works out really well. (um)

Abigail M.: And what doesn't work?

Ashley G.: Mm-hmm (affirmative).

Abigail M.: Okay, what does work, we have rotations going, and she ... I stick with the i-Ready and the remediation part, she does hands on with them, and (um) that seems to be working really well. I think (um) as far as what we need to improve upon would be [inaudible 00:01:17]-

Ashley G.: Okay. It doesn't ... If it's wonderful then you can say it's wonderful-

Abigail M.: Right now it's wonderful.

Ashley G.: Okay.

Abigail M.: I know that there's always improvements that you can make, but right now we're good.

Ashley G.: Alright, good. As a general ed math teacher do you have any concerns, or struggles, or issues that are prevalent as a result of your co-teaching role? Any issues that arise as a result of your co-teaching?

Abigail M.: Well, I think if you're gonna have children in here [inaudible 00:01:51], they need to be true co-taught kids, like one year behind. Not two and three years behind, and not have good numbers since that is ineffective. That is a struggle.

Ashley G.: Okay. What are your views on co-teaching as an instructional model for teaching math?

Abigail M.: I think it's very positive. I think it's good for the kids to see the different ways that we do things. When they have questions they come to me. If they don't get it from me they can go to Miss Burns. Sorry.

Abigail M.: I just think if it's a good situation everybody feeds off that, and I think it's productive.

Ashley G.: In what ways are you and your co-teacher's perspective of co-teaching different, and in what ways are these differences impact your teaching relationship or instruction? How are you ... How are your views about the co-teaching experience different in your opinion?

Abigail M.: In my opinion I'll get back to, you need to be a true co-taught kid, and not every kid belongs in here. I'm not sure about my co-teacher's feelings on that exactly, but I feel that that changes the way these things go ... "Perspective in what ways?"

Ashley G.: How are you perspectives different, and then what ways do these differences impact your teaching or your instructing?

Abigail M.: Your instruction changes dramatically and you can't go as quickly or whatever when you have a child or children who are two and three grade levels below where you are. Your group time is eaten up and before you know it, you look up and it's like "Oh. It's time to go to specials." [inaudible 00:03:47]

Ashley G.: What is your perception regarding establishing clearly defined roles and responsibilities for one another between you and your co-teachers? So when do you establish these roles or do you feel like establishing these roles are important?

Abigail M.: We talked about it at the beginning of the year as far as who would do what in the group with our group rotations. We talked about that at the beginning of the year. And as far as who leads the lesson type thing?

Ashley G.: Mm-hmm (affirmative).

Abigail M.: I think it depends on what it is and it just depends on ... I mean, sometimes she'll jump up and do it and other times. Most of the time I start the lesson and she comes in. But that part of it was never really defined. It was just the natural occurrence of how it flows.

Ashley G.: Okay. How important is professional development in co-teaching?

Abigail M.: Well, seeing as there hasn't been a lot of it, in the beginning I would think it would be very important because you have no idea what you're doing. But then you just sort of figure it out and [inaudible 00:04:59].

Ashley G.: You almost what?

Abigail M.: I almost sat in another meeting. I think we work well together. But it depends on who you have 'cause, yeah. Last year ... Can I tell you about that?

Ashley G.: Yes.

Abigail M.: Okay. Last year my math co-teaching experience was horrible.

Ashley G.: Okay.

Abigail M.: And we did go to professional development for that and it made not a hill of beans.

Ashley G.: So you went to a professional? You had what, workshops or co-workshops?

Abigail M.: We had a workshop and it was those ladies from California that came. It was really a ESOL thing and how that works together.

Ashley G.: Mm-hmm (affirmative).

Abigail M.: The co-teaching thing. It was really a good professional development, but you gotta have two people on the same page.

Ashley G.: Mm-hmm (affirmative). So what made your experience last year horrible?

Abigail M.: Well, one of you wants to work and the other one doesn't.

Ashley G.: And how would you compare last year's experience to this year's experience?

Abigail M.: Night and day. We both want success for our students and we both know that everybody needs different things.

Ashley G.: Okay. In what ways is professional development and co-teaching supported by administration?

Abigail M.: I have no idea.

Ashley G.: Alright. How do you perceive your ability to effectively co-teach diverse learners? So your high kids, your average kids, your sped kids. How do you perceive your ability to teach all of those kids at the same time?

Abigail M.: Well, I mean that's where your grouping comes in and your differentiation with those groups and that kind of stuff. Right?

Ashley G.: Yeah.

Abigail M.: Yeah?

Ashley G.: I agree. And so you feel like you are adequately prepared to differentiate for your kids and [inaudible 00:06:49].

Abigail M.: Most of the time. Not one hundred percent but most.

Ashley G.: What could help you to improve your ability to effectively co-teach these students with special needs?

Abigail M.: Well, it's a co-teaching class. Again, I'm gonna go back to one year behind. Isn't that the general rule for that?

Ashley G.: What's the general rule?

Abigail M.: Two and three years behind, that's the wrong placement.

Ashley G.: And what happens when you feel like the students are misplaced? Do you then have a talk with the SPED teacher about it?

Abigail M.: We figure out how to work with them. Like now, she pulls a group of the kids that are really behind.

Ashley G.: Mm-hmm (affirmative).

Abigail M.: For like thirty minutes in another room and works with them. And I continue with the kids in here and then we come back and I catch those kids up in their group and then we just continue that way. And it seems to be working. So we modify what we're doing.

Ashley G.: How many kids do you have total?

Abigail M.: For math 21.

Ashley G.: 21. And how many of those kids are SPED?

Abigail M.: Seven? No. Yeah [inaudible 00:08:10]. Six. Six, yeah.

Ashley G.: You have a small class.

Abigail M.: Mm-hmm (affirmative).

Ashley G.: In your opinion, which strategies are of the highest priority for collaborative success? For example, [inaudible 00:08:34] with your co-teacher, identifying teaching styles, creating a plan for managing the class. What do you think is a top priority for making sure that you and your co-teacher are successful in the classroom?

Abigail M.: Oh, I think...

Ashley G.: What strategies are of the highest priority for collaborating with your co-teacher?

Abigail M.: Oh, developing a rapport I think is number one. And then it was important to me to establish the classroom management. I don't know how important it was to her, but to me that was a big deal.

Ashley G.: And did you establish that together or did she kind of ...

Abigail M.: I kind of pushed that a little bit. You know, a little.

Ashley G.: Okay. Okay.

Abigail M.: But I mean she has things that she does and I back away. But in the beginning I was sort of pushy with it.

Ashley G.: Okay. And what are some of the advantages or benefits of the co-teaching model? So the model itself.

Abigail M.: Oh, I think all the kids benefit from the experience. I mean having one person, you get so much more out of two and just the [inaudible 00:09:52] flow of it is, yeah. I really like it. I'm tired of doing it, but I like it.

Ashley G.: Alright. And what are some of the co-teaching models you use in your class?

Abigail M.: We stand up there and teach.

Ashley G.: So for example, some of the co-teaching models would be one teach, one assist while you're up there teaching.

Abigail M.: Okay, well the other day I was mostly on and she was working with the co-taught kids and a couple others. And I pretty much ran it and paced it and everything. But then there's days where we switch roles. We switch roles. I think we really flow.

Ashley G.: And do you plan ahead to determine who's gonna lead?

Abigail M.: No.

Ashley G.: Or do you kinda just feed off of each other?

Abigail M.: We just feed off of each other.

Ashley G.: So which models of co-teaching do you find you use the most often? So would it be, the one teaching model, one observe, one teach, one assist, the parallel teaching? Which do you use the most often in your classroom?

Abigail M.: I would say the parallel.

Ashley G.: Parallel. Why? Why do you tend to go that way more often than the others?

Abigail M.: 'Cause it just works. I mean we didn't sit down and say we're gonna parallel teach. It just sort of evolved.

Ashley G.: Okay. How could co-teaching ... What does planning between you and your co-teacher consist of? So how do you all plan? How often do you plan and what do you do with your plan?

