COACHING CO-TEACHERS USING A MULTI-TIERED SYSTEM OF SUPPORTS (MTSS)

by

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This is dedicated to my faithful and loving wife, Lisa, and my children, Miller, Duncan and Ruthie. Without your love and support throughout the years, I would not have been able to persevere and complete this. I will be forever working to be the husband and father I am supposed to be. This is the ultimate challenge, responsibility, and joy of my life. May may life be marked by love and dedication to you before anything else.

In loving memory of my mother, Connie.

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ABSTRACT

Co-teaching is a practice in which "two professionals co-plan, co-instruct and co-assess a diverse group of students. Both teachers provide substantive instruction to all students on a daily, consistent basis. Neither is considered the main teacher of the class; they are equals" (Murawski, 2008, p. 29). Unfortunately, co-teaching in practice is often characterized by one teacher handling most of the instruction and the other operating in an assistant role (Murawski & Lochner, 2009, 2010; Volonio & Zigmund, 2007). Co-teaching should also be characterized by the use of multiple models that facilitate small group instruction, which should increase student to teacher interaction and student engagement (Friend, 2014).

A way to address these gaps is to provide co-teachers with ongoing coaching support (CEC, 2012). The goal of this study was to increase the quality of co-teaching through different levels of coaching to facilitate small group instruction through parallel teaching and increase student engagement. This study used a MTSS model with a multi-probe design to respond to the level of support co-teachers need, starting with peer coaching, then traditional coaching, and finally bug in ear (BIE) coaching.

There were three sets of co-teaching pairs who participated. There was an intervention effect for all three pairs of teachers with peer coaching, the first tier of the intervention. Therefore, the other two levels of support were not needed as all participants met criteria in peer coaching. Additionally, there was an effect in increasing student engagement with peer coaching. These procedures can be used and adapted for future research in coaching co-teachers to improve their practices.

CHAPTER 1. INTRODUCTION

Co-teaching is a common practice for educating students with disabilities. However, there is a clear gap between best practices for co-teaching identified in research and actual co-teaching practices in schools (Friend, 2014; Magiera & Zigmond, 2005; Murawski & Swanson, 2001; Volonio & Zigmund, 2007; Weiss & Brigham, 2000; Zigmond & Matta, 2004). Too often, co-teaching involves the general education teacher leading instruction with the special education teacher (SET) assisting (Boudah, Schumaker, & Deshler, 1997; Magiera & Zigmund, 2005; Murawski & Swanson, 2001; Weiss & Brigham, 2000; Zigmund & Matta, 2004). Yet, research shows that when both teachers work together to provide more small group instruction, teacher-student interactions improve (Dieker, 2001; Friend, Cook, Hurley-Chaberlain, & Shamberger, 2010; Volonio & Zigmund, 2007) and teachers are able to build on their professional strengths (Friend, 2014). This disconnect between research and practice is likely due to shortages in highly qualified teachers in special education and a lack of quality evaluation and professional development opportunities for co-teaching. Improvements to teacher professional development in co-teaching could improve the overall quality of co-teaching, decrease the research to practice gap, and improve student outcomes (Duchaine, Jolivette, & Fredrick, 2011; Harris, Pollingue, & Hearington, 2014; Hasbrouck & Christen, 1997; Kennedy & Lees, 2015; Miller, Harris, & Watanabe, 1991; Mullan, 2015; Myers et al., 2011; Pierce & Miller, 1994; Ploessl & Rock, 2014; Scheeler, Congdon, & Stansbery, 2010; Tschantz & Vail, 2000; Winton, 2010).

Each student receiving special education services has supports and services in place through their Individualized Education Program (IEP) that can cover a wide continuum of services. Students with disabilities can be educated in the general education setting, special education setting or some combination as determined by their IEP. This creates multiple settings in which SETs can teach, whether it is a general education environment, or a special education environment geared to meet the specific needs of the students in the classroom. As part of IDEA (2004), there is an expectation that students with disabilities be educated in their least restrictive environment (LRE), which has caused a greater push for students with disabilities to be education in inclusive settings (Murawski & Lochner, 2010). A common practice for teaching students with disabilities is co-teaching, where a general education teacher and a SET work together to teach a classroom of students with disabilities and their typically developing peers (Murawski & Lochner, 2010).

What is Co-teaching?

Co-teaching has been defined as a practice in which "two professionals co-plan, co-instruct and co-assess a diverse group of students. Both teachers provide substantive instruction to all students on a daily, consistent basis. Neither is considered the main teacher of the class; they are equals" (Murawski, 2008, p. 29). During co-teaching lessons, there are six different teaching models the co-teaching pair can employ to meet the needs of all students and make use of two teachers in the classroom (Friend & Bursuck, 2009).

