THE EFFECTS OF VIRTUAL COACHING ON CO-TEACHERS’ PLANNING AND INSTRUCTION

by

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ABSTRACT

Recent legislation requires that students with disabilities receive equal access to the same educational opportunities as their typically developing peers (Cook et al., 2011). Therefore, most students with disabilities receive all or part of their education in the general education classrooms (U.S. Department of Education, 2008). Because of the diverse needs of students within the classrooms, co-teaching has become a popular method of special education service provision. The purpose of this study was to investigate the efficacy of virtual coaching provided to practicing co-teachers as they planned and cooperatively carried out instruction in the general education classroom. Single-case (ABAB) within participants withdrawal design was used to investigate the effectiveness of virtual coaching through online technologies on three co-teaching dyads (n=6). Data were collected through observations of archived video files, a Likert-type communication scale, and observational scales published in the co-teaching literature. Semi-structured interviews provided a measure of social validity. The efficacy of the virtual coaching intervention was examined through visual inspection of the data and percentage of nonoverlapping data. Observers used time-sampling measures to document student engagement during baseline and intervention conditions. Results indicated that all teachers increased use of varied co-teaching models and student-specific accommodations. Praise remained high while redirection of student behavior decreased over the length of the study. Students and co-teachers were not distracted by the virtual coaching intervention. The limitations of the study, implications for research and practice, as well as suggestions for future research are discussed. This study extended the work of Rock et al. (2009) and Scheeler et al. (2010).
DEDICATION

For Tori, there were times when I thought that I could not possibly love you more. And then I did. You will always be my best thing ever.

And

For Vicky, you will always be my best friend.
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CHAPTER I
INTRODUCTION

Until the passage of the Education for All Handicapped Children’s Act (EHCA) in 1975, students with disabilities were routinely denied the right to a free, appropriate public education. The passage of that landmark piece of legislation guaranteed students schooling until the age of 21. At that time, most schooling took place in segregated settings (Smith, Polloway, Patton, & Dowdy, 2008). Taught in separate classrooms by specially trained education professionals, a dual educational system quickly emerged—one for students with disabilities and one for students without. Separate approaches to teacher preparation and professional development served to further the dichotomy. Employing collaborative practices (e.g., co-teaching) on behalf of students with disabilities would not become part of the professional discussion for another decade.

February 2012 marked the 26th anniversary of the publication of former Assistant Secretary of Education, Madeleine Will’s (1986) seminal article, “Educating Children with Learning Problems: A Shared Responsibility.” Creating immediate controversy, Will introduced the Regular Education Initiative (REI). The REI offered education professionals an alternative service delivery model, which was considered radical at the time. In the article as well as during a public address on the matter, Will called for an end to the dichotomous educational system (i.e., general and special education). Arguing the dual approach was plagued by persistent and
unresolved problems that resulted in mixed results for students with disabilities, Will advocated for a unified system.

Will’s (1986) address and related publication sparked a new way of thinking about service provision for students with disabilities. In the dual system, special and general educators had separate roles and responsibilities (Halvorsen & Neary, 2009). Special educators taught students with disabilities. General educators taught those who did not. Although there were some attempts to integrate or mainstream students with disabilities into general education classrooms, general and special educators essentially worked in isolation. Moreover, while mainstreaming practices resulted in some students moving from segregated placements to general education classrooms, the specialized instructional supports they needed to succeed often did not accompany them (National Institute for Urban School Improvement, n.d.). As a result, much of the mainstreaming movement was limited to participation in non-academic educational activities, such as art, music, or physical education. Nonetheless, mainstreaming practices paved the way for more inclusive approaches, such as Will’s REI.

The move toward inclusive educational approaches (e.g., REI) shifted policy and practice from the philosophical notion that students with disabilities could benefit from time spent in the general education classroom to the ideological premise that students with disabilities not only had the right to be educated alongside their same-age, typically developing peers, but also to be protected from discriminatory practices (e.g., separate but equal) (Smith et al., 2008). Obviously, the principles underlying mainstreaming and inclusion differ. When students with disabilities are mainstreamed, the assumption is that they are ready, academically and socially; to receive grade-level instruction delivered by
a general educator in the general education classroom. By contrast, when students with disabilities are included, it is assumed that general and special educators collaborate, working in tandem in the general classroom to meet students’ unique academic, social, emotional, and behavioral needs.

Aligned with Will’s (1986) vision of a more unified system of education, fully inclusive service provision would mean that students with disabilities are not immediately and automatically segregated for specialized instruction. Instead, they are educated in neighborhood schools and receive special education services alongside same-age peers in the general education classroom. In practice, a range of inclusive practices has emerged, reflecting a commitment to maintaining the full continuum of service delivery options (Smith et al., 2008). The inclusion of students with disabilities results not only in changes in where students receive services, but also in the way in which general and special education teachers collaborate. As noted above, in an inclusive model, the two collaborate by coordinating and providing specialized instructional services delineated in students’ Individualized Education Programs (IEPs) within the context of the general education curriculum (Halvorsen & Neary, 2009). As special education services continue to evolve, support activities, such as co-teaching, require general and special educators to think, plan, and act differently (Friend, Cook, Hurley-Chamberlain, & Shamberger, 2010). In addition to Will’s official sanction for shared responsibility, the reauthorization of the Individuals with Disabilities Education Improvement Act of 2004 (IDEIA, also referred to as IDEA), coupled with the reauthorization of the Elementary and Secondary Education Act of 2001 (ESEA, also known as No Child Left Behind), set the stage for greater cooperation between general
and special educators. The former required educators to meet the needs of students with disabilities in inclusive settings to the maximum extent possible; the latter mandated their improved access, participation, and progress in the general education curriculum (Cook, McDuffie-Landrum, Oshita, & Cothren Cook, 2011; Luke & Schwartz, 2007; National Council on Disability, 2004).

Data presented in the 30th Annual Report to Congress confirmed that inclusive practices have increased with at least 95% of students with disabilities receiving all or part of their special education services in general education classrooms (U.S. Department of Education, 2008). The National Center for Education Statistics (NCES) reported that nationally, 57% of students with identified disabilities are served in general education classrooms 80% of the school day. In the state of Alabama, the number is greater than the national average as 79% of students with identified disabilities spend at least 80% of the school day in general education classrooms alongside their typically achieving peers (NCES, 2010).

Statement of the Problem

To meet the needs of an increasingly diverse student population, general and special educators had to find more collaborative ways of working together (Friend, 2007). Special educators who characteristically provided services to students with disabilities outside general education classrooms could no longer do so effectively (Friend). Moreover, general educators who previously had no instructional responsibility for these students found that this was no longer the case. Clear, distinct boundaries between general and special education practice had blurred. Undoubtedly, this shift toward shared responsibility resulted in a substantive change of practice for teachers who were
accustomed to entering their individual classrooms and closing the door (Waters & Burcroff, 2007).

This emerging reality, in which special and general educators are more often expected to share educational responsibility for all students and work in the same classroom space, requires them to learn new collaboration skills, chief among them how to plan and deliver joint instruction (Waters & Burcroff, 2007). The problem is neither current teacher preparation approaches, nor contemporary professional development efforts, appear to be providing teachers with the training and support they need to co-teach effectively (Spooner, Algozzine, Wood, & Hicks, 2010). Therefore, additional ways of supporting co-teachers must be developed and investigated.

**Rationale**

Dettmer, Thurston, and Dyck (2005) pointed out that one of the greatest obstacles co-teachers face is the lack of training and preparation for their new roles. Friend et al. (2010) maintained that high quality professional development for co-teachers should include joint coaching sessions. Indeed, even with quality training, teachers may struggle to implement skills they learn through teacher preparation programs or ongoing professional development training (Rock, Zigmond, Gregg, & Gable, 2011). The U.S. Department of Education (2010) has called for reform in the preparation and ongoing support of teachers. In the reform guidelines, the Department of Education outlined requirements, which indicated that every educator should have access to the preparation, ongoing support, and collaborative opportunities needed to be effective in inclusive classrooms (U.S. Department of Education). Therefore, a rationale for the study was to further our understanding of how job embedded professional development (i.e., virtual
coaching) can help co-teachers acquire the knowledge and skills needed for efficient planning and effective instruction in inclusive classrooms (Leko & Brownell, 2009; Rock et al., 2011; Sindelar, Brownell, & Billingsley, 2010).

Theoretical Framework

In order to be successful learners, adults must understand the importance of the new skills they are being asked to acquire and demonstrate (Lieb, 1991). McLeskey and Waldron (2004) conceptualized the knowledge that teachers possess in three ways: (a) knowledge for practice, (b) knowledge in practice, and (c) knowledge of practice. The concept of knowledge for practice holds that the more teachers know, the better they will teach. Teachers who have knowledge of subject matter, instructional strategies, and effective interventions through one-time professional development seminars gain knowledge for different practices. An outside expert presents information on the practice to teachers who are expected to then use the practice. Yet, historically teachers seldom use practices presented in this manner (McLeskey & Waldron). The second concept indicates that professionals may become better teachers through experience, personal reflection on practice, participation in collaborative groups, and inquiry into the classroom thereby gaining knowledge in practice. This idea follows the thought of learning within classrooms (i.e., in situ). Finally, McLeskey and Waldron saw knowledge of practice as learning constructed within an environment closely connected to the learner (i.e., the teacher). In this way, knowledge results from conjoined understandings of teachers and others committed to the long-term study of teaching and learning. Not only may this improve an individual teacher’s classroom practice, it may nurture a sense of professionalism because researchers and teachers have parity as fellow learners in the
processes of change in practice. This concept also ensures that supports are in place for sustainability of these practices.

The principles of adult learning theory (Carlson, 1989) that guide new teacher preparation practices and professional development include strategies that are learner-centered and interactive. The experience of receiving feedback during job-embedded learning (i.e., virtual coaching) could provide the opportunity for the learner-centered and interactive activities proposed by Carlson. Adult learners are most interested in learning when there is immediate relevance to the work they are attempting. For general and special educators new to co-teaching, virtual coaching during the processes of planning for and carrying out instruction in an inclusive classroom could provide assistance in understanding the application and relevance of a new skill set as it is put into practice. Immediate feedback through virtual coaching could provide high quality professional development for co-teachers so that appropriate models of co-teaching are implemented efficiently and effectively.

**Research Questions**

The purpose of this study was to investigate the efficacy of virtual coaching on practicing co-teachers as they plan and cooperatively carry out instruction in general education inclusive classrooms to students with and without disabilities. To do this, the researcher investigated two research questions:

Research Question 1 (RQ1)

How does virtual coaching affect how co-teachers plan for and carry out varied co-teaching models, student specific accommodations and modifications, and positive behavioral interventions and supports (PBIS)?
Research Question 2 (RQ2)

How does virtual coaching impact (i.e., benefit or disrupt) co-teachers and their P-6 students?

Limitations of the Study

To address the two research questions, single case research (SCR) (Kazdin, 2011) was employed to investigate the effects of virtual coaching on co-teaching planning and practice. There are several limitations associated with this study that could not be controlled by the researcher. First, a Likert-type questionnaire (Fraenkel & Wallen, 2003) [i.e., Co-Teacher Communication Satisfaction Scale (Ploessl & Rock, 2008)] was used to evaluate each teacher participant’s satisfaction with communication in the co-teaching relationship (see Appendix A). As a result, one limitation was the participants’ willingness to respond truthfully to the survey or semi-structured interview at different points during the study. Second, social desirability may have been inherent in participants’ responses (Gall, Gall, & Borg, 2007). For example, the teacher participants may have responded in ways they thought the researcher would want or ways they thought they should respond, instead of reporting their actual thoughts about the co-teaching relationship. Third, because the researcher was virtually (i.e., through electronic means) present during planning for and carrying out of various co-teaching lessons, the Hawthorne effect (i.e., participants may change their typical behavior merely because of the presence of the researcher) may have limited results (Gall et al.). Fourth, the small purposive sample size limited the ability of the researcher to generalize results of the study to the general population (Fraenkel & Wallen, 2003; Horner et al., 2005). Fifth, there was no random assignment to the control or intervention condition. Instead, the
SCR reversal design allowed each teacher participant to serve as his or her own control (Horner et al.; Kazdin). Sixth, the researcher also served as the virtual coach and primary observer (coder) for the study and, therefore, researcher bias may have limited the results. Finally, the trained inter-rater reliability observer was not naïve to the purpose of the research and therefore may have identified expected behaviors when they were not present (Gall et al.).

**Delimitations of the Study**

There are also delimitations associated with this investigation. The teacher participants invited to participate in this study were limited to intact teaching dyads from three purposively selected schools (Horner et al., 2005; Kazdin, 2010). This delimitation was desirable for comparison purposes as the invited participants completed the same intensive training program in special education. The study aimed to investigate the effectiveness of virtual coaching solely on the practice of co-teaching. Measurement of student outcomes was limited to academic engagement. Other facets of student performance such as academic achievement were not investigated due to lack of research resources.

**Assumptions of the Study**

Several assumptions are associated with this study. A primary one is that the co-teaching participants included in the study answered survey and interview questions honestly and to the best of their individual abilities. Second, due to their voluntary participation in the study, the researcher assumed that the co-teaching partners did not change their behavior simply because they were part of the study (Horner et al., 2005). Third, given the inclusive practices identified by the school districts, participants had
daily interactions with students who differed in levels of ability and disability. Fourth, the participants included in the study had varied knowledge bases and experiences. Fifth, the prior training on co-teaching given to the participants was adequate (Brownell et al., 2005). The researcher also assumed, as voluntary participants, the co-teachers followed the processes in the study as requested (Horner et al.).

Definition of Terms

For the purpose of clarity, a variety of terms associated with this investigation were required to be operationally defined.

Academic Disengagement: A P-12 student out of seat, talking to classmates about topics other than the assigned task, blurting, and/or staring into the distance (Rock et al., 2009).

Academic Engagement: A P-12 student participating in the lesson (i.e., eyes on the teacher; student in seat; working on assigned tasks; raising hand to answer questions) (Rock et al., 2009).

Advanced Online Bug-in-Ear Technology (BIE): A wireless communication system used to communicate with and provide discreet feedback to teachers while they were actively engaged in teaching students. The BIE technology combines four components: a webcam, a Bluetooth headset, a Bluetooth adapter, and Skype. The system developed by Rock and her colleagues (2009) (patent pending) used a Creative WebCam Live! Ultra-Wide Angle Web Camera™ (Version 3.0.0.217), a Plantronics P1-Voyager 510 Windsmart Bluetooth Headset™ (Model No. 72270-61), an IOGEAR Bluetooth 2.0 USB Adapter, Class 2™ (Model No. GBU221), and Skype™ (Version 3.0.0.217) (Rock et al.).
Bluetooth adapter: A technology device that allows short-range wireless transmission between the classroom computer and the Bluetooth Ear Piece. In other words, the adapter permits pairing of the Bluetooth earpiece with the co-teachers’ classroom computers (Rock et al., 2009).

Bluetooth Headset: An earpiece and microphone that provide a two-way audio connection to a computer via Bluetooth technology so that the co-teacher and coach can communicate discreetly.

Bluetooth Technology: A wireless protocol that connects electronic devices within short-ranges.

Co-Planning: The process of two teachers (i.e., the general and special educators) working together to design lessons, create units, determine assessments, identify needed accommodations and modifications, and craft positive behavior interventions and supports for students with and without disabilities (Dieker, 2001).

Co-Teaching: An instructional delivery approach in which special and general education teachers share responsibility for planning, delivery, and assessment of instruction for a heterogeneous group of students. The special and general education teachers work in coactive and coordinated fashion, that involves joint teaching of academically and behaviorally diverse students in inclusive classrooms (Bauwens, Hourcade, & Friend, 1989; Cook & Friend, 1995; Villa, Thousand and Nevin, 2004; Walther-Thomas, Bryant, & Land, 1996).

Disruption in Teacher Behavior (see Appendix B): Observed co-teacher behavior that indicates the virtual coaching (e.g., immediate feedback) provided through the
advanced online BIE technology interferes with the flow of instruction. Below are three types of possible disruption that may be observed (from Rock et al., 2009).

(a) Stop: The co-teacher stops instruction as defined by a 5 second or greater delay in teacher talk.

(b) Hesitation Nonverbal: The co-teacher hesitates briefly during instruction as defined by a physical drawing back or a facial expression showing surprise, panic, puzzlement, or thoughtfulness.

(c) Hesitation Verbal: The co-teacher hesitates briefly during instruction as defined by teacher talk characterized by “stalling for time language” such as “um”, “so”, or “what.”

Elementary Inclusion Classroom: The inclusion classroom, in the most basic definition, is a classroom where students with disabilities are supported in chronologically age-appropriate general education classes in their neighborhood schools and receive the specialized instruction delineated by their individualized education programs (IEPs) within the context of the general education classroom (Halvorsen & Neary, 2009).

Feedback: Education related information the coach provides to the co-teachers to evaluate behaviors, prompt for behaviors, or clarify behaviors (Rock et al., 2009).

General Education Co-Teacher: An educator who holds certification from a state education agency in P-6 General Elementary Education and who teaches cooperatively in the same classroom with a special education co-teacher (see below).

Positive Behavioral Interventions and Support Strategies (PBIS): The assessment and reengineering of environments so students with problem behaviors experience
reductions in these behaviors and increase social, personal, and professional quality in their lives. In this study, two specific strategies were coached for: (a) specific, descriptive praise (Simonsen, Myers, & DeLuca, 2010), and (b) neutral redirection (Steele, 1995).

Skype: A free voice over Internet protocol (VoIP) that allows users to videoconference at no cost (Skype, n.d.).

Special Education Co-Teacher: An educator who holds certification from a state education agency in the area of special education and who teaches cooperatively in the same classroom with a general education co-teacher (see above).

Student Specific Accommodations: Changes in instruction, management, and assessment that are needed by individual students with disabilities to help them participate and make progress in the general curriculum. In this study, the researcher focused on (a) alternate methods for responses (i.e., verbal responses, dictation to a scribe), (b) alternate modes of presentation (i.e., reduced number of items per page) (National Center for Learning Disabilities, 2006), and (c) use of color-coding strategies (Gould & Vaughn, 2000).

Student Specific Modifications: Changes in content or what the student is expected to learn in the general education setting (Smith et al., 2008). In this study, modifications coached for were limited to (a) targeting lower level skills, and (b) individualizing curriculum materials (Smith et al.).

Teachers’ Existing Classroom Technology: The classroom computer and Internet access in each participant’s classroom (Rock et al., 2009).
Virtual Coaching: Providing teachers with immediate feedback that is encouraging, instructive, and corrective through electronic means via the Internet and Advanced Online Bug-in-Ear technology (see above) (Rock et al., 2009).

Voice Over Internet Protocol (VoIP): An Internet Protocol (IP) telephony system used to manage the delivery of voice information over the Internet. Voice information is sent in digital form in discrete packets rather than the circuit-committed protocols of public switched telephone networks.

Summary

As teachers joined together to carry out principles of inclusive practice aimed at better meeting the educational needs of students with and without disabilities, collaborative approaches, such as co-teaching, have been designed to bolster their efforts (Murawski & Swanson, 2001). And it makes intuitive sense that combining the strengths of special and general educators should enhance educational experiences and outcomes for all students (Cook et al., 2011; Hallahan & Kauffman, 2006). So much so, in fact, Volonino and Zigmond (2007) noted that since 1995 co-teaching has been identified by the National Center on Educational Restructuring and Inclusion as the most common approach to specialized service provision in inclusive classrooms. Although it has gained in popularity, co-teaching has often suffered from poor quality implementation (Spooner et al., 2010). Dettmer et al. (2005) along with Spooner et al. (2010) maintained insufficient training and support practices typically undermined effective co-teaching practice.

In light of recent reform efforts such as the IDEA (2004) coupled with the reauthorization of the ESEA (2001), the U. S. Department of Education (2010) called for
reform in the preparation and ongoing support for teachers. Their outline provided that educators have access to the preparation, ongoing support and collaborative opportunities needed to be effective in inclusive classrooms (U. S. Department of Education). As learners, teachers must understand the importance of these practices in order to demonstrate them effectively in their classrooms (Lieb, 1991). Providing co-teachers with job-embedded professional development through virtual coaching not only provides teachers with this preparation and ongoing support, it results in the conjoined understandings of teachers and others committed to the long-term study of teaching and learning (McLeskey & Waldron, 2004). This combined effort may nurture a sense of professional collaboration needed for appropriate training and support because researchers and teachers have parity as fellow learners in the processes of change in practice.

The purpose of this study was not only to provide job-embedded virtual coaching to practicing co-teachers as they planned and cooperatively carried out instruction in the general education inclusive classroom, but also to examine its efficacy. The chapters that follow provide a comprehensive review of the relevant literature on co-teaching, methods used to carry out this investigation, the results of the investigation, and a discussion of findings relevant to previous co-teaching literature and future directions for study.
CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this study was to investigate the efficacy of virtual coaching provided to practicing co-teachers as they planned and cooperatively carried out instruction in the general education classroom. This chapter includes a review of the literature in the areas of co-teaching and coaching. First, an overview of present co-teaching practices is presented. Second, the empirical status of co-teaching is provided. Third, a theoretical framework for promoting best practices in co-teaching is described. Fourth, the importance of coaching and feedback in co-teacher training is established. Finally, a summary of what is known and unknown is offered.

A comprehensive review of the relevant co-teaching literature was conducted, using a combination of electronic and hand searching methods. A general search of the ERIC database using keywords (i.e., co-teaching, cooperative teaching, collaborative teaching) associated with cooperative teaching research produced 135 results. A second search of the psycARTICLES database, using the keywords “cooperative teaching and research” and “co-teaching” produced 105 results. A search of the Academic Search Premier database using similar keyword searches produced 27 results. Finally, ancestral citations were identified throughout the review of published work. The review that follows consists of peer-reviewed research articles relevant only to the purpose of this study.
An Overview of Present Co-teaching Practices

Professionals have defined co-teaching as an instructional delivery approach in which special and general education teachers share responsibility for planning, delivery, and assessment of instruction for a heterogeneous group of students. The special and general education teachers work in coactive and coordinated fashion, that involves joint teaching of academically and behaviorally diverse students in inclusive classrooms (Bauwens et al., 1989; Cook & Friend, 1995; Villa & Thousand, 2004; Walther-Thomas et al., 1996). Other authors (i.e., Dieker & Murawski, 2003; Gately & Gately, 2001; Salend, 2008) used similar definitions that outline characteristics teachers must have in order to implement effective co-teaching. These authors included aspects such as parity among the co-teachers, responsibility for classroom management techniques, and shared responsibility for the planning of, delivery of, and assessment of instruction in the co-taught classroom.

Co-teaching is one service delivery model that promotes collaboration between general and special educators. As mandated in the Individuals with Disabilities Education Act (IDEA, 2004), to the maximum extent possible the needs of students with disabilities should be met in the least restrictive environment. The goal of co-teaching is to not only better meet the academic, but also the behavioral, needs of all students. Co-teaching is designed so that two teachers share responsibility for educating a group of students in a heterogeneous setting.

Over the past 2 decades, the seminal work of Bauwens et al. (1989) has greatly influenced not only the professional knowledge base, but also the practice of co-teaching. Generally, the most widely accepted definition of co-teaching is based on the work of
Friend and Cook (1995) who shortened the term cooperative teaching to co-teaching and defined the service delivery model as two or more professionals jointly delivering substantive instruction to a diverse, or blended, group of students in a single physical space (p. 1).

Drawing on that definition, in this study, co-teaching is operationally defined as an instructional service delivery model in which two professionals provide special education or related services to students with disabilities in the general education classroom. Friend and Cook outlined six approaches to co-teaching that remain predominant in the co-teaching literature: (a) One teaching, one observing, (b) Station teaching, (c) Parallel teaching, (d) Alternative teaching, (e) Teaming, and (f) One teaching, one assisting. While others have proposed alternative methods for the implementation of co-teaching, the six models put forward by Friend and Cook are cited as those used and tested in much of the published co-teaching research. In the text that follows, a brief description of each is offered.

**One Teaching, One Observing**

The one teaching, one observing model is somewhat self-explanatory. One professional instructs while the other observes students within the general education classroom. The teacher who assumes the instructional role is teaching the whole class regardless of the number of students, while the observing teacher systematically collects academic or behavioral data related to the entire group or to individual students (e.g., number of students who are actively engaged throughout the lesson, or the number of times targeted students answer questions correctly). The model requires little joint planning between the two teachers, although they need to agree beforehand who will be
the observer, how data will be collected, and which students will be targeted. The non-
observing teacher is responsible for designing and delivering instruction. Friend and
Cook (2007) cautioned teachers not to become overly reliant on this model because the
observing teacher may be reduced to the role of an assistant. In order for use of the one
teaching one observing model to be considered mutually beneficial, the teachers should
alternate the teaching and observing roles. One benefit associated with this model is that
critical observation and data collection activities can be carried out without the added
responsibility of simultaneously managing students’ behaviors and providing effective
instruction.

**Station Teaching**

In the station teaching approach, both teachers actively instruct small groups of
students, by parceling the instructional content, skill, or learning strategy. Then, together
the two strategically plan which teacher delivers his or her respective part of the
instructional delivery. When carried out in the classroom, students move through the
stations, working under the guidance of each teacher for predetermined time segments.
Often, a third station is established at which students work independently or with peers
(Friend & Cook, 2007). Friend and Cook reported that the two most common problems in
implementing this model involved concerns about noise level and movement. The added
noise of another teacher talking during instruction and the additional disruptiveness of
students moving from station to station may trouble teachers. Teachers can address these
concerns by rearranging the physical space in the classroom and/or positioning teachers
to face away from each other to reduce distraction of two teachers’ voices. In order for
this model to work effectively, co-teachers should carefully divide instruction so that the
order of presentation does not affect students’ understanding. The station teaching model can be effective even when the teaching styles of the co-teachers differ. Benefits for students include a lower student-teacher ratio and students with disabilities are integrated into heterogeneous groups rather than singled out or grouped homogeneously.

**Parallel Teaching**

Parallel teaching was designed to decrease the student-teacher ratio in a large general education classroom (Friend & Cook, 2007). In this approach, teachers jointly plan instruction, and then the students are divided into two groups. Next, each teacher simultaneously provides instruction to one of the two heterogeneous groups. As can be seen, parallel teaching decreases the student-to-teacher ratio thereby providing students with disabilities and those who struggle with more opportunities to interact with a teacher. Parallel teaching differs from station teaching because the students do not receive instruction from both teachers. When using this model, teachers must plan jointly to ensure both groups of students receive, essentially, the same instruction and that grouping remains heterogeneous. As Friend and Cook cautioned, if teachers fail to vary grouping, the classroom may become a special education classroom within the general classroom. Also, teachers must consider their content competence when choosing this model. Although this issue seldom emerges in primary grades, it does pose a considerable dilemma for secondary co-teachers (Dieker, 2001).

**Alternative Teaching**

The alternative teaching model may be chosen by co-teachers if they consider it important for a small group of students in the class to receive instruction that differs from that provided to the larger group. This instruction may include pre-teaching, re-teaching,
assessment, or enrichment activities (Friend & Cook, 2007). In this approach, one teacher instructs a small group of students while the other teaches the larger group. Alternative teaching provides a context for intensive instruction within the general education classroom. One obvious concern is that the smaller group of students may miss essential instruction that was provided to the larger group. Therefore, grouping and timing must be carefully considered, and all students, at some point, should have opportunities to learn in the smaller group. When co-teachers use the alternative teaching approach, each one takes responsibility for providing small group instruction at different times. Decisions about which teacher instructs the small group should be based on the academic purpose underlying the alternative method. In other words, small group organization, purpose, and membership should be fluid, linked to student need, and considered within the context of the planned activity (Friend & Cook).

**Teaming**

When using the teaming model, co-teachers share responsibility for jointly planning and providing instruction to all of the students. This approach may include lecture presentations, simultaneously monitoring cooperative learning groups, or assisting students working independently. For instance, during large group instruction, co-teachers may demonstrate debates through modeling or they may role-play characters in a book. In another variation, one teacher explains while the other demonstrates a concept or step-by-step procedural activity. As students work in cooperative groups, both teachers circulate through the room prompting, questioning, and checking for comprehension. Of all approaches, teaming requires the greatest level of mutual trust, flexibility, and commitment. Co-teachers must overlap teaching styles or use styles that complement one
another in order for teaming to be successful (Friend & Cook, 2007). If not, teachers may find themselves confusing students and becoming frustrated with the interactions.

**One Teaching, One Assisting**

The final co-teaching model is one teaching, one assisting. As the name implies, one teacher delivers instruction while the other assists students who need redirection, clarification, or added support to benefit from the large group lesson. In this approach, the co-teachers’ goal is to ensure that all students in the classroom have the cognitive, behavioral, emotional, and social supports they need for optimal learning. One teaching, one assisting requires little joint planning and so may be used when preparation time is limited or unavailable. While this model can be used with ease, Friend and Cook (2007) caution that it too easily becomes the primary model put into practice in co-taught classrooms. When the one teaching, one assisting model consumes co-teachers’ practices, the assisting teacher, who is most often the special educator, may be perceived as a subordinate (e.g., glorified paraeducator) (Friend & Cook).

Friend and Cook (2007) posited that understanding these six co-teaching models is a prerequisite to establishing effective co-teaching relationships. The models are designed to be fluid and flexible. That means co-teachers should vary the models they implement to meet the needs of the students in their classrooms.

**Empirical Status of Co-teaching**

In this era of pressure toward evidence-based practice in educational settings, there is a push to provide support for the implementation of the aforementioned co-teaching models in schools. Descriptions of co-teaching models provide important information to frontline practitioners; however, current educational reform legislation,
such as IDEA 2004 and NCLB mandate use of evidence-based practices. Thus, the research base supporting co-teaching must be considered. In this review, the use of a meta-analysis to summarize and review previous quantitative research as well as metasynthesis to analyze previous qualitative findings to answer a variety of questions and guided the reviewer to seek areas for further investigation. In this way, the two types of syntheses assisted the reviewer in understanding whether what teachers are doing in practice makes a difference for students. Thus far, one meta-analysis and one metasynthesis provide the foundation for outcomes reported in previous co-teaching research and are reviewed in chronological order.

**Meta-analysis**

In conducting a meta-analysis of the co-teaching literature between 1989 and 1999, Murawski and Swanson (2001) identified only six studies that met rigorous methodological standards to be included in their meta-analysis. Of the six studies, three were published in refereed journals; the others were ERIC documents. Murawski and Swanson found an overall effect size of 0.40, which suggested that co-teaching is a moderately effective practice. The authors cautioned that the small number of studies and the inclusion of documents not published in refereed journals were limitations associated with their meta-analysis. However, of greater concern to Murawski and Swanson was the absence of explicit measures of treatment integrity. In other words, it was not clearly reported by the researchers, whether the co-teachers were co-teaching as planned throughout the entire instructional period. This concern led Murawski and Swanson to recommend that researchers gather data about co-teaching fidelity in future studies. In addition, they cited the need for studies with experimental and control groups to
determine how co-teaching differs from other service delivery options. Further, the authors recommended the need for studies that analyze outcomes for students related to a variety of variables. For example, analyzing student outcomes allows researchers to better understand when, where, and with whom co-teaching is most effectively implemented (Murawski & Swanson).

**Metasyntesis**

Six years after Murawski and Swanson’s (2001) quantitative meta-analysis of co-teaching appeared in the professional literature, Scruggs, Mastropieri, and McDuffie (2007) published a metasynthesis based on the results of 32 qualitative studies on the topic of co-teaching. When conducting a research synthesis, the authors attempted to systematically integrate a large body of published literature. To that end, Scruggs et al. investigated studies that employed qualitative research methods as the primary approach to the published research. However, studies were included if quantitative methods were also used. Relevant research was coded for demographic variables such as grade level, setting (region, urban/suburban/rural), and predominant co-teaching model. Reports were saved to a digital format and coded using methods of open coding (Creswell, 2006), free coding (i.e., NVivo), and then axial coding (Strauss & Corbin, 1998). The authors reported the data analyses procedures in use throughout the investigation were inductive in order to find categories of phenomena and the relationships between the categories. The meta-synthesis included qualitative studies about teachers’ perception of the professional benefits of co-teaching, as well as perceived benefits to students with and without disabilities. The results indicated that for students with disabilities one major benefit of co-teaching was successful inclusion.
Although students with disabilities believed they received additional attention and experienced greater satisfaction in the co-taught classroom, teachers indicated strong concerns about students’ skill levels (i.e., students within the inclusion classroom should be required to maintain a minimum academic and behavioral skill level). When students with moderate to severe disabilities were included in the sample, teachers explicitly stated that individuals whose needs they felt could not be met within the general education setting should not be included in the co-taught classroom. The researchers concluded that administrators, teachers, and students perceived co-teaching as beneficial for both social and academic areas of education. Overall, teachers reported satisfaction with co-teaching and indicated that the practice increased confidence and risk-taking by students with disabilities, which may in turn lead to continued improvement in all areas. The authors cautioned that benefits of co-teaching are contingent upon administrative support, volunteerism, compatibility, mutual planning time, and the need for more training (Scruggs et al., 2007).

Scruggs et al. (2007) found the one teach, one observe model was the most widely used of the six available among co-teachers. In this arrangement, the special education teacher often reported assuming a subordinate position. Indeed, the instructional delivery favored by the general education teachers continued to include mostly whole-class strategies with little differentiated instruction and a reluctance to individualize programs for students. In 30 of the 32 studies included in the meta-synthesis, researchers emphasized the importance of and difficulty with planning their participants experienced. Moreover, in studies that were included in the synthesis, researchers reported poorly defined co-teaching roles, territorial issues (e.g., classroom space and control), difficulty
for special education teachers to adapt to routines, and differing climates in the general education classrooms as common barriers to effective co-teaching practice. Interestingly, even though across the studies most of the participants experienced persistent barriers to co-teaching, they reported overall satisfaction with the co-teaching practice. Overall, results of the meta-synthesis suggested the co-taught instruction was nothing special, but was simply good general education instruction with assistance.

After critical examination of the co-teaching practice described throughout the synthesis, the models scarcely bore a resemblance to the models of co-teaching put forth by Cook and Friend (1995) or outlined by Walther-Thomas (1997). The service delivery model was employed less effectively than may be possible and in many cases was good general education instruction with assistance. Although the sample of studies was diverse and included varied educational settings and situations, the researchers reported the predominant model of co-teaching to be the one teach, one assist approach in 24 out of 32 reports.

While there was an overall satisfaction with co-teaching among participants, a common theme reported by Scruggs et al. (2007) was the need for teacher training in co-teaching. In some cases, general education teachers reported being unprepared to handle some medical conditions of students with disabilities (Vesay, 2004). In other instances, teachers expressed the need for additional training in flexible thinking (Buckley, 2005), skill development (Curtin, 1998), different co-teaching models (Feldmen, 1998), and the use of technology (Luckner, 1999). In fact, nearly all explorations offered requests for additional training from participants (Scruggs et al.). As can be seen, these studies spanned 7 years and the teachers continued to request training to support co-teaching.
Models of Co-teaching Observed in Practice

To date, two syntheses—one qualitative and one quantitative—of co-teaching have appeared in the literature. In contrast, the literature base for co-teaching is replete with information that described how co-teaching should be implemented in inclusive classrooms (Cook & Friend, 1995); modifications of models for secondary rather than elementary settings (Dieker, 2001; Murawski & Dieker, 2004); and tips and advice for creating effective co-teaching relationships (Friend & Cook, 2007; Keefe, Moore, & Duff, 2004; Vaughn, Schumm, & Arguelles, 1997; Walther-Thomas & Bryant, 1996). Many researchers have investigated what co-teaching looks like when put into practice in real world classrooms. These articles are discussed sequentially, beginning over a decade ago.

In 1995, Baker and Zigmond compared observations of co-teaching in five different states (i.e., Kansas, Minnesota, Pennsylvania, Virginia, and Washington). The authors found what they described as good general education instruction occurring in the classrooms. Unfortunately, they concluded there was no specially designed instruction evident in these co-taught classrooms for students with disabilities. The models of co-teaching observed included consultation, team teaching, peer tutoring, and assistance by paraprofessionals or combinations thereof. The special education teachers appeared to place more importance on the activities in the classroom than on providing specialized, personalized instruction for students with disabilities (Baker & Zigmond).

Five years later, Rice and Zigmond (2000) shifted the comparison of co-teaching in practice among states to co-teaching in practice internationally when they conducted research with a sample of 17 teachers in Queensland, Australia and Pennsylvania, USA.
The comparative research design included eight interviews and three observations in Queensland, while there were nine interviews and nine observations in Pennsylvania. Through a qualitative analysis of semi-structured interviews with and systematic observations of teachers of varied experiences, the researchers reported the most common model of co-teaching to be one teach, one assist (Friend & Cook, 2007) with the general education teacher assuming the primary teaching role in both Queensland and Pennsylvania. Further analysis of these data produced six themes specific to the influence of attitudes, benefits to all, compatibility, equal status, contributions, and training on co-teaching partners. None of the models observed in either setting fully met the co-teaching criteria defined by the researchers. This incongruence may be attributed to the lack of an effective communication and agreement during planning for use of the models.

As if in response to Rice and Zigmond (2000) as well as Murawski and Swanson (2001), Dieker (2001) researched professed effective co-teaching teams in order to identify variables that contributed to successful practice. Specifically, Dieker investigated co-teaching team structures and practices. Participants included a convenience sample of 15 teams nominated by three or more university professors, special education supervisors, administrators, and inclusion faculty members. Of the 15 teams, 9 agreed to participate. The final sample consisted of nine general education teachers and seven special education teachers in seven middle school classrooms and two high school classrooms at seven different schools.

With each co-teaching pair, Dieker (2001) conducted four classroom observations over 16 weeks using content analyses procedures. In addition, co-teaching teams documented the amount of time they devoted to planning during 6 predetermined weeks.
within the first 16 weeks of the study. Not only did co-teachers record the actual time spent planning but also they reported their desired amount of planning time. Teachers indicated that they did not have this time. Dieker interviewed students with and without disabilities (i.e., six total in each classroom) using a structured protocol, as well as co-teachers using a structured protocol designed to better understand the development of co-teaching relationships among participants. An independent coder provided inter-rater reliability at an 80% agreement rate for themes that emerged from the student and co-teacher interview data.

Based on this qualitative analysis, Dieker (2001) reported that the teams used five co-teaching models described by Cook and Friend (1995). After closer examination, however, it became apparent that often four of the teams employed one teach, one assist; four teams used team teaching if there was common planning time scheduled, and only one team used a variety of co-teaching models.

Based in part on these findings, Dieker (2001) recommended further research and development of Friend and Cook’s (1995) original co-teaching models for use in secondary classrooms. These recommendations included (a) preplanning sessions so that co-teachers become familiar with each other before the school begins, (b) preparation for a positive climate, (c) consideration of academic and behavioral needs that affect the process of co-teaching, (d) development of academic and behavioral goals, (e) clarification of roles, (f) scheduled common planning time, (g) development of an evaluation plan, and (h) maintenance of the continuum of service options. Moreover, Dieker emphasized the need for additional investigation of co-teaching practices in order
to improve the use of varied co-teaching models among both new and experienced general and special educators.

Morocco and Aguilar (2002) supported the conclusions of previous researchers in that they also found that most special education teachers assumed a supportive role when co-teaching with general educators. Although both teachers shared in the full range of instructional roles (i.e., primary instruction, assisting students), the content area teachers provided instruction most often and the special education teachers provided students with individualized help most often.

Rea, McLaughlin, and Walther-Thomas (2002) continued an investigation of co-teaching practice with quantitative and qualitative methods. Like Dieker (2001), they focused their inquiry on the description of special education models at two middle schools; however, their research compared an inclusive model at one school with a pull-out model at another. In the results, the researchers indicated students who participated in the inclusion model earned higher grades, achieved at the same rate or higher on standardized tests, demonstrated no more behavior problems, and had fewer absences than students in the pull-out program. The researchers relied on archival data to compare outcomes for students placed in the two programs. While these data supported the use of inclusive co-teaching practices, the findings are limited in several ways. Of primary concern is the sample of two distinctive service delivery models in a small, suburban school district. The researchers identified co-teaching as common practice in the inclusive school. Yet, there was no clear description of how co-teaching was operationalized in this setting. No direct correlation between co-teaching and student
outcome could be made, as it appeared the higher achieving school simply did a better job educating all students.

The researchers (Rea et al., 2002) noted that better communication between professionals, regardless of the model of service delivery, is necessary as schools become more inclusive. The more inclusive school provided teachers with common planning time, manageable specialist caseloads, and collaborative team meeting time to support communication, problem-solving, and the development of appropriate support for students in the inclusive setting. This suggested good collaboration among general and special educators promotes greater achievement for students with learning disabilities than pull-out programs.

Weiss and Lloyd (2002) continued the examination of roles and responsibilities for special education teachers in their qualitative analysis of data collected on the actions of six special education teachers (i.e., three middle school level teachers and three high school level teachers). The purposive sample was identified in order to examine and describe the roles and instructional actions of secondary special education teachers who co-taught in general education classrooms and special education classrooms. Weiss and Lloyd completed 54 thirty-minute observations (nine per teacher) over a 4-month period. The results indicated that during their time in general education classrooms, special education teachers played four roles. Similar to results reported by other researchers (i.e., Rice & Zigmond, 2000; Walther-Thomas, 1997), special education teachers monitored student behavior and supported the instruction that was dominated by the general education teacher. A second action carried out by special educators who participated in this investigation was teaching the same content to a group of students in a separate room
(i.e., a pull-out setting). The third action observed by investigators was special education teachers teaching different content to a group of students within the general education classroom (sometimes called pull-out/pull-in). Only one of the six special education teachers taught with the general education teacher in the inclusive classroom using a team teaching approach. Conversely, in the special education classroom, the special educator became the sole instructor, providing more specific explanations, questions, help, and feedback. In the case of co-teaching in the general education setting, there was little use of the special education teachers’ expertise. Co-teaching was implemented without much thought of how to implement or how well the implementation was progressing, which mirrored the results found by Zigmond and Baker (1995). The co-teachers reported little consistency in training and special education provided only extra monitoring and an added person in the classroom to ask questions. Teachers reported barriers to implementation such as special education teachers’ time split among several general education teachers, gaps in the skill level of special educators compared to content area teachers, and special education teachers’ role as an aide in the classroom. Teachers who participated in this study indicated a need for more information related to effective implementation of co-teaching, a need for better training, and a need for support once co-teaching models were in practice. Yet, once again teachers were satisfied overall with co-teaching as implemented in these classrooms.