Abigail M.: Like this afternoon we stood up at my desk and we looked and we said, "Well, this is what we need to do for tomorrow." And we talked through how we would do it. And she says, "I will do this hands-on activity." And I say, "Well, I'm gonna work on milestone stuff." I'll catch you later.

Speaker 3: I wanted to see if you got the [inaudible 00:11:55].

Abigail M.: She's in a meeting.

Speaker 3: Oh, a meeting.

Abigail M.: It's very informal.

Ashley G.: How do you think your students in the co-taught class perceive your individual role? So how do they view you, how do they view her? Do they view you as the main teacher, or?

Abigail M.: Yes.

Ashley G.: They do?

Abigail M.: Most of the time they do, but right now I've been pretty hard on them and I think they need a soft place to fall so they're heading to Miss Burns right now. But yeah. Typically I'm the main. I think it's really supposed to be they don't really know who, right?

Ashley G.: And then please describe a typical day in your co-taught math class. Like the structure, the schedule, the routine. How do you all structure your class?

Abigail M.: Okay. I'll just tell you like today.

Ashley G.: Yeah.

Abigail M.: Okay. Typically we come in. We do a [inaudible 00:12:53] turn over for x, and then I go over what we're doing that day. We talk about our math lesson, what it's gonna be. We get our [inaudible 00:13:04] books out. And today I led the lesson I think? No. Yes, I did. But Miss Burns always comes in and some days it can be ... And then we go into small groups. We do ... For me it's milestones practice and for her it's hands-on whatever, fractions or whatever. Oftentimes we run over and we're running out. It's pretty quick.

Ashley G.: Okay. Miss Burns is hands on.

Abigail M.: Yeah.

Ashley G.: Okay. That concludes our interview.

Abigail M.: Oh, that was quick!

<u>Interview with Charles, School A, fourth Grade Special Ed. Co-Teacher</u>

Ashley Gray: Describe your experience with your current co-teaching assignment.

Charles: This year, my co-teaching assignment is that I as a special education teacher am paired with a fourth-grade gen ed math teacher.

Ashley Gray: What's your experience like?

Charles: We have a very good relationship. The teacher and I both co-taught with each other last year for the first time, so this is the second year co-teaching fourth grade math together. We have a very positive relationship because we're each more familiar with the fourth-grade math standards and we're also more familiar with each other's way of doing things.

Ashley Gray: As a special ed teacher, do you have any concerns or struggles, or issues that are prevalent as a result of your co-teaching role?

Charles: Sometimes the only issue that kind of comes up is the data collection as a special education teacher. As a SPED teacher, you have to collect data not only the students' benchmark scores and maybe standardized test scores, but you also have to collect data on their individual IEP goals. Sometimes whatever their IEP goal is doesn't necessarily matchup with what we're doing in class. Considering we're starting a new lesson every week, they might have a goal that only corresponds with one lesson or two lessons within a nine-week grading quarter, so then I have to give them some supplemental stuff.

Ashley Gray: In what ways, if any, are you and your co-teacher's perspectives of co-teaching different? In what ways do these differences impact your teaching relationship or instruction?

Charles: Our differences. I think sometimes we kind of do a model where the gen ed teacher does most of the primary direct instruction, or whole group instruction. But then, sometimes we do switch where we kind of bounce off of each other where I might show one way to do a problem and she models on the board a secondary way to do a problem. Sometimes we switch roles. One of us might monitor around the room while the other one does whole group instruction. We try to trade off, but she primarily does the whole group instruction.

Ashley Gray: Then, how do you collaborate with the math teacher to benefit your students?

Charles: During the year, we used to plan a separate time during the week. But as you know, with meeting, it gets hard to. But, we would plan one day during the week that her and I, and the other fourth grade teachers that teach math and the other support staff teachers that teach math, we would all get together and collaborate on what was the priority standard, how did it relate to the resources and lessons we had, and what small group activities we would do. Now, primarily, we just plan maybe during our PLC time, also,

collaborating on what strategies work and what don't work, or what time we get before or after school.

Ashley Gray: Then, how does the workload get divided, so as far as the planning or delivering instruction? You said earlier that you two kind of switch roles when you're doing your one teach, one assist. While she's doing the whole group instruction, you'll kind of walk around and monitor the kids. You said sometimes you'll do the whole group instruction and she'll walk around. How else does the workload get divided?

Charles: During small groups, she normal will have a small group where she might be working on the current skill or remediating on whatever the most previous skill was that we did in class. I will primarily work with small groups, usually that have the SPED students in it. Sometimes I'll work with the groups that don't have any special ed students in there. But, I primarily work on scaffolding and kind of breaking it down even to a lower level so that some of the special ed students can get the support they need to approach the different standards and skills.

Ashley Gray: Then, what does planning between your co-teacher consist of? You said that at this point you all mainly plan during your PLCs. What do you do during your PLCs? What are you ... and how? That's once a week, but how does that take ... What takes place during those planning sessions?

Charles: One, like I said, that's just part of it, because her and I will, you know, when we get a chance during planning to, or after school, we'll say what we're doing the following week, what standard, what small groups, what manipulatives we might use in the groups. We also collaborate how we're going to motivate the kids to make sure that the kids are getting in their i-Ready minutes and getting in ... Make sure they're passing the required number of lessons every week, so how do we motivate them to make sure, because they can't get it all in class time. They have to do some of that before school or later.

Charles: Also, with the supports, as far as different roles that we do, I also, whenever the kids are doing a quiz or a test, I make sure that all the special ed students have their accommodations if some need to be in a small room, if some need extended time, those that need questions read aloud to them. That can be a little bit of a daunting task sometimes because I think now we're up to nine special ... 9 or 10 special ed students in the class currently.

Ashley Gray: Then, what is your perception regarding establishing clearly defined roles and responsibilities for one another? How and when do you do this, as far as you and your co-teacher? When do you establish your roles, and then what do you think ... What's your ... how important is that? How important is establishing roles in your co-teaching assignment?

Charles: Well, with the current teacher that I co-teach with, I think things were pretty much already established last year when we developed a relationship with each other. Just the fact that we pretty much go about things the same as far as how classroom management would go, how the instruction would go in order, and how we would approach different problems, how we would try and support different kids. We think about things the same for a lot. But, the roles were pretty much already defined starting off this year. Like I said, she does most of the whole group instruction, but then we still have that back and forth a lot.

Ashley Gray: Then, how important is professional development in co-teaching?

Charles: Well, I think it depends, because, you know, like her and I have not been sent any professional developments that are specifically geared toward co-teaching and working with two teachers in the room at once, or multiple teachers. But, we have been to professional developments, say with arts now, with fine art activities that can relate to math. Then, her and I would talk and say like, "Hey, this is something we could use in class," or, "No, this wouldn't work with our kids," or, "It doesn't apply to our standards." Professional development, if we both go to the same one, it can be helpful, but we haven't been sent to one that is specifically geared toward co-teaching.

Ashley Gray: Then, in what ways is professional development supported by administration?

Charles: I feel like administration primarily supports professional development that meets the needs of the school improvement plan and whatever is the current priority of the district.

Ashley Gray: Then, how do you perceive your ability to effectively co-teach diverse learners?

Charles: Well, we have to take a lot of things into account, because besides the special ed students in the room, about half of the students in the class are also ESOL. That overlaps with some of the special ed students, making them twice exceptional. We also have students that

deal with poverty. We have some students that have to meet with the counselors regularly because they are having some issues. We also have some discipline issues in the room with certain kids' behaviors. We have to monitor how we group certain students, how we do positive reinforcement with certain students, and make acknowledgements of certain students to make sure that they're on task and on focus.

Ashley Gray: What could help you to improve your ability effectively co-teach students with special needs?

Charles: Improve my ability to co-teach students with special needs. I think it would be beneficial if we could go to a professional development that focused on a co-teaching model rather than just certain activities from the other ones that we normally go to. It might also be more beneficial if the curriculum that the district used had more suggestions for small group activities for these priority standards where students might be performing a grade level below.