1. One-teach, one-observe in which one teacher leads large-group instruction while the other gathers academic, behavioral, or social data on specific students or the class group;
2. Station teaching, in which instruction is divided into three non-sequential parts and students, likewise divided into three groups, rotate from station to station, being taught by the teachers at two stations and working independently at the third;
3. Parallel teaching, in which the two teachers, each with half the class group, present the same material for the primary purpose of fostering instructional differentiation, increasing student participation and facilitating more teacher-student interaction;
4. Alternative teaching, in which one teacher works with most students while the other works with a small group for remediation, enrichment, assessment, pre-teaching, or another purpose;
5. Team teaching, in which both teachers lead large-group instruction by both delivering instructional content, representing opposing views in a debate, illustrating two ways to solve a problem, and so on; and
6. One-teach, one-assist, in which one teacher leads instruction while the other circulates among the students offering individual assistance, managing student behavior, and providing any other assistance necessary to the students or their co-teacher.

Beyond daily instruction, co-teaching involves shared responsibility in planning and assessment, as both teachers are responsible for all students, not just a specific group of students based on expertise or licensing (Friend et al., 2010; Kamens, Susko, & Elliot, 2013; Murawski & Lochner, 2010). Although there is a belief that both teachers in a co-teaching partnership share responsibility equally, SETs often are relegated to an assistant role and not actively involved in the full teaching process (Murawski, 2009; Murawski & Lochner, 2010; Walther-Thomas, 1997).

This is problematic because the general education teacher is often perceived as the "real teacher," which can create an unsatisfactory power dynamic between co-teaching partners in which the SET does not have an equal voice in planning, instructing and assessing (Murawski, 2009; Murawski & Lochner, 2010; Volonio and Zigmund, 2007). Additionally, this could be also seen as a misuse of resources when a SET is assigned to a co-taught classroom, and he or she is not fully involved in all aspects of co-teaching by acting in an assistant role when the SET could offer much more. A school could assign a paraprofessional to act as an assistant in the same classroom, using fewer resources, yet essentially fulfilling the same role as a SET who is relegated to an assistant role. Co-teaching that primarily occurs through the one teach, one assist model often utilizes the SET as the assistant and this can create a perception that the general education teacher is the "real teacher" and the SET is an assistant. The SET can be perceived as being there to help only students with disabilities, deal with problem behavior, and provide assistance during independent work time.

What is Quality Co-Teaching?

Some common features of quality co-teaching are shared responsibility for all students by both co-teachers (Bouck, 2007; Dieker, 2001; Friend et al., 2010; Little & Dieker, 2009), rather than the idea that the SET only supports students with disabilities and the general education teacher is only responsible for general education students (i.e. Levenson, 2011). A common characteristic of quality co-teaching is the use of multiple models of co-teaching, which allows for small group instruction and more teacher-student interaction (Dieker, 2001; Friend et al., 2010; Volonio and Zigmund, 2007). If multiple models, such as parallel and station teaching, are used there will inherently be more small group instruction because both teachers are leading instruction to smaller groups. This should result in more teacher-student interaction, as opposed to one teacher leading the instruction in the commonly used one teach, one assist model. A third characteristic of quality co-teaching is the engagement of all learners (Bouck, 2007; Dieker, 2001; Volonio & Zigmund, 2007; Zigmund & Matta, 2005), through the use of differentiation, universal design for learning (UDL), effective classroom management, and effective communication and planning between the co-teachers.

Although there are clear characteristics of quality co-teaching, there is commonly a lack of small group instruction and overall use of the multiple models of co-teaching in practice (Volonio

and Zigmund, 2007). Boudah, Schumaker, and Deshler (1997) showed high school students in co-taught classes had little opportunity for academic engagement and achievement for students with LD decreased. The multiple models of co-teaching are frequently discussed and defined with examples of how to employ them in the literature, but there is little evidence of multiple models in practice (Murawski & Swanson, 2001; Weiss & Brigham, 2000). For example, Zigmund and Matta (2004) observed 41 co-taught classrooms for 201 lessons in 14 high schools, and there were only two lessons with more sophisticated co-teaching practices like station or parallel teaching, with the vast majority of co-teachers relying on the one-teach, one-assist model. Magiera and Zigmund (2005) found that co-taught classroom did not change the instructional experience in ways that would likely enhance achievement (e.g., more small group instruction, improved engagement, more teacher-student interaction). Zigmond (2006) replicated these results, and in a qualitative study, Zigmond and Matta (2005) found that "SETs did not provide explicit strategic instruction to facilitate learning or memory of the content material." The implication here is that co-taught classes should look different than a typical general education class by employing more small group instruction and allowing for more teacher-student interaction with two teachers, thus increasing engagement (Friend, 2014).