In an attempt to describe the efforts of one school district to implement co-teaching at the district level, Wischnowski, Salmon, and Eaton (2004) reported on 2 years of data collected while a rural school district in New York State implemented co-teaching for the first time. Data related to student achievement, appropriateness of testing
accommodations, behavioral referrals, students' self-concepts, and stakeholder satisfaction. In the final analysis, Wischnowski et al. found outcome measures to be difficult to gather. Therefore, they reported successful efforts as none of the students regressed over the 2 years included in the study. Of interest is that while the authors claim to provide a framework for organizing data-driven decisions, very limited data were reported. Likewise, during the 2-year period of implementation, elementary and secondary co-teachers relied on one teach, one assist with the general education teachers taking leading roles as the primary model of co-teaching. As with other studies, stakeholders reported a general level of satisfaction with the co-teaching that was implemented.

Keefe and Moore (2004) continued the analysis of secondary co-teaching practices and reported results based on semi-structured interviews with suburban high school teachers. Keefe and Moore documented their intent to assist teachers with the inclusion of students with disabilities into general education high school classrooms. Qualitative analysis yielded three major themes: the nature of collaboration, the roles of the teachers, and the outcomes for students and teachers. No consistent method for creating co-teaching partnerships was found among teachers included in this study. Some of the partners never met before co-teaching, while others had partnered because they knew one another. The teachers in this study reported a need for teachers interested in co-teaching to have input identifying preferred partners leading the researchers to note the importance of compatibility as a contributing factor for successful practice. Teacher participants also cited the importance of communication, particularly in the beginning stages of the relationship, as an important ingredient for success.
The co-teaching participants involved in this study (Keefe & Moore, 2004) struggled with role identification in part because in this school, they were left to figure out how to work together. Because the teachers had no guidance in implementing co-teaching models, many settled into a division of labor where in the general educator took responsibility for delivering the curriculum and the special educator took responsibility for providing the necessary modifications and accommodations. The special education teachers reported that the students viewed them as assistants in the classroom, while general education teachers reported that their co-teaching partners’ lack of content knowledge posed a hindrance. Special educators echoed this concern and indicated there was a lack of trust between the partners when one of the two was not comfortable with the curriculum. All teachers suggested that at the secondary level, special education teachers should specialize in one or two subjects in order to become more capable and contributing partners in the co-taught classroom. Overall, both general and special education teachers did not report being sufficiently prepared for delivering co-taught instruction.

Keeping the spotlight on secondary co-teaching, Magiera, Smith, Zigmond and Gerbauer (2005) investigated the practices of 10 partners in eight secondary math classrooms. These researchers’ descriptions of the roles of the general educator and special educator paralleled that of previous observational reports of Dieker (2001) and Keefe and Moore (2004). Trained observers recorded narrative notes and collected observational data at 5-minute intervals during 49 forty- to fifty-minute co-taught lessons. For each pair, three observations occurred at the beginning of the second semester and up to three observations occurred later in the semester. Magiera et al. reported that
monitoring students while they worked independently was the role performed most often by co-teachers. While the general education teachers’ next most commonly occurring role was to provide primary instruction, the second most common role of the special education teachers was that of assisting students. Friend (2007) maintained that the one teach, one assist model is appropriate for beginning co-teaching practice, but as the researchers of this study noted, these teachers had been co-teaching for 3 to 5 years.

During the interviews with the four mathematics and four special educators, the partners described the special educator’s role as supportive, which confirmed the observational data.

Even when two teachers were present, whole-class instruction remained the dominant approach to math instruction. The researchers described a revolving door model of co-teaching as the model observed most often. Participants cited a lack of co-teaching training and lack of time for co-planning as barriers to successful implementation.

Turning the instructional tide to outcomes, Magiera and Zigmond (2005) designed and implemented a study to investigate the instructional experience of students with disabilities in co-taught versus solo-taught classroom settings. While in previous studies (see Dieker, 2001, Walther-Thomas, 1997), participants were nominated because they reflected exemplar models of co-teaching; the teachers included in this research were not. In fact, they reported receiving limited or no training in co-teaching models and receiving little or no co-planning time. Observations occurred in each middle school classroom under two conditions when (a) the special educator was co-teaching with the general educator and (b) when the general educator was teaching solo. Researchers observed in 11 classrooms under each condition for four times.
Magiera and Zigmond (2005) reported significant differences in the number of one-to-one instructional interactions during co-taught lessons compared to solo-taught lessons. During co-teaching lessons, students with disabilities received individual instruction from a teacher 2.2% of the time, but during solo-taught lessons, such interactions occurred less than 1% of the time. Although students with disabilities had more contact with a teacher during co-taught lessons, it was limited to the special educator. The general educator interacted with students with disabilities significantly more often during solo-taught lessons. The researchers reported no significant differences in other variables (i.e., student grouping, on-task behavior, students interacting with other students, independent student work, whole class content instruction, student participation, or directions provided to entire class or individual students).

Overall, Magiera and Zigmond (2005) found little instructional benefit for students with disabilities in co-taught classrooms; however, the effects of training and planning time remain unknown. For example, the lack of significant differences in the grouping and instructional arrangements used might have been due to insufficient training on the co-teaching models. Magiera and Zigmond suggested future research should compare co-teachers who receive ongoing training and consistent co-planning time with those who do not.

In 2005, Mastropieri, Scruggs, Graetz, Norland, Gardiizi, and McDuffie presented findings from a long-term qualitative investigation of co-teaching in science and social studies middle and high school classrooms. Case study data were collected from four case examples through observations of classroom activities, field notes of researchers, videotapes, interviews with teachers and students, and artifacts such as students’ written
work. As with previously discussed research, in some cases, co-teaching was successful and effective and therefore promoted success for students and teachers while in other cases barriers remained. Interestingly, the greatest success in all cases occurred as two teams of teachers taught units on ecosystems in fourth and seventh grade science. Both teams reported benefits for teachers, but the fourth grade team (which volunteered to teach together) displayed more parity in the classroom than the middle school team who were assigned to teach together. The assigned team relied most often on the one teach, one assist model of co-teaching. In the second case example, tensions grew as the year progressed. The co-teachers did not agree about the best ways to teach students or handle classroom behaviors of students. Eventually, the teachers split the class into two groups and moved into two rooms for many classroom activities. The researchers reported that students were able to adapt to the differing teaching styles of the educators, but the teachers themselves struggled with differing teaching and management styles. Two other case examples reported results from two different high schools that put heavy emphasis on testing. In both cases, teachers demonstrated distinct working roles and responsibilities in the classrooms. As with other research in the area, general education teachers became curriculum experts who held dominant roles in the classrooms and special educators became managers of student behavior and held the roles of assistant.

The results of a study conducted by Harbort et al. (2007) converged with those of Dieker (2001), Magiera and Zigmond (2005), and Rice and Zigmond (1999), when they investigated the responsibilities of individual teachers in two co-teaching teams at the secondary level. The results based on momentary time sampling procedures indicated the addition of the special education teacher to the general education classroom did not
change daily instructional practices. As with the results by Keefe and Moore (2004) and Magiera et al. (2005), it was found that most often instructional time was devoted to large group instruction. One teach, one assist was the only co-teaching model implemented in both classrooms, and the general education teacher assumed the primary role for instructional content delivery. Harbort et al. concluded that the one teaching, one assisting model used in these two classrooms did not provide effective special education services to the students with disabilities who received instruction in the general education classroom. The outcomes of this study were discouraging to the researchers because three of the four participating teachers reported at least 3 years of previous co-teaching experience. The researchers recommended teacher training include providing guided practice in co-planning, giving pre-service teachers feedback on their co-teaching competencies, and conducting formal evaluations of co-teaching practice on student learning.

Hang and Rabren (2009) studied students’ and teachers’ perspectives of various co-teaching models and the efficacy of their practices through surveys and observations. The study included 31 general educators and 14 special educators from elementary and secondary levels all of whom were in their first year of co-teaching. Participants also included 58 students with disabilities. Hang and Rabren’s results supported previous researchers (i.e., Austin, 2001; Dieker, 2001) with confirmation that students with disabilities and teachers in co-taught settings harbored positive perceptions. The findings converged with those reported by Walther-Thomas (1997), which reported more appropriate behaviors were evidenced by students with disabilities in co-taught settings than those in resource (pull-out) settings. Further, the results supported the importance of
co-planning time. Interestingly, both the general and special educators viewed themselves as more responsible for behavior management than the other teacher. The researchers hypothesized the lack of common planning may explain why the two teachers each felt they assumed more responsibility than the other. Interestingly, behavioral records indicated more inappropriate behaviors by students during co-teaching. Researchers suggested this increase was due to more eyes watching for inappropriate behaviors. Results of the study documented that students in co-taught settings scored significantly higher on an achievement test when the test’s results were compared to previous years.

In this review of the literature from 13 studies between the years of 1995 and 2009, 69% reported, that the one teach, one assist co-teaching approach was the primary model of co-teaching used by participants. Friend and Cook (2007) recommended that the one teach, one assist model should be a model of co-teaching that partners can implement easily and that beginning co-teaching partners should start with this model or use the model interchangeably throughout the cycle of a lesson. Then, as the co-teaching relationship grows the co-teachers should use the one teach, one assist model less often. The accumulated research on co-teaching indicated an overreliance on the one teach, one assist model, yet provided no means to change the practice so teachers may implement co-teaching with fidelity through the all six models. Of the 10 studies included in this review, 4 (40%) included Zigmond as one of the investigators (i.e., Baker & Zigmond, 1995; Magiera et al., 2005; Magiera & Zigmond, 2005; Rice & Zigmond, 2000). Therefore, while others have attempted some critical analysis of the empirical status of co-teaching, only one investigator (i.e., Zigmond) has continued to probe the practice of co-teaching as a useful and effective service delivery model for students with disabilities.
who are receiving instruction in general education settings. There is limited proof of the
effectiveness of the model, yet co-teaching continues to be the primary means of service
delivery for students served under IDEA within the general education setting (Magiera &
Zigmond, 2005; Volonino & Zigmond, 2007).

**Benefits for Students and Teachers**

In an attempt to move beyond investigating the models of co-teaching put into
practice, researchers also explored more deeply the attitudes, benefits, and barriers that
surfaced when co-teaching became daily practice. The qualitative research indicated that
potential benefits of co-teaching may be high: (a) increased collaboration and use of
differentiated teaching strategies (Banerji & Dailey, 1995), (b) an increased
understanding of what diverse students require (Banerji & Daily), (c) increased support
among teachers (Cross & Walker-Knight, 1997; Salend et al., 1997), (d) enhanced
learning environments for students (Baker & Zigmond, 1995), and (e) increased social
outcomes for students with disabilities in co-taught settings (Cross & Walker-Knight,
(i.e., Banerji & Dailey; Cross & Walker-Knight) suggested that teachers benefit through
the personal and professional support gained by working closely with a colleague and
exposure to a wider range of students. Ideally, students in the co-taught classroom gain
the attention of a second teacher which may help students not formally identified with a
disability, but who may need extra help. The findings of research investigating student
outcomes, student perceptions of co-teaching, and teacher perceptions of co-teaching are
discussed beginning with those conducted earliest and proceeding to those that have been
conducted most recently.
Student Outcomes

Bear and Proctor (1990) investigated the performance of students in inclusive third grade classrooms. Students’ test scores in inclusive classrooms where a Team Approach to Mastery (TAM) was implemented were compared to the scores of students in pull-out resource rooms. The TAM model included two teachers who jointly delivered instruction to one group of students. Students in third grade classrooms in four neighboring school districts were the participants for the study. Participant groups included two groups of students who were identified with mild disabilities and two groups of students with no identified disabilities. Students with disabilities were split into either TAM or resource settings. Students without disabilities were placed in a TAM classroom or a typical general education classroom. Bear and Proctor reported that when students with disabilities were included in the general education classroom, they did not harm the academic achievement of other students.

In Self, Benning, Marston, and Magnusson’s (1991) 3-year study of a cooperative teaching project (CTP), researchers reported formidable outcomes for students whose teachers participated in the model. Student progress was monitored weekly by oral reading fluency (i.e., the number of correct words identified during a 1-minute of oral reading). Teachers adjusted instruction according to students’ needs. Paired t-test analysis indicated that changes in students’ oral reading fluency scores were significant at the .003 level.

Although the results of this research sounded promising, the co-teaching model described by the researchers did not reflect the service delivery model designed by Bauwens and Hourcade (1989). During the study, the special education teacher worked in
the general education classroom carrying out the role of a supplemental instructor by
providing 25 minutes of intensive reading and reading readiness instruction to targeted
students 5 days a week. Although all teachers and support personnel in the school worked
together to provide intensive reading instruction to students at risk for failure in the
general education classroom, the special education teacher served only those students
who demonstrated the greatest instructional needs. Therefore, while CTP appeared to be a
collaborative model for inclusive classrooms, it actually reflected a traditional special
education program provided in the general education classroom instead of a resource
(pull-out) room.

Boudah, Schumaker, and Deshler (1997) compared four experimental co-teaching
pairs (eight teachers) with four control co-teaching pairs (eight teachers). Participants in
the experimental group received two training sessions on the Collaborative Instruction
Model (CIM) which targeted four strategic skills: organizing information, analyzing
concepts, paraphrasing information, and mastering information. Researchers used time
sampling measures to record the intensity of instruction and role exchange between
teaching pairs. Student data collection included academic engagement, mastery of
strategic skills, and test scores. The results indicated the teachers in the experimental
group devoted a higher percentage of instructional time to directing student learning. Yet,
the researchers reported limited academic engagement opportunities for students with
disabilities who were included in secondary co-taught classrooms. More troubling,
perhaps, was that while students with disabilities who were taught by teachers in this
group used strategic skills significantly more often, their test scores decreased from
63.7% (range = 0-100%) to 58.19% (range = 31.39-71.67). Conversely, students
identified as low achieving increased their performance from 66.6% (range = 0-100%) to 71.96% (range = 46.60-97.50%).

In a turn from social to academic benefits for students, Klingner, Vaughn, Hughes, Schumm, and Elbaum (1998) examined the academic progress of students with and without learning disabilities who were fully included in general education co-taught classrooms. Two special education teachers were assigned to co-teach with three general education teachers each (six co-taught classrooms). Student participants included 25 students with learning disabilities and 89 of their non-disabled peers (n=114). The teachers in the study received year-long professional development in empirically sound instructional approaches including co-teaching.

Based on achievement scores, Klingner et al. (1998) reported that 82% of the participants showed progress. Students with learning disabilities showed more growth than students identified as low-to-average achievers. While students identified as high achievers demonstrated the most growth, those students with identified learning disabilities made significant gains in reading measures. However, the researchers reported that 20% of students with learning disabilities did not improve their scores on reading measures and 26% of the low-to-average achievers made no progress in reading in general. There were no statistically significant gains in math. While the researchers stated the teachers co-taught, they offered no operational definition of co-teaching, yet the purpose of the study was to describe academic outcomes for students of all ability levels in a general education co-taught classroom. The researchers specified the roles of the special educators as co-teaching, instructing small groups as needed, and working one-on-one with students with learning disabilities. There was no further description of
how the two teachers carried out co-teaching instruction. The sample of students was also a concern since the school population included 937 students, 94% of whom were identified as Hispanic with 4% White non-Hispanic, 1% African American, and 1% Asian. In regard to the progress of the students, the researchers failed to discuss variables such as cultural differences and the primary language spoken at home, on the progress of students.

While students with learning disabilities showed greater progress than the low-to-average achievers, the researchers did not discuss the relationship or impact of specific co-taught instructional practices used in the classroom on student outcome data. Rather than an analysis of how co-teaching impacted outcomes for students with learning disabilities in inclusive settings, this research study offers more of an analysis of how the specific instructional practices implemented after professional development impacted literacy learning for students with learning disabilities and low achieving students who are from Hispanic ethnic backgrounds.

In the study of co-teaching in Queensland, AU and Pennsylvania, USA described earlier in this review, Rice and Zigmond (2000) reported on academic and behavioral factors related to student outcomes, and noted a limitation of the study was that only data collected from the perspective of the co-teachers were included. In this case, the teachers believed co-teaching that was well done and resulted in academic and social gains for all students. Therefore, they regarded it as an effective service delivery model for secondary classrooms. The researchers asserted that any claims regarding the effectiveness of co-teaching practice should also address students’ perspectives.
Teachers who participated in the previously discussed study conducted by Keefe, Moore, and Duff (2004) reported positive outcomes for students including reduced stigma involved in being identified as a student in need of special services, increased help and modifications, and improved levels of learning. Interestingly, while the general education teachers reported no negative outcomes for students with disabilities, special education teachers expressed concerns that some students need levels of support that reach beyond those that can be accomplished in the general education classroom.

Fontana (2005) investigated the academic achievement of eighth grade students with learning disabilities who received special education service in co-taught general education classrooms (experimental group) compared to same age peers who did not attend co-taught classes (control group). Fontana reported significant improvement at p. < .05 level of students’ math performance when comparisons of grades were made using paired samples t-test to compare mean of seventh grade math grades with means of eighth grade math grades for students in the experimental group. The researcher also reported improvement in writing for this group of students, but not at a significant level. And while the control group showed an increase in grade averages from seventh to eighth grade, they reported the increases were not significant. Teachers’ responses to an informal survey completed before and then after co-teaching arrangements indicated that teachers in the co-teaching models were using more instructional adaptations and instructional strategies than they could if they were each teaching in isolation. While teachers used a variety of co-teaching models throughout the length of the study, one teach, one assist was the model was most often used. Teachers who participated in this study received little initial training or ongoing support in co-teaching throughout the
school year. Fontana suggested that training would have been beneficial for teachers who participated as the training could have supported the teachers in handling differing philosophical views and in attempting new skills. Although the general education teachers appeared to direct the special education teachers, the co-teachers were satisfied with co-teaching in general. Moreover, while they increased use of instructional adaptations, they used only those that would benefit the entire class rather than those that may have benefitted a small group or an individual. Fontana suggested that future research studies should investigate the effects of various co-teaching models on student achievement.

**Student Perceptions**

To gain insight into the students’ perspectives, Pugach and Wesson (1995) interviewed nine fifth grade students with learning disabilities and nine of their peers without disabilities who were included in a co-taught classroom. Students reported a positive classroom climate wherein both teachers (i.e., general education teacher and special education teacher) offered them more one-on-one assistance. Pugach and Wesson reported that the students thought there was a content knowledge difference between the two teachers. The students viewed the special education teacher as the relief teacher because this teacher mainly provided individualized help. The students viewed this positively and apparently were not stigmatized by receiving extra help.

Vaughn, Elbaum, and Schumm (1996) reported on student-specific data in an investigation of the social functioning of 64 students who participated in co-taught second, third, and fourth grades. Data collected through peer ratings, positive and negative nominations, reciprocal friendships, and self-concept and peer relationships
measures indicated that while placement in inclusive settings did the students no harm socially, it did not significantly increase students’ self-concepts from fall to spring semesters. Although the number of students with disabilities who were not liked by peers increased from fall to spring, researchers noted a dramatic increase in the number of reciprocal friendships that students with disabilities formed. Vaughn et al. cautioned that results of the study were limited due to the difficulty separating setting effects from other extraneous or confounding variables including teacher effectiveness or other contributing factors such as school and home influences.

Vaughn, Elbaum, Schumm, and Hughes (1998) returned to the examination of social benefits for students in their investigation of social outcomes for 185 students with and without learning disabilities in two general education settings which included a co-taught inclusive classroom and a classroom in which consultation and collaboration approaches were used. Proponents of inclusive education argue that students with disabilities are more socially accepted, feel better about themselves, and have a greater number of friends when placed in the general education classroom for the entire school day (Bilken & Zollers, 1986; Gartner & Lipsky, 1989; Putnam, Spiegel, & Bruininks, 1995). Vaughn and her colleagues set out to test these assumptions, arguing that peers, regardless of instructional setting, poorly accept students with learning disabilities.

The co-taught classroom was one in which the general and special education teachers shared instructional responsibility for between 27 and 35 students where approximately half of whom were students with learning disabilities served in the general education classroom for the entire day. The general education teachers delivered whole-class instruction, while the special educators taught individuals or small groups of
students. In the consultation and collaboration classroom, there were 31 to 37 students, 3 to 8 of whom had learning disabilities, and were served by a full-time general education teacher, a part-time teaching assistant for 4 hours per day, and a part-time special education teacher for 1 to 2 hours each day. General and special education teachers co-planned for 30 minutes each week, but discussed instructional plans and student progress daily. In this setting, the special education teacher took the lead in delivering lessons, demonstrating instructional adaptations, working with small groups of students with learning disabilities, and individualizing instruction for those students. While the two settings differed in practice, both were acceptable models of co-teaching models as described previously. Students’ social outcomes were based on four measures given at the beginning and end of a school year (a) a peer acceptance 4-point rating scale, (b) the Piers-Harris Children’s Self-Concept Scale, (c) an 18-item Friendship Quality Self-Report Scale, and (d) the Social Skills Rating Scale. The first three scales were used to assess students while the final scale measured teachers’ perceptions. In congruence with previous research (see Vaughn et al., 1996), students who were high achievers maintained reciprocal friendships throughout the school year and functioned as a control group. This group consistently rated higher than students identified as low achievers and students with learning disabilities on each of the measures. Students with learning disabilities (n=59) rated lowest on all social measures. Vaughn et al. (1998) found high levels of acceptance of students with disabilities among teachers in both models. However, these researchers noted that the ratio of students with disabilities to peers who are typically achieving was smaller in the consultation and collaboration classroom than in the co-taught classroom. Moreover, teachers in the consulting and collaboration
classroom maintained high academic expectations for all students while those in the co-
taught classroom found difficulties maintaining those standards when half of the class consisted of students with identified disabilities. These findings are contrary to the findings of Bear and Proctor (1990) who concluded that students with disabilities in the general education classroom did not hinder the performance of students without disabilities.

In 1999, Luckner presented qualitative data taken on two classrooms that provided service through co-teaching to students who were deaf or hard of hearing alongside peers who had no hearing loss. Through analysis of observations and interviews with teachers, students, administrators, and parents, seven subthemes emerged. The subthemes of barriers to inclusion included (a) co-teaching benefits to students and teachers, (b) student exposures to age-appropriate content, responsibilities, and study skills, (c) students’ acquisition of communication skills, (d) student’s sense of belonging, (e) increases in teacher work demands and time related to co-teaching, (f) the need for strong interpersonal skills and commitment to the relationship, and (g) students’ varied language abilities as a barrier to inclusion.

Benefits and barriers to the co-teaching interaction reported in the study mirrored those of previous research (see Salend et al., 1997; Self et al., 1991; Vaughn et al., 1998; Walther-Thomas, 1997). Primary benefits included (a) high expectations and exposure to content and study skills provided to the students with disabilities; (b) high opportunities for social interactions, language, speech, and behavioral models for students who were hearing impaired; (c) increased opportunities for students to get individual attention; (d) the opportunity for students to learn sign language; (e) increased sense of shared
responsibility, and support for teachers; and (f) increased opportunities for teachers to gain additional professional skills. Conversely, the primary challenges reported involved the lack of interpersonal skills and increased time teachers needed to work collaboratively.

In this study, the reported benefits for students with and without hearing impairments far outweighed the co-teaching challenges. Luckner (1999) cautioned that the results should not be generalized as the sample was a small size (i.e., two classrooms). Luckner also noted the need for more research to investigate the processes of co-teaching in practice, co-planning, student grouping, and student outcomes in order to establish the efficacy of co-teaching for all students.

Gerber and Popp (1999) expanded the co-teaching discourse by investigating the perspectives of students and parents in four elementary schools, four middle schools, and two high schools across rural, urban, and suburban settings. Through analysis of interview data, Gerber and Popp’s findings converged with previous research findings (Pugach & Wesson, 1995; Vaughn et al., 1998) which indicated students with and without disabilities harbored positive attitudes about the co-teaching models used in their classrooms. In addition, in this case, students’ report card grades across all grade levels were higher in collaborative classrooms. One drawback to co-teaching students noted was that they were more likely to be caught misbehaving. By contrast, co-teachers viewed this as an advantage (i.e., better classroom management).

Parental perspectives about co-teaching varied. A major concern for parents of students without disabilities was the lack of information about co-teaching. Conversely, parents of students with disabilities reported a better understanding of co-teaching. These
parents also commented on the positive social outcomes cultivated by co-teachers in the inclusive setting. All parents indicated increased acceptance of differing abilities in classmates. Although parents of students without disabilities voiced concerns that standards would be lowered in co-taught classrooms, due to the presence of students with disabilities, most agreed that co-teaching benefitted all students by helping them achieve higher grades and obtain deeper understanding of content (Gerber & Popp, 1999).

Teacher Perspectives

In 1992, Friend and Cook interviewed one co-teaching team (i.e., two teachers) to gain insight into their experiences. The teachers discussed management considerations such as sharing joint ownership for outcomes for all students in the general education classroom, allotting adequate time for co-planning, and preparing for the added time co-taught instruction requires. As a result of this one interview, Friend and Cook created a list of guidelines (see Friend & Cook) to assist in the implementation of co-teaching practice.

Walther-Thomas (1997) reported on a 3-year study of 18 elementary and 7 middle schools. The researcher conducted classroom observations and semi-structured interviews, reviewed school documents, and took part in informal contacts (no formal data collected during informal contacts) to investigate teacher and administrator perspectives of co-teaching. Based on data collected from a sample consisting of 119 teachers and 24 administrators, Walther-Thomas reported finding co-teaching benefits and problems at different grade levels. The longitudinal nature of the study allowed participants to reflect on and separate initial impressions about co-teaching benefits and concerns from those that that appeared more long lasting. Teachers and administrators
reported four major benefits for students with disabilities in co-taught classrooms. First, students with disabilities experienced improved self-confidence/self-esteem, academic outcomes, social skills, and peer relationships. Second, they received more teacher attention because the overall student to teacher ratio was reduced. Third, all students benefitted from specialized strategies and study skills instruction that were provided by the special education teachers. Lastly, an enhanced sense of the classroom community was evident in the co-taught classroom.

Teacher benefits also emerged through this inquiry. Specifically, the co-teachers reported experiencing greater professional satisfaction, growth, support, and increased collaboration. On the other hand, teachers and administrators reported dealing with a number of problems including conflicts with student scheduling, increased caseloads, lack of joint planning time, and insufficient staff development that precluded effective co-teaching over the course of the study. Teachers cited administrative support as an essential component to facilitating successful co-teaching.

In addition, in this study, Walther-Thomas identified common features that were frequently observed across co-taught classrooms. When everyone spoke the same language (i.e., shared meaning, terminology, and definitions), offered moral support, recognized the importance of both teachers, and provided the necessary resources, the benefits to students and teachers increased. In other words, those partners who made the commitment to work through problems experienced greater success with co-teaching. The results led Walther-Thomas to call for continued research to further investigate the benefits and problems associated with co-teaching in inclusive classrooms.
Salend et al. (1997) provided a case example illustrating how the co-teaching relationship evolved in one teaching partnership (n=2). Through reflective journaling, the two teachers documented the growth of their co-teaching relationship. Both teachers wrote about the barriers they encountered and described how their teaching methodologies changed as their co-teaching relationship grew. The teachers reported gaining a renewed enjoyment for teaching and learning through co-teaching. Although Salend et al. recognized the limitations of their findings based on a small sample size (n=2), their case study analysis captured the complex blend of factors that affected teachers who worked together cooperatively.

Wood (1998) continued the investigation of co-teaching roles and responsibilities in inclusive settings through qualitative methods in an investigation of teacher attitudes and role perceptions of three general and special education co-teaching pairs. Results of the study revealed only isolated instances of collaboration, especially during the initial stages of inclusion for students with severe disabilities. Because no teacher training was reported in the study, the resulting poorly defined teacher roles and a lack of equitable division of labor between the teachers were not surprising. On another note, as the teachers became more familiar with one another, role perceptions appeared less rigid, and teaming was more cooperative.

Convergent with previous research (see Walther-Thomas, 1997), Wood (1998) found common barriers such as lack of time to consult, large caseloads for special educators, and lack of appropriate funding to pose ongoing problems for co-teachers. Further, co-teachers noted interpersonal and professional issues (i.e., general educators found the use of different education strategies, the use of hierarchical positioning, and the
use of increased interventions intrusive) as barriers to the consultation process. As a result, Wood concluded that training for collaborative arrangements must address the development of new roles for both general and special educators and acknowledge that negotiating them is likely to be fraught with difficulty.

In his mixed-method investigation of teachers’ beliefs about co-teaching, Austin (2001), surveyed 92 teachers and interviewed 12 co-teachers in order to glean relevant information about the state of co-teaching practice from the perspective of co-teachers. Consistent with previous research, general education teachers were perceived as doing more than their special education partners in inclusive classrooms by both general and special educators. Both groups agreed that co-teaching contributed to improved teaching practice and that they benefited from working with a co-teaching partner. Overall, there was a general satisfaction with co-teaching among participants.

While teachers reported general satisfaction with their co-teaching experiences, 93% of the special education co-teachers considered placement of student teachers in a co-teaching assignment to be either useful or very useful (the two highest ratings on the survey), but only 70.5% of general education co-teachers considered such a placement useful. Likewise, significantly more special education co-teachers considered pre-service coursework in collaborative teaching useful than their general education partners did (46.7% and 29.5%, respectively). Disparity was found between perceptions of the usefulness of a particular teacher preparation in theory and appreciation of the same preparation in practice.

An interesting finding from interviews conducted in this investigation was teachers’ perception of outcomes for students. While Austin (2001) reported that the
The majority of co-teachers interviewed thought that co-teaching positively influenced the academic and social development of all students, no artifacts were made available to support those assertions. The teachers found co-teaching to be a positive experience that contributed to their individual professional development. Special education teachers indicated an increase in content knowledge while general education teachers identified benefits to their classroom management routines and curriculum adaptations. In all, Austin recommended continued use of co-teaching practices, calling for teacher preparation programs to provide more training for co-teaching and school districts to provide increased school-based supports.

For the use of this study, in all, 17 articles were reviewed and examined in order to synthesize information related to attitudes, benefits, and barriers to effective co-teaching practices. Results of seven student outcome investigations remain mixed. In some cases, students performed better in co-taught settings while in other cases there was no difference or students’ performance decreased. Findings from the reviewed studies indicated that students and teachers view co-teaching in a generally positive manner. Yet in most cases, authors indicated a need for increased teacher preparation or support in order to assist teachers in implementing co-teaching as designed. Researchers invariably noted an overreliance on the one teach, one assist model of co-teaching even in cases where co-teachers reported high satisfaction with co-teaching practice as implemented in their respective school districts.

Co-teaching Assessment Instruments

The results of this review produced only four articles in which authorities described a co-teaching measurement tool. Specifically, Gately and Gately (2001) created
an informal instrument (i.e., The Co-teacher Rating Scale [CtRS]) to examine eight essential collaborative components that make or break relationships between co-teachers. While the CtRS may provide co-teachers with descriptive information about the specific collaborative components of their relationship that need improvement, the authors failed to offer any evidence supporting the instrument’s technical adequacy. Moreover, the numerous and varied collaborative constructs included in the CtRS extend beyond the realm of communication.

The Co-teacher Relationship Scale (CRS) developed by Noonan, McCormick, and Heck (2003) is a measure that can be used to assess attitudes and beliefs in order to match possible co-teaching partners. The limited technical adequacy provided for the scale and the small sample size used indicate the CRS needs further development and continued research as an effective evaluation tool. The authors maintained that low scores on this scale suggest a need for further assessment of communication. Yet, they failed to offer any specific communication instrument.

A third scale, entitled Are We Really Co-teachers Scale, designed by Villa, Thousand, and Nevin (2004) is a 34-item scale that provides an assessment of classroom interactions and behaviors of co-teaching partners (i.e., type of co-teaching approach used) in order to assist administrators in making decisions about co-teaching practices and professional development opportunities. The technical adequacy of this scale was not provided as part of the report.

A fourth measure identified in the literature was designed as an observation tool for examining co-teaching in practice. Magiera, Simmons, Marotta, and Battaglia (2005) developed the Quality Indicator Model of Co-Teaching in order to identify whether
specific quality indicators are present or absent during co-teaching. The validity of the indicators identified in the model remains untested. Other authors have provided evaluative frameworks, but not standardized instruments for observing co-teaching in practice (Gable, Mostert, & Tonelson, 2004; Hourcade, Parette, & Anderson, 2003; Salend, Gordon, & Lopez-Vona, 2002; Wilson, 2005).

A fifth measure newly published in the literature is an observational checklist developed by Murawski and Lochner (2011). The Co-Teaching Solution System Checklist (CTSS Checklist) is divided into three separate checklists related to items that observers should a) ask for, b) look for, and c) listen for. Within each section of the checklist, items are further separated into the aspects of co-planning and co-instructing. Co-teachers are rated on a Likert-type scale of 0-2. A score of “0” would indicate that the observer did not see the item, behavior, or discussion. A score of “1” indicates that the observer saw an attempt at the item, behavior, or discussion. A score of “2” indicates that the observer saw the item, behavior, or discussion done well. While the literature base supports the items Murawski and Lochner chose to include in the CTSS Checklist, like the other measures identified in this review, no reliability or validity data are available to support the observational measurement tool.

Rationale for Improving Pre-service and In-service Co-teaching Training Practices

The literature reviewed for this study revealed several problems with current co-teaching practices, chiefly the overreliance on one teach, one assist and one teach, one observe co-teaching models. Other problems revealed through this review were the lack of training for teachers who were new to the co-teaching service delivery model and the lack of time to jointly plan for instruction with general education teaching partners.
Billingsley, Griffin, Smith, Kaman, and Israel (2009) identified the struggle to implement collaborative practices as a major concern for new special education teachers. Sindelar et al. (2010) agreed with this assessment and indicated that new special education teachers struggle when attempting to collaborate with general education teachers. According to these researchers, new special education teachers struggle with pedagogy including the teaching of multiple content areas and reading, managing materials, assessing students, managing student behaviors, and managing the diverse roles expected of them. Sindelar and colleagues posited that the empirical support for the foundation of special education teacher preparation is feeble and that, as a discipline, we as researchers and educators of teachers have failed to establish our merit. They identified the use of e-mentoring and online professional communities of support as priorities in investigations that support and facilitate the work of new special education teachers. One course of action to promote effective co-teaching practices may be achieved through improving pre-service and in-service training approaches.

**Overview of Best Practice Special Education Approaches to Pre-service Training**

In 2001, Boudah, Logan, and Greenwood provided six key statements for special education training programs that would include university and school collaborative partnerships in order to translate research to practice. The first three statements included elements related to the process of entering the field of special education: a) up-front commitment for honest and on-going relationships, b) intensive work by the teachers and the researchers, and c) extensive and sustained effort from all. The second three statements were directly related to the support needed to implement co-teaching: a) administrative support at the building level, b) involvement of key individuals (i.e.,
teachers and researchers), and c) recognition of teacher efforts including financial resources.

According to Sindelar et al. (2010), teacher preparation has not held a high priority in the field of special education and therefore the current condition of research on initial preparation is sparse. There is in fact, an absence of a tradition of teacher education research in the field of special education. The research base for elements viewed as essential in initial preparation is so broad that there are wide research gaps to fill. There is a great need to know what makes a difference in order to fill the gap in empirically validated training content with the increased access for students in the general education setting.

In an earlier review, Brownell, Ross, Colón, and McCallum (2005) compared teacher education in special education across 60 programs in an attempt to determine common features present in exemplary teacher education programs. Researchers reported on diverse program philosophies, yet identified extensive field experience and collaboration as characteristics viewed by faculty to be important features in special education training programs. Brownell and colleagues noted that the careful supervision of field experiences was necessary in order to directly link research-based strategies taught in coursework to teachers’ application of those strategies while in acquisition of new strategies. Sindelar and colleagues (2010) echoed this view that involvement in field experiences assisted teachers with applying knowledge learned in methods courses yet noted that when teachers had small numbers of opportunities to apply practice, field experiences became barriers to development (Sindelar et al.). While all 60 programs
included in the review underscored the importance of collaboration, they rarely indicated the pedagogy used to develop collaboration skills in pre-service teachers.

Spooner et al. (2010) would agree, as their retrospective synthesis of work published in *Teacher Education and Special Education* volumes 27 to 32 (issue 2) which indicated a body of knowledge that revealed a need for professionals to focus on improving preparation programs for individuals who provide services to students with disabilities. Spooner and colleagues stressed the need for teacher educators to continue investigations related to improving practice and how that translates to pedagogy in university classrooms through both virtual and face-to-face instruction. Course content should be focused on collaborative and consultative skills for working with other professionals and families of students with disabilities. Co-teaching was among the preparatory practices difficult to categorize and analyze in order to determine the nature and quality of the evidence base supporting the practice. Therefore, the authors stressed that the field of special education needs to investigate co-teaching practice as professionals work to improve services to students with disabilities within the general education classroom, and the field of special education depends on the application of evidence-based practices by frontline personnel in classroom situations (Spooner et al.). Consequently teacher educators and researchers must have a presence in those classrooms to provide high degrees of pre-service teacher and teacher educator collaboration to focus on new instructional methods in order to provide better outcomes for novice special educators.
Contemporary Approaches and Shortcomings to Pre-service Training in Co-teaching

Many school programs are turning to co-teaching as the primary service delivery model for students in inclusive classrooms (Volonino & Zigmond, 2007). Proponents describe co-teaching models (Friend & Cook, 2007), outline issues for practice (Dieker & Murawski, 2003), and list barriers to implementation (Bakken, Clark, & Thompson, 1998). A key barrier prevalent in the literature is lack of training (Bakken et al.). Co-teaching as designed by Friend and Cook (1993) provided for two experts in their respective fields working together to provide enhanced educational environments for all students. While co-teaching has become one of the most popular service delivery models for students with disabilities placed in general education settings (Magiera & Zigmond, 2005; Volonino & Zigmond), few teacher education programs provide instruction in co-teaching (Murawski, 2002). McDaniel and Colarulli (1997) found that co-teaching at the collegiate level led to increased curricular coherence, greater involvement of faculty with colleagues, and a more critical evaluation of teaching methods and philosophies for students. Through co-teaching at the college level, faculty members were able to better integrate diversity, and infuse social justice perspectives into coursework by combining two or more distinctly different yet complimentary disciplines (Hertzog & Adams, 2001). When faculty members worked collectively to enhance subject learning and sustainable productive gains for students, there was a shift in higher education perceptions from a focus on increased faculty workload to increased student learning (McDaniel & Colarulli). McDaniel and Colarulli noted that learning and teaching outside one’s own discipline challenged professors to model active learning for students while modeling effective co-teaching practice.
In recent years, teacher training programs have attempted to advance the science of co-teaching through modeling the techniques of co-teaching during practice at the collegiate level. Waters and Burcroff (2007) posited that, “Given that co-teaching is an expected behavior, the practice must be taught with intent and modeled by professors to increase the likelihood that it will be implemented successfully in P-12 classrooms” (p. 304). These researchers stressed that adults as learners must see and experience the behavior of co-teaching in practice. Therefore, teacher education programs should model as well as teach the skills they find necessary for good co-teaching practice. To this end, Waters and Burcroff described the execution and growth of a co-teaching arrangement at the university level. In their quest to identify appropriate means to prepare teachers to enter the workforce, administrators and faculty completed a self-study where two questions surfaced repeatedly. The first was related to professors modeling the behaviors and practices that students who successfully exited the program were expected to incorporate into methods for teaching, and the second was related to the success and implementation of theories and strategies in the field (i.e., elementary classrooms). The data collected through this self-study exposed the need for teacher educators to not only teach about different co-teaching strategies, but to also model the strategies in their own instruction and in the comprehensive evaluation requirements for the class.

One major barrier to effective co-teaching practice at the teacher training level is faculty member receptiveness (Shibley, 2006). Co-teaching can only be successful if the teachers involved genuinely understand the benefits of the model and are voluntarily willing to work with a partner in the collaborative effort. Unfortunately, faculty members may be unreceptive and resistant to change (Bernstein, Scheerhorn, & Ritter, 2002;
Many times faculty members become the single authority in an area of study within their respective institutions and may be unwilling to share the power equated with this expertise (Harris & Harvey, 2000). Similar to teachers in elementary and secondary settings, college teachers are accustomed to teaching in isolated settings. Individual educators put into practice methods each thinks is best for students. Connecting values with a cooperative partner is difficult at best and creates a time-intensive situation that may compromise faculty members’ commitment to personal research. The time to produce an effective co-teaching situation is significant in order to maintain and develop cooperative teaching roles (Harris & Harvey; Letterman & Dugan, 2004; Moore & Wells, 1999; Shibley).