Ashley Gray: I already asked that. In your opinion, what strategies are of the highest priority for collaborative success, for example, establishing rapport, identifying teaching styles, creating a behavior management plan for the class? What do you think would be the number one priority when establishing a good co-teaching relationship with your teacher?

Charles: Well, I think all three of those things are important. But, first thing is you got to establish a rapport with a co-teacher. You can have two different teaching styles. You can even go about how you would handle discipline situations differently. But if you don't have that rapport where you can work with that person, nothing's going to work. Nothing's going to happen. Because really, if you bring your differences to the table, then that can help more of the students in the room.

Ashley Gray: All right. Which methods of co-teaching do you find you use the most often? You talked about the gen ed teacher standing at the front of the room and you'll sometimes walk around to assist. That would be the one teach, one assist. Is that the method you use most often? And if not, which one do you use the most often and why?

Charles: I wouldn't say that's the most often one. I would say when we are both up at the front of the class and we are demonstrating multiple ways how to go about a problem, I would say that is probably the one that we do most of the time, especially when we're going over new concepts and we're trying to show the kids there's more than

way, more than one way to do multi-digit multiplication, more than one way to do, I mean, most of the priority standards that we've done this year.

Ashley Gray: What are some of the benefits or advantages of the co-teaching model itself?

Charles: I think one big advantage is by having that second teacher in the room that you can bounce off ideas of each other when something's not working. When some of the concepts are too abstract, you know, we talk to each other and we're like, "Hey, we need to use manipulatives when we're introducing this," or, "The kids need extra practice with this skill." Another benefit would just be that you have that extra educator in the room when you're doing small group rotation. Instead of just having one teacher group, you have two teacher groups. That way, you can give students more support.

Ashley Gray: Then, how could co-teaching as an educational model be improved?

Charles: I believe administrators need to pair co-teachers, whether they're special ed, ESOL, whoever, with the gen ed teachers. I think they need to put more thinking into it sometimes. Like me and my co-teacher, we lucked out. We work together well. We have a good relationship, and we agree on several things. But sometimes, I do know of co-teachers who they just get paired up with somebody because it was who was hired at the time or who was allotted, or it worked out in the schedule, but they didn't actually check to see if those two people could work together.

Ashley Gray: Then, lastly, do you feel a part of the classroom? So when you go into the class, do you feel that the students view you and the gen ed teacher the same way? Then, how does the classroom environment make you feel like you are a part, if you do feel that way?

Charles: I definitely do feel like I'm a part of the classroom. I think it's especially because I'm with the same group of kids all day. I just also co-teach with another teacher during the day. But, the kids do view me as a teacher, just as the gen ed teacher, but they do know that there's a difference between the two of us. They do know that there's ... You know, I'm there to support everyone, but they do know that I have to give some special attention to certain students sometimes.

Ashley Gray: All right. That concludes-

Charles: Is that it?

Ashley Gray: That is it. [inaudible 00:14:49]-

Interview with Deborah B., School B, fourth Grade Mathematics Teacher

Deborah B.: Yeah.

Ashley G.: Yeah. Okay. So this interview will be related to your co-teaching experience specifically in math. Okay. Um, do you want to continue what you were saying prior to our...?

Deborah B.: Oh, sure. I was just saying, yeah, being that me starting after Thanksgiving, being their third teacher, (um) their first teacher, she was on maternity leave and while she here for the month of August, I'm not sure what happened when she was, she had them up through Labor Day and... they had no real routines in place. And they had not even started in their math books. So we are extremely behind. (um)...

Ashley G.: When you say they had no routines, what does that mean?

Deborah B.: I mean, oh, well (uh...) like as far as if you are doing, if you have a small group instruction after your whole group and you might have some on i-Ready, or you have somebody somebody doing different leveled of work. Um, they had no concept of that. None. So I had basically the month of December was like the first month of school for me.

Ashley G.: Yeah.

Deborah B.: So yeah, yes.

Ashley G.: So how did you, how did you combat that? Like how did you make it work for you or how are you making it work?

Deborah B.: So it's still a struggle because some things are hard to untrain.

Ashley G.: Um-hum (affirmation).

Deborah B.: Um, but like Ms. Previous Teacher's Name, I mean, she's old school. I love her. She was their sub.

Ashley G.: Was that the previous teacher?

Deborah B.: No, she was the sub. She was here from September to November.

Ashley G.: Okay.

Deborah B.: Um, she was doing the long-term sub for their original teacher, but she's retired and she is very much a whole group teacher. So I teach a lesson. You sit down and do your worksheet and I grade papers and they were used to being silent all the time and I think coming in and just having a little bit, little bit of flexibility that I had to get, you know, a little classroom management, they had their perceived... Fourth grade as a whole changed their... They were changing their discipline as I came in because it wasn't working for this group of kids. The checkbook situation and we just went to the Dojo points. So I came in at an awkward time.

Ashley G.: Yeah.

Deborah B.: And they were not used to having any homework at all. Um now, that wasn't Ms. Previous Teacher's Name decision. That was, um, I think the grade level decided on no homework other than reading each night and practicing your multiplication facts. But it was clear they weren't doing that because (hhmm...) probably 80 percent of them. *Nods head.* That's why you see these multiplication charts on their desk because I'm no longer assessing basic facts, but I need you to be able to do the multiple step problems without having to 'I don't know what to do.' They had no strategies for that and I don't have time to wait on that.

Ashley G.: So, I know in third grade they do the same thing. They don't have homework. They have reading and practice your facts. And so is that why fourth grade decided to do it? So they can continue?

Deborah B.: Um, I don't know that they did say they told parents that curriculum night that things do shift second semester and it homework will probably be assigned more often, but um, I'm not real sure why. I would say our previous principal now, she had all the research on what the research says about homework being ineffective, unless it's reading or if a kid needs to practice a specific skill in math (phone ringing). And, those were the two things that she wanted, um. She wanted um, she would say, so I am not a fan of homework, so if you don't want to assign homework, you don't have to. So everybody was like, well that's one less thing I got to do. But then when you teaching something like math, they need that spiral review. They need or they need practicing the skill you're working on. So you and their parents can see that either they do know how to do it or they don't know how to do it. So, um, it appeared when I joined, I started giving them homework. Some parents were happy, some parents were like, I don't even like homework. What is this coming from? Like, yeah, it's almost the middle of the year and I'm just starting to give homework. But they decided as a grade level to start giving homework because they saw that the kids needed it.

Ashley G.: And they saw that in the middle of the year when you came? Okay.

Deborah B.: Yeah, now Ms. Previous Teacher's Name, she was asking for why can't she assigned homework ever since she started with them because she saw the need to give them homework.

Ashley G.: So she started in September, so the original teacher was only here in August?

Deborah B.: Um-hum, she was here for the month of August. But again, Ms. Previous Teacher's Name didn't even know they had books because she had not even given them out the whole month she was here for August, um, they were working on something called A Million Dollar Project. And not one kid can tell me what it was, but they didn't do a single thing in the i-Ready book. They did some i-Ready, uh, lessons on the computer. Not a whole lot, but some. And I don't know what they did that time because they weren't here, but Ms. Previous Teacher's Name being that who she is, she thought, well they can't do this stuff. So she went back and she pulled stuff from like, uh SuperTeacher, or like practicing multiplication facts, or going back to do a addition and subtraction with regrouping over three or four digits because they weren't able to do some of that either. So, um, yeah, it's just been a constant, you know, struggle of getting things together.

Ashley G.: So what's working in your current co-teaching...

Deborah B.: What's working now this is going on three weeks now. I, they gave me a pair of pro, um, so that when we're doing the small group instruction, um, they don't have any independent time because they cannot handle that. It is my largest group and I have um, during that time, not only the kids who have, you know, the lowest academically, they are also not the best behaved and they don't know how to manage themselves when you are doing something independent. So they have no independent time. So the assignment I might give to them independently, I give it to Ms. Parapro and she's there to help monitor or sometimes help them work through it. So they have me, Ms. Kallie, and Ms. Parapro, and i-Ready. And we do four, we do, we do, try to at least three rotations a day because nothing I teach whole group, they don't understand, it's a complete waste of time.