Friend (2014) argues that parallel and station teaching should be used frequently for direct instruction because these models naturally get students into small groups for direct instruction and/or practice of skills, which results in more teacher-student interaction. Each of these models have their own benefits as parallel teaching is ideal for introducing new content, whereas station teaching can be used to review skills and concepts for short periods of time. Instead of relying on a co-teaching model like one-teach, one-assist as is often the case (e.g. Magiera & Zigmond, 2005; Zigmond & Matta, 2004), co-teachers should make use of co-teaching models like parallel and station teaching more frequently to benefit from small group instruction and increased teacher-student interaction (Friend, 2014).

How Does Co-Teaching Affect Student Outcomes?

When considering the effectiveness of co-teaching in using multiple models of instruction and engaging students in small group instruction, one must consider how co-teaching affects student outcomes for all students in academic performance and in reducing problem behavior. The research literature is mixed on how co-teaching affects student outcomes in practice, and these

mixed results are likely a result of the gap in identified best practices in co-teaching and what actually happens in co-taught classrooms.

In a financial analysis of one district's implementation of special education services, Levenson (2011) asserted that "push-in" (inclusionary practices which include co-teaching) provide the least return on investment due to the limited amount of students that a special education teacher can service during a general education class. This perspective seems to be flawed because there were small numbers of students with disabilities in many of these classes (as few as three), and the author had the assumption that the special education teacher was only able to support the students with disabilities and the general education teacher would only support typically developing students. Also, this did not consider the quality of the co-teaching or other instruction for all students and how each professional impacted these outcomes. The study only focused on standardized test results and growth in comparison to the cost associated with the service.

Johnson (2013) found that 9th grade general education students performed better in general education math classes than in co-taught classes. Beyond these studies, there is not adequate data to definitively support the notion that students with disabilities are greatly benefiting from co-teaching as opposed to instruction in special education environments (Weiss & Brigham, 2000; Welch, 2000; Zigmond, 2003).

While these are some examples where co-teaching was not effective in improving student or teacher outcomes, there are other studies with positive results. In Welch (2000), co-teaching pairs used descriptive analysis to reflect on their planning, implementation and assessment as a pair in two elementary school classrooms where there were improvements in reading fluency in one classroom and reading comprehension, vocabulary, spelling, and word recognition in the other. These findings also support the improvements in math and language standardized test results for students with learning disabilities in co-taught settings from Rea, McLaughlin, and Walter-Thomas (2002). The co-teaching pairs were required to spend at least 30 minutes reflecting on their practice and preparing for their next lesson during planning and assessment sessions. The participating teachers indicated more positive perceptions of co-teaching, improved relationships with their co-teachers and more positive relationships with students in their classrooms. However, both co-teaching pairs indicated they wanted more time for planning and reflection.

Wichnowski, Salmon and Eaton (2004) studied co-teaching in a rural school district in New York for two years to determine the effectiveness of co-teaching in the elementary and middle

school levels. This study examined many outcomes such as student achievement, access to accommodations and supports, behavior, and perceptions of various stakeholders. There were no significant differences in academic performance for students with disabilities in either the inclusive or special education environment, and all stakeholders indicated a positive perspective of including students with disabilities through co-teaching. While this study does not demonstrate that co-teaching is clearly a better alternative than educating students in more restrictive environment, the comparable results are encouraging when there are some studies when students with disabilities have worse academic achievement in inclusive environments (i.e., Levenson, 2011). Furthermore, it may be possible that if the quality of co-teaching is improved, then there could be an improved difference in student outcomes for students with disabilities in co-taught classrooms as opposed to more restrictive environments (Friend, 2014).

Potential Causes of the Research to Practice Gap

The mixed results in the research about co-teaching's effectiveness can be attributed to a number of different factors like lack of training and professional development in co-teaching practices or over-reliance on one or a few co-teaching models, but one factor may be the overall shortage of licensed teachers, particularly in special education. Ensuring teacher quality, professional development, and retention are pressing issues due to issues with teacher turnover and shortages. While teacher turnover within the first five years of entering the profession are often reported as high as 50%, these figures are actually 17% (Aragon, 2016). This discrepancy is due to teachers leaving the profession temporarily (e.g., pregnancy, rearing of children, involuntary transfers), but even with less teacher turnover than often reported, there are still shortages within specific subject areas (i.e., math, science and special education) and in certain demographic and geographic areas (i.e. urban, rural, high-poverty, high-minority, and low-achieving schools; Mason-Williams, 2015). This shortage of qualified special education teachers could be an explanation of why co-teaching in practice often overly relies on one co-teaching model and does not exemplify the characteristics of quality co-teaching in the literature. If there were more qualified and trained special education teachers and those teachers stayed in the profession longer, there may be more consistent use of multiple co-teaching models other than one teach, one assist.