Stang and Lyons (2008) noted that teacher preparation programs simply might not be well suited to foster co-teaching. As with teaching at other levels, the initial planning and implementation time is intensive (Waters & Burcroff, 2007). Teacher educators must find or make time to develop the framework for the class, including the syllabus, together. Faculty may resist the increased workload necessary for collaborative preparation and planning. Conflict may occur if roles are unclear or not agreed upon. When two faculty members are responsible for collectively teaching a course, there must be a sense of co-ownership just as is necessary for co-teachers in P-12 classrooms (Harris & Harvey, 2000). The willingness to share respect and accept different points of view and the loss of autonomy one may feel when co-teaching creates challenges for faculty who view themselves as leaders (Letterman & Dugan, 2004; Shibley, 2006). Educators must attend to different perspectives and be prepared to defend and be flexible in personal beliefs and philosophies (Stang & Lyons). Equally important in the co-taught classroom,
is the willingness of co-teaching partners to accept and discuss differences within the
classroom. Many times professors are not willing to walk the walk regarding differences
as valuable aspects of learning and human experience (Harris & Harvey). Kluth and
Straut (2003) described the university classroom as a laboratory for budding co-teaching
and co-planning skills that pre-service teachers employed in inclusive classrooms will
need.

Stang and Lyons (2008) highlighted the need for pre-service teachers to have
opportunities to observe collaboration in higher education in their mixed methods
analysis of 43 participants enrolled in a co-taught university course. Participants reported
the act of observing the two faculty members co-teach was a valuable learning tool.
Results of their study supported previous calls for teacher preparation programs to model
co-teaching as an instructional method (Harris & Harvey, 2000). While participants
reported that knowledge of co-teaching increased, they indicated that comfort in the use
of co-teaching in practice did not mirror this knowledge increase. Stang and Lyons
suggested that the absence of direct field experiences of co-teaching paired with the
classroom modeling might be the reason for this difference. The researchers supported
the work of Brownell and colleagues (2005) and suggested that teacher preparation
programs not only model co-teaching practice, but also to allow students to practice and
reflect upon their individual co-teaching efforts.

In an attempt to provide pre-service teachers with supports for co-teaching,
Goodnough, Osmond, Dibbon, Glassman, and Stevens (2009) paired two pre-service
teachers with one in-practice cooperating teacher (four triads) for 12-week practicum
placements. The researchers collected qualitative data through interviews, observations,
and analyses of electronic journals. Goodnough et al. sought to describe the types of co-teaching that would emerge naturally as two pre-service teachers worked together with one cooperating teacher over a 3-month period. The researchers also hoped to identify advantages and disadvantages to this triadic model of student teaching. The researchers viewed the paired teaching experiences as situated learning where the paired pre-service teachers would ideally become co-learners in order to develop professional knowledge of co-teaching practice as they learned to teach. In the study, all four triads began by co-teaching. When the practice of co-teaching became difficult, participants reverted to individual teaching and peer coaching rather than co-teaching as described by Friend and Cook (1995). Ultimately, Goodnough and colleagues suggested that providing pre-service teachers with guidelines that would encourage a combination of approaches in teaching and planning would add to the triad model. The missing component here is the support from teacher educators as the teachers in training struggle to implement new practices.

In light of today’s ever-changing school settings, one may wonder why co-teaching is the exception rather than the rule in academia. As we look to the future in order to make practice more effective, we must consider that co-teaching can only be effective if there is a genuinely equal relationship between co-teachers. We must create partnerships that offer differing knowledge bases and combine theoretical knowledge with practical knowledge so that university co-teaching partners may foster ongoing dialog and mutual inquiry (George & Davis-Wiley, 2000). In general, professionals require adequate time for planning, scheduling, and communication in order to create effective co-teaching partnerships. Without these essential components, college teachers
will talk about co-teaching and learning and fall back on the tried and true methods of classroom lecture and passive, receptive, disengaged pre-service teachers. If professionals at the college level can surmount the barriers that are common in all co-teaching relationships, then they may be better-equipped to assist pre-service teachers for the changing settings that face them as they enter practice in inclusive classrooms and schools (George & Davis-Wiley; Stang & Lyons, 2008; Waters & Brucroff, 2007).

To this end, McHatton and Daniel (2008) paired eight special education majors with eight English education majors in order to assist their students in a collaborative relationship at the pre-service level. Data collection consisted of surveys conducted before and after the practicum experience. Findings from this study supported Murawski’s (2002) call for pre-service teacher educators to employ co-teaching as a practice in order to model best practice and to provide students with an ample understanding of what it means to teach and meet the needs of all students. McHatton and Daniel recognized that “[t]eacher education is all about modeling. Yet, when it comes to co-teaching, we prepare our candidates individually and in isolation” (p. 130).

Kamens (2007) designed a qualitative case study which explored two pairs of pre-service teachers who co-taught while paired with teams of collaborating cooperating teachers. Students reported feelings of positive support from fellow student teacher. Participants noted the continual feedback as a means of emotional support, which helped boost confidence in teaching abilities and self-esteem. Participants also noted how their roles in the classroom fluctuated throughout the semester as they negotiated the relationship and learned more about each other and the students. These findings are similar to those of Mastropieri et al. (2005) whose participants also negotiated interactions as roles and
responsibilities changed in the classroom. In their study, the participants learned to construct knowledge about co-teaching as they worked together through their student teaching experiences. The student teachers were placed into this co-teaching relationship without any specific training or preparation and, as in many cases reported by Friend and Cook (1995), left to muddle through and figure it out for themselves. Interestingly, the cooperating co-teachers did not influence the student teacher interactions. In the case of both teams, the students began to model some of the in-practice co-teachers’ interactions, but their attempts were minimal. Instead, they developed their own patterns of interactions. Researchers suggested positive implications for the impact of designing student teaching field experiences that are structured for co-teaching in order to prepare future educators for co-teaching and collaborative practice. Of concern were strategies for student teacher supervision. In this study, each pre-service teacher was assigned an individual supervisor. During one classroom observation, both supervisors were present in the classroom making so many adults in the room a distracting environment for the students. Kamens (2007) noted that peripheral data indicated that ongoing mediated opportunities for discussion of the experience might have been beneficial for pre-service teacher outcomes. The author suggested that the discussions provide structured guidance and support for problem solving and in-depth development of the co-teaching relationship during the student teaching experience.

**Contemporary Approaches and Shortcomings to In-service Training in Co-teaching**

Turning the focus to educators already in the field of practice, Sindelar et al. (2010) suggested the need to explore research that addresses questions of technology to effectively provide special education teachers with feedback on instruction. These
researchers found that in-service educators were typically unaware of the gap in research to practice, and that general education teachers were more willing to implement new instructional strategies for students with disabilities if application of those strategies benefitted all students. Sindelar and colleagues indicated that when educators attempted new interventions, intensive efforts through coaching followed by consultation or debriefing during planning were essential. Boudah et al. (2001) suggested that researchers should assume this leadership role in supportive, respectful ways because without direction and gentle insistence the quality of the training decreases. These researchers concluded that effective in-service training requires that teacher educators move away from simply telling teachers what to do and toward facilitating the process of how to effectively implement new practices. Indeed, Gersten, Morvant, and Brengelman (1995) posited that coaching, observing, and providing feedback should be a continually occurring process within the context of classrooms where teachers begin to put new skills into practice. Additionally, Joyce and Showers (2002), indicated that when professional development requires the integration and transfer of complex knowledge or ideas (i.e., modifications to teaching methods) training should include four components: (a) awareness of the practice, (b) demonstration of the practice, (c) practice of the new skill, and (d) feedback and coaching while implementing the new skill or practice. Therefore, in-service training in co-teaching should include all four components so that the models of co-teaching may be implemented effectively and with fidelity.

Other authors, (i.e., Sikula, 2002; Sprinthall, Reiman, & Ties-Sprinthall, 1996) agreed, confirming that professional development is not solely the responsibility of the in-service teacher. Sprinthall et al. indicated that teachers should be treated as equal
partners in efforts to improve effective practice, and Sikula maintained that professional development was most effective when university programs partnered with schools. These authors concluded that professional development should grow from the district and school level and should be focused to include an understanding for the ways teachers think, feel, and make meaning of professional development experiences. Therefore, the professional development of in-service teachers should be simultaneous and ongoing with renewal activities within individual districts and schools. Sikula posited that professional development training should consider the complexities of individual school systems. If school complexities are considered then the training may be grounded in theory and practice. In this way, both the knowledge and experience bases of in-service teachers are considered.

Rooney (2007) stated that the expertise of in-service teachers was dependent on quality professional development, yet much professional development continues to be stuffed into a teaching week like “mortar into bricks,” just enough to hold pieces together. He suggested that the responsibility of professional growth must lie with in-service teachers. Rooney stated that continued professional development is expected and should be an intentional part of educators’ work that is supported through time and finances in individual districts. Connelly and Rosenberg (2009) agreed maintaining an expectation of ongoing development for educators throughout professional careers. In this way, educators may maintain expertise in what they practice.

Looking more closely at the field of special education, Leko and Brownell (2009) acknowledged the lack of information linked to how professional development programs address the needs of special educators. These authors identified the timeliness of this
concern as recent federal mandates (i.e., IDEA 2004 & NCLB 2001) have changed expectations for students with disabilities and their teachers (Leko & Brownell). They agreed with Sikula (2002) indicating that professional development needs can differ based on individual teacher’s experiences and the settings in which they work. Leko and Brownell outlined principles of effective professional development based on 30 years of research. The principles included (a) alignment with educators’ goals and needs (i.e., local, state, and national standards and school-wide curricula), (b) focused content so that special educators understand how the general education curriculum and the interventions they are using fit to address content standards, (c) active participation in classrooms for teachers to learn new practices and implement them that setting, and (d) collaborative efforts that focus on student data to improve student achievement. In this way, professional development for special educators can provide meaningful, manageable strategies appropriate for implementation within the context of the school setting.

Leko and Brownell (2009) contended that because many teachers enter the field of education ill prepared for effective classroom practices, professional development should be a blend of teaching basics, behavior management strategies, lesson planning, content area preparation, and effective pedagogy. In addition to the above guidelines, Leko and Brownell suggested that professional development for special educators must be active so that teachers have concrete demonstrations and become actively engaged in learning new practices within the classroom setting. Sindelar and colleagues (2010) supported the work of Leko and Brownell who posited that professional development endeavors should include explicit instruction for research-based practices, opportunities to practice those strategies with feedback, and coaching provided by experts.
Recently, Walsh (2012) described one school district’s implementation of a professional development program [i.e., Designing Quality Inclusive Education (DQIE)] which supported effective co-teaching over 6 years. From 2003 to 2009 the focus for professional development was co-teaching as a service delivery model in inclusive classrooms. In their work, the district recognized that effective professional development required sustained intensive, and collaborative efforts. Interestingly, as Dieker (2001) and Walther-Thomas (1997) found, the most frequently requested support identified by Walsh was funding to provide relief for co-teachers to plan together on a regular basis. One strategy identified by Walsh as useful in the model, was instructional coaching as collegial support to integrate co-teaching into classroom instruction. Walsh also described professional development sessions, which included classroom observations with feedback related to co-teaching strategies that individualized the professional development experience for teachers. This cycle of professional development combined with demonstrating, practicing, providing feedback, and coaching mirrored the professional development techniques Joyce and Showers described in 2002. Walsh identified feedback through coaching as a critical factor in the successful implementation of co-teaching through job embedded professional development.

**Theoretical Framework for Improving Training in Co-teaching**

As this shift in pedagogical practice takes place, teacher educators must be mindful that the practices of co-teaching modeled for pre-service teachers are appropriate practice for learning (Waters & Burcroft, 2007). Through the social learning theory, Bandura (1977) concentrated on the power of example. The major premise is that individuals learn by observing others. In Bandura’s view, modeling may have as much
influence on learning as direct experience. Interestingly, Bandura’s learning theory suggested three necessary stages in the link between observation, modeling, and implementation: attention, retention, and motivation.

Based on the literature, it appears co-teaching training may lack the third stage (i.e., motivation). Attention could be obtained during training sessions. The practice of co-teaching could grab practitioners’ and administrators’ attention because it appears to be simple to implement, distinctive, useful, and has been depicted as positive in the literature. In this way, training in co-teaching could expand teachers’ repertoires of instructional delivery models beyond what teachers would discover by trial and error, and in ways more varied than could be observed in daily practice. Teachers could retain this knowledge of co-teaching models but may not have opportunities or motivation to implement co-teaching in practice.

The knowledge of co-teaching practice is present yet not implemented with fidelity as designed (Friend, 2007). Bandura posited individuals can learn new behavior without any practice or direct reinforcement for behavioral outcomes. Therefore this knowledge could lie dormant, available for future use, as long as one remembers it. Bandura contended that major gains in learning occur when the learner develops a conscious awareness of techniques. Yet, the highest level of observational learning is achieved through organizing and rehearsing a modeled behavior through symbolic practice, and then executing the behavior overtly (Bandura, 1977). In much of the co-teaching literature reviewed for this study, there was no description of the training provided to teachers as learners of this new skill. Where training was indicated, authors did not provide detailed descriptions of training sessions. In no cases within the reviewed
literature, was there indication of symbolic practice or execution of the behaviors with feedback from trainers.

Bandura (1977) stated that verbal description is not an effective way of altering behavior. In the case of co-teaching, modeling through social-cognitive learning theory would possibly not be sufficient to translate co-teaching methods into practice. There could be an added behavioral component: guided practice and feedback. This component was evident in the previously discussed teacher training literature. Many of the studies where modeling was done during training were completed nearly 10 years ago, yet teachers continued to over implement the one teach one assist co-teaching model when co-teaching daily.

**Role of Adult Learning Theory**

Malcolm Knowles’ work in adult learning gained widespread popularity when 200 articles and studies were produced that related to adults as learners between the years of 1970 and 1980 (Carlson, 1989). In his view, education is guided interaction and therefore the quality of education depends deeply on the guide (i.e., teacher). While adult learning theory is grounded in social-cognitive learning theory and behavioral theory (Carlson), Knowles theorized that as learners, adults are motivated to learn new practice based on interest and selfish benefit. For example, if teachers were to be shown the course of benefits of co-teaching, then they may implement co-teaching as designed, and in turn provide benefits to students with and without disabilities. In Knowles’ view, adults are goal-oriented and therefore need a program that is organized and comprised of clearly defined elements. Based on this theory, pre-service and in-service teachers would need to see clearly how co-teaching would help them attain their professional goals. A
second aspect of Knowles’ work that could relate to co-teaching is the need for practitioners to see relevance in the service delivery model. Based on this aspect of the theory, teachers would need to understand how to apply the various co-teaching models in the classroom and teacher educators and trainers would need to explicitly demonstrate and reinforce the practical aspects of co-teaching useful to teachers in their work.

Knowles acknowledged the interactive nature of teaching and learning when he stated:

Teaching is a process of guided interaction between the teacher, the student, and the materials of instruction. . . . Teaching, like medical practice, is mostly a matter of cooperation with nature. The function of the teacher is to guide the student into the kind of experiences that will enable him (sic) to develop his own natural potentialities. (Knowles, 1950 in Carlson, ¶ #17)

**Four Critical Elements of Learning/Training**

Knowles posited four critical elements of learning that any training must include in order to ensure that adult learners master essential content and skill. These elements included motivation, reinforcement, retention, and transference. These four elements could comprise the theoretical foundation for strengthening existing training approaches to co-teaching.

**Motivation**

Because co-teaching was designed to be a voluntary collaborative service delivery model (Scruggs et al., 2007), participants should be intrinsically motivated to carry out the practice. Yet, in many cases, co-teaching has become mandated practice in which case participants often fail to recognize the need for or the benefits associated with it. In some instances, co-teachers are intimidated or offended by the addition of a second teacher with whom they must work (Friend & Cook, 2007). Therefore, it is important for pre-service training experiences to offer opportunities for co-teachers to freely explore
the various reasons why co-teaching is an important practice (McHatton & Daniel, 2008; Waters & Burcroff, 2007). In this way, co-teachers can more clearly see the benefits of the various models and gain increased motivation for engaging in varied co-teaching practices. In Knowles’ (1989) view, the best way to motivate adult learners is to enhance their reasons for enrolling in a program and to decrease the barriers for learning (Lieb, 1991). Based on this view, in order to achieve appropriate levels of motivation, the level of tension must be adjusted to meet the level of importance of the objective. Finally, if motivation is to be achieved, an appropriate level of support should be set to guide participants.

In the case of mandated co-teaching, it could be theorized that motivation follows from co-teachers experiencing a need for knowledge, which in turn raises interest in the process. Using a mutually respectful support network, motivational guidance could be structured to support the risk involved in implementing newly learned behaviors. This structured support could in turn, lower passive resistance encountered in many co-teaching arrangements. It is apparent that Campbell and Stanley’s (1963) acquired behavioral dispositions of modeling, trial and error experience, verbal description, perception of the practice, and exhortation are not sufficient means to translate the theoretical models into current co-teaching practice. The one teach, one assist approach was the dominant model consistently observed in classrooms throughout previously published research (i.e., 75% of studies reviewed by Scruggs et al., 2007). Therefore, guided practice and immediate feedback during acquisition of and fluency in the use of the instructional models could possibly lead to the behavioral momentum teachers need in order to implement varied models of co-teaching rather than to persist in continued
overreliance on the teach and assist model illustrated in available co-teaching literature (Scruggs et al., 2007). Without sufficient motivation for co-teaching partners to implement appropriate models, co-teaching as practice may fail to achieve the level of promise put forth by proponents of the practice.

Reinforcement

In addition to this motivation, Knowles (1989) cited reinforcement as a necessity in the teaching and learning process. It is through reinforcement that trainers can encourage correct modes of behavior or performance. Reinforcement could be achieved through positive and negative reinforcement that occurs as an immediate and natural consequence of improving evidence-based practices in co-taught classrooms. Present training in co-teaching simply urges practitioners to implement co-teaching as a means to provide special education services in the general education setting. This form of pedagogy is the least effective means to influence teacher attitudes or actions in daily practice. Included in the sparse training is the verbal description of and possible modeling of co-teaching as it should look in the classroom, with no continued support or guidance (Gerber & Popp, 2000; Keefe & Moore, 2004; Magiera & Zigmond, 2005; Welch & Chisholm, 1994).

Indeed as professional educators, we understand that reinforcement is a necessary part of the teaching and learning process. Through reinforcement, instructors encourage correct modes of behavior and performance (i.e., fidelity to co-teaching models as designed). Positive reinforcement is used when individuals are practicing new skills. Reinforcement should occur at frequent and regular intervals when individuals are in the acquisition stage of the learning process in order to assist participants in retention of
newly learned skills. Reinforcement should then continue in order to maintain consistent positive implementation of the skills (Lieb, 1991). In Knowles’ (1989) view of adult learning, reinforcement must be part of the teaching and learning process in order to ensure desired behaviors become everyday practice. Reinforcement of appropriate implementation was critical in attempts to change teachers’ behavior through feedback (Scheeler, Ruhl, & McAfee, 2004). In the present co-teaching literature, there was no evidence of reinforcement during the acquisition stage of learning development. Therefore, the implementation of a stratified process of reinforcement can lead teachers to understand that varied co-teaching models are manageable and understandable. In turn, there should be an increase in the target behavior (i.e., appropriate varied co-teaching practice).

**Retention**

The instructor’s job is not complete until the learners maintain the learned practice. Knowles (1989) contended that retention is achieved by the amount of practice the learner participates in during the learning process. Based on this contention, once participants demonstrate appropriate co-teaching models, they should be urged to practice and maintain proper use of the service delivery model and feedback through coaching that is provided in real time while instruction takes place should assist learners to understand and interpret the appropriate times to apply the new information (i.e., varied models of co-teaching) during different occasions. In addition, to assist in the retention of newly acquired skills, intermittent reinforcement through ongoing coaching provided in real-time could provide this distributed practice instead of the typical one-time training approaches.
Transference

The final aspect is the transference of the learning after training, with transference being the ability to use the information that one has learned in different situations or settings. According to Knowles (1989), the transfer of learning is not automatic and therefore must be facilitated and transferences are most likely to occur when learners (a) associate new information with something they already know, (b) find similarities in material of frameworks, (c) the degree of original learning was high, and (d) they find benefits to the elements of the new information. In traditional co-teaching training, participants learn of the models and possible benefits for students with disabilities. Then teachers depart to their home schools to implement the models without further or little support throughout the acquisition stage of learning the new skills (Murawski, 2002). In the case for feedback, the coaches’ feedback becomes internalized which allows teachers/co-teachers to become self-directed with time. The best motivators for adult learners are interest and self-benefit (Lieb, 1991).

As teachers of teachers we must consider that adults as learners bring a lifetime of experience that must be acknowledged and appreciated to any new learning situation (Lee, 1998). Based on this assumption, if participants can see the benefits of co-teaching, they may possibly perform better and those benefits may in turn be longer lasting. Interestingly, the reviewer found an absence in the co-teaching literature of adult learning through a systematic, stratified approach. It was found that individual participants were left with a knowledge of the practice and expected to put newly acquired knowledge into practice without the behavioral support needed for implementation (McLeskey & Waldron, 2004).
Based on the above connections between theory and practice, in order for co-teaching to reap the benefits touted by proponents, there should be a high level of consideration that efforts in intensive training include the (a) modeling from social cognitive learning theory, (b) positive and corrective feedback from behavioral theory, and (c) signaling and performance feedback in situ from adult learning theory.

**Importance of Immediate Feedback/In Situ Coaching in Changing Pre-service Teacher Behavior**

Indeed, a missing piece in much of co-teacher training is guided practice and feedback. Although guided practice would not fix all barriers to the implementation of appropriate co-teaching practice, no studies for the preparation of teachers investigated this important part of learning were found in the literature. Coaching and follow-up reinforcement must be put into service in order to assist co-teachers in the transfer of learning into practice so that varied co-teaching models are implemented with fidelity and sustained throughout the co-teaching relationship (Sindelar et al., 2010; Walsh, 2012). If positive feedback is not offered, then well-intended practice can be short lived. Additionally, providing teachers immediate feedback can prevent erroneous practice that might otherwise go unnoticed. Feedback to teachers must provide affirmation of what they can currently do and what they need to do next in order to improve their understanding of the practice (Rock et al., 2009; Scheeler, Congdon, & Stansbery, 2010). The teachers must also then be able to act upon the feedback. If individuals do not understand or recognize what they need to do, then they are unlikely to be able to act on the information provided. Since almost all pre-service teachers become teachers regardless of their ability to teach, teacher education programs must identify and
encourage use of effective practices early in training and use these effective practices consistently (Leko & Brownell, 2009; Scheeler et al., 2004).

Through the analysis of studies related to the content of feedback, Sheeler et al. (2004) found that positive, specific, corrective feedback resulted in positive transformations in teacher behavior. In their review of 10 different studies, Scheeler and colleagues found 3 separate studies that supported the use of immediate feedback over delayed feedback. In all three studies, immediate feedback resulted in faster acquisition of effective teaching behaviors and acquisition at a higher level than delayed feedback (see Coulter and Grossen, 1997; O’Reilly, Renzaglia, & Lee, 1994; O’Reilly et al., 1992). Researchers found that targeted teaching behaviors were acquired faster and more efficiently when feedback was immediate. Scheeler and her colleagues reported that the type of feedback also made differences in teachers’ behaviors. Scheeler et al. (2004) posited that teachers, like other learners, acquire and maintain new skills best when provided systematic instruction on the skill with multiple opportunities to practice and feedback that is specific, immediate, corrective, and positive.

Indeed, in order to bring about lasting changes in teacher practice, the work of Scheeler and colleagues (2004) supported the critical need to provide teachers who implement new practices with feedback that is immediate, specific, positive, and corrective. Available research supports three general conclusions Scheeler and colleagues posited that should be adapted into practice: (a) feedback of any kind is better than no feedback, (b) immediate feedback is better than delayed feedback, and (c) feedback should be specific, corrective, and positive. Interestingly, Scheeler and colleagues found that many pre-service teachers reported that they do not get enough feedback or enough
supervision while completing pre-service training. Findings from the limited research base called for further research on effective feedback (Scheeler et al.). Researchers should investigate the use of immediate feedback in more and varied settings, with more teachers, and in different teaching and learning conditions. According to Scheeler et al. feedback that was not disruptive to the learning environment was most important.

In a second review of literature related to pre-service teacher training, Scheeler (2007) suggested that didactic instruction used alone was not sufficient or effective in preparing teachers to sustain their newly acquired skills. Scheeler posited that teacher training alone might not be sufficient to support program implementation even when the program is a school-wide endeavor. While none of the studies provided evidence that instruction alone provided any change in teaching behavior, in two of the studies researchers recommended practice along with feedback as necessary components of any training program implemented to shape or change teaching behaviors in classrooms (see Bowles & Nelson, 1976; Rose & Church, 1998). Based on the review, Scheeler identified four factors that emerged as important in order to support and sustain effective teaching skills: (a) the use of immediate feedback to promote efficient effective acquisition of new skills, (b) teacher training to mastery level on teaching skills, (c) specific programming for generalization, and (d) the provision of performance feedback in situ. Scheeler noted that providing immediate feedback might be useful because it prevents the learner from practicing errors and provides reinforcement for behaviors that are research-based. This immediate feedback can result in efficient acquisition of new skills and behaviors. It also provides for more thorough and efficient supervision of pre-service teachers. Engelmann (1988, in Scheeler) identified the average teacher needs to practice a skill at least 12
times before becoming proficient in the skill. Providing immediate feedback through a bug-in-ear device during this practice was one proven way to assist pre-service teachers in the acquisition of new behaviors (Rock et al., 2009; Scheeler et al., 2004). Research in this area also indicated that traditional teacher supervision with delayed feedback was less effective than the immediate feedback (Coulter & Grossen, 1997; O’Reilly et al., 1994; Scheeler, McAfee, Ruhl, & Lee, 2006) yet it is commonly used in most teacher preparation programs.

**Technology Enhanced Feedback/Coaching – Bug in Ear and Virtual Bug in Ear Coaching Studies**

In recent years, advancements in technology have afforded teacher educators/trainers new means to provide pre-service and in-service teachers with immediate feedback in real time. The work in this area is limited as two authors (i.e., Rock et al., 2009; Scheeler et al., 2006) have provided the complete literature base for use of bug-in-ear technology in order to provide feedback in real-time to teachers in training. To date based on this review of the literature, research in the area is limited to four published articles and is not yet an integral part in of pre-service training.

In traditional teacher training, feedback from supervisors is delayed until after lesson completion or even days later. This delay is likely to decrease the effectiveness of the feedback (Scheeler & Lee, 2002). Bug-in-ear (BIE) technology, first reported in an article by Korner and Brown (1952) nearly 60 years ago, was a wireless FM listening device made up of a transmitter and a receiver. Scheeler and Lee reported on the use of this discreet technology to provide immediate feedback in various settings. These researchers also reported on recent work of Giebelhaus and Cruz (1994) who used the BIE to communicate with pre-service teachers in order to prompt for target behaviors
when teachers employed objectionable behaviors during instruction. In order to build on the research base, Scheeler and Lee designed and implemented a study to combine the use of immediate feedback and the use of BIE technology as the method to provide such feedback. Scheeler and Lee selected three pre-service teachers from a group of eight enrolled in practicum placements for participation in their case study on teacher training. Multiple baselines across participants design was used to investigate the effects of immediate corrective feedback using an in-room wireless FM listening system on the number of completed three-term contingency trials (TTC) for each pre-service teacher. Results of this study indicated that “immediate corrective feedback was more effective than a traditional delayed feedback procedure in the completion of three-term contingency trial” (pp. 238, 239). This result supported previous research related to immediate feedback (Giebelhaus). Scheeler and Lee reported that the main advantage to the BIE system was that the pre-service teacher was the only one aware that feedback was delivered during instruction. In this preliminary work, Scheeler and Lee found the use of immediate corrective feedback through an in-room wireless FM system was a way to promote practice of newly acquired skills efficiently and thus provided the pre-service teachers with more opportunities to reach fluency on desired teaching behaviors.

Building on her preliminary work in the area, Scheeler continued the investigation of immediate corrective feedback delivered via wireless technology. Scheeler et al. (2006) continued to examine the effects of immediate corrective feedback with BIE to increase completion of three-term contingency trials. Another purpose for this study was to investigate the relationship between teaching behavior and behaviors of students. In order to extend previous research, this study also investigated the acceptability of the
intervention (immediate feedback through BIE) to both students and teachers. Scheeler and colleagues continued the use of single case design as a means to test the use of wireless BIE technology. Results indicated that immediate, corrective feedback through BIE provided support for previous work as described in the literature. In terms of teacher behavior as it related to student behavior, the results of this study failed to demonstrate a significant impact on student achievement. The researchers offered varied explanations for this result including variability in lesson content from new learning to review, and variations in beginning level of correct responses related to final level of correct responses. An important finding from this investigation related to the intrusiveness of immediate feedback in previous research. In earlier studies, feedback was delivered by interrupting the lesson in order to correct teachers’ behaviors and researchers (O’Reilly et al., 1994) suggested that future research identify means that were less intrusive. In this study, Scheeler and her colleagues delivered immediate, corrective feedback to teachers in situ through BIE technology and while the supervisor giving the feedback was present in the room, only the teachers were aware of any interruptions.

Building upon the work of Scheeler et al. (2006), another group of researchers (Rock et al., 2009) developed an advanced online bug-in-ear system that used advancements in mobile technology and interactive video conferencing in order to bring BIE technology into the cyber age. Rock and colleagues critically examined all aspects of the traditional BIE technology and found several shortcomings. First, traditional BIE technology as used in the work of Scheeler et al. relied on an FM radio frequency with limited transmission capacity; in the case of Scheeler’s work the supervisor was within 4-6 meters of the teacher. Therefore, the supervisor continued to be present in the
classroom site in order to observe and give immediate feedback to the teacher. Rock et al. noted that previous research (Phillips & Halle, 2004) indicated that the presence of researchers or teacher supervisors in the classroom serves as a confounding factor in teachers’ and students’ behaviors. They also noted that in the case of traditional BIE technology, the observer speaking into the microphone in the close confines of a classroom might also confound the situation. Therefore, the obtrusive nature of feedback delivered in this manner has discouraged special education teacher educators from using the traditional BIE technology (Rock et al.).

Because they understood the value of the traditional BIE technology, yet saw the need to integrate recent advancements in mobile technology into teacher education training programs, Rock and her colleagues developed what they have termed the advanced online BIE system (patent pending). The system was made up of four components including a web cam, a Bluetooth headset, a Bluetooth adapter, and Skype (see Rock et al., 2009). Rock and colleagues then set out to test the effectiveness of the improved BIE device. The results of this research supported previous BIE research findings in the area of education. The improved system was successful in extending the use of the BIE technology. The traditional system (Scheeler & Lee, 2002) had a limited transmission range; therefore, the supervisor was still present in each classroom. However, the advanced BIE system had unlimited transmission capabilities and made it possible for the researchers (Rock et al.) to visit eight classrooms across one state in a single school day. Although there were technology issues noted in the study, the researchers found that the advanced BIE system was also effective in changing teachers’ behaviors. Rock et al. reported significant increases in teachers’ use of high-access
instructional practices (i.e., partnering and choral responses) and teacher praise as well as significant decreases in teachers’ use of low-access instructional practices such as round robin reading and question and answer sessions with hand raising. The study conducted by Rock et al. supported previous BIE studies, and found that the online BIE technology was not disruptive to the teachers, students, or to classroom routines in general and it positively influenced behaviors in both students and teachers.

Recently, Scheeler et al. (2010) continued their work with traditional BIE technology and reported the results of a study conducted with co-teaching partners. In this single-subject research of three dyads of co-teachers, Scheeler et al. investigated immediate feedback through peer coaching of the instructing teacher by the assisting teacher in a one teach, one assist co-teaching model. Before the intervention was implemented with each dyad, they were trained in the use of the BIE technology and developed short phrases they would use with each other while delivering feedback. Once the intervention began, the researchers observed teacher-directed lessons in which one teacher directed whole class instruction while the second teacher (who provided the feedback) walked throughout the classroom supporting students as needed. Then midway through the lesson, the teachers traded places and the teacher who was giving the immediate feedback would take responsibility for classroom instruction while the co-teacher supplied feedback and assisted students who needed help. For all three dyads, Scheeler and colleagues reported increased percentages for completed TTC during the intervention phase of the study and that all participants met the set criteria of 90% or higher in just three sessions. All teachers maintained the behavior at a higher rate than baseline throughout the fading and maintenance phases of the study. During the
generalization phase of the study, four participants continued at 100% completion while two others performed at 96% and 75%. While this study provided implications for peer coaching, it did not hold promise for improved co-teaching practice. Scheeler and colleagues reported they told the teachers they were participating in a study to help them with co-teaching, yet the only co-teaching model used throughout the entire study was the one teach, one assist approach. One teach, one assist is one of two models of co-teaching that, as previously discussed, are overly used in co-teaching classrooms (Harbort et al., 2007; Keefe & Moore, 2004; Magiera & Zigmond, 2005). So, while the results of this study supported the use of BIE technology to provide immediate feedback in order to improve evidence-based teaching practices (in this case TTC), it did not improve co-teaching practices implemented by participants (Scheeler et al.).

**Summary of What is Known and Unknown**

After careful review and examination of published co-teaching research, several general conclusions can be drawn.

1. Teachers, students, administrators, and parents perceive co-teaching to be beneficial to students in inclusive general education classrooms. Researchers have noted both social and academic benefits for students resulting from co-teaching as a service delivery model (Austin, 2001; Baker & Zigmond, 1995; Cross & Walker-Knight, 1997; Dieker, 2001; Fontana, 2005; Hang & Rabren, 2009; Walther-Thomas, 1997).

2. While co-teachers have a general sense of the benefit for co-teaching, researchers have identified numerous conditions necessary for co-teaching to succeed (i.e., sufficient planning time, appropriate training, and compatibility of co-teaching partners) (Dieker, 2001; Dieker & Murawski, 2003; Friend & Cook, 1992).
3. It is evident that the predominant co-teaching model practiced in P-12 classrooms is the one teach, one assist model, with the special education teacher in the role of assistant or manager of behavior.

According to Scruggs et al. (2007), “If the qualitative research to date represents general practice, it can be stated that the ideal of true collaboration between two equal partners—focused on curriculum needs, innovative practice, and appropriate individualization—has largely not been met” (p. 412). The trepidations put forth by Boudah et al. (1997) and Zigmond (2001) have been enduring.

Existing approaches to pre-service training have attempted to address noted concerns in training from in-service teachers who indicated that more training might help teachers to implement co-teaching as designed. Pre-service training programs are moving beyond isolated practice into collaborative efforts among teacher educators. Through the efforts of a few teacher educators, co-teaching is becoming practice at the university level. In this way, teacher educators model appropriate co-teaching practice to pre-service teachers during coursework in methods and content areas (Waters & Burcroff, 2007). Other programs have attempted to place pre-service teachers in co-teaching settings during practicum and internship placements (with another pre-service teacher or with an in-service teacher). Little is known about the outcomes of these programs as they have only recently been implemented and have not reported teaching behaviors of participants after graduation. We do know that many pre-service teachers reported that they felt that they did not receive enough supervision during practicum or student teaching experiences (Buck, Morsink, Griffin, Hines, & Lenk, 1992). Through theoretical and empirical work with adults as learners, researchers have found that modeling alone was not sufficient
practice to effect behavior. The combination of teaching through modeling along with immediate, corrective, instructive, encouraging, and specific feedback has been empirically shown to effectively support target behaviors (Rock et al. 2009).

Much of the co-teaching literature identified the one teach, one assist approach as the primary method of co-teaching in practice (Harbort et al., 2007; Magiera, 2002; Murawski & Swanson, 2001), but research has not determined if there are differences in other practices of co-teaching, or why teachers find the implementation of varying models a struggle. The models of co-teaching are founded on solid evidenced-based practices (Friend & Cook, 2007). Educators have not figured out how to support teachers in implementing those practices with fidelity to design so that we are able to investigate their appropriateness as practices for students with and without disabilities (Friend et al., 2010). While the use of immediate feedback (through the use of the advanced bug-in-ear system) has proven to effectively change individual teacher’s behaviors (Rock et al., 2009; Scheeler et al., 2010), there is no evidence that the technology is effective in changing behaviors of co-teaching partners.

Addressing the gaps and unknowns found in the present literature base for co-teaching could produce a solid foundation for pre-service and in-service teachers entering into co-teaching relationships so that parity in co-taught classrooms becomes the norm rather than the outlier in future investigations into co-teaching practices. Support for effective training with immediate feedback in real-time could result not only in improved transfer of co-teaching practice but also in enhanced outcomes for students with disabilities.
CHAPTER III

METHODOLGY

The purpose of this study was to investigate the efficacy of virtual coaching provided to practicing co-teachers as they planned and cooperatively carried out instruction in the general education classroom. This chapter includes descriptions of the research design, participant recruitment, independent and dependent variables, data collection procedures, and data analyses used in this study.

A Brief Review of Co-teaching Research

Levin, O’Donnell, and Kratochwill (2003) identified four stages of educational research; (a) initial hypothesis and exploration; (b) controlled experiments and demonstrations; (c) randomized field trials, and (d) identification of variables adopted for practice; in order to provide the best evidence for appropriate practice. Clearly, the research base for co-teaching indicates that researchers have undertaken studies best characterized as stage one and stage two. As can be seen from the qualitative metasynthesis results reported in Chapter II, administrators, co-teachers, and students perceived co-teaching as beneficial for students in both social and academic areas (Scruggs et al., 2007). Previously, researchers have focused inquiry on the description of co-teaching practice in schools (see Rea et al., 2002 and Weiss & Lloyd, 2002). Results from these inquiries indicated that co-teaching practice was put into action before clear methods for implementation were planned or methods for practice evaluation were available (Zigmond & Baker, 1995). Following an investigation of co-teaching in middle schools, Dieker (2001) recommended research in the development of planning sessions, preparations for positive
climates, considerations of individual academic and behavioral needs and goals, and clarification of roles and varied co-teaching models. Other researchers identified problems hindering the implementation of appropriate co-teaching practice, which included teachers’ need for additional training in skill development (Austin, 2001; Curtin, 1998; Keefe & Moore, 2004), need for knowledge of different co-teaching models (Feldmen, 1998; Friend & Cook, 2007; Waters & Burcroft, 2007), need for appropriate and common planning time, and need for co-teaching partners to think in flexible ways (Buckley, 2005), and nearly all researchers confirmed participants needed more training in co-teaching practice. Now, co-teaching researchers must undertake more second stage studies (i.e., controlled experiments and demonstrations) to investigate these areas before commencing with randomized field trials.

**Single Case Research in Special Education**

Scruggs and Mastropieri (2006) posited that single-subject or single-case researchers have played a prominent role in the development of special education. One benefit of single case research design is that the approach allows investigators to focus evaluation of interventions on individuals rather than groups (Barlow, Nock, & Hersen, 2009; Scruggs & Mastropieri). In addition, through single case research analysis, the effects of specific interventions become evident when participants’ behavioral changes occur during the intervention phases of the investigation (Kazdin, 2011). The use of participants as their own control in successive replications provides an added degree of strength in generalizing the effect of the intervention to other individuals. Single-case research designs initiate the development of a body of evidence that can validate the
undertaking of larger-scale studies in order to evaluate the appropriateness of specific interventions in the field of special education (Scruggs & Mastropieri).

**Single-case Research of Co-teaching Practice**

As noted in Chapter II, single-case research in the co-teaching literature is limited to one study conducted recently by Scheeler et al. (2010). In this study, the researchers employed single-case research multiple baseline methodology to evaluate the effects of peer coaching using bug-in-ear technology during co-taught lessons. Participants in the study provided immediate feedback to one another on one specific teaching behavior (i.e., three-term contingency trials) during instruction using traditional bug-in-ear technology. The aim of the study was to determine if the feedback of a peer during instruction changed teachers’ behaviors so that both teachers became highly engaged in the instructional process. Yet, lessons were limited to whole group instruction with one teacher providing instruction and the second teacher in a supportive role with the added task of providing feedback to the teaching partner. While the teachers met the criterion of three sessions with 90% completion of TTC for 3 consecutive days, there was no change in co-teaching behaviors. One teach, one assist was the only model of co-teaching used by the teacher participants. The study by Scheeler et al. was limited in scope and did not include feedback on co-planning and subsequent practice. In this study, an expert coach provided feedback to co-teachers during planning and instruction to promote specific co-teaching practices that included use of varied models of co-teaching, student-specific accommodation and modification strategies, and positive behavioral interventions and supports.
Research Questions

As stated in Chapter I, the following research questions were investigated:

1. Research Question 1 (RQ1): How does virtual coaching affect how co-teachers plan for and carry out varied co-teaching models, student specific accommodations and modifications, and positive behavioral interventions and supports (PBIS)?

2. Research Question 2 (RQ2): How does virtual coaching impact (i.e., benefit or disrupt) co-teachers and their P-6 students?

Research Design

A single-case withdrawal (ABAB) within participants design (Barlow et al., 2009; Kazdin, 2011) was used to evaluate the effects of virtual coaching on co-teachers’ planning and instruction. This experimental research involved comparing baseline and intervention conditions (Lane, Wolery, Reichow, & Rogers, 2007). This withdrawal design required four conditions in which the intervention was alternately withheld and introduced (Barlow et al.; Kazdin; Tankersley, Harjusola-Webb, & Landrum, 2008) (see Table 1).

To implement an ABAB Design, two baseline data collection phases were combined with two intervention data collection phases (Kazdin, 2011) (see Table 1).

1. In Phase One, baseline sessions were conducted for both co-planning and co-teaching as controls before the virtual coaching intervention started (Kazdin, 2011).

2. Then, in Phase Two, as the virtual coaching intervention was introduced, each co-teaching dyad’s individual performance during the baseline condition was compared to performance during the intervention condition (Horner et al., 2005; Tankersley et al.,
2008). When changes in targeted behaviors were associated with the intervention, a functional relationship was demonstrated (Kazdin, 2011).