Ashley G.: So do you do whole group?

Deborah B.: Um, if I do, it's no more than 15 or 20 minutes because they can't handle any more than that.

Ashley G.: Um-hum (affirmation).

Deborah B.: And a lot of times what I tell them in that 15 minutes, I have to start off by repeating it up there, but when they get to my small group.

Ashley G.: Yeah.

Deborah B.: So (deep breath), I'm still swimming, swimming.

Ashley G.: Um, as a general ed. math teacher, do you have any concerns or struggles or issues that are prevalent as a result of your co-teaching role? So issues that you may have that maybe a teacher that does not have a co-taught class may have.

Deborah B.: Um... well, one of my struggles is the other two fourth grade math classes. They're going to be ahead anyway because they're a different population of kids, but they also have 30 minutes longer in math than I have in math.

Ashley G.: The other two that...

Deborah B.: The other two fourth grade math classes.

Ashley G.: Oh...

Deborah B.: They have two hours for math, and I have 90 minutes.

Ashley G.: Okay, the other classes have two hours. How do they fit two hours in? How much time do they have for um, reading and language arts?

Deborah B.: They all have... they have the two man team.

Ashley G.: Yes.

Deborah B.: And how their day is separated, I think they, I will say I don't think they're doing as much science and social studies as our team is because that's what Ms. Science and Social Studies teacher is, only science and social studies. Um, so I don't really know how their handl..., how they are, and they, not only... in addition to that, they also have W.I.N. Time at the end of the day that we don't have W.I.N. Time because we can't build it into our schedules because of the three man team. So we the, we're the team with no W.I.N. Time, we have the neediest kids, and our class periods are shortened.

Ashley G.: Yeah.

Deborah B.: So I only teach math but I have 90 minutes. And then truly with transitions, there's not a true 90 minutes. Yep.

Ashley G.: What are your views on co-teaching as an instructional model for teaching math, specifically?

Deborah B.: Um, I think it can be successful. I have had a, uh train wreck of a co-teaching uh before and literally she was a couple years before retirement. I mean literally she would come in my room and fall asleep, um, and then asked me for the stuff that I was just doing with my class to give her resource students when she left my room. Yeah, that was, that was interesting. But I've had a good co-teacher and it worked really well. Sometimes she would begin the lesson teaching whole group or I would in one of us is monitoring and making sure that they're on task and doing what we need them to do. And then if we did split off into small groups it worked really well. So if you have a good one that you're planning well, like Kallie and I work really well together.

New Speaker: Um-hum (affirmation).

Deborah B.: It's really more of the classic group of kids we've had. We've tried several different things but what we're doing with Ms. Parapro works best. So that if we're, I find that they're falling further behind because they are unable to do as much whole group as say, my first and third period groups, um, I will usually kind of divide and conquer. Kallie and I might be doing the same thing at the same time and then they wouldn't so (inaudible). So that way we will be at, even if they need a double dip, we can redo the review it, or that way she teaches two groups, I teach two groups, and they're all still getting the same thing. So that helps with that. And then with Mrs. Parapro, if they're even doing a review standard that they are stuck on, or she does the Ready games with them. Like where she monitors or a game that I create or give them to do that go along with the same standards that we're working on. Um, but without Ms. Parapro in the room, it was (deep breath) yeah, more rough. So I met with Ms. Assistant Principal and that was what, she's like, well what if I gave you like a para for an hour.

Ashley G.: That's awesome.

Deborah B.: I said that would be awesome. I totally could use her. She's like, well even if you can't physically hold her in the room, it will be okay if she needed to pull some out. Okay, so...

Ashley G.: So does she pull them out or...?

Deborah B.: No, right now she uses that table over there and Ms. Kallie will have a group right there. But if, you know, if we need to like for assessments, so they go out the room.

Ashley G.: Okay.

Deborah B.: Because I have like, yeah, 15 kids who are small group testing. So when those 15 leave my room I have less in the room than actually leaves. Um-hum. Maybe 16 now, forgot I had a new one. He just qualified.

Ashley G.: How many kids do you have in that period? Total.

Deborah B.: Twenty-seven. So I have more kids with I.E.P.s than not. She just gave me her updated list.

Ashley G.: So out of that 27, 15 have IEPS?

Deborah B.: *Nods head signifying, yes.

Ashley G.: Fourth grade has two Sp.Ed.,co-taught classes, right?

Deborah B.: Nope, one. I'm it. They said they're planning to split them for next year because of all of this. Then now when we created rosters last year at the end of the year, being an E.I.P., I helped create those rosters and they changed. But they said they changed based on the Sp.Ed, uh..., scheduling and that was how they had to be. So yeah, it's pretty bad. Eleven, 12, 13, 14, 15. Yep, it's 15.

Ashley G.: Now, what is this that you're looking at?

Deborah B.: This is a spreadsheet that Ms. Kallie has given, gave to me so that we can keep track of their accommodations. Like, um, pretty much all of them needed preferential seating. So I don't know how much preferential (laughter) seating you can give to 15 kids. Um, and away from distractions because it's hard to put them away from each other because they just distract each other. So, um, I am going to really hope that they do create two classes next year because it's been an interesting year. It's very necessary. And then you have some that are truly not co-taught, but um they're higher than the resource which...

Ashley G.: Right.

Deborah B.: You know, I don't understand why resource can't either differentiate or can this middle group not do, Do the Math and do something else on their level versus having them be exposed to fourth grade standards that they can't do. Because of those 15, quite a few of them are failing. That was the reason I had the meeting with Ms. Assistant Principal because I was just like, I see them trying. Not all of them. Some of them are at the point where they already know they're behind and they don't care anymore. You know, when you get to fourth grade you kind of realize that everybody's above me and they stopped caring. So you're saying I can't modify the work, but how do you get there, if the ones who are really trying, if they're trying and they still

have a 57 average, what do you do with that kid? Because eventually they're going to stop trying.

Ashley G.: Yeah.

Deborah B.: And she's like, I know. Maybe just give them some, you know, participation grades for like journals and um, you know, if you can maybe that'll help balance it out a bit. But yeah, they have to do the fourth grade standards. I was like, so basically...

Ashley G.: Give them grades...

Deborah B.: Keep working with them... No, she didn't. No, I couldn't give them no, absolutely no grades, but I can give them. Okay. I have one, I have given, I think, four participation grades already and I still have some failling.

Ashley G.: So what's a participation grade?

Deborah B.: Like when we did or when we do our general entry for whatever, something like when we start something new, I don't do a journal every day. It was more of a new thing because it's more of a resource journal.

Ashley G.: Um-hum (affirmation).

Deborah B.: So the day we do that, they can get a participation grade for putting in an equivalent fractions journal page 100 or um equivalent fraction practice that we do an interactive tour on the board. Everybody gets a 100. And I've done it because if not I, their averages would be like, I don't know, some would have 10s because they, that's what they get on fourth grade work. So as a parent, I'm just thinking why? Why would I even sign off on this? On an IEP meeting? I don't know because literally the one that I had a meeting about this, let's just collect six more weeks of data. Um, because I was like, 'Oh, here's my problem. I've just had a phone call conversation with mom and I'm like, I see progress.' But mom's like, 'Well, why is her average still a 57?' I said, 'How do you express?' I said, 'I don't know that you want, I know what you want me to do, but I need to make sure she's, she's right here in this meeting. Y'all need to make sure she understands that if I say she's making progress, she might be making progress as far as starting to grasp the fourth grade standards, but she's unable to pass fourth grade math,' and so here's Ms. Translator. She's like, 'This is going to sound really weird. But um, what Ms. Deborah is saying and what we see that we see that she can do some of the work. Now, while it might not be a passing grade, um, maybe we want to see if being exposed to the standards is going to help her going forward.' She's like, 'At least let's take us at least, let's take at least six more weeks of data because she wasn't trying this hard at the beginning of the

year. She's been trying much harder since you took over. So we're going to take six more weeks um to collect data. Yeah.