SET Evaluation and Professional Development

When considering teacher retention, the issue of teacher evaluation and professional development is crucial because evaluation can be used to help support teachers in their practice, instead of what could be a negative connotation. Evaluation of teachers, SETs is especially difficult because there are no standards in place (Brownell & Jones, 2015; Holdheide, 2015). SETs have many other responsibilities (e.g., writing and implementing IEPs, as well as collaborating with families, service providers and general educators, co-teaching) beyond typical academic instruction that make standard observation practices less valid for performance evaluations (Benedict, Thomas, Kimerling, & Leko, 2013).

In the position paper presented by the Council for Exceptional Children (CEC, 2012), it is clear that a structured, collaborative integration of professional development and evaluation is important in evaluating SETs. By providing regular feedback to teachers and providing them opportunities and resources to improve in instrumental areas and skills, the evaluation process can be more focused on growth. This focus on growth can enhance the role of special education teachers within the teaching profession, and may have positive impacts on teacher retention through such support.

The role of co-teaching for SETs can greatly benefit from this type of ongoing support. An issue in supporting co-teachers is that there is not a common tool specific to evaluating co-teaching performance, as co-teachers are typically evaluated on the same tool that evaluators use for all other teachers (Kamens et al, 2013). Without a unique observation or evaluation tool, it could be more difficult to match specific professional development needs and opportunities for co-teachers as the feedback may not be the most reflective of the co-teachers' performance as opposed to evaluating one teacher with the same tool. One particular evaluation tool for co-teachers that has some promise to be standardized is the Co-Teaching Core Competencies Observation Checklist (Murawski & Lochner, 2017), in which co-teachers are evaluated based on items observers "ask for" (e.g., lesson plans, syllabi, behavior documentation, class notes, accommodated assignments), "look for" (e.g., shared responsibility, communication, variety of instructional approaches), and "listen for" (e.g., collaborative language, higher ordered thinking questions, "we" language). This tool includes a numerical rating for each individual domain from 0 (not observed) to three (done well) with specific criteria for each level of performance in each domain, translating to a final numerical rating to assess the level of co-teaching expertise the partnership currently has. The tool

is designed to be used repetitively to facilitate growth, as the authors state that the aim of the tool is to "provide specific items for administrators to ask for, look for, and listen for when observing co-teachers to assess their collaborative activities and, more importantly, to help guide them in their efforts to shape and improve their teaching" (Murawski & Lochner, 2010). Also, the observation literature shows that feedback to teachers is best when it is descriptive and supports continuous improvement, rather than simply being evaluative (Darling-Hammond, 2014; Friend & Cook, 2007). By using a tool such as the Co-Teaching Core Competencies Observation Checklist in an ongoing manner to provide descriptive feedback, co-teachers can apply what others observe to improve their practices and hopefully improve student outcomes. This ongoing cycle of feedback that is non-evaluative and specific to a SET's placement also satisfies some of the components of effective SET evaluation per the CEC (2012) position paper, particularly if there are opportunities for professional development in this feedback cycle.

In co-teaching, professional development should include collaboration between administration (or alternative support personnel) and the co-teachers themselves (Friend et al., 2010). Unfortunately, co-teaching training is often unrealized because it is too brief and limited (Fennick & Liddy, 2001). Professional development for co-teachers should include training and feedback in realistic situations (Croft, Coggshall, Dolan, & Powers, 2010). Co-teachers often over rely on the one-teach, one-assist model of co-teaching (Moin, Magiera, & Zigmond, 2008; Murawski, 2008; Scruggs, Mastroieri, & McDuffie, 2007) or the SET often focuses exclusively on behavior management (Harbort, Gunter, Hull, Borwn, Venn, Wiley, & Wiley, 2007; Weiss & Lloyd, 2002; Zigmond & Baker, 1995), which highlights the need for training in how to employ multiple models of co-teaching and shared responsibility in classroom management.