3. Then, in Phase Three, the virtual coaching intervention was withdrawn and conditions returned to those of the initial baselines (Kazdin, 2011).

4. In the final phase of the study, Phase Four, the virtual coaching intervention was reinstated (Kazdin, 2011).

Additional details for each phase are delineated in the procedures section of this chapter.

In order to gain temporal stability of scores, repeated assessment of the teaching participants’ co-planning and teaching behaviors during all four phases of the design allowed each participant to serve as his or her own control (Kazdin, 2011). A withdrawal design (ABAB) is designed to demonstrate a relationship between the introduction of the intervention (i.e., independent variable) and changes in the dependent variable(s) (Barlow et al., 2009; Tankersley et al., 2008).

The study was conducted using a small sample size [i.e., three co-teaching dyads (n=6)] using within participants design (Kazdin, 2011). Based on the work of Horner et al. (2005), this sample size was appropriate for this initial investigation into the effects of virtual coaching on co-teaching practices.

Table 1

<table>
<thead>
<tr>
<th>ABAB Withdrawal Design Phase Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The ABAB Withdrawal Design Procedure</strong></td>
</tr>
<tr>
<td><strong>Phases per each dyad</strong></td>
</tr>
<tr>
<td>One</td>
</tr>
<tr>
<td>Phases per each dyad</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>Two</td>
</tr>
<tr>
<td>Three</td>
</tr>
<tr>
<td>Four</td>
</tr>
</tbody>
</table>

**Reversibility in Withdrawal**

The researcher considered the issue of reversibility when deciding between a withdrawal design and a multiple baseline design. In most cases of withdrawal design, one would expect to see a reversal of behavior during the second baseline condition (Barlow et al., 2009; Kazdin, 2011). Kennedy (2005) posited that in the case of learned skills, it becomes difficult to reverse the effect of the intervention. For instance, once a teacher learns and implements a new method or behavioral support which results in positive changes in the classroom, it would be difficult to disrupt the implementation of the method or support simply by removing the outside force that resulted in the learned behavior. In this study, the researcher did not expect to see a reversal during the second baseline condition. Once co-teachers effectively planned for and implemented co-
teaching models, student-specific accommodations, and PBIS it was expected that the teachers would continue the behaviors when the virtual coaching was withdrawn.

**Data Collection Procedures**

The data collection included viewing archived video files of each dyad’s co-planning and co-teaching sessions and coding the behaviors using a data collection protocol to create a coded numerical analysis of each participant’s dependent variables. Direct counts were recorded based on direct systematic observations during each phase of the study for (a) co-teaching models planned for and used, (b) student-specific accommodations planned for and used, (c) positive behavioral interventions and supports planned for and used, (d) student engagement, and (e) instances of disruption were recorded based on direct systematic observations captured through video recording of co-teachers’ planning and instruction during each phase of the study. In addition, participants were asked to complete the Co-teacher Communication Satisfaction Scale (CCSS) (Ploessl & Rock, 2008) (see Appendix A), which is a Likert-type scale style satisfaction questionnaire, during baseline and at the final phase, in order to investigate how satisfaction with communication between co-teaching partners changed over the course of the study. The CCSS was designed to yield a numerical score that measures individual co-teacher’s communication satisfaction with actual and recalled conversations with one another. The quantitative data and their analyses provided the researcher with a general understanding of the problem. Table 2 provides an overview of the research model organized by each research question.
Table 2

Research Model Matrix

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Dependent Variable</th>
<th>Measurement (Quantitative)</th>
<th>Analysis</th>
<th>Interobserver Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Planned/Implemented Accommodation/Modifications</td>
<td>Quantitative: Data Collection protocol accommodations/ modifications CTSS, CtRS</td>
<td>Scale scores on selected items.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Planned/Implemented PBIS</td>
<td>Quantitative: Coding protocol redirects/praise, CTSS Checklist, CtRS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ2</td>
<td>Evidence of disruption</td>
<td>Quantitative: Data Collection protocol (i.e., disruption)</td>
<td>Data collection protocols: a. frequency counts b. Visual Analysis</td>
<td>(A/A+D)100</td>
</tr>
<tr>
<td></td>
<td>Student engagement</td>
<td>Data Collection protocol (i.e., momentary time sampling for percent engagement)</td>
<td>Data Collection protocol: Percent Engagement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>co-teacher interviews</td>
<td>Measure of social validity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Participants

Co-teacher Participants

Six practicing teachers were recruited as co-teaching participants for this study.

Three of these six were graduates of Project TEEACH, a federally funded personnel
development training program. Participants recruited from Project TEEACH had each completed the same 3-credit hour graduate level course, at The University of Alabama. The course provided training in collaboration and co-teaching. A practicum (i.e., field experience) in co-teaching was a required component of the course. The three participants recruited from Project TEEACH identified a voluntary co-teaching partner with whom to co-teach. Each of the three identified partners reported having had experienced professional development activities in the area of co-teaching at each of their school systems. Three co-teaching pairs were created in this way. Each co-teaching pair consisted of a certified general education teacher and a certified special education teacher (see Table 3). Each co-teaching pair served students who received special education services under the Individuals with Disabilities Education Act (IDEA, 2004) in the general education inclusive classroom. School administrators were contacted to obtain permission for the teachers to participate in the study. Copies of the invitation to the teachers to participate and a sample letter from a school administrator confirming permission are included in Appendix C.

**Selection process.** A purposive convenience sample (Kazdin, 2010) was selected for this study. The researcher invited individuals who met the following criteria, practicing teachers who graduated from an advanced certification training program in special education (through Project TEEACH) and their state certified co-teaching partners, to participate in the study. Fink (2003) defined a convenience sample as “a group of individuals who are ready and available” (p. 41). Babbie (2008) pointed out that it can be “appropriate to select a sample on the basis of knowledge of a population, its elements and the purpose of the study” (p. 178). The sampling methodology was
Table 3

*Make-up of Co-teaching Pairs*

<table>
<thead>
<tr>
<th>Co-teaching dyads</th>
<th>General Education Teacher</th>
<th>Years of Experience/ Co-teaching Experience</th>
<th>Ethnicity</th>
<th>Special Education Teacher</th>
<th>Years of Experience/ Co-teaching Experience</th>
<th>Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>Non-Project TEEACH graduate</td>
<td>10/&lt;1</td>
<td>African American</td>
<td>Project TEEACH graduate</td>
<td>15/&lt;1</td>
<td>African American</td>
</tr>
<tr>
<td>Pair 2</td>
<td>Project TEEACH graduate</td>
<td>15&lt;1</td>
<td>African American</td>
<td>Non-Project TEEACH graduate</td>
<td>1&lt;1</td>
<td>White</td>
</tr>
<tr>
<td>Pair 3</td>
<td>Project TEEACH graduate</td>
<td>5/&lt;1</td>
<td>White</td>
<td>Non-Project TEEACH graduate</td>
<td>28&lt;1</td>
<td>White</td>
</tr>
</tbody>
</table>

purposive in that all participants were chosen for specific attributes, common similarities in training, diversity in ethnicity, and identified disabilities necessary for the research and convenience for both the study methodology and the geographic location (Babbie).

**Setting**

Based on the purposive convenience sample methodology used, the setting for the study included three elementary schools in the state of Alabama. Site One was a public primary school in a small city school district serving 273 students in grades Pre-K-5. School ethnicity data include a population consisting of 99% Black, <1% Hispanic, and <1% Multi-ethnic students. Ninety-six and eight tenths percent of the students at this school met requirements for free or reduced lunch (ALSDE, 2012). Site Two was a public primary school in a small city district serving 250 students in grades Pre-K-5. School ethnicity data included a population consisting of 99% Black and <1 % White students. Ninety percent of the students met requirements for free or reduced lunch (ALSDE). Site Three was a public primary school in the same county serving 316
students in grades Pre-K-5. School ethnicity data included a population consisting of 40% Black, 20% Hispanic, and 40% White students. Sixty-nine percent of students at this school met requirements for free or reduced lunch (ALSDE). The teacher participants’ elementary general education inclusive classrooms within each school site provided the specific settings for this investigation. Participants’ grade levels varied in range from the second through third grade. A private, remote office served as the setting from which the researcher conducted observations and provided virtual coaching.

**Virtual Coaching Apparatus**

Throughout all phases of the study, the researcher and participants used an online platform developed and tested from 2007 to present by Rock and her colleagues (see Rock et al., 2009). The virtual coaching technology made use of participants’ existing classroom computer and Internet connection. During baseline conditions (Phases One and Three), when no virtual coaching was provided to participants, only the interactive video conferencing (IVC) component (i.e., Skype) was used. When virtual coaching was underway during intervention conditions (Phases Two and Four), the teachers’ existing IVC equipment was used with advanced online BIE technology so that feedback could be provided immediately in situ (i.e., while the co-teachers were teaching). The equipment that compiled the online BIE system was provided to the participants through their involvement in Project TEEACH [i.e., a Bluetooth headset, a Bluetooth wireless adapter, a webcam, and Skype (a free Internet-based Voice-over-IP system)].

**Virtual coaching technologies for use during co-planning.** During the co-planning sessions, the researcher used a Mac PowerBook laptop computer with a webcam and Skype as her apparatus. Because the researcher coached from a private, remote
office, there was no need for the use of a Bluetooth headset or wireless adapter. Instead, the researcher used the laptop computer’s internal microphone and speakers. The researcher used the Call Recorder for Mac, a plug-in for Skype that enables video call recording, in order to electronically capture each observation. Video files recorded across conditions for each co-planning session were saved on an external hard drive and archived for later analysis. The external hard drive remained in a locked office to maintain protection as required by The University of Alabama’s IRB. For the co-planning sessions, the participants used existing classroom computers with Internet connections, personal computer’s internal microphone and speakers for web-based interactive video conferencing and Skype to connect with the researcher during the co-planning sessions across the phases.

**Virtual coaching technologies for use during co-teaching.** The researcher used the same apparatus described previously for the co-planning sessions with the co-teaching session across conditions. As mentioned previously, participants continued to use existing classroom technologies (i.e., the classroom computer with Internet access and the webcam) with the addition of the Bluetooth earpiece and adaptor. One co-teacher wore the headset to receive immediate feedback by the coach (i.e., researcher) during a co-teaching lesson. For the next lesson, the other participant in the co-teaching pair wore the Bluetooth earpiece in order to receive discreet, immediate feedback from the coach. Components for the advanced online bug-in-ear virtual coaching system are identified in Table 4.
Table 4

*Original Advanced Online Bug-in-Ear Virtual Coaching System*

<table>
<thead>
<tr>
<th>Technology Components</th>
</tr>
</thead>
</table>

**Technology Components for Co-Teachers**

Plantronics P1-Voyager 510 Bluetooth Headset

IOGear Enhanced Date Rate Bluetooth Wireless USB Adapter GBU221

Creative WebCam Live! Ultra-Web Camera

Skype

**Technology Components for Coaches**

Pamela Call Recording (Optional for bug-in-ear video recording) or Call Recorder for Mac (Optional for bug-in-ear video recording on Macs)

Maxtor One Touch III USB 2.0 External Hard Drive (Optional for archiving video recorded sessions)

Skype

Internal or External Microphone

Internal or External Webcam

Source: Rock et al., 2009 (Information is proprietary; patent pending)

**Independent Variables**

Fraenkel and Wallen (2003) described independent variables as “those that the researcher chooses to study in order to assess their possible effect(s) on one or more other variables” (p. 43). In applied research, the independent variable is the intervention procedure which, when applied, determines what, if any, change occurs to the dependent variable (Schloss, Misra, & Smith, 1992). In this study, one independent variable [i.e.,
virtual coaching using the online platform developed by Rock and her colleagues (2009)] was investigated.

**Virtual Coaching**

The use of virtual coaching to provide immediate feedback during co-planning sessions and the subsequent 30-minute co-taught lessons occurred through use of a web-based interactive video conferencing (IVC) system and the advanced online bug-in-ear system (Rock et al., 2009). The system, which was described previously, used mobile communication devices and Internet technology (see Table 4) (Rock et al., 2009). The web-based interactive video-conferencing component of the system did not allow for unscheduled online visits because the participants must electronically accept all incoming requests; therefore, there were no unexpected observations or virtual coaching sessions (Rock et al., 2009).

The virtual coaching intervention used by the researcher was comprised of differing types of immediate feedback. According to Scheeler et al. (2004), feedback is most effective when provided immediately. Four types of feedback (i.e., reinforcement, corrective, questioning, and instructive) were provided to co-teaching participants during co-planning and co-instruction throughout the intervention phases (Phases Two and Four) of the study. Reinforcement or positive feedback consists of statements that provide “social praise for performing specific teaching behaviors” (Scheeler et al., p. 399). Corrective feedback includes statements related to the “type and extent of error and specific ways to correct the error” (p. 399). Questioning feedback is defined as “a sentence posed in interrogative form to get information or to clarify specific teaching behaviors” (Random House Unabridged Dictionary, 2006 in Rock et al., 2009, p. 72).
Instructional feedback defined as “[when] objective information related to predetermined specific teaching behaviors is offered” (Scheeler et al., p. 399).

In this study, the virtual coaching targeted three areas: (a) co-teaching models, (b) student-specific accommodations and modifications, and (c) PBIS strategies during Phases Two and Three. For co-teaching models, the feedback provided through the virtual coaching was limited to (a) implementation of different models related to the content of the lesson, (b) implementation of different models related to the lesson cycle, and (c) fidelity to variety of models. Virtual coaching feedback that targeted student-specific accommodations was limited to (a) alternate methods for responses (e.g., verbal responses, dictation to a scribe), (b) alternate modes of presentation (e.g., reduced number of items per page) (National Center for Learning Disabilities, 2006), and (c) use of color coding strategies (Gould & Vaughn, 2000). Feedback that targeted student-specific modifications was limited to (a) targeting lower level skills and (b) individualizing curriculum materials (Smith et al., 2008). Feedback targeting PBIS was limited to (a) specific, descriptive praise (Simonsen et al., 2010) and (b) neutral redirection (Steele, 1995).

**Dependent Variables**

Virtual coaching sessions were recorded using Call Recorder for Mac (Ecamm Network, LLC, 2011) offered through the Skype program. For each session, the participants were asked to electronically accept or decline the video recording. In addition, the participants had the option to terminate the session at any time by ending the Skype call. Saved video files were archived and coded to collect data related to the dependent variable. The dependent variables are described below.
RQ1 Dependent Variables: Co-planning and Co-instruction

Three dependent variables were used to investigate changes in teacher behavior related to RQ1: (a) during instruction, the use of varied co-teaching models indicated during co-planning; (b) during instruction, the use of student-specific accommodations and modifications indicated during co-planning; and (c) during instruction, the use of PBIS strategies indicated during co-planning. These co-teaching behaviors were measured using the data collection protocols identified for use with RQ1 (see Appendix D). In addition, the number and ratio of co-teaching models, student-specific accommodations and modifications, and PBIS strategies planned for versus the number carried out during co-taught instruction were analyzed for each variable.

For the first dependent variable, the researcher and the reliability observer recorded (via frequency counts) the varied types of co-teaching models the co-teaching participants planned to use during instruction. During the lessons, the observers recorded (via frequency counts) the types of co-teaching models the co-teaching participants carried out. Observers also evaluated instructional uses of the models that were related to items on the CtRS (Gately & Gately, 2001) and CTSS Checklist (Murawski & Lochner, 2011). The second dependent variable was measured through frequency counts of the number and types of student-specific accommodations and modifications co-teaching participants planned to use during instruction and selected items on the CtRS (Gately & Gately) and CTSS Checklist (Murawski & Lochner). During the lessons, the observers recorded (via frequency counts) the types of student-specific accommodations and modifications the co-teaching participants carried out. Observers also evaluated instructional uses of the accommodations and modifications that were related to items on
the CtRS (Gately & Gately) and CTSS Checklist (Murawski & Lochner). The third dependent variable was measured through frequency counts of (a) redirects, reprimands, and praise statements on data collection protocols adapted from Rock et al. (2009); (b) the type and number of PBIS strategies co-teaching participants planned to use; and (c) selected items on the CtRS (Gately & Gately) and CTSS Checklist (Murawski & Lochner).

The frequency counts of co-teaching behaviors, student-specific accommodations and modifications, and PBIS were based on direct and systematic observation of the co-planning and co-teaching sessions without (Phases One and Three) and with (Phases Two and Four) virtual coaching interventions. These sessions, which were captured through video recording, were used as the primary method for data collection across all conditions in all phases. The use of rating scales provided a secondary measure, which allowed for repeated measures within each condition.

**RQ2 Dependent Variables: Benefit or Disruption of Virtual Coaching**

In order to investigate the impact of virtual coaching on co-teachers and their students, three dependent variables; (a) co-teachers’ perceptions about coaching (as a measure of social validity), (b) P-6 student engagement during co-taught lessons, and (c) co-teachers’ hesitations during instruction; were measured to investigate the benefit or disruption in elementary school classrooms. The first dependent variable related to RQ2 was measured through statements from interviews conducted with participating co-teaching pairs (see Appendix E). The second dependent variable measured student engagement using momentary time sampling techniques to determine the percent of student engagement throughout the co-taught lessons. The final dependent variable, co-
teachers’ hesitation during virtual coaching while co-instructing, measured the impact on teaching as evidence of disruption in the lesson during planning and instruction, by marking the data collection protocol adapted from Rock et al. (2009), using a frequency count to record hesitations in instructional pacing during the virtual coaching sessions (Phases Two and Four) (see Appendix B).

**Quantitative Measurement**

In order to evaluate the incidences of varied co-teaching practices, archived video files of co-taught lessons were coded to measure the frequency of teacher instructional practices (Rock et al., 2009) used by each co-teaching dyad for the presence of (a) learning groups defined as “variety, heterogeneity emphasized, multiple approaches to co-teaching,” (Nevin, 2006, p. 250); (b) student specific accommodations and modifications that teachers planned and that were appropriate for students in the setting; and (c) monitoring of student progress defined as “elicits/reinforces active responses, both teachers accessed by all students, shared evaluation and grading of student work,” (Nevin, p. 250). Frequency counts were recorded for each co-teaching behavior resulting from a virtual coaching prompt or an independently demonstrated co-teaching behavior. The frequency counts from direct count of co-teaching behaviors with and without virtual coaching intervention and captured through video recording was the primary method for data collection across all conditions.

Another method that the researcher used to evaluate the dependent variables associated with co-teaching planning and implementation is the CtRS (Gately & Gately, 2001). Archived video files were coded using the CtRS (Gately & Gately). Quality indicators included in the rating scale included the following: (a) professionalism defined
as “demeanor toward each other and the students” (Nevin, 2006, p. 250); (b) classroom management defined as “rules, behavioral accommodations, and shared responsibility,” (Nevin, p. 250); and (c) the instructional process defined as planning for “group and individual instruction, sharing both content and strategy teaching,” (Nevin, p. 250). The use of rating scales provided a secondary measure, which allows for repeated measures within each condition.

To measure whether changes in the instructional format and the virtual coaching condition impacted students, the percentage of student engagement was analyzed from the archived videos and examined for the number of students who were academically engaged throughout the lesson. An academically engaged student was defined as a student who is actively participating in the lesson during presentation (e.g., eyes on teacher, assigned task, or partner; participating through raising hand or choral responses to answer questions) at the time of measurement. Disengagement was defined as a student wandering in the classroom, and/or chatting with peers socially about subjects other than the assigned task, vocalizing, and/or staring into space, laying their heads on the table, sleeping, or acting inappropriately toward peers (e.g., insulting, hitting, spitting) or focusing on non-essential materials in the classroom (e.g., drawing, playing with objects) (Rock et al., 2009). Momentary time-sampling techniques used 5-minute intervals to document student engagement during each 30-minute lesson (Rock et al.). Trained observers watched each video recorded file and counted the total number of students who were visible in the video image at each 5-minute interval. Then observers examined each student and determined whether or not each student visible on the video capture was engaged. The total number of students viewed and the number of students
who were disengaged were recorded on a data collection protocol (see Appendix F). The procedure was repeated at each 5-minute interval throughout the length of the 30-minute lesson (Rock et al.).

To examine the disruptiveness of the coach’s virtual feedback, observers evaluated the same archived planning sessions and co-taught lessons for the frequency of times teachers stopped. A disruption was “defined as a 5-second or greater delay in teacher talk after or while the teacher receive[s] feedback; hesitate without verbal response, “defined as the teacher physically drawing back or showing a facial expression of surprise, panic, puzzlement, or thoughtfulness”; and hesitate with a verbal response, “defined as teacher talk characterized by ‘stalling for time language’ such as ‘um,’ ‘so,’ or ‘what’” (Rock et al., 2009, p. 71). Again, each time the observer noted one of the defined behaviors, a tally mark was recorded in the appropriate category on the data collection protocol.

**Inter-observer Agreement**

Since the reliability of the collected data is crucial, the use of an inter-observer agreement (IOA) served as the reliability measurement method. To establish IOA, two observers were trained to code the archived video files. Training sessions included viewing *The Power of Two* which is a commercially published video-disk (Friend, 2005) to familiarize the observers with the co-teaching models that were to be examined in the study. Data collection protocols were reviewed and operational definitions were learned during training sessions. The researcher also provided examples of teacher and student behaviors as well as instruction on coding procedures. Training also included a review of
procedures for use of the CtRS (Gately & Gately, 2001) and the CTSS Checklist (Murawski & Lochner, 2011) observation forms.

The researcher served as primary observer and coded all of the recorded video files. The data collected by this observer was used for data analysis purposes in the study. The second trained observer, who is a retired elementary school teacher and college supervisor, served as the reliability observer. The primary and secondary observers have served as Project TEEACH coders for 3 years and had extensive experience coding video files using similar coding schemes.

Contemporary single-case researchers have suggested that between 15% (Barlow et al., 2009) and 33% (Kennedy, 2005) of the total number of observation sessions should be used to establish an adequate IOA. In order to stay within the conventions of the suggested percentages for this study, the reliability observer observed and coded 25% of all the recorded archived video files included. The data from the secondary observer was not incorporated into the study for the dependent variable analyses. Data from the primary and secondary observers were compared and reported as an estimate of reliability. Reliability was calculated code by code by determining the percentage of agreement of the two observers. For example, at 5-minute intervals each observer counted the number of students visible in the video and recorded the number on a data collection protocol. The observer then counted the number of students who appeared to be disengaged and recorded the number on the same protocol. The reliability estimate was calculated using the following formula (Kazdin, 2010):

\[
\% \text{ Reliability} = \frac{\text{Number of Agreements of Codes}}{\text{Number of Agreements of Codes + Disagreements}} \times 100
\]
Barlow et al. posited that an 80% or higher IOA is conventional, and 90% agreement is preferred. In this study, the 80% agreement level was the minimum standard for an IOA. When an agreement fell below the 80% minimum standard, the observers retrained in the coding procedures, operational definitions, and then recoded archived video files. An 80% agreement was met for all selected video recording; therefore, a third trained observer was not required to reach a conclusive reliability measure.

**Procedures**

Establishing contact with participants and implementing the proposed single case research as designed were time and labor-intensive undertakings. Therefore, the months of March through May were devoted to securing Institutional Review Board (IRB) approval from The University of Alabama and contacting and obtaining required informed consent from teacher participants and administrators. The months of August, September, and 2 weeks in October were devoted to collecting baseline and intervention data. The months of November, December, and January were set aside for conducting quantitative data analyses and preparing drafts of the results and discussion chapters.

**Before Data Collection**

Adhering to protocols of The University of Alabama Institutional Review Board (IRB) and The American Psychological Association (APA), the researcher submitted a request for approval to complete this research study from IRB. The protection of an individual’s confidentiality was a primary concern of the researcher, thus any identifying information was not made public. The researcher contacted each teacher participant individually through email messages and phone calls, made the usual introductions, then followed a pre-designed script incorporating the (a) overview and concept of the research
design, (b) the details concerning individualized data security, and (c) protections and instructions for participant interviews (see Appendix G). After receiving approval from The University of Alabama Review Board (IRB) to conduct this study (see Appendix H), the researcher met with administrators and participants to explain the informed consent procedure and to answer any questions. The researcher distributed informed consent forms (see Appendix I) for each teacher participant to complete before any data collection was initiated.

After teacher participants returned signed informed letters of consent, the researcher contacted the participants, established firm dates, and then conducted the research. During that time, participants were asked to ensure the advanced online bug-in-ear technology was working in their respective classrooms. Installation instructions (see Appendix J), general troubleshooting instructions (see Appendix K), instructions for troubleshooting dropped calls (see Appendix L), audio troubleshooting instructions (see Appendix M), instructions for troubleshooting frozen web-cams (see Appendix N), and a Skype guide for network administrators (see Appendix O) were provided to each dyad of participants before data collection began.

Then, each co-teaching dyad field-tested the virtual coaching technology with the researcher to ensure that remote connections were adequate and that the recording and storage systems were operational. At the conclusion of the field tests, baseline observations were scheduled according to each participating pairs’ daily schedule. The researcher observed the same co-planning and teaching content area for 30 minutes during all baseline and intervention phases to ensure consistency of subject matter.
During Data Collection

Horner et al. (2005) suggested that single case researchers should strive to ensure the baseline condition is as similar to the intervention condition as possible. In this study, the researcher met this standard by virtually visiting classrooms during the same content area instruction and for equal amounts of time during each observation. Co-teacher participants alternated days wearing the Bluetooth earpiece during the baseline phases (Phases One and Three), and alternated similarly during the intervention phases (Phases Two and Four) of the study.

Phase One Baseline phase. During the baseline condition, the researcher virtually observed each participating pair of teachers as they cooperatively planned for and carried out instruction. The co-planning sessions took place in the general education classroom so the researcher was able to observe through the virtual coaching system described previously. The researcher greeted the participants and recorded each 30-minute planning session for analysis, but did not provide immediate or delayed feedback to the participants at any time before, during, or after the planning sessions. As mentioned previously, the planning sessions were recorded by the researcher using Call Recorder for Mac and stored on an external hard drive in a locked office for later analyses.

The researcher then virtually visited the classroom to observe 30 minutes of the planned co-taught lessons. Again, the researcher recorded the lessons for analysis, but did not provide immediate or delayed feedback to the participants before, during, or after the lessons. In order to establish similar conditions during baseline and intervention, the participants alternated wearing the Bluetooth earpiece during co-taught instruction. This
also allowed the non-Project TEEACH participants and their new students to become familiar with the technology. As stated earlier, in order to control for some confounding variables, the researcher observed the same content area during each co-taught lesson during baseline and intervention phases with each teacher dyad. Procedures for virtual observations were identical during the return to baseline observation phase. Gast (2010) specified that baseline data was to be collected continuously “over a minimum of 3 consecutive days” (p. 250). According to Kratochwill and colleagues (2010), in order “for a phase to qualify as an attempt to demonstrate an effect, the phase must have a minimum of three data points” (p. 15). While three data points in each phase is a minimum according to these authors, Kratochwill et al., posited “To Meet Standards with Reservations a reversal/withdrawal (e.g., ABAB) design must have a minimum of four phases per case with at least three data points per phase” (p. 16). In this study, four phases per case with four data points per phase were obtained and met this standard. The design of this study required that the researcher observe both co-planning and co-teaching session (see Table 1). Therefore, in order to meet the higher standard (i.e. Meet Standards without Reservations: four phases with at least five data points per phase), the researcher would need to observe an additional 18 co-planning and co-teaching sessions. Due to time constraints of the researcher, four data points was the adopted standard for this research undertaking.

The primary and secondary observers individually and separately coded the recorded baseline video sessions for variables as defined and described previously using frequency counts for observed co-teaching planning and instructional behaviors. Counts were recorded and totaled on data collection protocols adapted from Rock et al. (2009)
(see Appendix D), then, the data was entered into an Excel spreadsheet. Then the primary researcher plotted these data onto a line graph. Plotting and analyzing baseline data served two purposes. The first was to document a pattern, or patterns, of behavior that needed to be changed, and the second was to ensure that the pattern or patterns of behavior had a consistent level and variability without a visual trend so that a comparison of new patterns could be seen following the intervention phases (Phases Two and Four) of the study (Kratochwill et al., 2010). It was important that the data collected in the baseline phase were stable before an intervention stage began. Kazdin (2011) posited that a stable rate during a baseline condition requires that there is an absence of trend (i.e., slope) and little variability in the collected data. For this study, an absence of trend of one dependent variable provided the needed absence of behavioral pattern for the researcher to move to the intervention phase (Phase Two) of the study.

After baseline observations were complete, teacher participants completed a survey, The Co-Teacher Communication Satisfaction Scale (CCSS) (Ploessl & Rock, 2008), probing how they viewed communication with their co-teaching partner (see Appendix A). Demographic data collected included age, gender, ethnicity, highest professional degree held, number of years teaching, number of years co-teaching, grade level taught, and type of school currently employed.

The Co-teaching Rating Scale (CtRS) (Gately & Gately, 2001), an informal instrument used to examine eight essential collaborative components that make or break relationships between co-teachers (see Appendix P), and the Co-teaching Solution System Checklist (CTSS Checklist) (Murawski & Lochner, 2011) used to assist observers to know what to look for and listen for during co-planning and co-teaching observations.
(see Appendix Q) were used as secondary measurement tools while the archived video files of the first baseline teaching session in Phase One were analyzed for items on the CtRS and CTSS Checklist. These data served as the pre-assessment of co-teaching behaviors.

**Phase Two Intervention phase.** Once baseline stability requirements were met (i.e., four data points, level trend, and little variability), the intervention phase (virtual coaching during co-planning and co-teaching) was introduced. Settings for the first intervention phase remained the same as those in the baseline phase. During the initial intervention phase, the researcher virtually observed each participating pair of teachers as they cooperatively planned for instruction in the general education inclusive classroom. Throughout the co-planning sessions, the researcher used virtual coaching to provide immediate feedback (i.e., encouraging, corrective, questioning, and instructive) to the participants as they planned a co-taught lesson. As mentioned previously, during co-planning, the participants did not use the Bluetooth earpiece, instead they used the computer’s external speakers so that both teachers were able to hear the virtual coach (i.e., researcher) at all times. No P-6 students were present during the co-planning sessions. As previously noted, the researcher recorded the 30-minute planning session for later analysis. The recorded co-planning sessions were archived electronically on an external hard drive and stored in a locked office.

After each co-planning session, the researcher virtually visited each classroom for 30 minutes during the planned co-taught lesson. Throughout each lesson, the researcher provided virtual coaching (i.e., immediate feedback) to one co-teacher participant through the advanced online bug-in-ear system. Again, the researcher recorded each co-
taught lesson and archived each video file on an external hard drive in a locked office for later analysis. The primary and secondary observers, individually and separately, coded the archived video files for each dependent variable previously defined using frequency counts for the observed coached occurrence of planned co-teaching behaviors. Counts were recorded and totaled using procedures mirroring those during the baseline phase (Phase One) on data collection protocols adapted from Rock et al. (2009) (see Appendices F, G, and H). Next, the observers entered these data into an Excel spreadsheet at the end of each coding session. The researcher regularly plotted these data onto a line graph, using the Microsoft Excel for Mac 2011 (Microsoft Corporation, 2010).

Virtual coaching continued for four sessions (i.e., Planning-Teaching-Planning-Teaching) (see Table 1) with each co-teaching dyad for the first intervention phase (Phase Two), then the researcher withdrew the intervention and the return to baseline phase began (Gast, 2010; Kratochwill et al., 2010).

**Phase Three Return to baseline phase.** The procedures for the second baseline phase (Phase Three) replicated those used in the first baseline phase (Phase One) previously described. Data collection during the second baseline phase continued for a minimum of four observational sessions (i.e., Planning-Teaching-Planning-Teaching) (Kratochwill et al., 2010) (see Table 1). After the researcher conducted four observation sessions for the second baseline condition, the researcher introduced the second virtual coaching intervention phase.

**Phase Four Second intervention phase.** During the second intervention phase (Phase Four), the researcher resumed virtual coaching with the co-teaching participants. The procedures for this phase of the study replicated those used during the first
intervention phase of the study (see Table 1). The second intervention phase continued until a stability in trend was established. As with the first intervention phase (Phase Two), the researcher obtained a minimum of four data points for each participant dyad as the adopted standard for this research phase (Kratochwill et al., 2010). See Table 5 for a summary of phases and decision rules.

Table 5

*Summary of Research Phases and Condition Rules*

<table>
<thead>
<tr>
<th>Condition</th>
<th>Transition</th>
<th>Decision Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (A)</td>
<td>Phase A to Phase B</td>
<td>Obtain 4 data points. Stable data rate (absence of trend, little variability)</td>
</tr>
<tr>
<td>Intervention (B)</td>
<td>Phase B return to Phase A</td>
<td>Obtain 4 data points Acceptable stability in trend and level reached</td>
</tr>
<tr>
<td>Baseline (A)</td>
<td>Phase A to Phase B</td>
<td>Obtain 4 data points Acceptable stability in trend and level reached</td>
</tr>
<tr>
<td>Intervention (B)</td>
<td>Continuation of Phase B</td>
<td>Obtain 4 data points Acceptable stability in trend and level reached</td>
</tr>
</tbody>
</table>

After the completion of the final intervention session (Phase Four), teacher participants completed a survey, [i.e., Co-Teacher Communication Satisfaction Scale (CCSS) (Ploessl & Rock, 2007)], probing how they viewed communication with their co-teaching partner (see Appendix A). The researcher compared data collected from this survey with data collected from the same survey completed at the end of the first baseline phase. The CtRS (Gately & Gately, 2001) (see Appendix P) and the CTSS Checklist (Murawski & Lochner, 2011) (see Appendix Q) were used as secondary measurement
tools and archived video files of the final intervention teaching sessions (Phase Four) were analyzed for items on the CtRS and CTSS Checklist. These data served as the post-assessment of co-teaching behaviors.

**After Data Collection**

As adult learners are goal-oriented and often intimidated when outside individuals enter their learning space (Lieb, 1991), it was important that the virtual coach establish a climate of an open atmosphere where all participants felt supported. In order to investigate whether the coach (i.e., the researcher) provided this climate and participants found the virtual coaching useful, each teacher participant completed a short semi-structured interview with the researcher at the completion of the project. The interview included questions adapted from Scheeler et al. (2010). The interview questions were

1. Did you like receiving virtual coaching through the use of the web-based IVC system and advanced online bug-in-ear?
2. Why or why not?
3. Were you distracted by the virtual coaching while planning and/or teaching?
4. If so, what was most distracting?
5. Was the virtual coaching helpful in preparing for and teaching with your co-teacher?
6. What are some of the examples of feedback you found useful throughout the virtual coaching sessions?
7. Would you recommend the use of virtual coaching to other professionals who are beginning the practice of co-teaching?
8. Why or why not?; and
9. What impact, if any, did this experience have on your students?

Following each interview, the researcher asked the participant if she had any questions and thanked her for her time and effort to participate in the research project. During this debriefing, participants were encouraged to contact the researcher if questions arose about the study. The researcher described the purpose of the study, the way in which interview answers were to be used, and broader issues addressed in the study. In addition, the researcher discussed the study methods and anticipated or observed results.

Once interview transcription was completed, the researcher contacted each participant through an email message and asked participants to validate the accuracy of statements made during the interview process through member checking procedures outlined by Gall et al. (2007). Specifically, teacher participants were asked to validate and review transcriptions of personal interviews to ensure the statements were accurate and complete. The researcher offered to send participants the results of the study and provided references for further reading in the areas of co-teaching, virtual coaching, and teacher training. Finally, the researcher asked participants if they had any questions about the study, if there was a part of the study that was difficult, and if they would change any part of the study (Fraenkel & Wallen, 2003; Gall et al.).

**Single-case Quantitative Data Analysis**

**Trend and Visual Analysis**

In single-case research, the traditional approach to analysis involves “systematic visual comparison of responding within and across conditions of a study” (Parsonson & Baer, 1978 in Horner et al., 2005, p. 169). This visual interpretation consists of three indicators: level, trend, and variability of performance occurring during both baseline and
intervention phases. According to Horner et al., level is the mean of an occurrence of a behavior during a phase of the study. The trend is the reference for the “rate of increase or decrease of a best-fit straight line for the dependent variable within a condition (i.e., slope)” (Horner et al., p. 171). And Horner et al. defined variability as “the degree to which performance fluctuates around a mean or slope during a phase” (p. 171). In addition, Horner et al. stated that in order for visual analysis to be complete, the researcher must also evaluate

(a) the immediacy of effects following the onset and/or withdrawal of the intervention, (b) the proportion of data points in adjacent phases that overlap in level, (c) the magnitude of changes in the dependent variable, and (d) the consistency of data patterns across multiple presentation of intervention and non-intervention conditions. (p. 171)

Any functional relationship between the independent and dependent variables is determined by the combination of information gathered from these assessments and comparisons made with the information (Horner et al.).

According to Spriggs and Gast (in Gast, 2010) there are two basic purposes for the use of visual displays. One is to assist in the organization of data while data collection is in progress, which in turn facilitates formative evaluation. The second is the “detailed numerical summary and description of behavior, which allows readers to analyze the relation between independent and dependent variables” (Spriggs & Gast in Gast, p. 167). Simply stated, the graphic display tells the story.

The autonomous analysis of the relationship between independent and dependent variables is one strength of single-case research. When all data are reported, “readers can determine for themselves whether a particular intervention has a reliable and ‘significant’ effect on a participant’s behavior” (Spriggs & Gast in Gast, 2010, p. 167). Spriggs and
Gast identified the graph as a simple concise way to report data that would be complicated to explain in narrative form and the visual display provides the reader with (a) the progression of phases, (b) the amount of time spent in each phase, (c) the independent and dependent variables, (d) the experimental design, and (e) the relationship of the variables. In this study, the researcher wanted to see an accelerating (i.e., increasing) trend in the number of co-teaching models planned for and used, the number of student-specific accommodations and modifications planned and used, and the number of PBIS approaches planned and used. The reliance on visual inspection may discount many reliable yet weak effects of an intervention (Kazdin, 2011). Therefore, agreements and disagreements identified by the second coder assisted the researcher in guarding against Type II errors [i.e., concluding no effect from an intervention that produced an effect (Kazdin)].

Gast and Spriggs (2010) posited that visual techniques for analyzing data across time and conditions are required to formatively evaluate a program’s effectiveness. In this research project, the researcher carried out level and trend visual analysis methods outlined by Gast and Spriggs using the Microsoft Excel for Mac 2011 Version 14.1.3 program (Microsoft Corporation, 2010).

**Treatment Effect**

Treatment effect was hand calculated and analyzed using the Percent of Non-overlapping Data (PND) methods (Scruggs et al., 1987). In order to do this, the number of data points in the first intervention phase (Phase Two) that exceed the highest data point in the first baseline phase (Phase One) was divided by the total number of data points in the first intervention phase. The quotient was then multiplied by 100, so that the
resulting number became a percentage score (Scruggs & Mastropieri, 1998). The researcher followed the same method when analyzing the second baseline phase (Phase Three) and the second intervention phase (Phase Four). Finally, the researcher followed procedures outlined by Scruggs and Mastropieri for total PND. To do this, the two PND scores were summed to produce a total score for each dependent variable (Scruggs & Mastropieri, pp. 223-224). The strongest feature of the PND is that it is easy to compute and easy to interpret (i.e., interventions that are more effective yield higher percentage scores) (Faith, Allison, & Gorman, 1996).

**Treatment Integrity (Virtual Coaching Fidelity)**

The researcher analyzed treatment integrity by using the behavioral data (see Appendix B). The researcher totaled frequency counts and analyzed the data for each type of immediate feedback provided to participants for each co-planning session and each co-teaching lesson. Virtual coaching feedback should include more positive than corrective feedback (Scheeler et al., 2004). For example, frequency counts for encouragement should outnumber corrective statements by a ratio of 4:1. In addition, virtual coaching should be specific to (a) co-teaching models, (b) student specific accommodations and modifications, and (c) PBIS strategies. The same archived video files recorded during the intervention phases (Phases Two and Four) were coded to examine the frequency of virtual coaching behaviors of the (a) coach’s encouragement, which is defined as “praise contingent on demonstration of a specific teaching behavior is provided (Scheeler et al.,)” (in Rock et al., 2009, p. 71); (b) coach’s question, which is defined as a question asked in order for clarification or to get more information of a specific teaching behavior (Rock et al., 2009); and (c) coach’s instructional feedback,
which is defined as “objective information related to predetermined specific teaching behaviors is offered” (Scheeler, et al., in Rock et al., 2009, p. 399). Observers also recorded when during the planning session or lesson the virtual coach provided the feedback (a) before planning or teaching, defined as feedback delivered before the planning session or lesson begins; (b) during the planning or teaching, defined as feedback delivered during breaks in planning or teaching, while teachers are planning or teaching; and (c) after the planning session or lesson, defined as feedback delivered after the planning session or lesson terminates. Each time the observer noted one of the defined behaviors, the observer marked a tally mark in the appropriate category on the data collection protocol.

Social Validity

It is important to measure the social validity of an intervention in order to ensure that all participants (i.e., co-teachers, coaches) agree that the procedures are reasonable for the classroom. Interventions viewed as socially acceptable have a higher probability of effectiveness. Social validity assists researchers in reporting the procedures of an intervention as acceptable, feasible, and effective (Horner et al., 2005). Therefore, following the end of the second intervention phase (Phase Four), the researcher interviewed teacher participants using the semi-structured protocol previously described (see Appendix E). The researcher used the interactive video conferencing component of the advanced online bug-in-ear system to record participants’ responses to interview probes. Interview dialogues were stored on an external hard disk in a locked office for transcription and analyses. The researcher used teacher interview statements as a measure of social validity for this study (Horner et al.).
Percent Change in Scale Scores

The researcher used scores from previously designed scales as observation protocol and assessment measures for co-teaching dyads, as part of the data analysis for RQ1 and RQ2. The percent of change in scale scores on the CtRS (Gately & Gately, 2001), CTSS Checklist (Murawski & Lochner, 2011), and CCSS (Ploessl & Rock, 2007) were used to analyze treatment effects. The CtRS (Gately & Gately) and CTSS Checklist (Murawski & Lochner) provided observers with numerical ratings from 0 to 3 in order to rate behaviors that should be observed during co-planning and co-teaching sessions. A score of 1 on any CtRS (Gately & Gately) category indicated that the behavior was rarely seen. Scores of 2 and 3 indicated behaviors were sometimes seen and usually seen, respectively.