Ashley G.: In what ways, if any, are you and your co-teacher's perspectives of co-teaching different?

Deborah B.: Um... I don't know that I have a different view. I know and when I did second grade one year, um, there was a teacher who had a co teacher and they did a really good mix. but that have some in the past where they... I don't know if the teachers aren't getting along that that could kinda be an issue. I know last year there was something that went on but I don't know what, but as far as added their, their um, personalities didn't mix because I think some, some classroom teachers who are like, you know, they're assigned to them as their homeroom or whatever. I mean and you take ownership. They're your group. And your name uh on your, if they're beside your name on testing and if you don't agree with what the co-teacher's doing, sometimes I think that heavier problem if you work well with your co-teacher, I think it will be a good relationship. I think Ms. Kallie and I work well together but I mean I haven't experienced that but I've heard of like how that can not be beneficial when you're not on the same page.

Ashley G.: Okay. And then what is your perception regarding establishing clearly defined roles and responsibilities for one another?

Deborah B.: Um, I think if, you know, if we are, you know, what you want them to want to get accomplished and you have the same info, you can kind of come together and decide okay well I'll do this part or I mean sometimes you know, Ms. Kallie will say, you know, she's coming from middle school. She was like I feel like I want you to start off with this group because they seem to do better for me when they have had this standard introduced by you. So if we are in a different place in our rotation that we might switch it up. So I think communication and making sure that you acknowledge where you are with you know, if you feel don't feel comfortable with something, you need to know it because you can't. Everybody's not a know it all. You don't know all of anything, ever.

Ashley G.: Yeah, it's good that she acknowledges that. Yeah. Um, how important is professional development and co-teaching?

Deborah B.: Oh, I think it's, I think it's very important. I did not attend any of the co-teaching trainings because I was not in this role. So that was not a part of it. Now I have been, um, I know because of the E.I.P. , we didn't have to go to the co-teaching training, but we talked about how if you're a push-in model what that could look like. It did not have to be, 'I just take my E.I.P. kids and I keep them for 30 minutes,' but I struggle with um, my kids. So you know, typically if you have a Sp.Ed cluster you don't always have the E.I.P. as

well. But I do, and even in that co-taught class. It's not a lot, but you know, I've had three at one time, now I have two, one exited. But um, at first Ms. E.I.P. Teacher tried pushing in and that was a train wreck because the kids she brought with her from another class, we're also behavior problems with along with my behavior problems, And I don't know why she stayed as long... I mean, I've I asked her, I said this is really not the class to push into. She goes, I agree, but she did the whole first, rest of the semester. She came in anyway, but I think it was just, she was also getting her footing because she was coming from first grade E.I.P. that moved into fourth grade E.I.P. So (chuckle) it's just been a lot of transition for all of these guys. Even the E.I.P. kids, have been in a transition so they were used to what I was doing in E.I.P. and then she came doing something different because I was their E.I.P. teacher.

Ashley G.: Yes.

Deborah B.: So it has been a lot of transitions. So I think to be where we are now, I think that is awesome. By the grace of God, I know because yes, it costs that caused a lot of moving parts there.

Ashley G.: So you were once their E.I.P. teacher and then you became their homer... You're the homer... well...

Deborah B.: I'm homeroom for one of the groups.

Ashley G.: Ok, but you're their math teacher?

Deborah B.: Um-hum.

Ashley G.: That is very interesting. Okay. And then how is um, the professional development supported by administration?

Deborah B.: It's supported well. I think um, we haven't had as much of, um... how do I say this? I don't know if we've had enough enough relevant professional development this year. Um, from the things that we have received in, in, in terms of professional development I think could have been, I think that time could have been better used with other things. Like things that really are necessary. So (inaudible) that out there? (*Laughter) But, I mean that's just how I feel. Nobody asked me, I don't mind telling them... Um, only because even some of the people who are giving it are like apologetic because, I'm sorry I had to do something like, so I'm trying to make it relevant since I am told I have to present this.

Ashley G.: Yeah.

Deborah B.: So if you are going to make me do something then why don't you tell me what the teachers are saying they need cause I don't think. Now we haven't filled out a teacher survey, uh, I don't know the last time they've asked us what we feel like we needed.

Ashley G.: That will be helpful.

Deborah B.: Um-hum. Very, very.

Ashley G.: Um, how do you perceive your ability to effectively co-teach diverse learners?

Deborah B.: Um, I think I'm able to do it, but I'm used to working with different levels being... I've been. Me, I've worked in E.I.P., started E.I.P. What? I don't know, been with Ms. First Grade Teacher since first grade is the first year I was in E.I.P. so four years, I guess five years, however many years that is.

Ashley G.: Um-hum.

Deborah B.: This would be year five, um, so I'm used to working with different levels of kids and I think that has been uh, beneficial. As an E.I.P. teacher, I got far more professional development than I ever did as a classroom teacher because of the different levels. And I think that some of those trainings should be offered to Regular Ed. Teachers or regular, you know, regular classroom teachers whereas some things they don't allow them to attend. I think it would be bene..., I wouldn't say allow, but the audience is E.I.P. or Sp.Ed. or ESOL and I think that can benefit everyone. Um, so I think that because of the different trainings I've been to as an E.I.P. teacher or things I've sought out to do, like webinars online, has helped me to know how to reach certain kids. A lot of them truly you've got to reach them on a personal level before you can teach them because they don't want to open up to you.

Ashley G.: Okay, and then what could help you to improve your ability to effectively co-teach students with special needs?

Deborah B.: Well, well I could actually probably use a little training and working with special needs kids because I'd have, you know, like again, they have a lot of trainings that are for Sp.Ed. teachers only. And that is not including that co-teacher that it would be a lot more beneficial if they, if you're going to put, you know, that teacher in a co-teaching situation, they should be also included in some of them. I would love to know what Do the Math is since Do the Math is not what my kids need. Um, because, well, I mean for one example that my, I wasn't even their teacher for three weeks and I, there was one I had an I.E.P. meeting and I was very concerned with him. I mean I've known him for awhile. I know him since he was here in kindergarten twice. So I mean I get it and he's still really behind. He was a very hard worker. So

I asked, I was like, I'm just, you know, concerned because he works extremely hard and he never complains about anything. But he can do it. I was like he'll do it all. I mean his paper is complete, but there's, the answers are wrong and he, and if you tell him they're wrong. "It's okay. Okay. I'mma get this. I'mma get this." Like he worked that hard, and his mom even said in the meeting, she was like, I know every time there's something comes home about tutoring. He said, mom, I got to do this because I got to do better.

Ashley G.: Oh my gosh (empathizing).

Deborah B.: So she felt bad. She was like, so I know he tries so hard, so he's, I'm like, I worry about him because how long is he going to keep up all this hard work and he can't do it.

Ashley G.: Yeah, when he's not being successful.

Deborah B.: Because his I.E.P. goals were that he was going to be able to add and subtract with regrouping with three digits, with an accuracy rate of 70 percent. And I said, 'My concern is that goal is not even a fourth grade standard, but you have him in a fourth grade co-taught.' And I said, 'Well, do you think we need to look at putting him in resource?' And I said, 'Oh, I didn't realize that y'all thought,' I said, 'that was an option. Well, no. The thing is though, if they go to Do the Math, they never get exposed to fourth grade standards.' And I said, 'Well, I'm sorry, maybe I'm missing something if they can't do fourth grade standards, who cares if they ever see them?' And she's 'No, well, I mean... I see where you're coming from.' I said 'But, I mean really, he's working this hard and not seeing any progress and his goal is still adding and subtracting with regrouping. How do you expect him to be successful in this classroom?' So, you know, long story short, he got moved back to resource the next day. He is after his day in resource, he saw me in the hallway. 'Oh thank you Ms. Deborah for changing my class. This is so much better for me.' I was like, you gon' make me cry. Like, but he never complained. Never once did he say this stuff is too hard for me. But he knew, he knew. And you know, and they, he, she was even surprised when she gave him the assessment, she thought he would be at least wear her current group of three kids were.