One way that administrators can provide individualized support to meet the diverse needs of co-teachers is through a multi-tiered system of supports (MTSS) approach (e.g. Kennedy & Lees, 2015; Mullan, 2015; Myers et al., 2011). MTSS can be applied to professional development for teachers by implementing multiple tiers or levels of supports, starting at a broad level of support for all teachers (typically a training session), depending on the needs of teachers and how they respond to the first level of support, more intense and individualized levels of support are employed as needed. For example, in Myers et al. (2011), teachers attended a training on the use the school's positive behavior support system, specifically targeting the use of behavior specific praise of students. The four teachers in this study were a mix of general and special education teachers and

taught grades 5-7. For teachers who were not responsive to this training in increasing their use of behavior specific praise, the researchers implemented weekly targeted training for individual teachers where the teachers' data were shared and the researcher gave praise to the teacher, a second tier of support. If a teacher did not reach criteria in the second tier, a third tier was implemented, in which a teacher was observed more frequently with a coaching session following each lesson to review the data and receive praise from the observer. All four teachers included in this study improved their use of behavior specific praise, but the teachers responded differently at the different tiers of support This suggests that a MTSS approach with professional development for teachers has promise for appropriate support of teaching practices, rather than the typical reliance on group training sessions with little follow-up and reliance on administrator evaluations (Myers et al., 2011). Other studies have shown similar results in changing teacher behavior at different levels of support, targeting the use of discrete trial training in early childhood special educators (Mullan, 2015) and to improve the use of developmentally appropriate interactions between preservice teachers and preschool students during practicum experiences (Kennedy & Lees, 2015). A gap in this research is the lack of student outcomes as a result of this training. Further research should consider the student effects of an MTSS approach to teacher support.

If MTSS were applied to co-teaching, then different levels of training and support offered to co-teachers based on their needs and level of expertise. A co-teaching pair that has little experience co-teaching, has difficulties with classroom management, and rarely uses a co-teaching model other than one teach, one assist will need more support than a co-teaching pair with more experience and fewer issues. For example, a tier one practice could be a large group professional development training session on how to use the multiple models of co-teaching, a second tier with targeted supports like explicit feedback and recommendations on lessons, and a third tier where there is more intensive support like the use of an improvement plan with greater frequency of observation and feedback. This was the structure of the MTSS in Myers et al. (2011) to support preservice co-teachers' development in early childhood classrooms.

There has been little use of MTSS with co-teachers in the literature, although there is evidence of effectiveness for this model with teachers to increase behaviors like increase use of praise (Codding, Feinberg, Dunn, & Pace, 2005; Codding, Skowron, & Pace, 2005; Colvin, Flannery, Sugai, & Monegan, 2009; DiGennaro, Martens, & McIntyre, 2005; Mullan, 2015; Myers et al., 2011; Leblanc, Ricciardi, & Luiselli, 2005; Matheson & Shriver, 2005; Mortensen & Witt,

1998; Noell et al., 2000). For example, in Myers et al. (2011), upper elementary and middle school special and general educators participated in a large group training focused on the use of the school's positive behavior support plan. Four teachers were included in this study and the researchers measured participating teachers' use of behavior specific praise in observed lessons. The large group training was tier one, then if teachers did not increase their use of behavior specific praise for three consecutive lessons to six uses of behavior specific praise and at least a 4:1 positive to negative interaction ration between teacher and students, then the teacher would move into the second tier of support, a weekly, targeted training session where the teacher and researcher who observed the lesson would review the data from the previous lesson and the researcher would praise the teacher for their performance. If the criteria were not met with this second tier of support, then a third tier of more frequent observation and coaching from researchers would be implemented. All four teachers in this study increased their use of behavior specific praise, with two teachers meeting criteria at the second tier and the other two teachers needed to move into the third tier to meet the criteria. The use of MTSS to provide the level of support co-teachers need to develop and improve in their teaching practices seems to be a worthwhile undertaking to address the mixed results for students and the research to practice gap for use of effective co-teaching strategies and models.

Previous research related to coaching co-teachers can help focus how to apply support to co-teachers using this MTSS model. By identifying practices that have been effective in improving teacher performance and identifying areas that need further inquiry, this study can have more focus to improve the quality of co-teaching.

Statement of the Problem

Co-teachers in practice often over rely on the one teach, one assist model, while the literature is clear that other models should be used. Co-taught classrooms should be characterized by small group instruction, with equitable roles between the co-teachers, with higher levels of student engagement. Co-teachers need professional development and other supports to help them move beyond the one teach, one assist model.

Purpose of the Study

The purpose of this dissertation is to expand the literature in professional development of co-teaching by designing and evaluating a multi-tiered system of supports model to coach co-teachers to improve their use of the parallel teaching model that will increase the amount of small group instruction, teacher-student interaction and student engagement. After further examining the research literature for practices of coaching co-teaching are identified, the focus shifts to implementing the multi-tiered system of supports model to coach co-teachers to improve their use of the parallel teaching model that will increase the amount of small group instruction, teacher-student interaction and student engagement.

Research Questions

This study seeks to understand how coaching co-teachers can support the use of parallel teaching and affect student engagement. Also of interest are the perceptions of acceptability and likelihood of continued use of the co-teachers who participate.