Similarly, scores of 0, 1, and 2 on behaviors included in the CTSS Checklist (Murawski & Lochner, 2011) indicated that the observer did not see, saw an attempt, or saw the behavior done well, respectively. While the frequency counts previously described provided most of the data for this research study, change in scale scores on multiple outcome measures provided additional information related to the effects of the intervention and assisted in the interpretation of the effectiveness of the intervention. Therefore, for each of the described scales, the following steps were followed in order to calculate the percentage of change in scale scores. First, for each item used from the scale, a numerical score was collected based on the number indicated in the observation category (i.e., on the CTSS: 0 = didn’t see, 1 = saw an attempt, and 2 = saw the behavior done well). Second, the sum of all numerical scores was totaled for the score on each scale. Lastly, the final intervention score minus the initial baseline score was divided by
the initial baseline score and this quotient was then multiplied by 100 in order to calculate the percentage of change. If the percentage of change number was greater than 0, then the number indicated an increase in behavior from baseline to intervention phases (Committee for Children, 2008).

As stated previously, the CCSS (Ploessl & Rock, 2007) is a Likert-type scale used to measure participants’ satisfaction with communication. Change in total scores from this evaluation tool were compared to assess the percent of change in co-teaching participants communication satisfaction.

**Contribution of Analysis to Current Literature**

Friend and colleagues (2010) emphasized the importance of securing fidelity to the six models of co-teaching as designed, before examining achievement data related to the effects of co-teaching on students with disabilities. As noted in Chapter II, one basic problem in the current literature is the recurrent overreliance on the one teach, one assist model of co-teaching (Feldmen, 1998; Harbort et al., 2007; Rice & Zigmond, 2000; Scruggs et al., 2007; Weiss & Lloyd, 2002). Another problem identified by co-teaching researchers was a lack of specialized instruction for students with disabilities served in co-taught classrooms (Baker & Zigmond, 1995; Magiera & Zignmond, 2005; Scruggs et al., 2007). Scruggs et al. noted concerns over little differentiated instruction and a reluctance to individualize instruction for students with disabilities within general education classrooms. Additionally, Baker and Zigmond (1995) ascertained that co-teachers were providing good student-specific general education, yet there was an obvious lack of specially designed instruction, including accommodations and modifications. A third problem identified by the researchers was the role of the special
educator as manager of behavior rather than educator (Harbort et al.; Weiss & Lloyd, 2002; Zigmond & Baker, 1995). Importantly, previous research investigations identified the need for and request from co-teachers for more and varied training to improve co-teaching practice (Curtin, 1998; Keefe & Moore, 2004; Scruggs et al.). As stated in Chapter II, teachers need opportunities to observe collaboration, attempt the act of co-teaching in practice, and receive feedback in their efforts during training (Brownell et al., 2005; Stang & Lyons, 2008). In many cases, teachers are left to construct knowledge of co-teaching while negotiating the co-teaching setting (Kamens, 2007). While modeling of co-teaching during coursework is a step in the right direction, it has not been an effective tool to change co-teaching practice in the field. The current study extended this previous research in an attempt to support co-teachers as they begin to plan for and implement co-teaching practice. The researcher supported participants with virtual coaching while they planned and implemented varied co-teaching models, planned and provided student specific accommodations and modifications, and planned and implemented PBIS strategies. In this way, this research study extended previous work in the area of co-teaching in an attempt to provide needed support to beginning co-teachers as a way to ensure that co-teaching was implemented with fidelity to the models as designed.

Recently, Scheeler et al. (2010) asked co-teaching participants to provide feedback to one another during instruction. In the Scheeler et al. study, the teaching pairs took turns instructing students and providing feedback. The teachers were not both actively instructing students throughout the length of the lesson, instead one teacher delivered instruction while the second teacher coached. Midway through the lesson, the teachers traded roles so that the coach became the teacher who delivered instruction and
the partnering teacher became the coach. Scheeler et al. reported that co-teachers effectively coached one another to increase completion of three-term contingency trials during teacher-directed lessons where one teacher instructed from the front of the classroom while the peer coach drifted around the room and provided support to individual students. Therefore, co-teachers implemented only one model of co-teaching (one teach, one assist).

As mentioned previously, Friend and Cook (2007) indicated that one teach, one assist is one of two models of co-teaching that should be used on a limited basis, yet many co-teaching partners overly rely on the model (Harbort et al., 2007; Murawski & Swanson, 2001; Scruggs et al., 2007). This researcher sought to extend the work of Scheeler and her colleagues (2010) by providing expert virtual coaching during planning sessions and co-taught lessons via web-based IVC and advanced online bug-in-ear technology to co-teachers. An expert coach, rather than a peer, provided coaching throughout this study. The ongoing analysis of dependent variables measured in this study guided the researcher to support co-teachers as they attempted to increase varied models of co-teaching, provide student-specific accommodations and modifications, and implement PBIS strategies. Finally, this research provided coach’s feedback to co-teachers through web-based technologies, not on-site obtrusive methods. In addition, in doing so, the researcher sought to extend the research of web-based BIE coaching (Rock et al., 2009) by providing virtual coaching in new conditions and with co-teaching partners.
Summary

The purpose of this study was to investigate the efficacy of virtual coaching delivered through web-based IVC and advanced online bug-in-ear technology provided to practicing co-teachers as they planned and cooperatively carried out instruction in the general education classroom. A single-case ABAB withdrawal research design (see Table 1) allowed the researcher to observe and intervene, during participants’ co-planning and co-teaching sessions in elementary general education inclusive classrooms. After initial baseline data collection (Phase One), the researcher coached co-teaching participants via web-based IVC and advanced online bug-in-ear system (Rock et al., 2009) (Phase Two). Then, following a brief withdrawal of the virtual coaching intervention (Phase Three), the final phase of the study proceeded. In the final phase (Phase Four), the researcher continued to virtually coach co-teaching participants during their co-planning and co-teaching sessions. Interview data were collected after the second intervention phase in order to evaluate co-teacher participants’ social validity of virtual coaching.

Researchers have documented co-teaching approaches of one teach, one assist and one teach, one observe as the two models of co-teaching most frequently observed in previously studied classrooms (Scruggs et al., 2007). While these models are useful in practice, proponents have suggested they should be used on a limited basis or as part of the lesson cycle (Friend et al., 2006; Friend & Cook, 2007).

In 30 of the 32 studies reviewed by Scruggs et al. (2007), teachers stated the importance of and difficulty with planning. Indeed, this indicated a need in the field to actively support teachers as they plan for and implement co-teaching strategies. Possibly of greater concern to researchers in the field of special education is the lack of what is
special about special education within the co-taught classroom (Zigmond, 2001). As previously stated, researchers reported on good general education practice but a lack of specially designed instruction (Baker & Zigmond, 1995), little differentiated instruction, reluctance to individualize (Scruggs et al., 2007), and lack of attention to PBIS (Mastropieri et al., 2005) in co-taught classrooms. Teachers identified the lack of training (Keefe & Moore, 2004), the need for greater skill development (Curtin, 1998), and need for different training methods (Scruggs et al.) as problems permeating co-teaching practice. This investigator attempted to meet these needs by providing support to co-teachers through immediate feedback via virtual coaching and investigating any changes in teacher, coach, and students’ behaviors that were observed throughout the length of the study; thereby contributing to the existing knowledge base by supporting (i.e., Rock et al., 2009) and extending the work of previous researchers (i.e., Scheeler et al., 2010).
CHAPTER IV

RESULTS

The purpose of this study was to investigate the efficacy of virtual coaching provided to practicing co-teachers as they planned and cooperatively carried out instruction in the general education classroom. This chapter includes the results of the investigation organized by research questions, social validity, interrater reliability, and treatment fidelity.

Participants and Settings

As described in Chapter III, six practicing teachers (three general education teachers and three special education teachers) agreed to participate in this study. All participants reported previous training in co-teaching either through district based professional development, or training through university coursework. Yet, none of the participants reported experience co-teaching in practice. Four participants received masters’ degrees in special education, one participant a bachelor degree in elementary education, and one teacher participant a bachelor in special education. Table 2 in Chapter III delineates the make-up of each co-teaching pair. School setting demographics were reported in narrative form in Chapter III and are reported in table form below (see Table 6).

Within Participants Visual Analysis

According to Kazdin (2011), visual inspection relies on four characteristics of the data that are related to the magnitude (i.e., mean and level) and rate (i.e., trend and latency) of behavior change across phases. In this study, changes in each co-teaching dyad’s co-planning and co-teaching behaviors were assessed between the baseline and intervention phases, using
visual inspection (Tankersley et al., 2008). To do so, graphic displays were created to
illustrate accelerating, decelerating, or variable trends in the number of co-teaching
models planned and implemented, number of student-specific accommodations and
modifications planned and implemented, and number of redirections, and specific and
descriptive praise statements. These graphic displays can be seen in Figures 2 and 6. The
level or change in co-planning and co-teaching behavior immediately after
implementation of the virtual coaching intervention, and the latency or quickness of co-
planning and co-teaching behavior change at the end of one condition and beginning of
another (i.e., baseline or intervention) are also displayed in Figures 2 and 6 (Kazdin;
Tankersley et al.). Finally, the researcher calculated and compared the mean number of
each dyad’s co-planning and co-teaching behaviors, during each phase, to establish the
effect of the virtual coaching intervention (Kazdin; Tankersley et al.). See Table 7 for
changes in means across the four phases of this study.

Table 6

School Setting Demographics

<table>
<thead>
<tr>
<th>Participants</th>
<th>Grade</th>
<th>School Size</th>
<th>Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Black</td>
</tr>
<tr>
<td>Dyad 1</td>
<td>2</td>
<td>273 Pre-K-5</td>
<td>99%</td>
</tr>
<tr>
<td>Dyad 2</td>
<td>3</td>
<td>250 Pre-K-5</td>
<td>99%</td>
</tr>
<tr>
<td>Dyad 3</td>
<td>2</td>
<td>316 Pre-K-5</td>
<td>40%</td>
</tr>
</tbody>
</table>
Percent Non-overlapping Data

Data were also analyzed using percentage of nonoverlapping data (PND) procedures developed by Scruggs et al. (1987) and Scruggs and Mastropieri (1998) previously described in Chapter III. The researcher used the following guidelines: PND greater than 90% indicated the treatment was highly effective; PND greater than 70% but less than 90% indicated the treatment was reliably effective; PND between 50% and 70% indicated the virtual coaching intervention’s effect was questionable; while PND of less than 50% indicated that the virtual coaching intervention was ineffective (Scruggs & Mastropieri), to evaluate the effectiveness of the virtual coaching intervention. Table 7 presents means, standard deviations, and PND for each dependent variable.

Table 7

Means, Standard Deviations, and Percentages of Nonoverlapping Data for Participants Across Phases

<table>
<thead>
<tr>
<th>Participant/Phase</th>
<th>Co-teaching Models</th>
<th>Accommodations or Modifications</th>
<th>Positive Behavioral Interventions and Supports</th>
<th>Praise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyad 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>1.00</td>
<td>0.00</td>
<td>8.50</td>
<td>7.78</td>
</tr>
<tr>
<td>Intervention</td>
<td>2.00</td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
</tr>
<tr>
<td>PND</td>
<td>100%</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline 2</td>
<td>1.00</td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Intervention 2</td>
<td>2.00</td>
<td>0.00</td>
<td>0.50</td>
<td>0.71</td>
</tr>
<tr>
<td>PND 2</td>
<td>100%</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total PND</td>
<td>100%</td>
<td>63%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyad 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>1.25</td>
<td>0.50</td>
<td>1.15</td>
<td>1.41</td>
</tr>
<tr>
<td>Intervention</td>
<td>2.00</td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
</tr>
<tr>
<td>PND</td>
<td>0%</td>
<td>75%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline 2</td>
<td>2.25</td>
<td>0.50</td>
<td>0.50</td>
<td>0.71</td>
</tr>
<tr>
<td>Intervention 2</td>
<td>2.50</td>
<td>0.58</td>
<td>0.50</td>
<td>0.71</td>
</tr>
<tr>
<td>PND 2</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total PND</td>
<td>0%</td>
<td>38%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 7 (con’t.)

<table>
<thead>
<tr>
<th>Participant/Phase</th>
<th>Co-teaching Models</th>
<th>Accommodations or Modifications</th>
<th>Positive Behavioral Interventions and Supports Redirections</th>
<th>Praise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyad 3 Baseline</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Dyad 3 Intervention</td>
<td>2.00</td>
<td>0.00</td>
<td>4.00</td>
<td>0.58</td>
</tr>
<tr>
<td>Dyad 3 PND</td>
<td>0%</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyad 3 Baseline 2</td>
<td>1.50</td>
<td>0.58</td>
<td>3.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Dyad 3 Intervention 2</td>
<td>2.50</td>
<td>0.50</td>
<td>3.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Dyad 3 PND 2</td>
<td>25%</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyad 3 Total PND</td>
<td>13%</td>
<td>50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Means</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>1.33</td>
<td>0.78</td>
<td>1.13</td>
<td>0.79</td>
</tr>
<tr>
<td>Intervention</td>
<td>1.92</td>
<td>0.00</td>
<td>4.00</td>
<td>0.79</td>
</tr>
<tr>
<td>PND</td>
<td>33%</td>
<td>92%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline 2</td>
<td>1.60</td>
<td>0.67</td>
<td>3.44</td>
<td>0.67</td>
</tr>
<tr>
<td>Intervention 2</td>
<td>2.25</td>
<td>0.45</td>
<td>3.25</td>
<td>0.62</td>
</tr>
<tr>
<td>PND 2</td>
<td>42%</td>
<td>8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total PND</td>
<td>38%</td>
<td>50%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. PND = percentage of nonoverlapping data. PND and PND 2 scores were summed to produce total PND (Scruggs & Mastropieri, 1998, pp. 223-224).

**Co-teaching Models Planned and Implemented**

**Number of Co-teaching Models Planned and Implemented**

Baseline and intervention data were graphed for each co-teaching dyad. Four data points were recorded for each dyad during two baseline and two intervention phases of the study. Table 1 reflects each co-teaching dyad’s individual data.

All three dyads increased the number of varied co-teaching models they planned to use and then implemented (see Table 1). Dyad 1 increased their varied models of co-teaching from an average of one model (1, 1, 1, and 1) during baseline (Phase One) to an average of two co-teaching models (2, 2, 2, and 2) during the final intervention phase (Phase Four). Dyad 1’s PND was 100% indicating a very effective intervention. Dyad 2 increased co-teaching models planned for and implemented from an average of 1.25 during baseline (Phase One) (2, 1, 1, and 1) to 2.5 (3, 3, 2, and 2) in the final phase (Phase Four). PND for Dyad 2 was 0% indicating the virtual coaching intervention was...
Figure 1. Frequency counts of co-teaching models planned and implemented.
not effective for Dyad 2. Dyad 3 increase the average number of co-teaching models they planned and implemented from an average of 1.75 (2, 0, 3, and 2) during baseline (Phase One) to an average of 2.5 co-teaching models (2, 2, 2, and 3) during the final intervention phase (Phase Four). PND for Dyad 3 was 13% indicating the virtual coaching intervention was ineffective.

**Fidelity to Planned Co-teaching Models**

In addition to investigating the number of different co-teaching models each dyad used, the researcher was also interested in exploring whether they dyads actually carried out the co-teaching models they planned for (i.e., fidelity to planned co-teaching models). Over the course of this study, all three co-teaching dyads increased their fidelity to the varied co-teaching models they planned. During baseline data collection (Phase One), Dyad 1 planned to use the team teaching model, but they did not implement it. Instead, they carried out one teach, one observe for their first co-taught lesson. During the second two sessions of baseline data collection, Dyad 1 planned for station teaching and implemented it (see Figure 2). Dyad 1 implemented their planned co-teaching models in 50% of the baseline sessions. Dyad 2 planned to use alternative and parallel teaching, then implemented one teach, one assist. The next two baseline (Phase One) sessions included a plan for station teaching, but the implementation of parallel teaching (see Figure 3). Although Dyad 2 attempted to vary the number of co-teaching models planned and implemented during the first baseline phase (Phase One) they did not follow through with the lessons as planned. Throughout the first baseline sessions, the dyad implemented 0% of the co-teaching models they had planned to use. Dyad 3 planned to use one teach, one assist and station teaching during their first co-teaching session; however, the special
education teacher was not present. The teachers did not co-teach, instead the general education teacher used whole group instruction while she waited for the special educator. For the next two baseline sessions (Phase One), Dyad 3 planned for alternative teaching; one teach, one assist; and parallel teaching, but implemented one teach, one assist and parallel teaching during the final two sessions of baseline data collection (Phase One) (see Figure 4). Dyad 3 implemented 40% of the co-teaching models that were planned during the first baseline phase (Phase One) of the study.

Figure 2. Dyad 1 varied co-teaching models planned and implemented.

Figure 3. Dyad 2 varied co-teaching models planned and implemented.
During the first intervention phase (Phase Two) of the study virtual coaching was introduced during planning and instruction for four teaching and planning sessions. During the first planning session, Dyad 1 planned to use one teach, one assist and parallel teaching for the lesson that followed planning. The lesson was carried out as planned. The next two coached sessions in the phase continued with the co-teachers planning to implement one teach, one assist as the lesson introduction and station teaching as the lesson body. During the fourth session, of the first intervention phase (Phase Two), the co-teachers implemented the planned co-teaching models with fidelity to their plan (see Figure 2). Throughout this virtual coaching intervention phase (Phase Two), co-teaching Dyad 1 implemented 100% of the co-teaching models they planned for each session. Dyad 2 began the first virtual coaching phase (Phase Two) of the study with a plan for
one teach, one assist during the introduction of the lesson and the parallel teaching model for the remainder of the lesson. The lesson was implemented as planned. During the next virtual coached planning session, Dyad 2 planned to use of the team teaching model as the lesson introduction and station teaching as the lesson body. The pair again implemented the lesson according to the planned models of co-teaching (see Figure 3).

Once virtual coaching was introduced (Phase Two), the number of co-teaching models leveled out at two. Moreover, in 100% of the cases co-teaching models were implemented as planned. Dyad 3 planned and implemented station teaching during the first two virtual coached sessions (Phase Two). The final two sessions of the virtual coaching intervention phase (Phase Two) included co-planned use of one teach, one assist and alternative teaching. The lesson was implemented with fidelity to the planned co-teaching models (see Figure 4). The introduction of virtual coaching intervention contributed to an increase to 100% implementation of co-teaching models the dyad planned during the first intervention phase (Phase Two).

When virtual coaching was withdrawn (Phase Three), Dyad 1 planned and used the station teaching model during all four sessions (see Figure 2). The dyad continued to implement 100% of the co-teaching models that they planned. Dyad 2 planned to carry out alternative teaching and parallel teaching during one of the four sessions, but implemented one teach, one assist in place of the alternative teaching model when the lesson followed. During the next two sessions, the dyad planned for one teach, one observe and parallel teaching. They used each model during the lesson and added team teaching to the lesson introduction (see Figure 3). When the virtual coaching intervention was withdrawn (Phase Three), Dyad 2 implemented 59% of the co-teaching models they
planned for the sessions. Dyad 3 planned for and implemented one teach, one assist
during the first two sessions of return to baseline (Phase Three). The co-teaching partners
then planned and implemented a combination of one teach, one assist and station teaching
during the next two planning and teaching sessions (see Figure 4). When the virtual
coaching intervention was withdrawn (Phase Three), Dyad 3 returned to planning for one
co-teaching model and then implemented that co-teaching model in 100% of the teaching
sessions.

The final phase of the study (Phase Four) reintroduced virtual coaching to the co-
teaching dyads, during planning and teaching sessions. In the final phase, Dyad 1 planned
for and implemented one teach, one assist and station teaching and then one teach, one
assist and parallel teaching with fidelity to all planned co-teaching models (see Figure 2).
In the final phase of the study (Phase Four), Dyad 1 returned to two co-teaching models
for planning and implementation. The dyad implemented 100% of the planned co-
teaching models. Overall, Dyad 1 implemented four of the six possible co-teaching
models. The dyad implemented the co-teaching models they had planned for in 88% of
their co-teaching sessions. Dyad 2 planned for and implemented one teach, one assist,
team teaching, and station teaching during the first two sessions of the final virtual
coaching phase (Phase Four). During the last two sessions, the duo planned for and
carried-out team teaching combined with station teaching (see Figure 3). In the final
phase of the study (Phase Four), the co-teachers implemented 100% of the co-teaching
models planned. Overall, this dyad implemented five of the six possible co-teaching
models. Dyad 2 implemented the co-teaching models they planned 65% of the time.
Dyad 3 planned for and implemented one teach, one assist and parallel teaching during
the first two sessions of this virtual coaching phase (Phase Four). During the final two 
sessions (Phase Four), the co-teaching pair planned for the combination of team teaching 
and parallel teaching, when the lesson followed the pair added one teach, one assist to the 
combination of co-teaching models (see Figure 4). In the final phase of the study (Phase 
Four), Dyad 3 implemented 100% of the planned models and added a third model to the 
final lesson that was not planned. Overall, Dyad 3 planned and implemented five of the 
six possible co-teaching models. Dyad 3 implemented the co-teaching models they 
planned for in 76% of their co-teaching sessions.

**Student-specific Accommodations or Modifications**

The investigator also examined how virtual coaching affected co-teachers 
planning for and implementation of student-specific accommodations and modifications. 
Baseline and intervention data were graphed for each co-teaching dyad. Four data points 
were recorded for each dyad during two baseline and two intervention phases of the study 
(see Figure 5). All three co-teaching dyads increased the number of student specific 
accommodations planned and implemented from baseline to the final phase of the study.

During Baseline (Phase One), Dyad 1 averaged zero student-specific 
accommodations planned and implemented (0, 0, 0, and 0). Dyad 1 increased the number 
of student-specific accommodations they planned and implemented during instruction to 
an average of 3.75 (5, 4, 3, and 3) during the final virtual coaching intervention phase 
(Phase Four). Dyad 2 increased their average number of student-specific 
accommodations planned and implemented from two (3, 1, 3, and 1) at baseline (Phase 
One) to three (3, 3, 3, and 3) during the final virtual coaching intervention phase (Phase 
Four). Dyad 3 increased the average number of student-specific accommodations planned
Figure 5. Student-specific accommodations or modifications planned/implemented.
and implemented from one (1, 0, 2, and 1) at baseline (Phase One) to three (3, 3, 3, and 3) in the final virtual coaching intervention phase (Phase Four) of the study.

During the first two baseline and intervention phases (Phases One and Two), the PND for Dyad 1 was 100%. This score indicated that the virtual coaching intervention was highly effective. PND for Dyad 2 was 75% for the first two phases of the study. The score indicated that the virtual coaching intervention was effective. The PND for Dyad 3 was 100% during the preliminary baseline and virtual coaching intervention phases (Phases One and Two), which indicated the virtual coaching intervention was highly effective during the two initial phases. When PND was combined for all three co-teaching dyads, overall PND for the first baseline and virtual coaching intervention phases (Phases One and Two) was 92%, which indicated that the virtual coaching intervention was highly effective for changing co-teachers planning and implementation of student-specific accommodations or modifications.

When the virtual coaching intervention was withdrawn and then reintroduced (Phases Three and Four) the PND for Dyad 1 decreased to 25%. This percentage score indicated that the virtual coaching intervention was ineffective during the final two phases (Phases Three and Four). The total PND for Dyad 1 was 63%, which indicated a questionable total effect. During the withdrawal and reintroduction of the virtual coaching intervention (Phases Three and Four), Dyad 2 accumulated a PND of 0 %. This score indicated that the virtual coaching intervention was ineffective during the final two phases (Phases Three and Four). This provided a total PND of 38%, which indicated the virtual coaching intervention was ineffective through all phases. For Dyad 3, PND decreased to 0% for the final two phases (Phases Three and Four) of the study. This
percentage score indicated that the virtual coaching intervention was ineffective during the final two phases (Phases Three and Four). The total PND for all phases of the investigation for Dyad 3 was 50%. This total PND indicated that the virtual coaching intervention’s effect was questionable. When PND was combined for all three dyads during the withdrawal and reintroduction of the virtual coaching intervention (Phases Three and Four), the PND was 8%. This percentage indicated that the virtual coaching intervention was ineffective during the final two phases. Combined PND for all three co-teaching dyads throughout all phases of the investigation was 50%. This combined PND score indicated the virtual coaching intervention’s effect was questionable.

**Positive Behavioral Interventions and Supports**

The effectiveness of virtual coaching on co-teachers’ use of PBIS was measured through frequency counts of redirections and specific, descriptive praise statements (during teaching sessions only), using coding sheets adapted from Rock et al. (2009). As stated previously in Chapter III, feedback targeting PBIS was limited to (a) specific, descriptive praise (Simons et al., 2010), and (b) neutral redirection (Steele, 1995). Baseline and intervention data were graphed for each co-teaching dyad. The collected data revealed mean numeric scores for use of PBIS through redirections and specific, descriptive praise statements (see Table 7). Figure 6 reflects each co-teaching dyad’s individual data for number of redirections and student specific praise during co-teaching instruction. The bar graphs included in this figure do not include planning data because the co-teaching dyads either planned to use PBIS or did not plan for PBIS. In other words, they did not identify a targeted number of praise or redirection statements they
Figure 6. Frequency counts of redirection and specific, descriptive praise.
wished to use. Consequently, it is not appropriate to compare PBIS co-planning data (i.e., yes or no) with PBIS co-teaching data (i.e., frequency counts).

**Redirect**

All three co-teaching dyads decreased the average number of redirections from baseline to the final intervention phase. During the first baseline phase (Phase One), Dyad 1 did not plan PBIS and averaged eight and one half (14 and 3) redirections. Dyad 2 planned for PBIS and averaged one (0 and 2) redirection during baseline. Dyad 3 did not plan for PBIS and averaged 8.5 (3 and 10) redirections during baseline (Phase One).

During the first intervention phase (Phase Two), Dyad 1 planned for PBIS and averaged one (0 and 2) redirection. During the first intervention phase (Phase Two), Dyad 2 continued to plan PBIS and averaged one (1 and 1) redirection during the virtual coaching intervention. During the first virtual coaching intervention phase (Phase Two), Dyad 3 did not plan for PBIS and averaged 11.5 (7 and 16) redirections during the virtual coaching intervention.

When virtual coaching was withdrawn (Phase Three), Dyad 1 continued to plan for PBIS and averaged one (1 and 1) redirection for each lesson. During the withdrawal of the virtual coaching intervention (Phase Three), Dyad 2 continued to plan for PBIS and averaged 0.5 (1 and 0) of a redirection a lesson. During the withdrawal of the virtual coaching intervention (Phase Three), Dyad 3 did not plan for PBIS and averaged 8.5 (8 and 9) redirections a lesson.

Once the virtual coaching intervention was reintroduced (Phase Four), Dyad 1 continued to plan for PBIS and averaged 0.5 (1 and 0) of a redirection per lesson. When the virtual coaching was reintroduced (Phase Four), Dyad 2 continued to plan for PBIS

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and maintained a low average of 0.5 (0 and 1) of a redirection per lesson. During this virtual coaching intervention phase (Phase Four), Dyad 3 planned for PBIS and decreased their average of redirections for each lesson to 3.5 (3 and 4).

**Specific, Descriptive Praise**

Throughout all phases of the investigation, all three co-teaching dyads maintained at least a four to one ratio of specific, descriptive praise to redirections with the exception of Dyad 1 during the first baseline phase (Phase One) (see Figure 6). Dyad 1 did not plan for PBIS and praised students an average of 25 (22 and 30) times during baseline lessons (Phase One). Dyad 2 planned for PBIS and averaged 30.5 (49 and 12) specific, descriptive praise statements during baseline (Phase One). Dyad 3 praised students more than the other two dyads. Dyad 3 did not plan for PBIS yet averaged 45 (40 and 50) specific, descriptive praise statements during baseline (Phase One).

During the first intervention phase (Phase Two) Dyad 1 planned for PBIS and gave specific, descriptive praise an average of 31.5 (16 and 47) times in each 30-minute lesson. Throughout the first intervention phase (Phase Two), Dyad 2 planned for PBIS and averaged 24.5 (31 and 18) specific, descriptive praises for each 30-minute lesson. Dyad 3 did not plan for yet averaged 56.5 (50 and 63) specific, descriptive praise statements during each 30-minute lesson in the first intervention phase (Phase Two).

When the virtual coaching intervention was withdrawn (Phase Three), Dyad 1 continued to plan for PBIS and averaged 22 (10 and 34) specific, descriptive praise statements for each 30-minute lesson. During the virtual coaching intervention withdrawal (Phase Three), Dyad 2 continued to plan PBIS. This dyad averaged 19 (23 and 15) specific, descriptive praise statements during each 30-minute lesson. When the
researcher withdrew the virtual coaching (Phase Three) from Dyad 3, the dyad continued not to plan for PBIS and averaged 42 (37 and 47) specific, descriptive praise statements during the two 30-minute lessons in the withdrawal phase.

When virtual coaching intervention was reintroduced (Phase Four), Dyad 1 planned for PBIS and averaged 19 (18 and 20) specific, descriptive praise statements during each 30-minute lesson. Once virtual coaching resumed (Phase Four) for Dyad 2, they averaged 35.5 (18 and 53) specific, descriptive praise statements per 30-minute lesson. During this virtual coaching intervention phase (Phase Four), Dyad 3 planned for PBIS and averaged 49.5 (56 and 43) specific, descriptive praise statements during each 30-minute co-taught lesson.

The average number of specific descriptive praise by all three co-teaching dyads remained consistent at 33.5 and 33.6 during the first baseline and intervention phases respectively (Phase One and Phase Two). The average number of specific, descriptive praises during withdrawal (Phase Three) decreased to 27.7. In the final phase (Phase Four), the three dyads averaged 32 specific, descriptive praise statements for each 30-minute lesson (see Figure 6).

**Percent Change in Scale Scores**

In order to obtain multiple measures of change as virtual coaching guided co-teachers to implement co-teaching with fidelity, one Likert-type scale and two observational scales were employed to evaluate the co-teaching interactions for each dyad. First, the co-teaching dyads were asked to complete the Co-teacher Communication Satisfaction Scale (CCSS) developed by Ploessl and Rock (2008). All six participants reported the highest levels of communication satisfaction during the initial baseline phase.
of the study and again at the completion of the final intervention phase. Therefore, there
were no changes in scale scores. The CCSS also served as an indicator of social validity
for this study.

Second, co-teaching behaviors were rated twice during the study (once during
initial baseline and then again during the final virtual coaching intervention session)
using selected (20/24) items identified in Chapter III (i.e. 1, 2, 4, 6, 7, 9, 10, 11, 12, 13,
14, 15, 16, 17, 18, 19, 20, 21, 23, and 24) on the Co-teacher Rating Scale (CtRS)
developed by Gately and Gately (2001). All three co-teaching dyads increased co-
teaching behaviors identified on the CtRS. Dyad 1 obtained the greatest percent change in
scale scores increasing 30 points from pre to post assessment an increase of 111%. Dyad
2 increased their rating by 27 points from pre to post assessment an increase of 90%.
Dyad 3 increased scores on identified behaviors by 25 points, an increase of 93% from
pre to post assessment (see Table 8).

The Co-teaching Solution System (CTSS) Checklist developed by Murawski and
Lochner (2011) provided a second observational tool that assisted coders to document
changes in co-teaching behaviors. Co-teaching behaviors outlined in the checklist were
evaluated during the initial baseline session and then again during the final virtual
coaching intervention session. All three dyads increased co-teaching behaviors identified
by Murawski and Lochner as necessary for effective co-teaching. The checklist is divided
into three categories (i.e. look for items, ask for items, and listen for items). Six Ask For
Items were not assessed (i.e. letters home/Syllabi, SHARE Worksheets, Problem-Solving
worksheets, Class Notes, Grade Books, and Descriptions of How Students Are
Individually Graded) as they included information unrelated to this study. Results of the
percent change for each category and overall percent change in total scale score are reported in Table 8. Dyad 1 increased in overall scale score from 13 to 37 points a 185% increase. Dyad 2 had an overall scale score increase from 31 to 38 points a percent increase of 23%. Dyad 3 increased scores on the checklist from 11 to 35 points an overall increase of 218. The greatest overall change in co-teaching behaviors was documented for Dyad 3. Dyad 1 showed greater percent changes in two of the three categories (i.e. Ask for Items and Listen for Items) (see Table 8). Dyad 2 showed the least amount of change but scored higher during the pre-assessment than the other two dyads in all three categories (see Table 8).

Table 8

*Baseline and Postintervention Scales Scores, Differences in Scores, and Percent Change in Scores for the CtRSS and CTSS Checklist*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Score</th>
<th>Score</th>
<th>Score</th>
<th>Score</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyad 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>27</td>
<td>8</td>
<td>2</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Post</td>
<td>57</td>
<td>20</td>
<td>9</td>
<td>8</td>
<td>37</td>
</tr>
<tr>
<td>Difference</td>
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<td>7</td>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td>Percent</td>
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<tr>
<td>Change</td>
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<td>increase</td>
<td>increase</td>
<td>increase</td>
</tr>
<tr>
<td>Dyad 2</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Baseline</td>
<td>30</td>
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<td>57</td>
<td>20</td>
<td>10</td>
<td>8</td>
<td>38</td>
</tr>
<tr>
<td>Difference</td>
<td>27</td>
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<td>2</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Percent</td>
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<td>23%</td>
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<td>increase</td>
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<td>increase</td>
</tr>
<tr>
<td>Dyad 3</td>
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<td></td>
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<td>52</td>
<td>17</td>
<td>10</td>
<td>8</td>
<td>35</td>
</tr>
<tr>
<td>Difference</td>
<td>25</td>
<td>15</td>
<td>5</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>Percent</td>
<td>93%</td>
<td>750%</td>
<td>100%</td>
<td>100%</td>
<td>218%</td>
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<tr>
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</tbody>
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Research Question 2
How does virtual coaching impact (i.e., benefit or disrupt) co-teachers and their P-6 students?

In order to investigate the impact of virtual coaching on co-teachers and students, three dependent variables: a) P-6 student engagement during co-taught lessons, b) co-teachers’ hesitations during instruction, and c) co-teachers’ perceptions, as measured by social validity, about virtual coaching, were used to investigate the benefit or disruption in elementary school classrooms.

Student Engagement

The first dependent variable measured student engagement using momentary time sampling techniques to determine the percent of student engagement throughout the co-taught lessons. The measure was used to investigate whether changes in the instructional format and the virtual coaching condition affected the percentage of students who were academically engaged throughout the lesson. Five-minute intervals were used to code student engagement during each 30-minute lesson (Rock et al., 2009). Mean percentages of students who were academically engaged (on task) increased for each of the Co-teaching dyads (see Table 9 or Figure 7). For Dyads 1 and 2, the mean percent of increased student engagement did not return to the initial baseline (Phase 1) percentage. For Dyad 3, percent engagement remained the same from baseline (Phase One) to intervention (Phase Two), and then decreased when the virtual coaching intervention was withdrawn (Phase Three). In the final intervention phase (Phase Four) Dyad 3 had the highest increase in student engagement.
Table 9

*Percent Student Engagement Throughout Each Study Phase*

<table>
<thead>
<tr>
<th>Classroom</th>
<th>Baseline 1</th>
<th>Intervention 1</th>
<th>Baseline 2</th>
<th>Intervention 2</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percen t</td>
<td>Percen t</td>
<td>Percen t</td>
<td>Percen t</td>
<td>Percen t</td>
</tr>
<tr>
<td>Dyad 1</td>
<td>95</td>
<td>7.6</td>
<td>96</td>
<td>5.6</td>
<td>97</td>
</tr>
<tr>
<td>Dyad 2</td>
<td>98</td>
<td>2.2</td>
<td>100</td>
<td>0.0</td>
<td>100</td>
</tr>
<tr>
<td>Dyad 3</td>
<td>95</td>
<td>4.2</td>
<td>95</td>
<td>6.5</td>
<td>95</td>
</tr>
<tr>
<td>Combined</td>
<td>96</td>
<td>4.4</td>
<td>97</td>
<td>4.4</td>
<td>97</td>
</tr>
</tbody>
</table>

Figure 7. Percent of students’ academic engagement/on-task behavior.

**Co-teachers’ Hesitation**

The second dependent variable, co-teachers’ hesitation during virtual coaching while co-instructing, measured the impact on teaching as evidence of disruption in the lesson during planning and instruction, was measured by a coding protocol adapted from
Rock et al. (2009) that used frequency counts to record hesitations in planning or instructional pacing during virtual coaching sessions (see Appendix B). There was no evidence of disruption in co-teachers’ planning or teaching behaviors. When the virtual coaching intervention was implemented, there were no instances when a co-teacher stopped, hesitated nonverbally, or hesitated verbally while feedback was delivered.

**Social Validity**

Upon completion of the study, all six participants completed brief interviews, which served as a measure of social validity for the virtual coaching intervention (Kazdin, 2011). The interviews conducted with participating co-teaching pairs used questions developed by Scheeler et al. in 2010 (see Appendix E). All respondents indicated that the virtual coaching experience was beneficial for co-teachers and their K-5 students. Eighty percent of co-teachers stated that they enjoyed the experience greatly while the other 20% indicated benefits of the virtual coaching while planning but found the virtual coaching during instruction distracting during early sessions. All co-teachers (100%) stated that the virtual coaching during co-planning was beneficial.

*Was the virtual coaching helpful in preparing for and teaching with your co-teacher?* One participant specifically spoke of the benefit virtual coaching provided in her transition into a new position and the implementation of co-teaching in the school. The co-teacher commented that the feedback provided during planning that linked engagement and the ability to reach all students was invaluable in assisting her to communicate the needs of students to her general education co-teaching partner. Five co-teachers also reported that the virtual coaching intervention assisted them to develop
varied instructional methods/co-teaching models in order to reach all students in the
general education classroom.

One of the essential components of a collaborative classroom is planning. Our virtual coaching experience allowed us to share our ideas and also voice them to with our coach. Often times when planning lessons, there may be gaps that may exist that one might not see. Our coach served as an extra pair of eyes to share ideas and make suggestions or corrections to our plans with the ultimate goal in mind and that is to increase student achievement and to include all students at all levels and behaviors.

I feel that the coaching sessions were significant in helping my co-teacher and I [sic] organize lesson plans that were well rounded, diverse, and suitable for all learners within the general education classroom.

Planning lessons in a classroom that I did not have full control of the students, instructional practices, procedures, and discipline, virtual coaching helped me to consider details I may have taken for granted.

The feedback was great food for thought as far as ideas and expanding them to give students the accommodations and help, they need to be successful.

The feedback provided us with ways to give students a better chance to be successful with more ideas and up to date accommodations and teaching practice.

*What are some of the examples of feedback you found useful throughout the virtual coaching sessions?*

It was helpful getting advice on each lesson ahead of time rather than after the fact.

The suggestion to use a shared delivery of instruction was very beneficial. The suggestion was incredibly beneficial when we taught subtraction with regrouping. The students were exposed to the method of squaring off to subtract which I delivered. The students had an opportunity to see the co-teacher’s method of subtracting by using standard regrouping. Now, all students are fluent in the use of both methods. Multiple representations of a skill were helpful and supported the practice of the Universal Design of Instruction.

*What impact if any did this experience have on your students?* Although there are no academic data to support achievement gains, all co-teachers stated they thought the virtual coaching intervention positively impacted student achievement in their
classrooms. One co-teaching dyad reported that pretest/posttest data indicated gain scores of two letter grades for students in the classroom when co-teaching was implemented through the study. This co-teaching team also reported their class scored highest for all grade level classrooms at the school on a standardized math assessment. Two other co-teachers reported students were impacted in positive ways because there was more teaching going on in the classroom. Four participants stated students were more engaged with small group activities when more than one teacher was present in the classroom. Two participants indicated achievement in their classrooms was improved, as students were eager to learn because the teaching methods provided fun and engaging activities that were different from the rest of the day.

Would you recommend the use of virtual coaching to other professionals who are beginning the practice of co-teaching? Why or why not? Overall, all participants recommended the use of virtual coaching for professionals who are beginning the practice of co-teaching.

Reliability

As anticipated, 48 sessions were conducted and archived in three classrooms. During 25% of the sessions for a total of 12 sessions, two trained observers watched and coded archived video files in and documented teachers’ and students’ behaviors to check reliability of coding. Overall, reliability throughout the study was 97% (range = 81%-100%) Reliability was calculated as previously described in Chapter III using the following formula (Kazdin, 2011):

\[
\% \text{ Reliability} = \frac{\text{Number of Agreements of Codes}}{\text{Number of Agreements of Codes} + \text{Disagreements}} \times 100
\]
In order to assess the reliability of data collected related to RQ1, individual coders independently watched and recorded codes for each 30-minute planning session or co-teaching lesson. Frequency counts were recorded, totaled, and entered into an Excel document for each dependent variable. Once all data were entered, the percent agreement was automatically calculated using the formula function of the Excel software program. The first dependent variable assessed for RQ1 was varied models of co-teaching. For Dyads 1 and 2, coders agreed 100% of the time. The percent reliability for Dyad 3 was calculated to be 84%. This created a combined reliability of 95% for co-teaching models planned for and implemented throughout the study (see Table 10). The second dependent variable (Student Specific Accommodations/Modifications) yielded percent reliability statistics of 90%, 100%, and 100%, respectively, for Dyads 1, 2, and 3. The combined reliability for accommodations or modifications was calculated at 96.6%. In order to measure the use of PBIS (the third dependent variable) within the classroom, frequency counts were recorded for the number of times teachers used statements of specific, descriptive praise and number of times co-teachers redirected students’ behaviors. Percent reliability was calculated for each co-teaching dyad: Dyad 1 R=92%, Dyad 2 R=96%, and Dyad 3 R=81%. The combined reliability for PBIS was calculated to be 90% (see Table 10).