Ashley G.: He wasn't?

Deborah B.: She had three kids. I had 27. Her three kids. She was thinking he was going to be, at least on that level. He was two levels below them when she did the... because apparently there is an assessment. And then you started that lesson and it's scripted. So I think it's because you have these kids here, and if you put too many in there, I don't know whether the problem is they all may not be on the same level, but that's what we do in our Regular Ed. classrooms anyway. So why can't they differentiate there. I mean, I even

suggested, I said, 'Well, some of my kids wouldn't see fourth grade standards on i-Ready if I didn't assign them to them, so if nothing else, you could assign stuff through i-Ready.' 'Oh, that's a good idea.' Like, because you just put them in this classroom in a situation, you know, they're not prepared for. How are we doing the best for what's best for these kids? I keep saying we can't go by what's best for your classroom. I said, 'Yes, my classroom is running over, but that's not what I'm saying. If this is not what's best for them, how do you put them in here?' So I dunno. That's, I got two more meetings coming up. And we've got to have some more talks because at least two more of those kids who really, really don't belong in co-taught and their, you know, the standards get harder. I mean, If there's, if they haven't mastered what they needed to master before fourth grade and they don't get what they need from fourth grade, they're going to drown in fifth grade because they're drowning in fourth grade.

Ashley G.: But it's a good thing that you're so vocal because I have kids right now in my co-taught class right now that I also feel like should not be in a co-taught class. But when we get in those meetings, and the Sp.Ed teacher's saying "They can do it, they can do it," but they're failing. So why are they failing if they can do it? But, I digress.

Deborah B.: Yeah, I know.

Ashley G.: In your opinion, which strategies are of the highest priority for collaborative success? So for example, establishing rapport with your co-teacher, or identifying teaching styles, creating a plan for managing the class. What do you think is... What are the most important things that you have to establish before you can have a successful co-teaching relationship?

Deborah B.: Well, I think that we're kinda on the same page as far as behavior and recognizing that the whole group stuff is when they typically have more trouble either following directions, even grasping what we just spent our time at the board doing or um staying on task. So, I think as far as making our groups smaller, in doing that, we were already on the same page. But I think too developing that relationship and saying, okay, what do you feel comfortable doing? And having that open and honest conversation, I will say not everybody will be willing to admit that they don't know something or they don't feel comfortable doing something. So we started off with that and she kind of... Because she was, you know, Ms. Previous Teacher's Name can be a little intimidating. So she did whatever Ms. Previous Teacher's Name told her to do (*laughter). Sometimes she could pull her kids and sometimes she couldn't because Ms. Previous Teacher's Name was up there teaching. She was so funny because I had some kids that I was coming to get for E.I.P. and she said, 'Are you coming in here?' When I was like, 'Um, well I could or I can bring him down to my room.' She goes, 'Yeah, or.. can they bring their work with them?' I was like, 'Well I have

work for them to do.' And she said, 'Well they need to do this work. When are they going to get it done.' I was like, 'I don't know. I only have them for 30 minutes which you... ugh, don't get.' So I will say that with that, I think she did what Ms. Previous Teacher's Name let her do. And so I came in with that and knowing that she needed to do more and she knows she could help more, but I don't know. So she would actually be able to pull some of her kids some of the time to work on things other than what they were doing in a whole, the whole group setting.

Ashley G.: So I know your co-teacher, she came from a middle school background, but what does she, what subjects did she teach in middle school?

Deborah B.: I think she was the language arts teacher if I'm not mistaken. I'm pretty sure. I don't think she... This... I know she told me this year was her first year even looking at the i-Ready book because I want, I don't know that, I don't even know if they use that in Middle School. Don't they use something different, don't they?

Ashley G.: I don't, I don't, yeah. I think they use something different.

Deborah B.: I'm pretty sure they use something different, but she did language arts.

Ashley G.: Okay.

Deborah B.: If I'm not a lot of us, I'm almost sure of that. But yeah, she did language arts, but she had already been looking at the books. So she was a little bit familiar with, but some not 100 percent.

Ashley G.: Okay.

Deborah B.: Because like I said, Ms. Previous Teacher's Name didn't know those books were there, so I want to say, she was a month in before she started using the books. So um...

Ashley G.: But Ms. Previous Teacher's Name, didn't she teach here?

Deborah B.: But before she. No, she retired the year this school opened, so she was not even...

Ashley G.: Oh.... got it.

Deborah B.: She never taught here as, as a classroom teacher. She subbed. Her first year here she was the I.S.S. teacher because she retired and she came back like you can work certain x number of days cause you can't be here every day. So she was I.S.S., but, so she's never been a teacher at School B.

Ashley G.: Okay.

Deborah B.: She just did subbing and I think A.S.P. bookkeeper that kind of thing. But yeah, she's just one that have to keep going. She has to be here.

Ashley G.: What are some of the advantages or benefits of the co-teaching model? So the model itself?

Deborah B.: The model is good for, especially for some of those kids who either are, I call them, they're like right on the cusp. They don't quite qualify for E.I.P., but could use some support. Um having a second person in the room and them getting, uh, some, uh, you know, a different perspective or a just different style of teaching or even just having that extra adult in the room. I think is very beneficial for some of those kids. Now there is some kids who, um, I think we have a few of our kids in our room recognize how much higher they are than these kids. And I know they put 'em in here to be role models, but I feel like it hinder is hindering them. Because you can't, I cannot quite. Because the other kids have so many needs.

Ashley G.: Um-hum (affirmation)

Deborah B.: I find, you know, those kids, are like, okay, they got it. You can do it already or you can take this as a challenge activity, and they get less of you.

Ashley G.: Um-hum (affirmation)

Deborah B.: So it's really not the best situation when you have that many in one room. There's too many in this room to really truly meet the needs of every other kid. So those kids who are, um, they had that in, you know, they're motivated already to do good. You could push those kids higher if you didn't have so many other needs in the room. So that is one of my worries that I, don't really feel like they're getting what they need from me because it's too many other ones that actually need 100 percent of me and I don't have 100 percent to give 'em.

Ashley G.: Um, so what are some of the co-teaching models that you find you use often during instruction?

Deborah B.: Um, mostly usually we alternate who does the whole group lesson. Um, we also and a lot of times it could be, well again, like she'll say, um, I think you should do this one, you know, and you know been some understood things. You feel more comfortable, you know, you not exactly comfortable doing it, so you'd rather me do it and that kind of thing. But so either alternate who does the whole group and one of us is walking around and sometimes if our whole group runs a little longer Ms. Parapro comes in and she jumps right in. She knows which kids she has to stand, you know, got her thumb on

them. I already know. And that has helped too, just knowing that. Okay, just because Ms. Deborah or Ms. Kallie might be with somebody else. I can't get away with it because ms. Parapro is in the room (*laughter). Um, and it's really sad that you got to have three adults in the room for one class to... but that is what has worked the best in just knowing that we alternate and that and then or she will take it lead. I'm trying to think of something else specific that I've noticed that, you know, that really works. But given our spacing I'm gonna... I'm actually in the process of organizing her drawer to put over there with her, like go grab another one of those little bins out of my garage. So like that way all your stuff is already here, so we can, that helps to keep it going.

Ashley G.: Um, and then how could co-teaching as an educational model be improved?

Deborah B.: Um... Probably just making sure both teachers are on the same page or even if they, if they're, I don't even know if it's even possible. Making sure you are teaming kids up with people who kind of know the kids. Being that we have a lot of new Sp.Ed teachers this year, um I know that was a little bit harder for them. Already knowing the kids and what they really can and cannot do. Because I found it interesting too that they would say the kids could do things that I could not see that they could do. And what data they were using to support that I am unaware. Because that data is not showing up in my room. So, and I go to those meetings and I make sure I have stuff to support what I'm saying. That does help too.

Ashley G.: So when you see that, so, so that's how you kind of support what you're saying? You just bring something, you bring data to show that, no they can't.

Deborah B.: Because they're saying well they, um, 'Well, he's been able to do this and then.' Well this is what I see in my classroom. And that's how I got that other kid back to resource because his mom was like, yeah, it's not. Yeah.