1. How does peer coaching affect the quality of co-teachers' use of parallel teaching? If not responsive to peer coaching, is more intensive coaching within MTSS necessary using first traditional coaching then BIE coaching?
2. Does co-teaching coaching lead to changes in student engagement?
3. How acceptable do participants find the use of a MTSS for coaching co-teachers in parallel teaching?
4. How likely are participants to continue to use peer coaching with their co-teacher after the conclusion of the study?

Significance

This study aims to apply an MTSS model of professional development specifically with practicing co-teachers to improve their co-teaching practices (specifically using parallel teaching) and increase student engagement. No other study has addressed a specific model of co-teaching through coaching, and no other study has used an MTSS approach to coaching practicing co-teachers. This novel approach aims to address gaps from research to practice related to the overreliance on the one teach, one assist model of co-teaching. This study is unique

as it focuses on parallel teaching, which inherently creates more equal roles between co-teachers, uses small group instruction and should increase student engagement. The hope is that this study will provide practical, cost-effective, and responsive options for professional development for co-teachers, and will provide avenues for future research to improve co-teaching practices and address gaps from research to practice.

Definition of Terms

Co-teaching - When a special education teacher and general education teaching work together in the same general education classroom with a mixed group of students with disabilities and their peers to co-plan, co-instruct and co-assess all students.

Multi-Tiered System of Supports (MTSS) - "a prevention based framework of team-driven data-based problem solving for improving the outcomes of every student though family, school, and community partnering and a layered continuum of evidence-based practices applied at the classroom, school, district, region, and state level" (Colorado Department of Education, 2016). A system aimed at applying different levels or tiers of support based on the needs of a student to help them learn or improve academic or behavioral skills to better access the general education curriculum.

Special Education Teacher (SET) - An individual who is licensed to teacher students with disabilities and who instructs students with disabilities anywhere in the broad continuum of services within special education.

Individualized Education Program (IEP) - the legal document that details the present level of academic and functional performance of a child with a disability, the child's goals, any services, accommodations, modifications, or any other supports necessary to help the child access the general education curriculum to the greatest extent possible for him or her.

Individuals with Disabilities Education Act (IDEA) - The federal special education law in place that guarantees educational rights for children with disabilities in the United States.

Alternate Route to Certification (ARC) - teacher preparation programs for individuals who have already earned a bachelor's degree in a field outside of education and decide to pursue education, often as a Transition to Teaching license.

Council for Exception Children (CEC) - The leading special education professional organization in the United States.

What Works Clearinghouse (WWC) - A division of the Institute of Educational Sciences (IES) that aims to support educators by evaluating the quality of research to define and identify evidence-based practices.

Parallel Teaching - A co-teaching model where the class is split into two relatively equal groups, and both the general education teacher and SET each lead his or her respective group in instruction and classroom management.

Bug in Ear (BIE) - A form of educational coaching during live lessons, where the teacher wears a listening device in his or her ear and an instructional coach speaks into a microphone to provide auditory feedback during the lesson to the teacher.

Behavior Specific Praise (BSP) - Giving verbal reinforcement specifically for engaging in a desired behavior as opposed to giving general praise. For example, "thank you for raising your hand and waiting quietly to be called on," instead of "thank you for meeting expectations" or "good job."

Parallel Teaching Observation Scale (PTOS) - a specific co-teaching evaluation tool for providing feedback to co-teachers when they use parallel teaching.

Treatment Acceptability Rating Form (TARF) - a survey to be completed by participants on a Likert scale that is used to determine the social validity of a study.

CHAPTER 2. LITERATURE REVIEW

There is a great need to better understand how to support co-teachers as there is high turnover and consistent shortages of highly qualified teachers, particularly in low income urban and rural areas (Mason-Williams, 2015). SETs have unique responsibilities (i.e. co-teaching) in which require specific professional development and support different from support for typical classroom instruction (Brownell & Jones, 2015; Holdheide, 2015). The CEC (2012) position paper on SET evaluation calls for ongoing, formative support in the evaluation process that highlights and offers professional development specific to the needs of the teachers. Coaching is one way that SETs can get support specific to co-teaching in an ongoing, formative fashion. Such a model that aligns with the CEC position through coaching co-teachers as opposed to a formal evaluation, and this could be helpful in providing SETs with the support necessary to increase retention in the field and hopefully reduce the shortage of SETs.

In surveying the literature related to coaching co-teachers, the author first reviewed studies that employed coaching co-teachers to identify different methods of coaching and how this coaching affects co-teacher performance. Also, it is of interest to see what studies targeted specific models of co-teaching or aimed to increase the number and/or quality of the co-teaching model used. Although the author was primarily interested in co-teacher performance and improving the quality of co-teaching, any student related outcomes were also of interest, as these may shed more light on the effectiveness of co-teaching.