Table 10

Percent Agreement and Range for Reliability

<table>
<thead>
<tr>
<th>Participants</th>
<th>Models</th>
<th>Accommodations/ Modifications</th>
<th>PBIS</th>
<th>Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IOA</td>
<td>Range</td>
<td>IOA</td>
<td>Range</td>
</tr>
<tr>
<td>Dyad 1</td>
<td>100%</td>
<td>90%</td>
<td>80-100</td>
<td>92%</td>
</tr>
</tbody>
</table>

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The same procedures were followed to calculate the percent that individual coders agreed when data were recorded for RQ2. To measure agreement on students’ academic engagement, coders used momentary time sampling procedures described in Chapter III to record the number of students who were engaged and disengaged throughout each lesson. Total percent engagements were compared and percent agreement was calculated for each co-teaching dyad. Individual coders agreed 100% of the time when recording data for Dyads 1 and 2 and agreed on 99% of cases for Dyad 3. The combined percentage agreement (reliability) for student engagement was calculated to be 99%. Independent coders agreed that there were no instances of disruption/hesitation while co-teachers were actively teaching and provided feedback through virtual coaching. Reliability for all three dyads was 100% indicating no disruption to the pace and cycle of the lessons.

**Treatment Fidelity**

Treatment fidelity was assessed via frequency counts of coaching statements. Individual coders examined the coach’s comments and determined whether the statements made were encouraging, questioning, or instructional. Then each coder entered total values for each category into an Excel document for further analysis. Percent agreement for frequency of statements was calculated as described previously and reported for each co-teaching dyad individually and all three co-teaching dyads combined (Dyad 1 = 99%, Dyad 2 = 99%, Dyad 3 = 94%, and combined R= 97%). The ratio of encouraging statements to corrective feedback was calculated, examined, and
compared with the suggested level of 4:1 set by Rock and her colleagues in 2009. In all three cases, the coach met the suggested ratio of encouraging feedback to corrective feedback: Dyad 1 ratio = 4.91:1, Dyad 2 ratio = 13:1, Dyad 3 ratio = 11.47:1. Overall, the combined ratio of encouraging statements to corrective feedback made by the coach was calculated to be 7.63:1 for all the coach’s feedback.

Summary

In summary, when co-teachers attempted to plan for and implement co-teaching without the support of the online coach, they struggled to put their planned co-teaching models into practice. When supported by the coach, all three co-teaching dyads improved their use of varied co-teaching models with fidelity to the planned co-teaching models. Moreover, without the support of the virtual coaching intervention, co-teachers either failed to plan for, or failed to carry out student-specific accommodations and modifications. With support each dyad increased the number of student specific accommodations or modifications they planned and implemented in their classrooms. All three dyads demonstrated at least a 4:1 ratio of specific, descriptive praise to redirections throughout the study. Mean number of redirections decreased over the length of the study while specific, descriptive praise remained constant. Overall, student engagement was higher during intervention phases. There was no evidence that virtual coaching disrupted planning or instruction.

The purpose of this study was to investigate the effects of virtual coaching on co-teachers’ planning and instruction. Therefore, multiple measures where implemented to assess changes in co-teaching behaviors. Although these changes varied with each dyad, all three co-teaching dyads increased co-teaching behaviors cited on both the CtRS.
(Gately & Gately, 2001) and the CTSS Checklist (Murawski & Lochner, 2011) from pre- to post-assessments.

Social validity was rated at the end of the final intervention phase (Phase Four). Participants indicated that the virtual coaching experience was beneficial to co-planning and co-teaching. While all co-teachers found the virtual coaching experience enjoyable, five teachers indicated that they found virtual coaching during planning sessions more beneficial than virtual coaching during instruction. All teachers cited gains in student academic achievement and engagement as benefits to the virtual coaching experience.

Interrater agreement and treatment fidelity were assessed in order to ensure consistency with measurement of co-planning and co-teaching behaviors in participants and the feedback of the virtual coach. The reliability of identified co-planning and co-teaching behaviors met or exceeded minimum levels of agreement throughout all phases, thereby supporting the integrity of the study. Treatment fidelity was assessed using frequency counts of coaching statements. In all three cases, the coach met or exceeded the suggested ratio of four encouraging statements for every one corrective or instructional statement set by Rock et al. in 2009.
CHAPTER V
DISCUSSION

The purpose of this study was to investigate the efficacy of virtual coaching provided to practicing co-teachers as they jointly planned and cooperatively carried out instruction together in the general education classroom. This chapter includes a brief summary of the study, discussion of the main findings, limitations, and the implications of the findings for future co-teaching studies.

Summary of the Study

Drawing on tenants of behavioral (Bandura, 1977) and adult learning (Knowles, 1950, in Carlson, 1989) theories, the researcher developed an underlying framework for this study, which served as a basis for investigating the effects of virtual coaching on co-teachers’ planning and co-teaching practice. Motivation, reinforcement, retention, and transference were the four critical elements of adult learning theory that guided this investigation (Lieb, 1991). The virtual coach established rapport with the individual co-teachers to prepare and motivate each to learn new skills. Reinforcement through encouraging feedback occurred as an immediate and natural result of improved implementation of co-teaching practices in these general education inclusive classrooms. The meaning and purpose of new skills was highlighted and retained through coaching provided (in real time) while instruction took place, not a once-and-done approach of workshop training. The transference of the virtual coach’s knowledge took place as the feedback became internalized allowing the co-teachers to become self-directed and not dependent on the virtual coach’s prompts during planning or implementation. The constructs of knowledge for
practice, knowledge of practice, and knowledge in practice identified by McLeskey and Waldron (2004) assisted in the transformation of the knowledge teachers’ had about co-teaching practice to how they demonstrated the use of that knowledge to become better co-teachers in practice. While it appears that current teacher education programs and professional development training adopted the view that if teachers are given the right conditions, then they will, regardless of their individual training, ensure that co-teaching is carried out with effective practice. This phenomenon has not been reported in the co-teaching literature (see Harbort et al., 2007; Keefe & Moore, 2004; Magiera et al., 2005; Magiera & Zigmond, 2005; Sindelar et al., 2010; Weiss & Lloyd, 2002).

Previous studies have examined virtual coaching and the use of BIE technology to assist teachers in the implementation of evidence-based practices or best practices (i.e., Rock et al., 2009; Scheeler et al., 2010). In this study, the researcher extended these previous efforts by providing virtual coaching during co-teachers’ planning sessions, as well as during their co-taught lessons. Findings provide preliminary evidence for use of virtual coaching with beginning co-teachers, and support the findings of previous researchers (i.e. Rock, et al.; Scheeler et al.).

The results of this study are promising given the limited time involved for virtual coaching and small sample size. Results from multiple measures of social validity confirm co-teachers found virtual coaching not only feasible, but also beneficial. In the following sections, the main findings of the study are discussed followed by an analysis of the implication of the findings for future co-teaching studies.
Convergent Findings

Co-teaching Models

The review of co-teaching literature uncovered an overreliance on the one teach, one, assist model of co-teaching (see Dieker, 2001; Harbort et al., 2007; Keefe & Moore, 2004; Magiera et al., 2005; Morocco & Aguilar, 2002; Rice & Zigmond, 2000; Scruggs et al., 2007; Weiss & Lloyd, 2002) when teachers were left to implement co-teaching without guidance. Therefore, in this study, the researcher set out to investigate the effectiveness of the virtual coaching intervention in increasing the number and variety of co-teaching models three co-teaching dyads planned and put into practice.

The results for increasing the number of models in practice for each lesson were mixed. For co-teaching Dyad 1, virtual coaching was highly effective in increasing the number of models put into practice. Yet, for dyads 2 and 3, the virtual coaching intervention was ineffective in increasing the number of models teachers used in each lesson. This may be due to a ceiling effect (Kazdin, 2011) because each lesson was limited to 30 minutes. The participants were aware that this was a co-teaching study and may have planned for and implemented more co-teaching models simply because they knew that the researcher was investigating co-teaching.

While the number of co-teaching models for each lesson was not affected in two of the co-teaching dyads, fidelity to the variety of models each co-teaching dyad planned and used was increased by the virtual coaching intervention. The study results support previous co-teaching research related to treatment integrity (Cook et al., 2011; Murawski & Swanson, 2001; Rea et al., 2002; Weiss & Lloyd, 2002). Classroom observations recorded and coded during baseline (Phase One) data collection indicated a lack of varied
co-teaching practice. Likewise, Dieker (2001) reported that only one of nine co-teaching teams observed used a variety of co-teaching models. In the Dieker (2001) study, four teams used one teach, one assist as their primary model of instruction while four teams used a teaming approach but only if they had appropriate planning time. Murawski and Swanson (2001) found that the researchers who completed the studies they analyzed were not clear about whether the co-teachers were implementing co-teaching as planned.

Similar to the results reported by Keefe and Moore (2004), without guidance in the implementation of co-teaching models during baseline data collection, participants did not implement the models of co-teaching that they had planned to use. Instead, they either settled into a division of labor where the general education teacher delivered instruction while the special education teacher assisted and supported individual students or they planned for one model of instruction and then carried out a different model (i.e., planned for station teaching and then used parallel for the lesson). Once virtual coaching was introduced and participants were given clarification and guidance relevant to each model, instructional pace, and goals for model selection, co-teachers began planning and carrying out more varied co-teaching models. This finding is aligned with Bandura’s (1977) concept that the knowledge of a skill may lay dormant until there is a motivation or opportunity to use the skill, and Knowles’ (Carlson, 1989) idea of guided interaction. According to other researchers (Bauwens & Hourcade, 1997; Cook & Friend, 1996; Magiera & Zigmond, 2005; Vaughn et al., 1997; Walther-Thomas et al., 2000), a wider range of co-teaching practices should be present when co-teaching is implemented within general education classrooms. In this study, all three co-teaching dyads increased use of
varied co-teaching models when supported by the virtual coaching intervention within the general education classroom.

**Roles and Responsibilities Within Co-teaching Models**

In earlier studies (i.e., Keefe & Moore, 2004; Magiera et al., 2005; Morocco & Aguilar, 2002; Rice & Zigmond, 2000; Weiss & Lloyd, 2002), the role of the special educator was reported to be that of a monitor, assistant, or supporter within the general education classroom. Although not measured directly, during baseline (Phase One), the roles assumed by teachers who participated in this study mirrored those noted by the researchers cited above (i.e., Keefe & Moore; Magiera et al.; Weiss & Lloyd). Interestingly, in this study during baseline data collection (Phase One) the general education teacher who was part of Dyad 1 and the special education teacher who was part of Dyad 3 were likely to assume the roles documented by the above-noted researchers. Although experienced teachers, for all three dyads, co-teaching was new practice and unfamiliar ground. The teachers were uncertain about stepping out of familiar solitary classroom settings into this new, shared territory. This uncertainty was voiced by one special educator (from Dyad 3) who stated that she was so used to pulling students into the resource room for one-on-one instruction that she felt uncomfortable in the general education classroom even though the general education teacher was welcoming and willing to work with her.

Rea et al. (2002) noted that teachers in the inclusive school setting they investigated were allotted common time to plan each day and did a better job overall meeting the needs of all students when compared to a school setting that was not inclusive. Of the three classroom settings investigated in this study, Dyad 2 appeared to
have the most inclusive school setting. Co-teachers in this classroom discussed meeting the needs of all students in the classroom during planning throughout the length of the study. While Dyad 3 was designated the *inclusion* classroom for the grade level and the number of students with disabilities enrolled in this class was proportionally high, the teachers required prompting to move away from dividing students into the *yours* and *mine* categories discouraged in the co-teaching literature (Friend et al., 2010). In both of these schools, co-teachers were given daily, common planning time that Scruggs et al. (2007) indicated was necessary for successful co-teaching. In the third classroom setting (Dyad 1), as in the other two settings, teachers were in their first year of implementation. The general educator stated that she was not prepared to meet the needs of students with disabilities in the classroom for the entire day and she simply needed help.

**Accommodations and Modifications**

The specially designed instruction Zigmond and Baker (1995) reported missing in co-teaching practice was absent during the baseline (Phase One) observational sessions in this study. As previous researchers found (Baker & Zigmond, 1995; Magiera & Zigmond, 2005; Zigmond & Baker), although general education practices were implemented during the baseline phase (Phase One) of the study, few to no accommodations were carried out for students with identified disabilities. Indeed, Magiera and Zigmond noted a lack of effective instructional grouping and assistance, which they attributed to insufficient training. When prompted or queried through the virtual coaching intervention, all three co-teaching dyads regularly planned for and supported students with appropriate accommodations based on individual student’s IEPs. In 1995, Baker and Zigmond reported that the co-teachers in their study placed more emphasis on activities in the
classroom than on specialized, personalized instruction for students with disabilities. The teachers who participated in this study centered discussions during baseline planning sessions largely on what to teach (i.e., looking through the teacher’s manual) in the lesson, rather than how to teach the lesson or how to accommodate learning for individuals during the lesson. PND calculations for changes in co-teachers’ use of student-specific accommodations or modifications confirmed the virtual coaching intervention was highly effective for Dyads 1 and 3. The intervention was effective for Dyad 2. Although Dyad 2 had a lower PND score, they responded to the virtual coaching intervention specific to students’ needs. This dyad planned for and implemented general accommodations during the first baseline condition; when prompted by the coach to think of individual students’ needs, these co-teachers provided individual students intensive instruction focused to meet his/her IEP goals. Kazdin (2011) stated that mixed results are often common in single-case research as not everyone responds to treatments in the same way even those that are well known to be effective (i.e., the use of aspirin for headache).

**PBIS**

As reported by Mastropieri et al. (2005), the classroom management type and approach general education teachers take may be different than those of the special education teacher. And managing whole-class student behavior can be a problem for special educators who are used to working with individual students (Sindelar et al., 2010). In this study, when co-teaching dyads purposefully planned approaches to PBIS during planning sessions even if they spoke only of general guidelines within the classroom, they praised students frequently and had to redirect students’ behaviors less often. As reported by Mastropieri et al. (2005), when both co-teachers employed effective
motivational strategies (i.e., specific, descriptive praise and neutral redirection), co-teaching approaches appeared successful.

**Evidence of Disruption**

When they completed their study in 2009, Rock and colleagues reported that the online feedback provided to teachers during instruction did not disrupt the pace or format of coached lessons, nor did it distract students. The present study supports these findings. No incidents of disruption were reported or observed during any phase of the study. Student engagement remained at 90% or higher. These heightened levels of engagement may be related to the PBIS that was already in place in participants’ classrooms. As noted in Chapter III, these participants received PBIS coaching online in previous studies (see Rock et al., 2009, 2011).

**Social Validity**

Social validity measures the acceptability of the intervention by participants (Kazdin, 2011). This research supports the social validity of the work of Rock et al. (2009) and Scheeler et al. (2010). Teacher participants in all three studies reported positive experiences with bug-in-ear coaching regardless of the format (i.e., expert coach from a distance during instruction, co-teaching partner in the same room during instruction, or expert coach from a distance during planning). Participants in this study indicated that the virtual coaching during planning was more valuable than coaching during instruction. Several factors may have contributed to teachers’ preference for coaching during planning. Specifically, during the first baseline condition (Phase One) when co-teachers’ planned, they decided on the model of co-teaching before they discussed goals of lessons. Prompting for and clarification of co-teaching models during
planning assisted the teachers to prepare for instruction using co-teaching models that were appropriate for lesson goals. Moreover, when student-specific accommodations were preplanned, co-teachers did not require additional prompts for their implementation during instruction.

Teachers’ positive perceptions of their co-teaching interactions mirrored those reported by earlier researchers (Scruggs et al., 2007; Vaughn et al., 1996; Vesay, 2004; Walther-Thomas, 1997). Given the results of the CCSS scale and the interview responses reported in this study, the co-teachers who participated were not only satisfied with their communication within the co-teaching partnership, but also with their individual virtual coaching and co-teaching experiences. Teachers who participated in this study also thought their students learned more because of co-teaching. However, because student achievement was beyond the scope of this research, there were no academic data available to support these claims.

Co-teaching Instrumentation

CCSS. Previous researchers (i.e., Keefe et al., 2004; Mastropieri et al., 2005; Salend et al., 1997; Scruggs et al., 2007; Walther-Thomas, 1997) have reported the importance of volunteerism and choice of co-teaching partners for successful co-teaching relationships. This study supports the research noted previously because participants in this study were voluntarily co-teaching with one another and given their reported high ratings on the CCSS, high levels of satisfaction with communication during co-planning and co-teaching sessions throughout the study. As Villa et al. (2004) indicated, co-teachers must communicate, communicate in different ways, and communicate again in order to form successful co-teaching partnerships. Further co-teaching communication
research should investigate the similarities and differences between co-teachers who are voluntary participants and those who are assigned to co-teaching partnerships.

**CtRS and CTSS Checklist.** Gately and Gately (2001) reported that co-teachers go through at least three stages as they begin and become proficient co-teaching partners. The co-teaching dyads that participated in this study improved scores on the CtRS (2001) in marked ways. The classrooms became fluid learning environments as the virtual coaching intervention assisted the dyads to move away from one teacher teaching while the other assisted students to co-teaching models where both teachers participated in presentation of lesson content. Indeed, Murawski and Dieker (2004) would agree as they posited that co-teachers experience greater success when they vary instructional practices. Instructional planning for all three dyads changed from one teacher seen as the “boss” while the other assumed the role as “helper” with a job to assist students to shared planning experiences where both teachers had input into the lesson content, co-teaching model most appropriate for teaching, and appropriate student-specific accommodations or modifications (Gately & Gately). Keefe and Moore (2004) indicated that when left to just figure things out, co-teachers settled into a division of labor where general educators delivered instruction and special educators provided accommodations and modifications. In this study, the virtual coaching intervention assisted teachers to jointly plan and carry out varied models of co-teaching as evidenced by higher scores on the CtRS for all three dyads in their final co-teaching session.

The CTSS Checklist (Murawski & Lochner, 2011) was used to assess changes in co-teaching dyads’ co-planning and co-instruction over the length of the study. While there is no published reliability or validity for the checklist, it did document changes in
co-planning and co-teaching behaviors for all three dyads who participated in this study. Proponents of co-teaching (Banerji & Dailey, 1995; Cross & Walker-Knight, 1997) indicated that co-teachers benefited by working closely with a colleague. The change in scores from baseline (Phase One) to the final intervention session (Phase Four) indicated as previous researchers (i.e., Dieker, 2001; Harbort et al., 2007; Magiera & Zigmond, 2005) noted, the addition of the special education teacher did not change daily practice. The addition of the virtual coaching intervention assisted co-teaching dyads to change behaviors thereby increasing scores on all sections of the CTSS Checklist from baseline (Phase One) to final intervention (Phase Four). Further research should be done to investigate closely the effects of the virtual coaching intervention on specific areas of co-teaching outlined on the CTSS Checklist (Murawski & Lochner, 2011).

**Divergent Findings**

**Technology Enhanced Feedback/Coaching-Bug in Ear Coaching**

Only one previous co-teaching study was identified that included immediate feedback as an independent variable (Scheeler et al., 2010). In the Scheeler et al. investigation, six (3 dyads) co-teaching partners took turns providing immediate feedback to one another during instruction using three-term contingency trials. In order for the second teacher in the room to provide immediate feedback, only the one teach, one assist model of co-teaching could be put into practice. Thus, the design of the study precluded the co-teachers’ use of more than one co-teaching model. In this study, the advanced online BIE technology allowed an expert coach to provide immediate feedback to both co-teachers during planning sessions and individual co-teaching participants for the lesson that followed. For the planning sessions, the co-teaching dyad used the video
conferencing component of Skype and the classroom computer’s microphone and external speakers so that all three were active in the conversation. During implementation of the lessons, one of the co-teachers wore the Bluetooth headset so that the virtual coach could provide discreet immediate feedback (Rock et al., 2009) during instruction. In this way, both teachers remained actively co-teaching and all six models of co-teaching were available for practice.

**Specific, Descriptive Praise and Redirection**

In the study completed by Rock et al. (2009), teachers’ statements of praise increased significantly from pre- to post-assessments. By contrast, in this study, although co-teachers’ praise rates were high and generally reflected the recommended 4:1 ratio of positive statements to redirections, the rate of praise did not increase from baseline to intervention. This lack of change may be linked to several factors including the previous online coaching experiences by three of the six participants and a ceiling effect for the 30-minute session limit. An interesting finding was that redirections decreased from baseline to intervention throughout each phase of the investigation. This decrease may have occurred for various reasons. The students were grouped into smaller groups with active supervision when parallel teaching and station teaching were the models of instruction (Friend & Cook, 2007). Therefore, students may have received more direct teacher interactions (Cook et al., 2011). For Dyad 3, co-teachers employed the use of proximity and strategic grouping after prompting from the virtual coach in order to support behavioral needs of students who required higher levels of redirection.
Co-teaching Models in Practice

Previous researchers (Dieker, 2001; Harbort et al., 2007; Magiera et al., 2005; Zigmond & Matta, 2004) documented the overreliance of one teach, one assist or one teach, one observe models of co-teaching where the general education teacher led whole class instruction while the special education teacher supported individual students. In the nine co-taught classrooms Dieker (2001) observed, only one co-teaching pair used more than one model of co-teaching. In this study, all three co-teaching dyads varied co-teaching models within individual lessons and across eight planned and implemented lessons. Dyad 1 implemented four of the six identified models of co-teaching while Dyads 2 and 3 implemented five of the six models outlined by Friend and Cook (2007). The motivation and reinforcement identified in adult learning theory (Lieb, 1998) provided by the virtual coach during planning assisted co-teachers to transfer their knowledge of co-teaching practices (McLeskey & Waldron, 2004) into their individual classrooms.

Limitations

In addition to the limitations identified in Chapter I, several other limitations are associated with this single-case research study. Specific to single-case research, Gast (2010) reported that baseline conditions should be measured over a minimum of 3 consecutive days. First, given the participants’ individual schedules, unavoidable meetings, and other daily changes at the schools this was not possible. Instead, consecutive planning and co-teaching sessions were used. Second, stability in baseline (Lane et al., 2007; Kratochwill et al., 2010) was another limitation noted for this study. Due to time constraints, instead of continuing baseline conditions until all dyads met
requirements for an absence in trend, the intervention phase was introduced when at least one dependent variable met the requirement for each dyad. Third, only four data points were collected in each phase of the study. Therefore, according to Kratochwill et al. (2010), the study meets standards with reservation. Fourth, the study may be limited by reversibility in withdrawal. In the case of learned skills (i.e., proper use of a co-teaching model), it is difficult to reverse the effect (Kennedy, 2005). Fifth, the calculation of PND ignores all baseline data except for one point, and that point may be unreliable (i.e., an outlier). In such cases, the effect of the intervention may be greater than calculated by PND (Kazdin, 2011). Sixth, the observational scales used as multiple measures [i.e., CtRS (Gately & Gately, 2001) and CTSS Checklist (Murawski & Lochner, 2011)] have no published reliability or validity so while based on theoretical guidelines for co-teaching practice they are not psychometrically sound. Seventh, the participants knew that they would be coached for co-teaching and therefore may have initiated models that are more diverse during baseline (Phase One) when they would not have had the researcher not been present. Eighth, a student was coded as on-task if he or she was not clearly off-task. Often students may have been passively listening to a teacher who was providing instruction to the whole class or small group. Observers had to interpret students’ behaviors and body positioning and assume the students were on-task. Finally, the technology, although advanced, limited the ability for the virtual coach to provide feedback to both co-teachers during instruction.

**Implications for Co-teaching Research**

The results of this study have several implications for co-teaching research. First, researchers should investigate co-teachers’ use of time during planning and instruction.
Second, further research should investigate the differing roles and responsibilities co-teachers employ when supported by the virtual coaching intervention. Third, a more in-depth study of the effects of virtual coaching on the value added by a second teacher in the classroom could further identify the needs of co-teachers as they implement co-teaching in inclusive settings.

**Issues of Time**

Common planning time, or the lack thereof, has long been a topic of discussion in co-teaching literature (see Buckley, 2005; Dieker, 2001; Hang & Rabren, 2009; Magiera et al., 2005; Moin et al., 2008; Murawski, 2012; Scruggs et al., 2007). Magiera et al. described what they termed *co-teaching on the run* due to lack of common planning time for teachers they observed. Dieker (2001) noted the difference in actual planning time and the amount of time co-teachers desired for planning. Indeed, Scruggs et al. (2007) posited that successful co-teaching is contingent upon time for common planning. Recently, Murawski outlined tips for efficient use of planning time. Interestingly, the lack of common planning time and hence, revolving door co-teaching (Magiera et al.; Scruggs et al.) was alleviated through the virtual coaching intervention. Because co-teachers were coached during planning time, 30-minute co-planning sessions were scheduled with teachers during identified common planning time or after school. Murawski suggested that co-teachers establish a set time for collaborative planning and stick to that time. The virtual coaching intervention requires an appointment with the virtual coach that keeps co-teachers on schedule and provides the needed support for planning identified by Dieker, Walther-Thomas (1997) and Walsh (2012).
Although the co-teaching dyads had time to plan, there was one occasion when the plan that teachers made was not put into action because the special education teacher failed to come during her scheduled co-teaching lesson. Increased caseloads are a common barrier to co-teaching practice, as special education teachers are required to manage more diverse roles with greater expectations of their time (Sindelar et al., 2010; Walther-Thomas, 1997; Wood, 1998). Further study should be done to investigate specifically how co-teachers use planning and instructional time and the effects of virtual coaching on time spent planning for and implementing co-teaching. Researchers should also investigate specifically what co-teachers talk about during planning, in what order they discuss specific planning issues, and the effects of virtual coaching on the content of planning sessions.

**Roles, Responsibilities, and Value Added**

By varying the grouping of students and models of co-teaching, teachers in this study reported more opportunities to interact with individual students and to present content-specific instruction in multiple formats within the general education classroom. It was beyond the scope of this research to investigate the specific roles assumed by the general and special education teachers, yet other researchers (i.e., Murawski, 2006; Moin et al., 2008; Rice & Zigmond, 2000; Walther-Thomas, 2002) have documented the supportive roles special educators play when co-teaching in diverse general education classrooms. The results of this study confirmed that virtual coaching assisted co-teachers with varying the models of co-teaching they put into practice, but further research could investigate the roles assumed by general and special educators when the models of co-teaching vary. Further research should also investigate the effects of virtual coaching on
the time co-teachers spend providing one-on-one instruction with students during co-taught lessons. Moin et al. provided documentation of the instructional activities in science classes. A future study could investigate the effects of the virtual coaching intervention on the instructional roles special education teachers assume in similar classrooms.

Additionally, questions remain as to the value added by the presence of a second teacher actively co-teaching within the general education classroom. Cook et al. (2011) urged special educators not to abandon the core principles of special education (i.e., intensive, individualized instruction in small groups; the use of research-based practices; flexibility in instruction; progress monitoring). Therefore, it is imperative that researchers investigate the amount of time special education teachers devote to intensive, individualized instruction in small groups when carrying out co-taught instruction with a general education partner. Researchers should additionally measure the amount of time co-teachers use researched-based practices, flexibility in instruction, and how often co-teachers monitor progress for all students in inclusive general education classrooms when the co-teaching models are varied and special education teachers assume more active roles in general education inclusive classrooms. Then, we can begin to determine whether value is added.

Only recently have researchers started examining the link between virtual coaching and improved teaching practice (Rock et al., 2009). The few studies that have examined this relationship, other than this study, have found a consistent and significant relationship between virtual coaching (Bug-in-Ear) and improved behavior change in teachers although the exact relationship between the two variables with individual
teachers or co-teaching partners remains unclear. For example, Scheeler et al. (2010) found that co-teachers who coached one another completed three-term contingency trials at higher levels. In an earlier study, Rock and her colleagues (2009) found that teachers’ use of evidence-based practices increased significantly when coached using the advanced online bug-in-ear system. This study extends the work of Rock et al. and Scheeler et al., by introducing virtual coaching during the planning phase as well as the instructional phase of each lesson.

However, neither of the two above-noted studies examined to what extent the change in teaching behaviors persisted over time. Therefore, this foundational relationship between virtual coaching and improved teaching behaviors suggests that, from a research perspective, the outcomes from these studies should be investigated more closely. Indeed, studies should be designed to continue the investigation of the effects of the virtual coaching intervention on co-teachers’ planning and practice. Further study should also look to tease out the effects of virtual coaching during planning sessions only or during instructional practice only. Researchers should include more single-case designs in order to build on this preliminary work and further investigate the effects of virtual coaching on co-teachers’ planning and instruction (Horner et al., 2005; Kratochwill et al., 2010).

**Implications for Co-teaching Practice**

The results of this study have implications for co-teaching practice. First, if co-teaching is going to be the primary service delivery method to meet needs of students in inclusive general education classrooms (Cook et al., 2010; Magiera & Zigmond, 2005; Volonino & Zigmond, 2007), then co-teachers must be provided with the support and
training needed to carry out effective co-teaching. Quantitative data collected in this study supported the use of virtual coaching to motivate co-teachers to plan for and transfer their knowledge of varied co-teaching models into classroom practice in order to provide effective co-teaching practice with fidelity. Second, when previous researchers (i.e., Dieker, 2001; Magiera & Zigmond; Zigmond, 2001) investigated what happened to the special in special education, they found that nothing special was happening in the classrooms they observed. In this study, co-teachers provided students with specific accommodations when supported with the virtual coaching intervention. Teachers had the knowledge of the instructional supports (i.e., accommodations or modifications) students needed, yet, without the support of the virtual coach, either did not see the relevance for them in relation to what they were teaching or were not able to transfer or apply this knowledge into the general education setting. This transference of knowledge is vital to the success of students with disabilities because they spend the majority of their day in the general education classroom (U.S. Department of Education, 2008). Therefore, co-teachers must be supported in situ through virtual coaching or other job embedded approaches to maximize transfer of core special education principles (i.e., flexibility; intensive, individualized instruction in small groups; progress monitoring; assessment; use of evidence-based practices [Cook et al.]) in the general education classroom.

The results of this study along with theories of behavior and adult learning and the work of previous researchers (i.e., Murawski, 2006; Rock et al., 2009, 2011; Scheeler et al., 2010) lend further credence to the notion that teacher training programs must go beyond the traditional lecture classes, seminar training, or Internet modules (Sindelar et
al., 2010; Spooner et al., 2010), to ensure that co-teachers acquire the skills needed to plan for and implement co-teaching in inclusive general education classrooms.

**Future Directions**

In theory, the benefits of co-teaching should far outweigh the barriers to its implementation (Friend et al., 2010). The theoretical benefits (e.g., higher student teacher interactions, individualized instruction) of co-teaching have not been evident in the majority of the co-teaching research (i.e., Friend et al., 2010; Magiera & Zigmond, 2005; Moin et al., 2008; Murawski, 2006). Therefore, future investigations should continue investigating innovations that assist general and special educators in realizing theorized benefits. Specifically, future researchers should investigate the effects of virtual coaching on the hallmarks of special education noted by Cook and colleagues (2011).

The limitations of this study confirm further replication should be conducted. For instance, future co-teaching researchers should strive to include larger samples of co-teacher participants. More research should also be completed in order to examine the effectiveness of virtual coaching with co-teacher partners over extended periods and the maintenance of acquired co-teaching skills when virtual coaching is withdrawn. Maintenance data collected over longer periods in diverse settings would help establish long-lasting acquisition of newly acquired co-teaching skills.

Studies should also be conducted to tease out the effects of virtual coaching during planning and instruction (i.e., virtual coaching during both planning and instruction, virtual coaching during planning sessions only, and virtual coaching during co-taught instruction only). Participants in this study indicated virtual coaching during planning may be an efficient intervention in and of itself. Consequently, virtual coaching
during actual instruction may not be needed to increase desired co-teaching behaviors. More research is needed to confirm this anecdote.

Proponents of co-teaching (Dieker, 2001; Friend & Cook, 1995; Murawski & Lochner, 2011) emphasized the importance of interpersonal communication in all co-teaching relationships. Future researchers could use the CCSS as a screening tool to identify intact co-teaching partners who are not satisfied with their co-teaching communication. In this way, researchers could investigate the effects of virtual coaching on improving communication between co-teaching partners who are struggling to communicate effectively and efficiently during planning and/or instruction.

Moving beyond investigating the impact of virtual coaching on co-teaching practice, future researchers should also focus the spotlight on how improved co-teaching impacts students’ academic and behavioral outcomes. Although the co-teachers who participated in this study thought their P-12 students’ academic achievement was positively impacted by improved co-teaching practices, no data were collected to support or refute their opinion. In addition, future co-teaching researchers could employ multiple baseline-across-settings designs to investigate whether changes in co-teaching behaviors are attributable to the virtual coaching intervention or to the time spent co-teaching. More studies should also be conducted that provide co-teachers with supports that foster their use of varied, appropriate models in practice. In this way, co-teachers may appropriately accommodate or adapt instruction individually for students with disabilities served in co-taught general education classrooms. Finally, an investigation designed to provide immediate feedback through virtual coaching to both co-teachers while they jointly implement co-teaching practices should be conducted.
Conclusion

Twenty-six years after former Assistant Secretary of Education, Madeleine Will (1986) introduced the REI we are still searching for effective ways to share the responsibility of educating students with disabilities in the general education classroom. This shift from separate to joint responsibility has changed the way general and special education teachers think and act, requiring that both teachers acquire the knowledge and skills needed to efficiently plan and deliver co-taught instruction (Leko & Brownell, 2009; Rock et al., 2011; Sindelar et al., 2010; Waters & Burcroft, 2007). Recent reform guidelines outlined by the Department of Education (2010) emphasize the need for pre- and in-service teachers to have access to quality preparation, ongoing support, and collaborative opportunities, so they may be more effective in inclusive classrooms. The results of this study, although by no means definitive, confirmed the efficacy of virtual coaching as an effective approach to supporting new co-teachers in bridging the gap between research and practice.
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Appendix A

The Co-teacher Communication Satisfaction Scale
The Co-Teacher Communication Satisfaction Scale

Please provide the following demographic data:

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| Marital Status:        | ☐ Single                                | ☐ Married                                |
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|                        |                                        | ☐ Widowed                                |
|                        |                                        | ☐ Other _________                        |

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| Type of School:         | ☐ Urban Public                         |
|                        | ☐ Urban Private                        |
|                        | ☐ Rural Public                         |
|                        | ☐ Rural Private                        |
|                        | ☐ Other _______                        |

| Highest Professional Degree held:     | ☐ Bachelors                      |
|                                       | ☐ Masters                        |
|                                       | ☐ Ed. S.                         |
|                                       | ☐ Ed.D.                          |
|                                       | ☐ Ph.D.                          |

The purpose of this questionnaire is to investigate your reactions to a recent Co-Teaching interaction. On the next few pages, you will be asked to react to a number of statements. Please indicate the degree to which you agree or disagree that each statement describes the interaction. The four (4) or middle position on the scale represents “undecided” or “neutral,” then moving out from center, “slight” agreement or disagreement, then “moderate,” then “strong” agreement or disagreement.

For example, if you strongly agree with the following statement you would mark the space to the left of the 1.

My coteaching partner moved around a lot.

Agree  ☐ 1  ☐ 2  ☑ 3  ☐ 4  ☐ 5  ☐ 6  ☐ 7  Disagree

1.  My Co-Teaching partner lets me know that I am communicating effectively.

Agree  ☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5  ☐ 6  ☐ 7  Disagree

2.  We did not accomplish our goals in this discussion.

Agree  ☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5  ☐ 6  ☐ 7  Disagree

3.  I would like to have more conversations like this one with my Co-Teaching partner.

Agree  ☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5  ☐ 6  ☐ 7  Disagree

4.  My Co-Teaching partner seemed genuinely interested in getting to know me.

Agree  ☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5  ☐ 6  ☐ 7  Disagree

5.  I am dissatisfied with our typical communication.

Agree  ☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5  ☐ 6  ☐ 7  Disagree

6.  I usually have something else to do when we meet.

Agree  ☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5  ☐ 6  ☐ 7  Disagree
7. During our Co-Teaching efforts, I was able to present myself as I intended.

<table>
<thead>
<tr>
<th>Agree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Disagree</th>
</tr>
</thead>
</table>

8. My Co-Teaching partner showed me that he/she understood what I said.

<table>
<thead>
<tr>
<th>Agree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Disagree</th>
</tr>
</thead>
</table>

9. I was satisfied with the Co-Teaching interaction.

<table>
<thead>
<tr>
<th>Agree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Disagree</th>
</tr>
</thead>
</table>

10. My Co-Teaching partner seemed very interested in what I had to say.

<table>
<thead>
<tr>
<th>Agree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Disagree</th>
</tr>
</thead>
</table>

11. I did not enjoy the Co-Teaching experience.

<table>
<thead>
<tr>
<th>Agree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Disagree</th>
</tr>
</thead>
</table>

12. My Co-Teaching partner did not provide concrete evidence for what he/she was saying during our interaction.

<table>
<thead>
<tr>
<th>Agree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Disagree</th>
</tr>
</thead>
</table>

13. I could talk about anything with my Co-Teaching partner.

<table>
<thead>
<tr>
<th>Agree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Disagree</th>
</tr>
</thead>
</table>

14. During our conversation, each of us was able to express our thoughts and opinions.

<table>
<thead>
<tr>
<th>Agree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Disagree</th>
</tr>
</thead>
</table>

15. We were comfortable enough in our communication that we could laugh together.

<table>
<thead>
<tr>
<th>Agree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Disagree</th>
</tr>
</thead>
</table>

16. Our dialogue flowed smoothly.

<table>
<thead>
<tr>
<th>Agree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Disagree</th>
</tr>
</thead>
</table>

199
17. My Co-Teaching partner changed the topic when his/her feelings were brought into the conversation.

   Agree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Disagree

18. My Co-Teaching partner frequently said things that added little to the conversation.

   Agree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Disagree

19. In our conversation, my partner did not remain focused on our topic.

   Agree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Disagree

Thank you for completing The Co-Teacher Communication Satisfaction Scale. The information gathered from completed scales will provide necessary information that may be used to improve communication among Co-Teaching partners.
Appendix B

Coding Protocol for Teacher Hesitation (RQ2)
DATA COLLECTION CHART: Research Question 2 (RQ2)

RQ2: How does eCoaching impact (i.e., benefit or disrupt) co-teachers and P-6 students?

<table>
<thead>
<tr>
<th>Coach:</th>
<th>Teacher:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of eCoaching Session with Feedback:</td>
<td>Observation Length:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COACHING BEHAVIOR Evidence of Comment Timing</th>
<th>TEACHER BEHAVIOR Evidence of Disruption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (minutes)</td>
<td>Counts</td>
</tr>
<tr>
<td>5min</td>
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<tr>
<td>10min</td>
<td></td>
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<tr>
<td>15min</td>
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<tr>
<td>25min</td>
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</tr>
<tr>
<td>30min</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encouragement</td>
</tr>
<tr>
<td>Question</td>
</tr>
<tr>
<td>Instruction</td>
</tr>
<tr>
<td>Totals</td>
</tr>
<tr>
<td>Notes:</td>
</tr>
</tbody>
</table>

*CATEGORY KEY

**Professor Behavior:**

**DTL:** Comment delivered during the planned lesson.

**BL:** Comment delivered before the planned lesson.

**AL:** Comment delivered after the planned lesson.

**Teacher Behavior:**

**S:** Stop – the teacher stops instruction as defined by a 5 second or greater delay in teacher talk

**HNV:** Hesitation Nonverbal - the teacher hesitates briefly during instruction as defined by a physical drawing back or a facial expression showing surprise, panic, puzzlement, or thoughtfulness.

**HV:** Hesitation Verbal -the teacher hesitates briefly during instruction as defined by teacher talk characterized by “stalling for time language” such as “um”, “so”, “what”.

(Adapted from Rock, et al., 2007)
Appendix C

Sample Administrators’ Letter of Participation
Sample Letter of Support

3-10-11

Dear Committee:

[Redacted] Primary School is an enthusiastic partner with The University [Redacted] College of Education in studying the Effects of eCoaching on co-teachers’ Planning and Instruction. This project is designed to investigate the efficacy of eCoaching in order to assist new co-teaching teams as they work to acquire new skills in order to be successful co-teachers.

We agree that it is important to provide students with disabilities needed supports within the general education setting. We look forward to participating in collaborative efforts with Ms. Ploessl to develop more effective co-teaching teams so that all students may be successful in our school.

As a principal partner, [Redacted] Primary School will assist in project activities, such as eCoaching during co-planning sessions and co-taught lessons. Our technology staff will work to ensure that teachers’ computers are able to access required Internet programs and will assist with any software installation or troubleshooting issues.

We believe that this innovative opportunity will assist our teachers who are new to Co-Teaching become effective collaborators. In turn, this will positively affect all students in classrooms where teachers are Co-Teaching.

Sincerely,

[Redacted], Principal
Appendix D

Coding Protocol for Teacher Behaviors (RQ1)
DATA COLLECTION CHART: Research Question 1 (RQ1)

RQ1: How does eCoaching affect co-teachers’ planning for use of varied co-teaching models, student specific accommodations & modifications, and class-wide positive behavioral supports (PBS)?