Ashley G.: Okay.

Deborah B.: So it is, uh, yeah, cause I, I dunno, I just feel like, because they already know right now what I've done that, (inaudble) kids who are being tested now in qualifying this year. Um...

Ashley G.: So they're going to be more kids than?

Deborah B.: Um-hum (affirmation). Um-hum. Um... one just qualified and um (sigh), they're not on our team down here. So that's what really scares me because I think his meeting his due sometime in March and I'm 99 percent sure he is gone qualify because I've had him in E.I.P. since second grade and there is something there (chuckle). So he's gonna have to come down here. I don't know what they will do... If they will change his, um, he didn't, they'd have

to change it or, or because they already know what's going on. Can they work it where he just comes here for math. But I think he's gonna need both reading and math and so they're going to add another kid. So there's at least, I'm pretty sure those two that they're testing now, will qualify before the end of the year. So that yeah.

Ashley G.: Is there not a legal limit on the amount of Sp.Ed kids you can have a co-taught class?

Deborah B.: Ok so, my understanding before this year was, yes. But um, I got a reply because I emailed Kacey when we heard that we knew that they signed consent and I already know those kids, and I know they're going to qualify for Sp.Ed, um... asking about that number and based on our model, um, there is no limit as far as what I was told. Now I didn't go online to Google to find any legal stuff because I know me, you know, I have a little hard time, you know, keeping my mouth closed so, um, I'm just playing happy, and if you say that there is no limit and you put it in an email, I hope that is the truth. Because that's what I was told in that email. And that was, you know, our admin was cc'd on it because of the concerns that we, as a three-man team, expressed because we already have all of these kids with the (inaudible) and they're gonna have to join us when they qualify. And anybody who new comes in that has an I.E.P., they're ours. I just got another one, but I think he's just speech only. I looked at his Milestones. He made a four on Milestones last year.

Ashley G.: A four?

Deborah B.: A four. Um-hum. Like right now he's in that co-taught class. I know he's probably like 'What in the world!' And he was where he needed to do be, because he came from Neighboring County. He was like 'We've already converting our fractions to decimals,' I said, 'Because that's where you're supposed to be. We're not quite there yet, but this is a great review for you.' What do I say to that kid? He needs to be in my other class.

Ashley G.: And you can't switch him?

Deborah B.: Well they don't want to. They've started him with this rotation because they fell it, they felt like it would be easier for us to move him from the co-taught one to the regular one. Saying that we were red.. We told them we would be reducing the size. And Ms. Science and Social Teacher's room because, bless her heart, because some of the kids are resource math and some are resource reading, Ms. Reading and Language Arts Teacher and I don't have them all but Ms. Science and Social Teacher gets them all in science and social studies at one time. So she has, I think, over 30 kids now already. And adding those kids will put her even higher and at that point I'm like, surely we got to be out of compliance, but according to them, there is no limit. And

we can't do it. They can't take into, um, consideration what teachers would prefer. They have to, uh, make sure that meeting the needs of the students. Um and what their um I.E.P. says they need. Well, I'm thinking their I.E.P. should say something, yeah the I.E.P. should say something different. But that's a whole 'nother, you know, you know, I'm trying not to digress and trying to be good here.

Ashley G.: How do you think your students in the co-taught class perceive your individual roles? So you and your co-teacher, do you think they feel, they consider you both to be teachers or do they feel like you're the main teacher and she's...

Deborah B.: Um, most of them, I think see us as equals. But there are a couple of those kids that really don't belong in here, that if Ms. Kallie corrects their behavior or something, they don't feel like they should obey it. Or they. And I'm like, whether she is, I mean she's a teacher, she's an adult. And if an adult asks...

Ashley G.: Right.

Deborah B.: You something you do something, you do it, regardless of what her role is. Um, I, after I've had that conversation, with this one said little boy, he has since corrected it. But speaking of which, on a phone call today with a parent and I mentioned something about Ms. Kallie she goes, 'Wait, who's Ms. Kallie?' Okay, it is March, and you don't know that we have a Ms. Kallie in our room? 'What do you mean he's?' I said, 'Well, um, she's my co-teacher. 'He's in a co-taught classroom? Does that mean he's co-taught?' Um... no (chuckles).

Ashley G.: (Chuckles) You would know that by now.

Deborah B.: I wanted to say 'Did you attend an I.E.P. meeting?' Um, no. 'Uh, he's in this co-taught classroom because this is the rotation he's in because a lot of them are in the same homeroom.' Most of them are in that homeroom and then they've added some and taking some away.

Ashley G.: Okay.

Deborah B.: To kind of give it some of a balance of not just all those kids, but she had no idea her child was in a co-taught classroom until today. Um-hum.

Ashley G.: Please describe a typical day in your co-taught math class (laughter). So... the structure, the schedule, the routine.

Deborah B.: When they come in because it's the second class that they attend, typically Ms. Previous Teacher's Name already had this engraved in their brains. And I will say, the stuff that she started, it was hard, it was harder to break. Like

they came in and she had it set aside the first 10 minutes they did.. if they had not finished their morning work in homeroom, because that was like a warm up. The little math for today, spiral review. We usually do that because it's, I think it's a pretty good review. Four problems, doesn't take long to get started, so they're usually, that first 10 minutes they did snack slash Morning Work, and then we went over it. And if there was a new concept being introduced, I did that as a, we would do it on a whiteboard. Like the interactive tutorial or, you know, whether it be a video, or whatever, a clip. And then we would split off into small group rotations and, um, typically, on a good day, if we are not doing a new standard, we could do four 15-minute groups.

Ashley G.: Four 15-minute groups.

Deborah B.: But you know, that's not always enough time. So sometimes I would extend it, but most days it's end... we usually do three 15 to 20-minute groups. And then pick up that last group we didn't see the next day. And carry over. Or if it's a group like that group that has it, they might not get that part. And that's harder for them to understand, 'Why don't we get to come to your table?' Um, 'Well you didn't need what we were doing today.' So, you know, I taught, I did start off with, you know, fair not equal. I'm giving you what you need. Do not question what one person has because what one person's working on you might not be working on that. So I did have to do that.

Ashley G.: So you said that they rarely, well they don't do really independent work. So what was what, what happens with tests?

Deborah B.: Um, the tests? Well, they all get it read to 'em, so it don't matter.

Ashley G.: And is that a, an accommodation on the Milestones as well?

Deborah B.: Yes, it is.

Ashley G.: (Whispers) This is so interesting .

Deborah B.: Um-hum. Now I mean I say all, but well, those 15 leave the room and then I have the rest, 12 stay in my room. Um-hum, and then some of those are ESOL. So some of them will be pulled out for small groups.

Ashley G.: So from the 12, some of those out of the 12...

Deborah B.: Will also be pulled out. Some of those will still also be pulled out.

Ashley G.: So potentially your... for testing, let's say, you're testing group could be smaller than maybe 10?

Deborah B.: Um-hum. Now I, now since I've taken over, I have not seen a single thing on what my E.I.P. kids need. And I know that they must have some accommodations. I have inquired and I have not gotten that yet. So I do say, if you need me to help you with some reading or word problems, I will read it. And I do, I walk around and monitor those, but they don't have, I don't have accommodations that says I have to give them a small group testing or read aloud accommodations. But of those 15, not all of them have a read aloud, but they all have that small group. So now that Ms. Parapro's here that has helped Ms. Kallie a lot, having 15 kids. They usually split those 15. But yeah, so usually I had to do some type of an assessment every Friday. So that is what our Friday looks like. Um, over half the class leaves and most of the time they take a very, very long time on those 10 problems. Very, very long, sometimes the entire...

Ashley G.: But this is them with a teacher? Like doing the assessment with someone.

Deborah B.: Um-hum.

Ashley G.: And for the most part, how are they performing?

Deborah B.: They're not performing on... now that's why, cause it's a grade level assessment. So if they're not, now I will say, that they have understood, right when we did the adding and subtracting with like denominators.

Ashley G.: Um-hum.