In order to survey the related literature to this area, the reviewed studies included participants who were either practicing special educators or pre-service special educators engaged in co-teaching with a general education teacher or a cooperating teacher. The co-teaching must take place in an inclusive classroom serving students with disabilities and their typically developing peers. The independent variable must be some sort of coaching aimed at improving co-teaching practice. This includes, but is not limited to peer coaching (where co-teachers provide feedback to one another), eCoaching (a lesson is observed by a coach not present who watches the lesson via some sort of video technology and gives feedback during or after a lesson), and traditional coaching (a third party is present in the classroom to give feedback to both teachers after a lesson). There may be other dependent variables than teaching practices, but improving teaching practices in some way were at least one of the dependent variables. This included

increasing the number of co-teaching models used, improvement on an evaluation tool, improvement in a specific behavior the study identifies as an important classroom practice, or any other teacher behavior a study aimed to increase or reduce that would increase the quality of the co-teaching. These studies included teachers of P-12 students, so adult vocational training and university co-teaching were not considered, as this is not co-teaching as defined by this study. Studies were published from 1990 to the present to reflect the application of the Individuals with Disabilities Education Act (IDEA) and its subsequent reauthorization in 2004 for those studies conducted in the United States. International studies could be included, but most of the literature

Summary of Research

Types of coaching

There were five studies that utilized peer coaching as its independent variable to affect co-teaching practices (Hasbrouck & Christen 1997; Kennedy & Lees 2015; Pierce & Miller 1994; Scheeler et al., 2010; Tschantz & Vail, 2000). In these instances, peer coaching was defined as co-teachers who worked together in the same classroom provided teaching feedback to each other based on a pre-determined rubric or observational tool. What was unique here was that there were two distinct ways in which peer coaching was used based on population of teachers. Hasbrouck and Christen (1997), Scheeler et al. (2010) and Tschantz and Vail (2000) made use of peer coaching between two in-service co-teachers, while Kennedy and Lees (2015) and Pierce and Miller (1994) used peer coaching among pre-service teachers as a way to provide each other more feedback in lieu of relying on just university supervisors for observational feedback. Pierce and Miller (1994) involved 32 pre-service SETs where one group engaged in traditional coaching and the other in peer coaching. This study found that both of these coaching methods are equally effective for increasing desired teacher behaviors (i.e. maintaining open communication with students, expresses ideas clearly and concisely, providing meaningful feedback) and decreasing undesirable behaviors (i.e. inconsistency in classroom management, inflexibility, lack of initiative). One unique feature of peer coaching among these studies was that Scheeler et al. (2010) used peer coaching during lessons with one co-teacher giving their partner feedback with BIE technology.

Both Ploessl and Rock (2014) and Scheeler et al. (2010) used some form of BIE coaching to improve co-teaching practices. BIE coaching was when a coach can speak directly to a teacher

or teachers during lesson through a device placed in the teacher(s)' ear. Ploessl and Rock (2014) used eCoaching to provide support during both planning and instruction related to the use of different co-teaching models, specific student accommodations/modifications, and implementation of positive behavior intervention supports (PBIS). The study used video conferencing during planning sessions to provide encouragement, support, ask and answer questions related to the independent variables and provide BIE support during instruction. Each co-teacher alternated wearing the BIE device from one lesson to the next. This use of BIE was of note because the coach had prior exposure and input to the content of the lesson and how it would be taught through the eCoaching during planning. This allowed for more specific feedback as opposed to a coach observing a lesson without the context of a planning session. The results of this study was in increase in participants' use of varied co-teaching models and student-specific accommodations through the use of BIE coaching.

In Scheeler et al. (2010) the focus was on BIE corrective feedback during instruction to support co-teachers' completion of a three term contingency (TTC) trial. The TTC is where one co-teacher poses a question to the class, a student responds to the question, and the co-teacher gives specific feedback based on the response of each individual student. The TTC is completed by either affirming that a response is correct, rather than moving on to the next question, or by staying in the line of questioning with a student if he or she answers incorrectly, rather than asking a different student after an incorrect response. Each co-teacher in the three co-teaching pairs in this study met the criteria for completing the study in three sessions, maintained the behavior at high levels in maintenance, and generalized the behavior to another setting without the coach being present.

How coaching affects co-teaching quality

Use of praise and feedback

While giving behavior specific praise (BSP) to students was better than generically giving praise (i.e. "good job), it was not an exclusive quality of co-teaching. Six studies included the use of BSP or quality feedback as one of their dependent variables (DV) when co-teaching co-teachers as each study identified this as good teaching practice (Duchaine et al., 2011; Kennedy & Lees, 2015; Miller et al., 1991; Ploessl & Rock, 2014; Scheeler et al., 2010; Tschantz and Vail, 2000).