Coach: 
Teacher: 

Date(s) of eCoaching Session with/without Feedback: Observation Length(s):

<table>
<thead>
<tr>
<th>Co-teaching Model Planned For</th>
<th>STUDENT SPECIFIC ACCOMMODATIONS/MODIFICATIONS PLANNED FOR</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Beginning</td>
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<tr>
<td>One-Teach-One-Assist</td>
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<td>Parallel Teaching</td>
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<td>Alternative Teaching</td>
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</tr>
<tr>
<td>Team Teaching</td>
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</tr>
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</table>

Change in Classroom Climate

<table>
<thead>
<tr>
<th>Category</th>
<th>5min</th>
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<th>20min</th>
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</table>

(Adapted from Rock, et al., 2007)
DATA COLLECTION CHART: Research Question 1 (RQ1)

RQ1: How does eCoaching affect how co-teachers carry out the models of co-teaching, the student specific accommodations, modifications, and the class-wide PBS they planned to use?

Coach:  
Date(s) of eCoaching Session with/without Feedback:  
Teacher:  
Observation Length(s):  

<table>
<thead>
<tr>
<th>Co-teaching Model in Use</th>
<th>CHANGE IN TEACHER BEHAVIOR</th>
<th>Student Specific Accommodations/Modifications in Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5m</td>
<td>10m</td>
</tr>
<tr>
<td>One-Teach-One-Assist</td>
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<tr>
<td>One-Teach-One-Observe</td>
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</table>

Change in Classroom Climate

<table>
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<tr>
<th>Category</th>
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<td>Pos. Stated Expectations</td>
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<td>Notes</td>
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<td></td>
<td>(Adapted from Rock, et al., 2007)</td>
</tr>
</tbody>
</table>
Appendix E

Semi-structured Interview Protocol
The interview will include questions adapted from Scheeler et al. (2010):

Did you like receiving eCoaching through the use of the advanced online BIE? Why or why not?

Were you distracted by the eCoaching while planning and/or teaching? If so, what was most distracting?

Was the eCoaching helpful in preparing for and teaching with your co-teacher?

What are some of the examples of feedback you found useful throughout the eCoaching sessions?

Would you recommend the use of eCoaching to other professionals who are beginning the practice of co-teaching? Why or why not?

What impact if any did this experience have on your students?
Appendix F

Coding Protocol for Impact on Student Engagement (RQ2)
DATA COLLECTION CHART: Research Question 2 (RQ2)

RQ2: How does eCoaching impact (i.e., benefit or disrupt) co-teachers and P-6 students?

Coach: 
Teacher: 

Date(s) of eCoaching Session with/without Feedback: 
Observation Length(s):

<table>
<thead>
<tr>
<th>5 minute Interval Recording</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervals</td>
<td>NFB</td>
</tr>
<tr>
<td>5 min</td>
<td># of students shown</td>
</tr>
<tr>
<td>10 min</td>
<td># of students shown</td>
</tr>
<tr>
<td>15 min</td>
<td># of students shown</td>
</tr>
<tr>
<td>20 min</td>
<td># of students shown</td>
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<tr>
<td>25 min</td>
<td># of students shown</td>
</tr>
<tr>
<td>30 min</td>
<td># of students shown</td>
</tr>
<tr>
<td>Totals</td>
<td># of students shown</td>
</tr>
</tbody>
</table>

Notes:

Key: NFB: No coaching feedback FB: Feedback

(From Rock, et al., 2009)
Appendix G

Invitation to Participate
Hello Scholars;

I am ready to begin a piece of research that will assist in fulfilling my doctoral study requirements and am writing to let you know about the study: *The Effects of eCoaching on Co-teachers’ Planning and Instruction.*

In this dissertation study, we hope to extend the work you have participated in through Project TEEACH to include support for Co-teaching planning and instruction. The aim of this project is to gain a better understanding of the efficacy of eCoaching and the effects of the online and Bug-in-Ear coaching on the implementation of co-teaching.

Donna Ploessl a doctoral student from The University of Alabama with the support and guidance of Drs. Marcia L. Rock and Madeleine Gregg is carrying out this dissertation research. We would like graduates of the Project TEEACH program to help by participating in our research. We would also like you to invite a co-teaching partner of your choice to participate in the research project.

If you and your co-teaching partner are interested in participating, you will be invited to take part in monitored and coached 30 minute co-planning sessions and the 30 minute co-teaching lessons that follow. We anticipate the total time for all coached and non-coached sessions to take four to six weeks. While there may be some mild discomfort related to use of the technology and coach’s feedback there is minimal risk to you or your co-teaching partner as participants.

All information collected will remain completely confidential and will not be shared with anyone outside the research team. We adhere to strict confidentiality guidelines (i.e., use pseudonyms when disseminating any participant information). All research materials (video files, coding sheets, interview transcripts, etc.) are stored under lock and key and data are stored on a password-protected computer in a locked office.

The results of the research study will complete part of a doctoral dissertation. Other versions or parts of the results may also be published as articles in professional journals or presented at professional conferences. Each participant will be provided a summary of findings. No names, addresses, school names, or other identifying information will be used as parts of these articles or presentations.

While there are several possible benefits to you, your co-teaching partner, and your students as a result of participation in this research study (i.e., support for new co-teaching endeavors, lower student teacher ratio in the classroom, increased individual assistance for students, etc.), the information we collect will be of great value to teacher educators, teachers, and school administrators and will aid in developing future learning approaches and supports for teachers. It will also contribute to the body of knowledge relevant to research in co-teaching, eCoaching technologies, and teacher preparation and professional development.
According to current professional guidelines and best practice, the Institutional Review Board at The University of Alabama, to protect the safety, rights, and well-being of participants, has assessed this dissertation project. This project has been reviewed and approved by The University of Alabama Institutional Review Board for the Protection of Human Subjects. If you would like to confirm this information, please contact Ms. Tanta Myles, The University of Alabama Research Compliance Officer, at 205-348-5152.

Participation in this research is voluntary. If you decide not to participate, you will not be expected to give a reason and there will be no consequences for lack of participation. Additionally, if you initially agree to participate and later change your mind, you are free to withdraw at any stage of the research project with no negative consequences.

If you and your co-teaching partner decide to participate, we will ask you each to sign a consent form to show that you have agreed to take part in the study. If you agree to participate and sign the consent form, you can decide to withdraw anytime during the study, without giving a reason.

If you have any concerns about the study or the way the research study is conducted, please contact Donna Ploessl at 205-454-7213, Dr. Marcia L. Rock at 336-256-8640, or Dr. Madeleine Gregg at 205-348-1417.

If you and your co-teaching partner decide to take part in the research study, please contact Donna Ploessl, via email at ploes002@crimson.ua.edu or donnap@rocketmail.com. You can also contact me at 205-454-7213.

I will then make arrangements regarding consent and initial meeting with you and your co-teaching partner. If you decide not to participate, I will not expect you to give a reason and your decision will be respected.

Best wishes,

Donna Ploessl
The University of Alabama
Doctoral Student
Appendix H

The University of Alabama IRB
March 5, 2012

Donna Ploessl, Ed. S.
Department of SPEMA
College of Education
Box 870232

Re: IRB#: 11-OR-131-R1 "The Effects of eCoaching on Co-Teachers’ Planning and Instruction"

Dear Ms. Ploessl:

The University of Alabama Institutional Review Board has granted approval for your renewal application.

Your protocol has been given expedited approval according to 45 CFR part 46. Approval has been given under expedited review category 7 as outlined below:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your application will expire on March 4, 2013. If your research will continue beyond this date, complete the relevant portions of the IRB Renewal Application. If you wish to modify the application, complete the Modification of an Approved Protocol Form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, complete the appropriate portions of the IRB Request for Study Closure Form.

Should you need to submit any further correspondence regarding this proposal, please include the above application number.

Good luck with your research.

Carpaneto T. Myles, MSM, CIR
Director & Research Compliance Officer
Office of Research Compliance
The University of Alabama
UNIVERSITY OF ALABAMA
INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS
REQUEST FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

I. Identifying Information

Principal Investigator: Donna M. Ploessl, Ed.S.
Second Investigator: Marcia L. Rock, Ph.D.
Third Investigator: Madeline Gregg, Ph.D.
Department: Special Education & Multiple Abilities
Specialized Education Services
Multiple Abilities
College: Education
Education
University: The University of Alabama
The University of Alabama
Address: 3803 26th Avenue East
University of North Carolina at Greensboro
Tuscaloosa, AL 35405
Room 205 Ferguson
Greensboro, NC 27410
Telephone: 205-444-7300
Building, Box 26170
PO Box 870232
Fax: 205-348-1417
The University of North Carolina at Greensboro
E-mail: plploess@ua.edu
Greensboro, NC
mgrock@uncg.edu
Tuscaloosa, AL 35487-0232
mggregg@bamaed.ua.edu

Title of Research Project: The Effects of eCoaching on Co-Teachers' Planning and Instruction

Date Submitted: 2-8-12
Funding Source: NONE

Type of Proposal: ☑ New
☐ Revision
☐ Renewal
☐ Completed
☐ Exempt

Please attach a renewal application
Please enter the original IRB # at the top of the page.

UA faculty or staff member signature:

II. NOTIFICATION OF IRB ACTION (to be completed by IRB):
Type of Review: Full board ☑ Expedited
IRB Action:
☑ Approved-this proposal complies with University and federal regulations for the protection of human subjects.

Date of Approval: 3/14/13
Approval is effective until the following date: 3/15/2014
Items approved: ☑ Research protocol
☐ Informed consent

Approval signature

Date 3/15/2014

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UNIVERSITY OF ALABAMA
INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS
REQUEST FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

I. Identifying information

Principal Investigator: Donna M. Ploes, Ed.S.  
Second Investigator: Marcia L. Rock, Ph.D.  
Third Investigator: Madeleine Gregg, Ph.D.

Department: Special Education & Multiple Abilities  
Department: Specialized Education Services  
Department: Special Education & Multiple Abilities

College: Education  
College: Education  
College: Education

University: The University of Alabama  
University: University of North Carolina at Greensboro  
The University of Alabama

Address: 3803 20th Avenue East  
Room 205 Ferguson Building, Box 26170  
The University of North Carolina at Greensboro

Tuscaloosa, AL 35405  
Greensboro, NC  
Greensboro, NC

Telephone: 205-454-7213  
336-256-8640  
205-348-1417

FAX: E-mail: ploes002@crimson.ua.edu  
mlrock@uncg.edu  
mggregg@bamaed.ua.edu

Title of Research Project: The Effects of eCoaching on Co-Teachers' Planning and Instruction

Date Submitted: 3-23-11  
Funding Source: None

Type of Proposal: New  
Revision:  
Renewal:  
Completed:  
Exempt:  

Please attach a renewal application
Please attach a continuing review of studies form

UA faculty or staff member signature: ________________________________

II. NOTIFICATION OF IRB ACTION (to be completed by IRB):

Type of Review: Full board  
Expedited

IRB Action:  
Rejected  
Tabled Pending Revisions  
Approved Pending Revisions  
Approved

Approved this proposal complies with University and federal regulations for the protection of human subjects.

Approval is effective until the following date: 4/19/2011

Items approved:  
Research protocol (dated 3-18-11)  
Informed consent (dated 3-18-11)  
Recruitment materials (dated 3-18-11)

Approval signature: ________________________________
Date 4/19/2011

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Request for Approval of Research Involving Human Subjects

Principal Investigator

Donna M. Ploessl, EdS.
3803 26th Avenue East
Tuscaloosa, AL 35405
205-454-7213

Title
The Effects of eCoaching on Co-Teachers’ Planning and Instruction

Purpose, Objectives, Design

According to the U.S. Department of Education (2010), more than 65% of students with disabilities served under the Individuals with Disability Education Act (IDEA) receive special education services in the general education classroom at least 80% of the day. In the state of Alabama, that number has reached 79% of students with disabilities (U.S. Dept. of Ed., 2010). The resulting increased number of students with disabilities receiving instruction in the general education classroom has changed the makeup of typical general education classrooms calling for a change in service delivery. Special educators’ roles as collaborators, who provided services outside general education classrooms, have evolved to include specialized instruction within the general education classrooms together with general education teachers (Friend, 2007). This evolution proved a significant change in practice for teachers who were accustomed to entering their individual classrooms and closing the door (Waters & Bancroft, 2007). The purpose of this study is to investigate the efficacy of eCoaching delivered through web-based IVC and advanced online bug-in-ear technology provided to practicing co-teachers as they plan and cooperatively carry out instruction in the general education classroom. Specifically, I will attempt to answer three questions:

a) How does eCoaching affect Co-Teachers’ planning for use of varied co-teaching models, student specific accommodations and modifications, and class-wide positive behavioral supports (PBS)?
b) How does eCoaching affect how Co-Teachers carry out the models of Co-Teaching, the student specific accommodations, modifications, and the class-wide PBS they planned to use?
c) How does eCoaching impact (i.e., benefit or disrupt) Co-Teachers and their P-6 students?

A single subject research design with post study qualitative interviews will support the researcher to answer these questions. A single subject withdrawal ABAB design (Kazdin, 2011) is proposed for this study. This design attempts to demonstrate a functional relationship between the treatment (i.e., eCoaching) and the target behaviors (i.e., co-teaching models, use of PBS). Mixed-methods research is proposed because the data collected through quantitative and qualitative approaches will provide the researcher a more complete picture of the
effect the eCoaching has on co-planning and co-teaching behaviors. The use of mixed methods sequential triangulation strategy allows for the collection, analysis, and interpretation of comprehensive narrative and observational data in order to gain additional insights into how the Co-Teachers perceived the online eCoaching they received (Creswell, 2003; Gall, Gall, & Borg, 2007).

In addition, participants will be asked to complete the Co-Teacher Communication Satisfaction Scale (CCSS) (Ploessl & Rock, 2007) a Likert-style satisfaction questionnaire, during baseline and at the completion of the study, in order to investigate how satisfaction with communication between co-teaching partners changed over the course of the study.

Qualitative data will be collected through semi-structured interviews at the end of the study (i.e. after return to intervention phase). The interviews will be recorded and transcribed, then coded and analyzed through thematic analysis. Using meaningful pattern analysis the researcher will provide rich descriptions of the Co-Teachers’ experiences with eCoaching (Creswell, 2003). The qualitative data analysis assists the researcher to refine and explain the quantitative results by exploring the participants’ views (Creswell, 2003).

Researchers have clearly demonstrated that one teach-one assist and one teach-one observe are the two models of co-teaching most frequently observed in previously studied classrooms (Scruggs, Mastropieri, & McDuffie, 2007). While these models are useful in practice, proponents suggest they should be used on a limited basis or as part of the lesson cycle (Friend et al., 2006; Friend & Cook, 2007). In 30 of the 32 studies reviewed by Scruggs, Mastropieri, and McDuffie, teachers stated the importance of and difficulty with planning. Indeed this indicates a need in the field to actively support teachers as they plan for and implement co-teaching strategies. Possibly of greater concern to researchers in the field of special education is the lack of what is special about special education within the co-taught classroom (Zigmond, 2001). Researchers reported that co-teachers in observed classrooms provided good general education practice but a lack of specially designed instruction (Baker, & Zigmond, 1995), little differentiated instruction and reluctance to individualize (Scruggs, Mastropieri, & McDuffie, 2007), and lack of attention to PBS (Mastropieri el al., 2005) in co-taught classrooms. Teachers identified the lack of training (Keefe, & Moore, 2004), the need for greater skill development (Curtin, 1998), and need for different training methods (Scruggs, Mastropieri, & McDuffie, 2007) as problems permeating co-teaching practice.

This investigator will attempt to meet the above stated needs by investigating a means to provide support to teachers (i.e., eCoaching) as they begin to plan for and implement co-teaching in their general education classrooms. The researcher will also investigate any changes in teaching behaviors that are observed because of the eCoaching throughout the length of the study; thereby contributing to the existing knowledge base and reducing the gap between research and practice.
Study Procedures

Procedures:

Protecting individual’s confidentiality will be a primary concern of the researcher, thus any identifying information will not be made public. The researcher will contact each teacher participant individually through email, and phone; make the usual introductions then follow a pre-designed script incorporating the overview and concept of the research design, the details concerning individualized data security and protections and instructions for participant interviews (see Appendix A). The researcher will meet with administrators and participants to explain informed consent and to answer any questions. The researcher will distribute informed consent forms (see Appendix B) for each teacher participant to complete before any data collection is initiated.

After signed informed letters of consent are returned, teacher participants will be contacted to establish firm dates during which the research will be conducted during this time participants will be asked to ensure the advanced online bug-in-ear technology is working in their respective classrooms. Installation instructions, general troubleshooting instructions, instructions for troubleshooting dropped calls, audio troubleshooting instructions, instructions for troubleshooting frozen web-cams, and a Skype guide for network administrators will be provided to each dyad of participants before data collection begins.

Then, each co-teaching dyad will field test the eCoaching technology with the researcher to ensure that remote connections are adequate and that the recording and storage systems are operational. At the conclusion of the field tests, baseline observations will be scheduled according to each participating pairs’ daily schedule.

Horner, Carr, Halle, McGee, Odom, & Wolery (2005) suggest that single case researchers should strive to ensure the baseline condition is as similar to the intervention condition as possible. In this study, the researcher will strive to meet this standard by virtually visiting classrooms during the same content area instruction and for equal amounts of time during each observation. Co-teacher participants will take turns alternate days wearing the Bluetooth earpiece during the baseline phases, as they will alternate similarly during the intervention phases of the study (see Table 1 for a summary of research phases and condition rules).

Baseline Phase

During the baseline condition, the researcher will virtually observe each participating pair of teachers as they cooperatively plan for instruction. The co-planning sessions will take place in the general education classroom so the researcher can observe through the eCoaching system described previously. The researcher will greet the participants and record each 30-minute planning session for analysis, but will not provide immediate or delayed feedback to the participants at any time before, during, or after the planning sessions. As mentioned previously, the planning sessions will be recorded by the researcher using Call Recorder for Mac and stored on an external hard drive in a locked office on campus for later analysis.

The researcher will then virtually visit the classroom to observe the planned 30-minute co-taught lessons. Again, the researcher will record the lesson for analysis, but will not provide immediate or delayed feedback to the participants before, during, or after
the lesson. In order to establish similar conditions during baseline and intervention, the participants will alternate wearing the Bluetooth earpiece during co-taught instruction. As stated earlier, in order to control for some confounding variables, the same content area will be observed during each co-taught lesson during baseline and intervention phases with each teacher dyad. Procedures for virtual observations will be identical during the return to baseline observation phase. Gast (2010) specifies that baseline data be collected continuously “over a minimum of 3 consecutive days” (p. 250).

**Intervention Phase**

Once baseline stability requirements are met (i.e. level trend and little variability) the intervention phase (eCoaching during co-planning and Co-Teaching) will be introduced. Settings for the first intervention phase remain the same as those in the baseline phase. During the initial intervention phase, the researcher will virtually observe each participating pair of teachers as they cooperatively plan for instruction in the general education classroom. Throughout the co-planning sessions, the researcher will use eCoaching to provide immediate feedback (i.e., encouraging, corrective, questioning, and instructive) to the participants as they plan a co-taught lesson.

The day after each co-planning session, the researcher will visit each classroom virtually, during the planned 30-minute co-taught lesson. During each lesson the researcher will provide eCoaching (i.e., immediate feedback) to one Co-Teacher participant through the advanced on-line bug-in-ear system. Again, the researcher will record each co-taught lesson and archive each video file on an external hard drive in a locked campus office for later analysis. The primary and secondary coders will individually and separately code the archived video files for each dependent variable defined previously using frequency counts for the observed coached occurrence of planned co-teaching behaviors. Counts will be recorded and totaled according to the procedures described during the baseline phase on coding forms adapted from Rock et al. (2009).

**Return to Baseline Phase**

The procedures for the return to baseline phase will replicate those used in the first baseline phase described previously.

**Second Intervention Phase**

During the second intervention phase the researcher will resume eCoaching with co-teaching participants. The procedures for the second intervention phase of the study will replicate those used during the first intervention phase. The second Intervention phase will continue until stability in trend is established. As with the first Intervention phase, the researcher will obtain a minimum of four data points for each participant dyad as the adopted standard for this research phase (Kratochwill et al., 2010).
<table>
<thead>
<tr>
<th>Condition</th>
<th>Transition</th>
<th>Decision Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (A)</td>
<td>Phase A to Phase B</td>
<td>Obtaining 4 data points. Stable data rate (absence of trend, little variability)</td>
</tr>
<tr>
<td>Intervention (B)</td>
<td>Phase B return to Phase A</td>
<td>Obtaining 4 data points. Acceptable stability in trend and level reached</td>
</tr>
<tr>
<td>Baseline (A)</td>
<td>Phase A to Phase B</td>
<td>Obtaining 4 data points. Acceptable stability in trend and level reached</td>
</tr>
<tr>
<td>Intervention (B)</td>
<td>Continuation of Phase B</td>
<td>Obtaining 4 data points. Acceptable stability in trend and level reached</td>
</tr>
</tbody>
</table>

Following the end of the second Intervention phase, the researcher will interview teacher participants using the semi-structured protocol adapted from Scheeler et al. (2010) (see Appendix C). The use of the interactive video conferencing component of the advanced on-line bug-in-ear system will be used to record participants’ responses to interview probes. Interview dialog will be stored on an external hard disk in a locked campus office for later transcription and analysis.

Upon completion of each interview, participants will be asked if there are any questions and thanked for their time and effort in the research project. During this debriefing, participants will be encouraged to contact the researcher if questions arise about the study. The researcher will describe the purpose of the study, the way in which interview answers will be evaluated, and broader issues addressed in the study. Also, the researcher will discuss the study methods and anticipated or observed results.

Once interview transcription is completed, the researcher will contact each participant through email and ask participants to validate the accuracy of statements made during the interview process through a member checking procedures outlined by Gall, Gall, and Borg (2007). Specifically, teacher participants will be asked to validate the researchers understanding of transcriptions of personal interviews to ensure the statements are accurate and complete. The researcher will offer to send participants the results of the study and provide references for further reading in the areas of co-teaching, eCoaching, and teacher training. Finally, participants will be asked if they have any questions about the study, if there was a part of the study that was difficult, and if they would change any part of the study (Fraenkel, & Wallen, 2003; Gall, Gall, & Borg, 2007).

**Measures (See Appendices)**

*The Co-teacher Communication Satisfaction Scale (Appendix D)*
*CtRSS (Appendix E)*
CTSS Checklist (Appendix F)
Coding forms adapted from Rock et al. (2009) (Appendix G)
Semi-structured interview protocol (Appendix C)

Key Terms:

Advanced online Bug-in-Ear System: A wireless communication system consisting of four components (patent pending): a Creative WebCam Live! Ultra-Wide Angle Web Camera™ (Version 3.0.0.217), a Plantronics P1-Voyager 510 Windsmart Bluetooth Headset™ (Model No. 72270-61), an IOGEAR Bluetooth 2.0 USB Adapter, Class 2™ (Model No. GBU221), and Skype™ (Version 3.0.0.217) used to provide discreet feedback (e.g., eCoaching) (Rock et al., 2009).

Co-teaching: “An educational approach in which general and special educators work in a co-active and coordinated fashion to jointly teach heterogeneous groups of students in educationally integrated settings (i.e. general classrooms).” (Bauwens, Hourcade, & Friend, 1989) (p. 18).

eCoaching: Providing teachers with immediate feedback that is encouraging, instructive, and corrective through electronic means via the Internet and Advanced Online Bug-in-Ear technology (see below) (Rock et al., 2009).

Timeline for Procedures

Because single case research calls for consecutive days of data collection (Kazdin, 2011), each phase of the study should require one week to complete. Given that individuals may become ill or are absent from work for personal reasons, the timeline for data collection for this research will be approximately four to six weeks. Therefore, eCoaching and data collection will occur during the months of April and May, 2011. Data analysis will take place during the months of June, July, and August, 2011.

Setting and Major Essential Equipment

Research Sites

Based on the purposive convenience sample methodology used, the setting for the study will include two elementary schools (i.e., [Redacted] School) in the Southeast.

Site One ([Redacted]) is a primary school in a small city school district serving 281 students in grades Pre-K-2. School ethnicity data include a population consisting of <1% Asian/Pacific Islander, 99% Black, and <1% White students. 90% of students meet requirements for free or reduced lunch. The school completed year five of school improvement during the 2009-2010 academic year.

Site Two ([Redacted]) is a private school in a small city district serving 671 students in grades Pre-K-12. School ethnicity data include a population consisting of 2% Asian/Pacific Islander, 10% Black, 3% Hispanic, and 85% White students. There are no free or reduced lunch data reported. The teacher participants’ elementary school
classrooms within each school site provide the specific sites for this investigation. Participants’ classrooms will vary in range from kindergarten through fifth grade.

A private, remote office on The University of Alabama campus will serve as the setting from which the researcher conducts observations and provides eCoaching.

eCoaching Apparatus

Throughout all phases of the proposed research project, the researcher and participants will use an online platform developed and tested from 2007 to present by Rock and her colleagues (see Rock et al., 2009). The eCoaching technology makes use of participants’ existing classroom computer and Internet connection. During baseline conditions, when no eCoaching is provided to participants, only the interactive video conferencing (IVC) component (i.e., Skype) will be used. In contrast, when eCoaching is underway during intervention conditions, the teachers’ existing IVC equipment will be used with advanced online Bug-In-Ear (BIE) technology so feedback can be provided immediately on site. The online BIE system was provided to participants through their involvement in Project TEEACH (i.e., a Bluetooth headset, a Bluetooth wireless adapter, a webcam, and Skype a free Internet based Voice-over-IP system).

eCoaching Technologies for use During Co-Planning

During the co-planning sessions, the researcher will use a Mac PowerBook computer with a webcam and Skype as her apparatus. Because the researcher will be coaching from a private, remote office, there will be no need for her to use of the Bluetooth headset or wireless adapter. Instead, the researcher will use the laptop computer’s internal microphone and speakers. The researcher will use, Call Recorder for Mac, a plug-in for Skype that enables video call recording, in order to electronically capture each observation. Video files recorded across conditions for each co-planning session will be saved on an external hard drive and archived for later analysis. The external hard drive will remain in a locked office to maintain Institutional Review Board protections. Participants will use Skype and existing classroom computers with Internet connections and the personal computer’s internal microphone and speakers for web-based interactive video conferencing with the researcher during the co-planning sessions across the four conditions. All video recordings will be destroyed after 5-7 years of completion of the project and raw numerical data will be destroyed after it is entered into the databases.

eCoaching Technologies for use During Co-Teaching

The researcher will use the apparatus described previously for each co-teaching session across conditions. As mentioned previously, participants will continue to use existing classroom technologies with the addition of the Bluetooth adaptor and Bluetooth earpiece. One co-teacher will wear the headset for immediate feedback during a co-teaching lesson, and then for the next lesson the other participant in the co-teaching pair will wear the Bluetooth earpiece in order to receive discreet, immediate feedback from the doctoral student researcher who will serve as the coach. Components for the advanced online bug-in-ear virtual coaching system are identified in Table 2.
Table 2
Original Advanced Online Bug-in-Ear eCoaching System

<table>
<thead>
<tr>
<th>Technology Components</th>
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<tbody>
<tr>
<td><strong>Technology Components for Co-Teachers</strong></td>
</tr>
<tr>
<td>Plantronics P1-Voyager 510 Bluetooth Headset</td>
</tr>
<tr>
<td>IOGear Enhanced Date Rate Bluetooth Wireless USB Adapter GBU221</td>
</tr>
<tr>
<td>Creative WebCam Live! Ultra-Web Camera</td>
</tr>
<tr>
<td>Skype</td>
</tr>
<tr>
<td><strong>Technology Components for Coaches</strong></td>
</tr>
<tr>
<td>Pamela Call Recording (Optional for bug-in-ear video recording)</td>
</tr>
<tr>
<td>or</td>
</tr>
<tr>
<td>Call Recorder for Mac (Optional for bug-in-ear video recording on Macs)</td>
</tr>
<tr>
<td>Maxtor One Touch III USB 2.0 External Hard Drive (Optional for archiving video recorded sessions)</td>
</tr>
<tr>
<td>Skype</td>
</tr>
<tr>
<td>Internal or External Microphone</td>
</tr>
<tr>
<td>Internal or External WebCam</td>
</tr>
</tbody>
</table>

Source: Rock et al., 2009  (Information is proprietary; patent pending)

**Data Analysis Plan**

**Quantitative Measurement**

In order to evaluate the incidences of varied co-teaching practices, archived video files of co-taught lessons will be coded to measure the frequency of teacher instructional practices (Rock et al., 2009) used. Frequency counts will be recorded for each co-teaching behavior resulting from an eCoaching prompt or an independently demonstrated co-teaching behavior. The frequency counts from direct count of co-teaching behaviors with and without eCoaching intervention, captured through video recording is the primary method for data collection across all conditions.
Another method that the researcher will use to evaluate the dependent variables associated with co-teaching planning and implementation is the CtRSS that Gately and Gately developed in 2005. Archived video files will be coded using the CtRSS. The use of rating scales provides a secondary measure, which allows for repeated measures within each condition.

To measure whether changes in the instructional format and the eCoaching condition impact students, percentage of student engagement will be analyzed from the archived videos and examined for the number of students who are academically engaged throughout the lesson. The use of momentary time sampling using 5-minute intervals will be used to code student engagement during each 30-minute lesson (Rock et al., 2009). Trained coders will watch each video recorded file, and count the total number of students who are visible in the video image at each 5-minute interval. The total number of students viewed and the number of students who are disengaged will be recorded on a data collection form (see Appendix G). The procedure will be repeated at each 5-minute interval throughout the length of the thirty-minute (30 min.) lesson (Rock et al., 2009).

To examine the disruptiveness of the eCoach’s feedback, coders will evaluate the same video archived planning sessions and co-taught lessons for the frequency of times teachers d) stop, “defined as a 5-second or greater delay in teacher talk after or while the teacher receive[s] feedback (Rock et al., 2009, p. 71); e) hesitate without verbal response, “defined as the teacher physically drawing back or showing a facial expression of surprise, panic, puzzlement, or thoughtfulness” (Rock et al., 2009, p. 71); and hesitate with a verbal response, “defined as, teacher talk characterized by ‘stalling for time language’ such as ‘um,’ ‘so,’ or ‘what.’” (Rock et al., 2009, p. 71). Again, each time the coder observes one of the defined behaviors a tally mark will be recorded in the appropriate category.

The Investigator will use SigmaPlot to graph coded teacher, student, and coach behaviors, and then analyze these data for trends across the differing phases of the study.

**Inter-Observer Agreement**

The reliability of the collected data is crucial. In this dissertation study, the use of inter-observer agreement (IOA) will serve as the reliability measurement method.

Contemporary single case researchers suggest that between 15% (Barlow, Nock, & Hersen, 2009) and 33% (Kennedy, 2005) of the total number of observation sessions should be used to establish adequate IOA. In order to stay within the conventions of suggested percentages, the reliability observer will observe and code 25% of all recorded video files included in this study. Data from the primary and secondary observers will be compared and reported as an estimate of reliability. Reliability will be calculated by determining the percentage of agreement of the two observers code by code. The reliability estimate will be calculated using the following formula (Kazdin, 2011):

\[
\% \text{ Reliability} = \frac{\text{Number of Agreements of Codes}}{\text{Number of Agreements of Codes + Disagreements}} \times 100
\]

Barlow et al., posit that 80% IOA or higher is conventional, and 90% agreement is preferred. In this study, the 80% agreement level will be the minimum standard for IOA.
If agreement falls below the 80% minimum standard, then coders will first re-train in coding procedures and definitions and then re-code archived video files. If an 80% agreement is not met after coders re-code selected videos, then a third trained coder will be enlisted to reach a conclusive reliability measure.

**Trend/Visual Analysis**

In single case research, the traditional approach to analysis involves “systematic visual comparison of responding within and across conditions of a study.” (Parsonson & Baer, 1978 in Horner et al., 2005, p.169). This visual interpretation consists of three indicators: level, trend, and variability of performance occurring during both baseline and intervention phases. Any functional relationship between the independent and dependent variables is determined by the combination of information gathered from these assessments and comparisons made with the information (Horner, et al.).

The autonomous analysis of the relationship between independent and dependent variables is a strength of single case research (Spriggs & Gast). When all data are reported, “readers can determine for themselves whether a particular intervention has a reliable and ‘significant’ effect on a participant’s behavior” (Spriggs & Gast in Gast, 2010, p. 167).

Gast and Spriggs (2010) posit that visual techniques for analyzing data across time and conditions are required to formatively evaluate a program’s effectiveness. In this research project, visual trend analysis methods outlined by Gast and Spriggs for level and trend will be carried out by the researcher using Sigma Plot graphing software (Systat Software, Inc., 2006).

**Treatment Effect**

Treatment effect will be hand calculated analyzed using the methods of Scruggs, Mastropieri, and Castro (1987), Percent of Non-overlapping Data (PND). In order to do this the number of data points in the first intervention phase that exceed the highest data point in the first baseline phase will be divided by the total number of data points in the first intervention phase. The quotient will then be multiplied by 100, so that the resulting number becomes a percentage score. The same method will be followed when analyzing the second baseline phase and the second intervention phase. The strongest feature of the PND is that it is easy to compute and easy to interpret (Faith, Allison, Gorman, 1996). Interventions that are more effective yield higher percentage scores.

**Percent Change in Scale Scores**

As part of the data analysis for RQ1 and RQ2 where previously designed scales are used as observation protocol and self-assessment measures for teaching pairs. The percent in changes of scale scores using the CtRSS, CTSS Checklist, and CCSS will be used to analyze treatment effects at the end of each phase of the study. While the frequency counts described previously will provide most of the data for this research study, using multiple outcome measures provides more information about the effects of the intervention and will assist in the interpretation of evaluating the effectiveness of the intervention.
Therefore for each of the described scales, the following steps will be followed in order to calculate the percentage of change in scale scores: 1) for each item used from the scale a numerical score will be collected based on the number indicated in the observation category (i.e. on the CTSS 0= didn’t see, 1=saw an attempt at, and 3=saw the behavior done well), 2) the mean of all numerical scores will be calculated by dividing the sum of all identified items by the number of identified items, 3) next, the final intervention mean minus the initial baseline mean will be divided by the initial baseline mean and this quotient will then be multiplied by 100 in order to calculate the percentage of change.

**Qualitative Data**

The qualitative data analysis for this study will employ methods of thematic analysis from participants’ transcriptions of interview videos. The primary and secondary coders, will read the self-report data, develop codes based, in part on those reported by previous advanced online BIE and co-teaching researchers (i.e., in Rock et al., 2009 participants wrote about student engagement, and effects of BIE on instruction), and then independently examine the data three times for recursive analysis (Lincoln & Guba, 1985; Rock et al., 2009). Interview transcriptions will be hand coded by each coder. After the coders have analyzed the transcripts of three participants, they will meet and discuss themes and reach consensus on any disagreements in individual analysis. At this point, the coders will develop an initial codebook containing the major codes for the study. Then the primary and secondary coders will independently code the remaining transcripts. Next, the coders will actually compare the codes (Creswell, 2007). In this case, intercoder agreement will be reached if the coders assign the same code word to a passage. Miles and Huberman (1994) recommend an 80% agreement; therefore, 80% intercoder agreement will be the standard for this dissertation study.

**Study Personnel**

There will be four personnel directly involved with this investigation; the doctoral student researcher, two faculty members who serve as co-chairs for the student researcher’s dissertation committee, and a trained coder who will assist to provide inter-rater reliability during data analysis. All personnel have passed completed training through the National Institutes of Health (NIH) or Collaborative Institutional Training Initiative (CITI training) for human subjects research and have documentation of training on file with IRB.

*Principal Investigator:* The primary investigator is Donna Ploessl Ed.S., a doctoral student in the Department of Special Education and Multiple Abilities at the College of Education. The researcher, who is a doctoral student, will serve as primary observer and will code all recorded video files.

*Co-Investigators:* Marcia L. Rock, Ph.D., and Madeleine Gregg, Ph.D., are UA faculty members who will supervise the principal investigator throughout the duration of the study. Sharron Maughn Ed.S., who is a retired elementary school teacher and serves as a college supervisor for the Multiple Abilities Program and supervisor and expert coder for Project TEEACH at The University of Alabama will serve as an expert coder for reliability in this research study.
Training and Supervision

The reliability of the collected data is crucial. In this dissertation study, the use of inter-observer agreement (IOA) will serve as the reliability measurement method. To establish IOA two observers will train to code the archived video files. Training sessions will include viewing *The Power of Two* (Friend, 2005) to familiarize observers with the co-teaching models that will be examined in the study. Coding forms and operational definitions will be reviewed during training sessions and examples of teacher and student behaviors will be provided as well as how each should be coded. Training will also include a review of procedures for use of the CITRSS (Gately & Gately, 2005) and the CTSS Checklist (Murawski & Lochner, 2010) observation forms. The primary and secondary observers have served as Project TEEACH coders for three (3) years and have extensive experience coding video files using similar coding schemes. UA faculty members (Drs. Rock and Gregg) will train the student researcher and reliability coder in sequential qualitative coding methods used in this study. Treatment integrity data will be analyzed using the eCoaching coach’s behavioral data (see Appendix G).

The student researcher’s UA faculty supervisors will overlook the day-to-day work of the research study. Trained coders will report any recognized signs of participant distress to the primary researcher and her UA faculty supervisors who will refer the participant to the university counseling center if necessary. All personnel involved with this research study will be instructed, during training sessions, to contact the primary investigator immediately with any noted questions, concerns, complaints, or unanticipated events including scientific misconduct that might occur.

Study Background

The literature reviewed for this study, revealed several problems with current co-teaching practices, chiefly the overreliance on one teach, one assist and one teach, one observe co-teaching models. Other problems revealed through this review were the lack of training for teachers who were new to the co-teaching service delivery model and the lack of time to jointly plan for instruction with general education teaching partners. Billingsley and colleagues (2009) identified the struggle to implement collaborative practices as a major concern for new special education teachers. Sindelar, Brownell, and Billingsley (2010) agreed with this assessment and indicated that new special education teachers struggle when attempting to collaborate with general education teachers. Sindelar and colleagues posit that the empirical support for the foundation of special education teacher preparation is feeble and that as a discipline we as researchers and educators of teachers have failed to establish our merit. They identified the use of e-mentoring and online professional communities of support as priorities in investigations that support and facilitate the work of new special education teachers (2010). Sindelar, Brownell, and Billingsley suggested the need to explore innovation research that allows us to address questions of technology use to effectively provide special education teachers with feedback on their instruction. There is a great need to know what makes a difference in order to fill the gap in empirically validated training content with the increased access for students in the general education setting. This study is an extension of work that the primary investigator has worked on as part of Project TEEACH.

This is the primary investigator’s doctoral dissertation research.
Subject Population

Six practicing teachers will be recruited as co-teaching participants for this research study. Four of these six will be graduates of Project TEEACH, a federally funded personnel development training program. Two of the four participants drawn from the Project TEEACH graduates are employed in the same private school and will make up one co-teaching pair for the study. The two remaining participants recruited from Project TEEACH will identify a voluntary co-teaching partner with whom to co-teach; thus, creating the second and third co-teaching pairs. Each co-teaching pair will consist of a certified general education teacher and a special education teacher (see Table 3).

Table 3

Make-up of Co-teaching Pairs

<table>
<thead>
<tr>
<th>Co-teaching Pairs</th>
<th>General Education Teacher</th>
<th>Special Education Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>Project TEEACH graduate</td>
<td>Non-Project TEEACH graduate</td>
</tr>
<tr>
<td>Pair 2</td>
<td>Project TEEACH graduate</td>
<td>Project TEEACH graduate</td>
</tr>
<tr>
<td>Pair 3</td>
<td>Project TEEACH graduate</td>
<td>Non-Project TEEACH graduate</td>
</tr>
</tbody>
</table>

A purposive convenience sample (Kazdin, 2011) is proposed for this study. The researcher will invite individuals who meet the following criteria; practicing teachers (and their students) who are graduates of an advanced certification training in special education (through Project TEEACH) and their state certified co-teaching partners. The sampling methodology is purposive in that all participants will be chosen for specific attributes, common similarities in training, diversity in ethnicity, and identified disabilities necessary for the research and convenient for both the study methodology and the geographic location (Babbie, 2008).

The participants included in this research study are not part of a vulnerable population. Women and minorities will be included as part of this research study.

Subject Recruitment Methods

School administrators will be contacted in order to obtain permission for the teachers to participate in the study. Copies of wording for invitation to participate can be found in Appendix A. The researcher will contact the Tuscaloosa City School System and secure permission for the research before the start of the investigation and send the documentation to the IRB at a later date. The researcher will contact each teacher participant individually through email, and phone; make the usual introductions then follow a pre-designed script incorporating the overview and concept of the research
design, the details concerning individualized data security and protections and instructions for participant interviews (see Appendix C). The researcher will meet with administrators and participants to explain informed consent and to answer any questions. Then the researcher will distribute informed consent forms (see Appendix B) for each teacher participant to complete before any data collection is initiated.

Risk

The risks participants might incur during this research are minimal. Because we are investigating the efficacy of eCoaching with wireless technologies using sound research design methods, we are observing teachers in normal activities (i.e. planning lessons and teaching lessons), which occur whether or not a researcher is present. While there may be some mild, discomfort related to use of the technology and coach’s feedback, there is minimal risk to the participants.

Special Precautions/Safeguards Against Risk

Day-to-day monitoring of archived video files by research personnel will serve to detect any risk to participants. In the case of any unanticipated psychological problems associated with the eCoaching procedures, the UA counseling center will serve as a resource to provide any needed professional intervention. Because this study presents only a minimal risk to participants there is no requirement for a Data Safety Monitoring Plan.