Deborah B.: Most of them got that, but not all. Some of them still wanted to add the denominator. Um and no matter how many times we go over that, that's um, so yeah, I don't know. They just make up numbers and write 'em down. And there's not even a rhyme or reason to... they get. They can tell you how they got it, but it makes no sense. But, so I take all, if I have... if they don't have an I.E.P. meeting. Or there's one that he just qualified this year so he's not gonna have an I.E.P. meeting. So we, um Kallie and I, have already talked about we can take this stuff, call mom and we're gonna go see (inaudible) cause something... this is not fair to him. Not Fair to me cause he's a behavior problem. You know? But he could be, could be behavior because he doesn't understand.

Ashley G.: Um-hum.

Deborah B.: And that's a lot of those. Um-hum.

Ashley G.: This has been one interesting interview (*Chuckles). That concludes our interview.

Appendix F: Observation Grid

Observation Grid: Co-Teaching in Mathematics				
Site Location: School A or School B	Date:	Grade Level:	Start Time:	Stop Time:
Focus of Research: Math and Special Ed. Teachers Perspectives on Co-Teaching				
Area of Observation	Whole Group Instruction	Small Group Instruction	Stations/Center Rotations/ Transitions	Other
Co-Teaching Method (one teach, one observe; one teach, one assist; parallel teaching; station teaching; etc…)				
Instructional Strategies (scaffolding, interactive notes, math manipulatives, graphic organizer, pre-teaching vocabulary)				
Interactions (teacher-class, teacher-student, teacher-teacher, student-student)				
Conversation (teacher talking time; student talking time; engagement of students)				

Math concept(s)/ skill(s) being taught (fractions, multiplication, etc…)				
Evidence of communication and language used (we, our, level of questions asked, flow of lesson, nonverbal cues)				
Resources (materials, differentiated, multiple modalities, evidence of co-planning)				
Classroom management (conflict management, student grouping, classroom dynamics)				
Classroom environment (parity, collaboration, who's leading the instruction)				
Other areas of observation (non-instructional activities)				
Important Notes				

Appendix G- Focus Group Questions

Thank you all so much for agreeing to meet with me once again to conduct this focus group session. I would like to start by asking…

1. What are your positive thoughts about co-teaching?

2. If a new colleague were coming to co-teach math, what advice would you give him or her?
2B. How would you advise them to do that?
What challenges would you forewarn the new colleague about co-teaching mathematics?

3. What realistic roles or obligations do math teachers exhibit in co-teaching?

4. What realistic roles or obligations do special education teachers exhibit in co-teaching math?

5. I'm finding in my research, that communication is really important in co-teaching; how are you able to communicate your math plans or ideas without formal planning?
Possible Follow-Up Question: Without formal planning sessions, how are you all able to be on the same page when it's time to deliver math instruction?
*Abigail and Lisa are the exception
Possible Follow-Up Question: How did you build that relationship? Can you give me three things you did to develop that relationship?
How is the parapro connected in the classroom, how is she made aware of classroom planning?

6. Which co-teaching method to use for any given math lesson? (one-teach, one drift; team teaching; parallel teaching; alternative teaching; one teach, one observe; station teaching).

7. As a co-teacher, is there ever a time when you don't agree with the type of method being used? If so, what do you do? Do you feel comfortable expressing this to your co-teacher?

8. Do you feel co-teaching in mathematics supports the success of Gen. Ed and Sp.Ed students? If so, what can be attributed for this success? If not, why do you think this is the case?
9. Does co-teaching support the success of math instruction? If so, how?

10. With the exception of one, all of you were placed in your co-teaching roles by administration. If you were given a choice of whether or not to be a math co-teacher next year, which option would you choose? Why? If the answer is no, what changes could be made to persuade you to be a willing participant? What supports would you like to see?

11. You all co-teach math, but the ways in which you structure your classrooms are very different. Could you tell me some advantages and disadvantages of your particular

classroom structure? In particular math instruction, how is this model beneficial in your classroom?

*Project models on the board

Gen. Ed and Sp.Ed teacher co-teach every subject	**Gen. Ed teacher and Sp.Ed teacher co-teach mathematics**	**Gen. Ed Teacher, Sp.Ed Teacher, E.I.P. teacher**	**Gen. Ed Teacher, Sp.Ed Teacher, Paraprofessional**
Sp.Ed teacher is with the same class the entire day	Sp.Ed teacher goes into the Gen.Ed's teacher room to co-teach mathematics	All three teachers in the room working with different groups on mathematics	All three teachers in the room teaching the same math concepts, but using different media, lessons, activities

Why do you teach math this way? (Teaching philosophy in math)

12. If you have to choose one co-teaching model to teach mathematics or if you could design your own model, which would you prefer? Why?

13. May I have copies of the lessons plans that were prepared for the days/weeks that I observed your classes?

13. Is there anything else I should know about co-teaching that you would like to share at this time?

Appendix H-Anticipated Data Reduction Matrix

	Why do I need to know this?	What kind of data will answer the questions?	Where can I find the data?	Whom do I contact for access?	Timeline for acquisition
What motivates teachers to become co-teachers? How do they come into the role of co-teaching?	To understand more about how teachers get into the co-teaching role.	Questionnaire	Email	fourth grade mathematics teachers; partnering special education teachers	February: Send out email with a 5-question questionnaire; teachers will be asked to complete the survey within one week
How are the perspectives of fourth grade elementary mathematics teachers' views on co- teaching similar to and different from their special education co-teachers?	To learn about how teachers view themselves as co-teachers and how they perceive their role in this model.	One-one-one interviews	Meetings with teachers	fourth grade mathematics teachers; partnering special education teachers	February: Meet with teachers after school for interviews 2 interviews per day 4 interviews within the week
How do teachers perceive co-teaching as an instructional model for teaching mathematics?	To learn if teachers find co-teaching an effective model for teaching mathematics.	One-one-one interviews	Meetings with teachers	fourth grade mathematics teachers; partnering special education teachers	February: Meet with teachers after school for interviews 2 interviews per day
Which co-teaching models are used most often in fourth grade mathematics classrooms?	To acquire information about how teachers utilize the multiple methods of co-teaching, and which methods they find most suitable.	One-one-one interviews; classroom observations; observing teachers during their planning period	Meetings with teachers; fourth grade mathematics classes; teacher planning locations	fourth grade mathematics teachers; partnering special education teachers	February: Meet with teachers after school for interviews February: Observe teachers during their planning periods (the same week as interviews) March: Observe partner teachers teaching mathematics
How do co-teachers effectively plan collaboratively to include the thoughts, ideas, and perspectives of both teachers?	To gather information about the planning practices of co-teaching partners.	One-one-one interviews; observe teachers during their planning period	Meetings with teachers; fourth grade mathematics classes; teacher planning locations	fourth grade mathematics teachers; partnering special education teachers	February: Meet with teachers after school for interviews February: Observe teachers during their planning periods (the same week as interviews)

Appendix I-Timeline of Study

<table>
<tr><th>January 2018</th><th colspan="2">February 2018</th><th colspan="2">March 2018</th><th>April 2018</th><th>May 2018</th></tr>
<tr><td>Dissertation Proposal Defense</td><td colspan="2">Begin study</td><td rowspan="4">Analyze data</td><td>Begin observing co-teachers teaching mathematics</td><td>Analyze data</td><td>Revise all chapters</td></tr>
<tr><td>IRB Approval</td><td colspan="2">Consent forms emailed and returned</td><td>Collect and analyze data</td><td>Work on chapters 4 and 5;</td><td rowspan="4">Submit draft of all five chapters</td></tr>
<tr><td rowspan="3">Informally ask participants to take part in the study</td><td rowspan="3">Collect and Analyze Data</td><td>Send questionnaire to participants</td><td>Work on Chapter 4</td><td rowspan="2">Revise chapters 1, 2, and 3</td></tr>
<tr><td>Begin interviews</td><td rowspan="2">Petition to graduate</td></tr>
<tr><td>Begin observing planning periods</td></tr>
</table>