Benefit

The expected benefit to teacher participants is improvement in collaborative skills that teachers may use to meet the needs of students with diverse needs within the general education classroom.

This study will provide teacher educators, with efficacy information related to eCoaching with teachers who are new to co-teaching. The information gathered through this research will assist professionals to learn how to help teachers working in co-taught classrooms provide better services to students who are enrolled in co-taught classes. Society will benefit from teachers who are more satisfied with their co-teaching relationships and who in turn may provide a more effective learning environment for all students.

Risk-benefit category for this research: Minimal risk, potential for direct benefit to participant.

Privacy and Confidentiality

Participant privacy will be ensured through the web-based interactive video-conferencing component of the system as it does not allow for unscheduled visits because the participants must accept all incoming requests; therefore there will be no unexpected observations or eCoaching sessions (Rock et al., 2009). The teacher participants may disconnect from the video conference at any time during the observation by simply clicking a button.

Confidentiality will be protected using anonymous forms, which contain ID numbers that the primary investigator and her co-investigators will use to identify general education teachers from special education teachers. No district, building, teacher, or P-6
student will be identified. Documents and study records will be stored in locked files on the university campus. This will limit access to the investigators. Upon completion and closure of the study all video files and raw data will be destroyed. No identifying information will be shared with individuals outside the research personnel. Pseudonyms will be used for participants and only general geographic information will be revealed when research results from this dissertation study are disseminated.

**Incentives**

We will provide no incentives to the teachers who agree to participate in this research.

**Costs to Subjects**

There will be no costs to the participants who agree to participate in this research.

**Debriefing Process**

The primary investigator will ask teacher participants to join in a debriefing session at the end of the study. During the debriefing session the following will be discussed: a) preliminary research results, b) questions for participants (e.g., Was there a part of the study that was difficult? Would you change anything in the study?), c) questions from participants (any questions that participants may have). At the end of the debriefing, the investigator will offer to send participants the results of the study and individuals will be thanked for their participation.

**Informed Consent Process**

**Teacher Participants**

We will ask all teacher participants who agree to participate in this research to sign a copy of the Informed Consent Statement (see appendix) that outlines the eight required elements of informed consent. The consent form is written on approximately an 8th grade reading level. We think this reading level is appropriate because all potential participating teachers have earned at minimum a Bachelor’s degree and are certified teachers in the state of Alabama.

The primary investigator will hand deliver informed consent documents to teachers who agree to participate in the research. During the delivery of informed consent documents:

1. The Investigator will explain the nature of the study, its purpose, procedures, expected duration and the benefits and risks of participation in accordance with IRB regulations.

2. Each participant will be informed of his/her rights to privacy and that the study data will be shared with the co-investigators who will have access to his/her research records.

3. The Investigator will discuss the consent with the participant and he or she will be encouraged to ask questions.
4. The participant will be given the opportunity to review the consent alone or to review it with study personnel.

5. Each participant will be encouraged to take the informed consent home and then sign it and contact the primary investigator who will collect the informed consent from the participant.

6. Each participant will be given a copy of the informed consent document.

**Informed Consent Documentation**  
Written consent forms will be signed by participants and housed in a locked office with other study data in a locked office on the UA campus. All data will be destroyed 5-7 years after completion of the study.

**P-6 Students**  
The P-6 students will be observed during the course of a regular lesson to assess their engagement and therefore do not qualify as research participants in the study. The researcher will inform the school system that the classroom videotaping will be taking place and follow recommended procedures identified by the system (e.g. informing parents).
Appendix I

Informed Consent
You are being asked to take part in a research study. This study is called: *The Effects of eCoaching on Co-Teachers’ Planning and Instruction*. Donna Ploessl who is a doctoral student at The University of Alabama is conducting the study.

Drs. Marcia L. Rock, and Madeleine Gregg who are professors in the Special Education and Multiple Abilities Program at The University of Alabama, are supervising Ms. Ploessl.

**What is this study about?**

This study is being done to investigate the effectiveness of eCoaching with practicing co-teachers as they cooperatively plan and carryout instruction in the general education classroom.

**Why is this study important--What good will the results do?**

The information we collect will be of great value to teacher educators, teachers, and school administrators and will aid in developing future learning approaches and supports for teachers. It will also contribute to the body of knowledge relevant to research in Co-Teaching, eCoaching technologies, and teacher preparation and professional development.

**Why have I been asked to take part in this study?**

You have been asked to be in this study because you have been identified as a general or special education teacher who completed training through Project TEEACH or are Co-Teaching with a graduate of Project TEEACH.

**How many people besides me will be in this study?**

Five other people will take part in this study.

**What will I be asked to do in this study?**

*If you decide to be in this study, you will be asked to do these things:*

- Complete a communication scale.
- Co-plan for co-taught lessons
- Co-teach the planned lessons
- Take part in monitored and coached 30 minute co-planning sessions
- Take part in monitored and coached 30 minute co-teaching lessons
- Reflect on the experience at the end of the study
How much time will I spend being in this study?

The monitored and coached co-planning sessions and the co-teaching lessons that follow will require 30 minutes on alternating days for a total of 16 sessions. We anticipate the total time for all coached and non-coached sessions to take four to six weeks.

Will I be paid for being in this study?

You will not be paid for being in this study.

Will being in this study cost me anything?

There will be no cost to you except for your time in participating in the study.

Can the researcher take me out of this study?

The researcher may take you out of this study if she thinks you no longer meet the study requirements.

What are the benefits (good things) that may happen to me if I am in this study?

There may be direct benefits for your participation in this study as it aims to support co-teachers as they begin to plan for and implement co-teaching in elementary classrooms. You may benefit from the feedback of an expert coach on implementation of varied models of co-teaching, student specific accommodations and modifications, and class-wide positive behavioral supports.

What are the benefits to scientists or society?

This study will help provide teacher educators, with efficacy information related to eCoaching with teachers who are new to co-teaching. The information gathered through this research will assist professionals to learn how to help teachers working in co-taught classrooms provide better services to students who are enrolled in co-taught classes. Society will benefit from teachers who are more satisfied with their co-teaching relationships and who in turn may provide a more effective learning environment for all students.

What are the risks (dangers or harm) to me if I am in this study?

While there may be some mild, discomfort related to use of the technology and coach’s feedback there is minimal risk to you as a participant.

How will my confidentiality (privacy) be protected? What will happen to the information the study keeps on me?

Confidentiality will be protected using anonymous forms, which contain ID numbers that the primary researcher and her advisors will use to identify general education teachers from special education teachers. Documents and study records will be stored in locked files. This will limit access to the investigators. All raw data will be destroyed after it has been entered into a database.
What are the alternatives to being in this study? Do I have other choices?

The alternative/other choice is not to participate.

What are my rights as a participant?

Taking part in this study is voluntary—it is your free choice. You may choose not to take part at all. If you start the study, you can stop at any time. Leaving the study will not result in any penalty or loss of any benefits you would otherwise receive.

The University of Alabama Institutional Review Board (IRB) is the committee that protects the rights of people in research studies. The IRB may review study records from time to time to be sure that people in research studies are being treated fairly and that the study is being carried out as planned.

Whom do I call if I have questions or problems?

If you have questions about the study right now, please ask them. If you have questions about the study later on, please call the investigator (Donna Ploessl) at (205-454-7213). If you have any questions about your rights as a research participant, you may contact Ms. Tanta Myles, The University of Alabama Research Compliance Officer, at (205)-348-5152.

I have read this consent form. The study has been explained to me. I understand what I will be asked to do. I freely agree to take part in it. I will receive a copy of this consent form to keep.

_________________________________________________  __________
Signature of Research Participant                                      Date

_________________________________________________  __________
Investigator                                                              Date
Appendix J

Technology Installation Instructions

(Developed By Marcia L. Rock, Ph.D. & Tracie Sellers)
Before installing any software programs, there are some things that must be checked. First, you must have Administrative rights to install the software on the computer that you will be using. Second, you must check your sound settings. To check your sound settings, follow these procedures. If you have a speaker icon in the bottom right corner of your screen, double-click the icon. This will bring up a window with volume settings. Make sure that the mute box is not checked for any of the settings. Also, be certain that the volume bar is moved up towards the top of the bar. If you do not have the speaker icon, follow these procedures. Click on Start, then on Control Panel. Click on Sounds, Speech, and Audio Devices. Then click on Sounds and Audio Devices. Click on the Volume tab. Then, click the box to Place Volume icon in the task bar. Click on OK, and then close the windows that are open. Third, you must have at least two available USB port. Finally, you must have an active Internet connection.

You will first need to install your IOGEAR Bluetooth Adapter:
1. DO NOT plug Adapter into your USB port yet!
2. Insert the IOGEAR CD into the CD drive.
3. The Installation screen will appear on your screen.
4. Click on Driver.
5. Follow the onscreen instructions. The following should be what you choose.
   a. Next
   b. I accept terms.
   c. Next
   d. Next
   e. Install
   f. OK (for the Driver Signature Notice)
6. A window will appear with “Bluetooth device not found”. DO NOT plug the adapter in yet! Click on CANCEL. The Driver installation will continue.
7. Click on Finish, and then Yes to Restart your computer.
8. Plug the IOGEAR adapter into an available USB port. Wait until Windows recognizes it.
9. Click on Finish.
10. Double-click the Bluetooth icon in the task bar in the bottom right corner of your screen.
    a. Click Next.
    b. Enter a computer name. Your computer probably already has a name. Click Next.
    c. Next
    d. Next
    e. Next
11. Your headset needs to be paired with your IOGEAR adapter. The headset needs to be in discover mode. To connect, hold the power button and the call control button simultaneously. See page 6 of the Headset manual for the locations of these buttons. A pop-up window will appear near the bottom right of the screen. Click on the pop-up
windows, and enter 0000 for the PIN. Your headset is now paired with your IOGEAR adapter.

12. Eject the IOGEAR CD.

You will now need to install the Creative Live! Ultra Webcam:
1. DO NOT connect webcam to your USB port yet!
2. Insert the Creative Live! Installation CD.
3. Click on Next.
4. Select “Americas” as the Region. Then click on Next.
5. Select “English” as the Language. Then click on Next.
6. Make sure that both boxes are checked for what needs to be installed. They will be checked by default. Then click on Install.
7. Follow the onscreen instructions. The following should be what you choose.
   a. Yes.
   b. Next
   c. Full installation
   d. Next
8. While the software is installing, place the webcam on top of the computer monitor or a flat surface. DO NOT connect the webcam to the USB port yet!
9. Click on Yes for the Detector.
10. When prompted, connect the webcam’s cable to an available USB port on your computer. Windows will automatically detect the webcam.
11. Click on Yes to Restart. Then click on Next. You can register your webcam after reboot.
12. To verify the installation, right-click on the My Computer icon on your desktop. Left-click on Properties. Left-click on the Hardware tab, then Device Manager. Left click the + sign next to Imaging Devices. You should see “Creative Webcam Live! Ultra”. Close the window, and then cancel.
13. Eject your Creative Live! CD.

You will now need to install the ArcSoft software:
1. Insert the ArcSoft CD.
2. Click on Install. Make sure that all four programs are checked. They are checked by default. Follow the onscreen instructions. The following should be what you choose. First the Photo Software will install. Second, the Collage Creator will install. Third, the Multimedia E-mail will install. Then, the Video Impression will install.
   a. English, click on OK.
   b. Next
c. Yes
d. Next
e. Next
f. Finish
g. English, click on OK.
h. Next
i. Yes
j. Next
k. Next
l. Finish
You will now need to download and install Skype:
1. Open Internet Explorer.
2. Type in http://www.skype.com in the Address bar.
3. Click on Download Skype.
4. Click on Download Now.
5. Click on Open. (It may say Run)
6. Click on English for the language. Click on the box to check for “Yes”.
7. Click Install.
8. Remove the check from “Install Google Toolbar”.
9. Click Next.
10. Make sure the check is there for the add-on for Internet Explorer.
11. Click on Start Skype.
12. Create a new Skype account.
   a. Enter your Full Name.
   b. Choose a Skype Name.
   c. Choose a password.
   d. Retype the password.
   e. Click on the box to check it for “Yes, I accept…”
13. On the Skype login screen, enter your Skype Name that you entered in step 12b, and type your password. Make sure both boxes are checked for “Sign me in when Skype starts”, and “Start Skype when the computer starts”.
14. Click on Sign-in.

CONGRATULATIONS! You are ready to schedule a VBIE test call with Dr. RockJ
Appendix K

e-Coaching (i.e., VBIE) General Troubleshooting Guidelines

(Developed by Marcia L. Rock, Ph.D.)
Four areas (MAC or PC) can pose problems—each needs to be examined to ensure the system is in good working order.

1. Internet connections (either end of the call)
2. Audio
3. Video
4. Recording (just re-hit and it will usually work)

*IMPORTANT: When adjustments are made to audio, video, or any other component, hang up and call again (i.e., reconnect via Skype) if the correction does not readily occur.

Steps

Technical Considerations for Coaches

- Check online status to be sure Internet connection is established
- MAC (Call Recorder)—go to Skype toolbar, then select preferences to determine if all 3 settings are correct:
  1. Audio
  2. Video
  3. Recording
- Computer issues—Visit apple icon—see system preferences—see control panel—go to audio—
  a. input and b. output—check both

PC Audio Troubleshooting with Teachers

- Use the blue button/cartoon—IM (Instant messaging) in Skype to guide the teacher through the audio or video trouble shooting
- FYI: When selecting audio settings, be certain to look for the “Bluetooth” options
  - Go to Skype—menu bar—Tools, then Preferences—Audio to check the setting selected is Bluetooth, but NOT high quality
  - Find Bluetooth connection to computer in the lower right hand corner—
Bluetooth icon—ask what color (DO NOT TELL THEM WHAT COLOR TO LOOK FOR! Instead, ask them to you what color the center icon is) (FYI: Green=connected, white or red=not connected); if not connected, the Bluetooth may need to be reinstalled, which requires the teacher to go offline. This takes about 5-10 minutes). Before reinstalling, the Bluetooth, if the dot is red or white, instruct the teacher to right click on the Bluetooth icon and follow the prompts to try to repair the Bluetooth with the computer. If this does not work, then reinstallation is needed. If repairing is successful, hang up and re-call.

• Go to Audio in the computer’s control panel—open the control panel and check audio settings for Bluetooth audio—turn the headset off and on 3-4 times. Note: if Bluetooth has been off the charger, the computer may need to be restarted. Code is 0000 for everyone when the Bluetooth is repaired with the computer. Then, hang up, and re-call. Also, be certain that in the computer’s control panel the mute box is not selected.

• Sometimes, the Bluetooth will need to be moved to another ear to be closer to the computer. Or, if there are too many obstacles (i.e., desks, chairs, kids) between the teacher and the computer, they may need to be repositioned to allow for a clearer audio connection. PC Video Troubleshooting with Teachers

• Go the Skype top toolbar (Tools, then Options in PC or Preferences in Mac) to check video settings
  a. Be sure “Enable” is selected
  b. Then check, “Start Video Automatically”
  c. Also, be certain that the “Show that I have video to people in my contact list” is selected as well as “Receive video from people in my contact list” options are selected.

• Check the webcam to ensure that the green or blue light is illuminated.

• If the incoming video is blurry, ask the teacher to adjust the webcam, and/or if you cannot see the students or teacher ask the teacher to reposition the webcam

• If video does not work after checking all the settings, ask the teacher to unplug and re-plug the webcam into the USB. Hang up and re-call.

• If all fail, the hardware may need to be reinstalled (if so, reschedule the session).
• We have had occasions wherein the USB ports fail permanently. When that happens the school district tech person has to be contacted.
Appendix L
Virtual Bug In Ear (VBIE) Troubleshooting Dropped Calls
(Compiled by Marcia L. Rock, Ph.D.)
Virtual Bug In Ear (VBIE) Troubleshooting Dropped Calls:

Thank you for contacting Skype Support.

Here are a number of suggestions which you should try to help resolve this issue. Please test after each step to see if the action has resolved the problem:

1) Ensure that you are using the latest version of Skype, available for free from:
http://skype.com/download/
This solves the issue for most Skype users as we are constantly improving our product

2) Use our Sound Setup Guide to make sure your audio settings are correct:
If you have more than one audio device to choose from in Skype -> Tools -> Options -> Sound devices, then please try with different selections.

3) In the Skype top menu: Tools -> Options -> "Connection" window; please tick the option to use the ports 80 & 443.

4) Check that your firewall is not interfering with Skype. You can find our firewall guides at http://www.skype.com/help/guides/firewalls/. Even if it can connect and you are able to use chat it is possible that your firewall is still blocking some connections that Skype needs for a reliable voice call.

5) For this step showing hidden folders and files has to be turned on. Please navigate to My Computer -> Tools -> Folder Options -> View. Once there, please make sure that the option "Show Hidden Files and Folders" is enabled.
   * Close Skype with a right click on the systray icon (next to the Windows clock) and selecting "Quit"
   * Locate the shared.xml file found in C:\Documents and settings\Your Windows Username\Application data\Skype\shared.xml
   * Delete shared.xml
   * Start Skype (shared.xml will be recreated)

6) Make sure all your PC's drivers are up-to-date (especially sound, video, motherboard controllers and network card - you can usually find the latest drivers on the manufacturer's website).

7) If you are using a router, please configure a port forwarding for Skype. You can find guides for an extensive list of routers on http://www.portforward.com/english/applications/port_forwarding/Skype/Skypeindex.htm. Please note that we are not responsible for this page and contents might change unexpectedly.

We would be happy if you could provide us with any additional information, which will allow us to reduce the number of dropped calls in the future so please tell us which step solved your problem or let us know if none of the above helped

Thank you for using Skype!

Best regards,
Anniki E.(Skype Support)
Appendix M

Virtual Bug In Ear (VBIE) Audio Troubleshooting

(Developed by Marcia L. Rock, Ph.D.)
Virtual Bug In Ear (VBIE) Audio Troubleshooting  
Marcia L. Rock, Ph.D.  
University of North Carolina at Greensboro  

If you are experiencing difficulty with your Bluetooth, please try the following troubleshooting actions:

First, check the bar on the lower right corner of your computer's desktop. Be certain there is a Bluetooth icon located there. If not, you need to reinstall your iogear (Bluetooth) CD. Always remember to shut down and restart after installation.

If the icon is there (or after you have reinstalled the software) then you need to click on it. Next, click on the "find devices" icon, you should see an icon there for your headset, select "connect to headset" to be certain it is on.

Second, when you are in SKYPE, click on the microphone in the lower right corner. Then, change the audio and microphone to Bluetooth, but DO NOT select the high quality version. Instead use the basic Bluetooth choice. Also, go to Tools, then Options in the Skype pull down menu to be certain all audio settings selected are correct. If using Mac, go to Preferences to check Skype audio settings.

Third, if the Bluetooth is still not working, you need to be certain the audio is not muted in your control panel. To do this, go to Start and click on My Computer. Next, click on Control Panel and once there select Sound, Speech, and Audio Devices. You should see another option there labeled Sounds and Audio Devices --click on that. Finally, check all the possible tabs (volume, sounds, audio, voices, hardware, etc.) and be certain that none of the mute boxes are checked. If they are then please "unmute", click on apply, and save. Also, be sure Bluetooth audio is selected in all the audio settings in the computer’s control panel.

Forth, if the Bluetooth was recently taken off the charger, you may need to shut down and restart your computer.

Still no luck? Fifth, try turning the Bluetooth headset on and off three or four times.

Again, your Bluetooth headset must be fully charged for any of these steps to work properly.
Appendix N

Troubleshooting Steps for Frozen Web Cam During VBIE Sessions

(Developed by Marcia L. Rock, Ph.D.)
Troubleshooting Steps for Frozen Web Cam During VBIE Sessions  
M.L. Rock, Ph.D.

Would you be so kind to please try the troubleshooting steps below to see if it corrects the problem with the web cam/video stream freezing during VBIE sessions.

1. Remove Skype, which is probably version 4.2 or 4.1.0.136 or something like that from your computer.

2. Shut down and restart your computer after you have removed Skype entirely from your computer.

3. Then, downgrade to an older version. Try Skype version 3.8.0.188. To download and install the older version of Skype go to http://oldapps.com/skype.htm

4. After installing the older version, shut down and restart your computer.

5. Finally, cross your fingers and toes!

Thanks a million! I hope that corrects the problem.
Appendix O

Guide for Network Administrators

(Skype Limited, 2008)
What is this Guide?
This guide provides information to help you understand how to manage Skype in the context of an enterprise environment.

Who should read this guide?
This Network Administrator’s Guide is for IT personnel (system and network administrators) who are responsible for managing the deployment of software applications, specifically on the Microsoft Windows Platform. This Network Administrator’s Guide assumes you are familiar with enterprise deployment issues, editing the Windows registry, Windows Group Policy Administration, basic XML syntax, as well as other things related to networking and operating system environments.

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Deploying Skype in the Enterprise
Our goal is to enable users to enjoy Skype from as wide a variety of networks as possible, without requiring people to understand or configure complex options such as relay hosts or preferred network ports. In this sense, Skype is generally ‘hands-off’.

The authentic and most up-to-date version of Skype is always available directly from Skype’s own download server at http://www.skype.com/download. From here there is a business version available which includes the Windows Installer (MSI).

Once installed, the Skype client periodically checks to see if there is a software update available, although system- or network administrators may disable this feature. And end users can adjust their Skype client preferences to control how updates and patches are handled in general.

General Guidelines
Skype wants end users and enterprises alike to have a safe and enjoyable experience using Skype to enable communications. Toward this end, we would like to underscore the importance of keeping your company’s computers and users safe and secure while doing so. Here are some of the main issues to be aware of:

• Before you deploy Skype in an organization, be sure it is an authentic copy. Check the digital signature of the installer and be sure to read and accept the terms and conditions in Skype’s End User License Agreement and Terms of Service before deploying Skype software.

• Keep your organization’s computers up-to-date with relevant patches. Most of the computer security problems on the Internet today can be traced back to improperly patched computers.

• Obvious as it may sound, use anti-virus protection, even on non-Microsoft computers.

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such as the Apple Macintosh, and keep the virus definitions constantly updated.

• When you use Skype, know who you’re authorizing and don’t hesitate to block users who are making unwanted contact. Keep user profiles up-to-date, but also know that everything in a user’s profile (except e-mail addresses which are masked for privacy) are viewable to others whose search criteria matches the information in the profile. The Privacy Policy at http://www.skype.com/legal/privacy sets out how Skype may use end user’s personal data, traffic data and the content contained in communication(s). You should ensure that end users have read and agree to this policy before using Skype.
• Always authenticate other parties before beginning to discuss any confidential business or sensitive personal information. Remember that although Skype takes care to protect communications from unwanted disclosure, there is the remote possibility that your computer, or those belonging to persons with whom you are communicating have been “hacked” or compromised in some way.

• Instruct your users to choose good passwords for Skype and change them regularly. Remember, users should never check “remember my password” when using Skype on a shared computer.

**Skype Client Notifications for New Versions and Updates**

Once the Skype application is installed, it periodically checks to see whether an update is available by default. The Skype client does not update itself. Instead, the Skype client notifies the user when a more recent copy or critical patch is available. This gives the user the option to upgrade.

Users may chose to disregard these upgrade notices. System- and network administrators may disable this feature to control software installation policies. See “Enterprise Installation and Setting Policies” below.

End users can control the Skype automatic update-notification feature by a Skype application preference (choose Tools > Options > Advanced). Alternatively, users may manually check to see if the copy of Skype they are running is the most current version. There are two ways to accomplish this:

• A user may select Help > Check for Updates from the Skype main window. This will launch the user’s default web browser and display a message indicating whether the installed version is up to date, or

• Without launching the Skype client, a user may open the Windows Control Panel and double-click on Add or Remove Programs. Then, the user can find the entry for Skype and click on the entry labeled, “Click here for support information.” Follow the hyperlink on the line entitled, “Product Updates” which launches the default web browser and indicates whether the installed version is up-to-date.

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**Enterprise-wide Installation and Setting Policies**

Skype recognizes the challenges that enterprises and other organizations face with respect to managing sophisticated IT environments, as well as the complexity related to managing all of the different software applications and hardware in use today. Therefore, we have released a ‘business version’ of the Skype client, which comes with a Windows Installer Package (MSI) making it easier to deploy in an enterprise network. You can download the business version at www.skype.com/go/businessdownload

Also, setting policies via Group Policy Objects and registry keys is now supported by Skype, please read on for more information.

Our goal is to enable system and network administrators by making it easier and by improving control over the enterprise-wide deployment and management of Skype.

**Policies**

The Skype client adheres to the precedence of managed settings in order of the following priority:

1. HKLM Registry Keys (highest precedence)
2. HKCU Registry Keys
3. shared and config.xml Skype client settings
4. Skype client user preferences and defaults (lowest precedence)

**Windows Registry**

The Skype client has end user interface controls and/or functions for many of the features
over which an enterprise might want to control. Some of the more technical and network-related features and configuration options are only accessible via the registry. This is because enterprises that require such functionality generally have systems in place for centrally managing users' registries, and registry access control to ensure that users can't circumvent such settings.

**XML Configuration Files**

In addition to the Windows Registry, the Skype client relies on an XML file-based setup. Administrators (and users with appropriate permissions) may open and edit these configuration files even while Skype is running.

There are two XML files - shared and private. The shared file is named shared.xml and the private file is called config.xml. Remember that XML file entries are case sensitive, so "Debug" and "debug" are different.

**Note:** Proper XML syntax and format (closing, opening tags, etc.) is required. Otherwise, changes will not apply or the configuration will be lost if Skype is not running.

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**Setting Up Group Policies**

Since the release of Skype version 3.0 in 2006, it now supports the use of Group Policies to deliver and apply desired policy settings and/or configurations to a set of enterprise users and computers within a Windows Active Directory environment.

The use of Group Policies provides system and network administrators with the most convenient and reliable way to support centralized management of policy settings for Skype clients across an enterprise.

Skype policy settings set the behavior of the Skype client for a given set of targeted users or computers. Skype has been policy-enabled meaning that the behavior of the Skype client is determined and changes based on registry values indicated in an administrative template (.adm) file. This way, you can manage Skype’s features and settings through registry-based policy.

Skype delivers these policy settings through a single Administrative Template file called Skype-v1.5.adm, which was designed to modify specific keys in the registry as described in the following section.

**Note:** You can download Skype-v1.5.adm from the Business section of the Skype website ([http://www.skype.com/security/Skype-v1.5.adm](http://www.skype.com/security/Skype-v1.5.adm)) to configure Skype policies using Group Policy Editor.

Registry-based policy settings appear and may be configured in the Group Policy Object Editor, which is under the Administrative Templates node.

The Skype-v1.5.adm file does not actually apply policy settings. Instead, it simply enables you to see the policy settings in the Group Policy Object Editor. From there, you can create Group Policy objects (GPOs) that contain the policy settings which you want.

For more information on how to deliver and apply group policies, refer to:

- **Open Group Policy as an MMC snap-in**

- **Using Administrative Template Files with Registry-Based Group Policy**

**Configurable Policies**

Following is the list of configurable policies that apply to Skype for Windows (version 3.0 and above):

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**Skype Client Functionality**

- DisableFileTransferPolicy Disable file transfer to prevent the user from sending and receiving files using Skype.
- DisableContactImportPolicy Disable import contacts.
- DisablePersonalisePolicy Disable personalization to prevent the user from changing sounds.
- DisableLanguageEditPolicy Disable language edit to prevent the user from editing language strings.
- WebStatusPolicy When enabled, always publishes the user's status on the web as Skype buttons; when disabled, prevents the user from publishing status on the web.

**Skype Non-functional Capabilities**

- DisableApiPolicy Disable Skype Public API to prevent third-party applications from accessing Skype functionality.
- DisableVersionCheckPolicy Disable new version checking by preventing Skype from detecting new versions and updates.
- MemoryOnlyPolicy Run in memory-only mode so Skype does not store any data on the local disk.

**Network-related Functionality**

- ListenPortPolicy Set the listening port where Skype listens for incoming connections.
- ListenPort Listening port number.
- ListenHTTPPortsPolicy When enabled, listen on HTTP (port 80) and HTTPS (port 443) ports; when disabled, don't listen on HTTP/HTTPS ports; when not configured, let the user decide.
- DisableTCPListenPolicy Disable listening for TCP connections to prevent the Skype client from receiving incoming TCP connections.
- DisableUDPPolicy Disable UDP communications to prevent the Skype client from using UDP to communicate with the network.
- DisableSupernodePolicy Prevent the Skype client from becoming a supernode.
- ProxyPolicy Establish the proxy policy.
- ProxyType Establish the proxy type.
- ProxyUnset Unset
- ProxyAutomatic Automatic
- ProxyDisabled Disabled
- ProxyUnset Unset
- ProxyHTTP HTTPS
- ProxySOCKS5 SOCKS5
- ProxyAddress Proxy address (host:port)
- ProxyUsername Username
- ProxyPassword Password

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**Registry Keys**

Following is the list of registry keys that apply to the Skype for Windows (version 3.0 and above):

**HKEY_LOCAL_MACHINE (HKLM)**
The registry keys for the local machine take precedence over the registry keys for the local user if there is a conflict.

HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, DisableApi, REG_DWORD = {0,1}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, DisableFileTransfer, REG_DWORD = {0,1}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, MemoryOnly, REG_DWORD = {0,1}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, DisableContactImport, REG_DWORD = {0,1}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, DisableVersionCheck, REG_DWORD = {0,1}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, DisablePersonalise, REG_DWORD = {0,1}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, DisableLanguageEdit, REG_DWORD = {0,1}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, ListenPort, REG_DWORD = {0,1}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, ListenHTTPPorts, REG_DWORD = {0,1}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, DisableTCPListen, REG_DWORD = {0,1}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, DisableUDP, REG_DWORD = {0,1}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, DisableSupernode, REG_DWORD = {0,1}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, ProxySetting, REG_SZ = {string}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, ProxyAddress, REG_SZ = {string}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, ProxyUsername, REG_SZ = {string}
HKEY_LOCAL_MACHINE\Software\Policies\Skype\Phone, WebStatus, REG_DWORD = {0,1}

HKEY_CURRENT_USER (HKCU)
The registry keys for the current user take precedence over the configuration parameters in the XML configuration files if there is a conflict.
The configuration parameters defined in the XML configuration files shared.xml and config.xml take precedence over any preferences the user selects in the Skype client if there is a conflict.

HKEY_CURRENT_USER\Software\Policies\Skype\Phone, DisableApi, REG_DWORD = {0,1}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, DisableFileTransfer, REG_DWORD = {0,1}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, MemoryOnly, REG_DWORD = {0,1}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, DisableContactImport, REG_DWORD = {0,1}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, DisableVersionCheck, REG_DWORD = {0,1}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, DisablePersonalise, REG_DWORD = {0,1}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, WebStatus, REG_DWORD = {0,1}

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HKEY_CURRENT_USER\Software\Policies\Skype\Phone, DisableLanguageEdit, REG_DWORD = {0,1}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, ListenPort, REG_DWORD = {0,1}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, ListenHTTPPorts, REG_DWORD = {0,1}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, DisableTCPListen, REG_DWORD = {0,1}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, DisableUDP, REG_DWORD = {0,1}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, DisableSupernode, REG_DWORD = {0,1}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, ProxySetting, REG_SZ = {string}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, ProxyAddress, REG_SZ = {string}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, ProxyUsername, REG_SZ = {string}
HKEY_CURRENT_USER\Software\Policies\Skype\Phone, WebStatus, REG_DWORD = {0,1}
Appendix P

The Co-teacher Rating Scale
## Co-Teaching Rating Scale for Supervisors

<table>
<thead>
<tr>
<th>RATING:</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1=rarely; 2=sometimes; 3=usually</td>
<td>1 2 3</td>
</tr>
<tr>
<td>1. Nonverbal communication is observed</td>
<td>1 2 3</td>
</tr>
<tr>
<td>2. Both teachers move freely throughout the space</td>
<td>1 2 3</td>
</tr>
<tr>
<td>3. Teachers appear competent with the curriculum and standards</td>
<td>1 2 3</td>
</tr>
<tr>
<td>4. Teachers agree on the goals of the co-taught classroom</td>
<td>1 2 3</td>
</tr>
<tr>
<td>5. Spontaneous planning occurs throughout the lesson</td>
<td>1 2 3</td>
</tr>
<tr>
<td>6. Both teachers take stage and present during the lesson</td>
<td>1 2 3</td>
</tr>
<tr>
<td>7. Classroom rules and routines have been jointly developed</td>
<td>1 2 3</td>
</tr>
<tr>
<td>8. Many measures are used for grading students</td>
<td>1 2 3</td>
</tr>
<tr>
<td>9. Humor is often used in the classroom</td>
<td>1 2 3</td>
</tr>
<tr>
<td>10. Materials are shared in the classroom</td>
<td>1 2 3</td>
</tr>
<tr>
<td>11. Both teachers appear familiar with the methods and materials with respect to the content area</td>
<td>1 2 3</td>
</tr>
<tr>
<td>12. Modifications of goals for students with special needs are incorporated into the class</td>
<td>1 2 3</td>
</tr>
<tr>
<td>13. Planning for classes appears to be the shared responsibility of both teachers</td>
<td>1 2 3</td>
</tr>
<tr>
<td>14. The “chalk” passes freely</td>
<td>1 2 3</td>
</tr>
<tr>
<td>15. A variety of classroom management techniques is used to enhance learning</td>
<td>1 2 3</td>
</tr>
<tr>
<td>16. Test modifications are commonplace</td>
<td>1 2 3</td>
</tr>
<tr>
<td>17. Communication is open and honest</td>
<td>1 2 3</td>
</tr>
<tr>
<td>18. There is fluid positioning of teachers in the classroom</td>
<td>1 2 3</td>
</tr>
<tr>
<td>19. Both teachers appear to feel confident in the content</td>
<td>1 2 3</td>
</tr>
<tr>
<td>20. Student-centered objectives are incorporated into the classroom curriculum</td>
<td>1 2 3</td>
</tr>
<tr>
<td>21. Time is allocated (or found) for common planning</td>
<td>1 2 3</td>
</tr>
<tr>
<td>22. Students appear to accept and seek out both teachers’ help in the learning process</td>
<td>1 2 3</td>
</tr>
<tr>
<td>23. Behavior management is the shared responsibility of both teachers</td>
<td>1 2 3</td>
</tr>
<tr>
<td>24. Goals and objectives in IEPs are considered as part of the grading for students with special needs</td>
<td>1 2 3</td>
</tr>
</tbody>
</table>

(From Gately, & Gately, 2001)
Appendix Q

Co-Teaching Solutions System Checklist
## CO-TEACHING CHECKLIST

<table>
<thead>
<tr>
<th>General Educator:</th>
<th>Special Educator:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observer:</td>
<td>Date/Time:</td>
</tr>
</tbody>
</table>

### To demonstrate the following aspects of Co-Teaching:

<table>
<thead>
<tr>
<th>ASK FOR ITEMS</th>
<th>0 — Didn't See It</th>
<th>1 — Saw an Attempt</th>
<th>2 — Saw It Done Well</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CO-PLANNING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesson Plans</td>
<td>Lesson plans should demonstrate that both teachers have had input in instructional planning and will actively engage all students at the appropriate levels. The CTSS® Teachers' Toolbox (<a href="http://www.coteachsolutionss.com">www.coteachsolutionss.com</a>) and the Co-Teaching Lesson Plan book (<a href="http://www.nprinc.com">www.nprinc.com</a>) are excellent resources for co-planning.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modified Materials/ Syllabi</td>
<td>Co-teachers who have planned together proactively will have materials ready prior to the lesson. These may include books on tape, modified assignments, closed-captioned video, manipulatives, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Letters Home/Syllabi</td>
<td>All materials that are sent home to parents/guardians can help demonstrate that co-teachers are engaged in co-planning. They should be co-signed and express parity between teachers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHARE: Worksheets</td>
<td>Co-teachers should have completed the SHARE worksheets recommended by Murawski (2003) and Murawski and Dieker (2004).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem-Solving Worksheet</td>
<td>Co-teachers should be able to provide evidence of problem-solving. They can use a variety of formats (notes from planning) to work through major problems together.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CO-INSTRUCTING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavior Documentation</td>
<td>Co-teachers should be able to produce documentation of data they collect while co-teaching. This documentation could include behaviors, homework, tardiness, social skills, classwork and/or participation in data collection.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tiered Lessons</td>
<td>Co-teachers should be able to demonstrate how lessons are tiered to provide differentiated instruction to a variety of individual learners. Lessons should address the high, average, and low achievers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Notes</td>
<td>Class notes (indicate what was taught during the class &amp; specifically what was emphasized). They also include mnemonics taught, and in some cases, modifications made.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CO-INSTRUCTING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade Book</td>
<td>Administrators can ask co-teachers to provide a copy of their grade books. Even if one teacher does the actual recording of the grades, it should be evident that both teachers had a hand in grading and communicating about assessments through notes or assignments.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accommodated Assignments</td>
<td>Assignments and assessments need to be tailored to individual needs. Co-teachers should be able to provide copies of modified tests, examples of accommodations given to students with special needs, and lists of IEP requirements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description of How Students Are Individually Graded</td>
<td>Co-teachers should have proactively discussed grading and how they will accommodate different learners. They may even have documentation of when they called or wrote parents to inform them of how the student with special needs would be graded in the class.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO-TEACHING CHECKLIST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Educator:</td>
<td>Special Educator:</td>
<td>Date/Time:</td>
<td></td>
</tr>
<tr>
<td>Observer:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### LOOK FOR ITEMS

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two or more professionals working together in the same physical space</td>
<td>0, 1, 2</td>
<td>At least two adults are working in the same space.</td>
</tr>
<tr>
<td>Class environment demonstrates parity and collaboration (both names on board, sharing materials, and space)</td>
<td>0, 1, 2</td>
<td>Both teachers share the space equally.</td>
</tr>
<tr>
<td>Both teachers begin and end class together and remain in the room the entire time</td>
<td>0, 1, 2</td>
<td>Both teachers are present at the start and end of class.</td>
</tr>
<tr>
<td>During instruction, both teachers assist students with and without disabilities</td>
<td>0, 1, 2</td>
<td>Both teachers are actively engaged in the instruction.</td>
</tr>
<tr>
<td>The class moves smoothly with evidence of co-planning and communication between co-teachers</td>
<td>0, 1, 2</td>
<td>Both teachers communicate effectively during the lesson.</td>
</tr>
<tr>
<td>Differentiated strategies to include technology are used to meet the range of learning needs</td>
<td>0, 1, 2</td>
<td>Teachers use technology to meet diverse learning needs.</td>
</tr>
<tr>
<td>A variety of instructional approaches (i.e., co-teaching approaches) are used, including regrouping students</td>
<td>0, 1, 2</td>
<td>Teachers use various strategies to teach.</td>
</tr>
<tr>
<td>Both teachers engage in appropriate behavior management strategies as needed and are consistent in their approach to behavior management</td>
<td>0, 1, 2</td>
<td>Teachers manage behavior effectively.</td>
</tr>
<tr>
<td>It is difficult to tell the special educator from the general educator</td>
<td>0, 1, 2</td>
<td>Both roles are clearly defined.</td>
</tr>
<tr>
<td>It is difficult to tell the special education students from the general education students</td>
<td>0, 1, 2</td>
<td>Students are easily identifiable.</td>
</tr>
</tbody>
</table>
## CO-TEACHING CHECKLIST

<table>
<thead>
<tr>
<th>LISTEN FOR ITEMS</th>
<th>0 — Didn’t See It</th>
<th>1 — Saw an Attempt</th>
<th>2 — Saw It Done Well</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-teachers use language (&quot;we&quot;; &quot;our&quot;) that demonstrates true collaboration and shared responsibility.</td>
<td>6 = Adults use &quot;I&quot; language frequently (e.g., &quot;I want you to ...&quot; or &quot;I'm in my class ...&quot;), making points.</td>
<td>/ = Adults attempt to use &quot;we&quot; language and include each other, but it is clear that one adult is more used to &quot;ruling&quot; the class.</td>
<td>2 = Adults clearly use &quot;we&quot; language (e.g., &quot;We would like you to ...&quot;), showing that they both share the responsibility and students know they are equally in charge.</td>
</tr>
<tr>
<td>Co-teachers phrase questions and statements so that it is obvious that all students in the class are included.</td>
<td>6 = Class is very teacher-directed and little involvement by students; questions/statements are general and not inclusive of all students.</td>
<td>/ = A few statements/questions are phrased to encourage participation from a variety of students.</td>
<td>2 = A clear attempt is made by both adults to engage all students through the use of a variety of types of questions and statements.</td>
</tr>
<tr>
<td>Students’ conversations evidence a sense of community (including peers with and without disabilities).</td>
<td>6 = Students do not talk to one another over during class or specific students are clearly excluded from the student interactions.</td>
<td>/ = Most students appear to be included in the majority of student interactions.</td>
<td>2 = It is evident from the students’ actions and words that all students are considered an equal part of the class and are included in all student interactions.</td>
</tr>
<tr>
<td>Co-teachers ask questions at a variety of levels to meet all students’ needs (basic recall to higher-order thinking).</td>
<td>6 = Adults do not use questions or ask questions geared just to one level (to the middle or &quot;watered down&quot;).</td>
<td>/ = Adults use closed and open questions at a variety of levels in a general manner.</td>
<td>2 = Adults used closed and open questions at a variety of levels in a way that demonstrates they are able to differentiate for specific students in order to ensure maximum (appropriate) levels of challenge.</td>
</tr>
</tbody>
</table>

(From Murawski, & Lochner, 2010)