Duchaine et al. (2011) used written performance feedback from a coach to secondary math co-teachers about their use of BSP statements to their students. BSP phrases included specific language about the behavior being praised (i.e., "I like how you followed the steps to solve the equation") rather than a general praise statement (i.e., "good job"). During baseline, the three teachers used little to no BSP statements, then received training on BSP from the intervention agent, set a goal for the use of BSP, and two of the three participants met their goal, even though all three participants demonstrated an effect from baseline to intervention. Additionally, the researchers tracked on-task behavior of the students in the class, but there was no clear effect for this DV.

Ploessl and Rock (2014) also included BSP as one of the DV's in their study. They specifically tracked whether or not eCoaching with BIE support during planning and instruction could increase the number of BSP statements and reduce the number of behavioral redirections that co-teachers provided in a lesson. While there was not a clear effect on increasing the number of BSP statements and reducing behavioral redirections in the data, there was an increase in BSP statements and a decrease in teacher-provided redirections. It was difficult to show a clear effect because each of the three dyads had a high number of BSP statements during the baseline phases, but on average, BSP statements increased and redirections decreased. Also, in Scheeler et al. (2010) there were some components of the use of BSP in the TTC trials, specifically that co-teachers would provide BSP when giving feedback to students' verbal responses to questions. The focus in this study was for co-teachers to give appropriate feedback to either correct or incorrect responses to verbal questions, and while it was not necessary to give behavior-specific feedback, to complete the TTC trial, the co-teacher had to verbally respond that the answer was correct or incorrect instead of ignoring the response and/or moving on to the next question or student, with BIE support. This study demonstrated that when giving specific feedback to students is targeted with support, the amount and quality of BSP can be improved.

Kennedy & Lees (2015) targeted improving age-appropriate interactions between the pre-service teachers and their early childhood special education students through video-based peer coaching and tiered supports based on the Classroom Assessment Scoring System (CLASS). One of the domains of the rubric in which participants were evaluated included a rating of quality feedback to students, which was similar to the idea of BSP. The results of this study showed that all participants were able to improve their ratings on the rubric. Likewise, the six participants in

Miller et al. (1991) increased their use of specific praise and decreased their use of general praise as measured by the Florida Performance Measurement System (FPMS). The participants were able to maintain and generalize these changes in their behavior as well.

Tschantz and Vail (2000) targeted co-teachers' responsiveness to students which includes BSP, giving choices, prompting and modeling. Each of the three teachers demonstrated a strong effect in increasing their use of responsiveness statements as a result of peer coaching from their special education co-teacher.

Other aspects of quality co-teaching

Other than praise and feedback, there was little overlap across the included studies in terms of dependent variables. Two studies' purpose was to increase the availability and use of accommodation for students with disabilities (Hasbrouck & Christen, 1997; Ploessl & Rock, 2014). While all three teachers in Hasbrouck and Christen (1997) indicated peer coaching was helpful to them in their practices, only one teacher increased their use of accommodations to adapt curriculum based on the needs of students with disabilities in their class based on the data collection. Ploessl and Rock (2014) demonstrated an effect in all three co-teaching dyads when trying to increase the use of accommodations for students with disabilities, and two of these dyads demonstrated a strong effect.

Harris et al., 2014 sought to increase pre-service teachers' familiarity with math vocabulary that they would later teach independently. Through an initial training on their protocol with ongoing coaching on teaching math vocabulary, there was a significant increase in participants' ability to explain the vocabulary from pretest to posttest, $z = 6.357$, $p < .005$, with a large effect size, $r = 0.82$. Lastly, Hasbrouck and Christen (1997) sought to improve co-teachers' classroom management, but only one of three co-teachers demonstrated an effect.

Coaching specific co-teaching models

Only one included study focused on increasing the number of co-teaching models its participants used (Ploessl & Rock, 2014). This study used eCoaching during planning sessions to help co-teachers plan to implement more models of co-teaching based on their content and tracked fidelity use for the planned models of co-teaching during the lesson. Only one of the three co-

teaching dyads in this study increased their use of co-teaching models as a result of the eCoaching. Not only was Ploessl and Rock (2014) the only included study that tried to increase the number of co-teaching models, it was the only study that focused on the different models in any way.

Gaps in the Research

With few number of studies in this body of literature there is a real need for inquiry to further explore these practices. In looking to apply interventions like peer and BIE coaching in future research, one may want to consider the use of a tiered system of supports to align to each pair of co-teachers need. A multi-tiered system where there are options of increased support at different levels based on a co-teaching pair's needs. For example, in tier one all co-teachers attend a professional development session highlighting different aspects of high quality co-teaching. After observations, if co-teachers do not show the level of desired performance, they would enter the next tier with more support offered in the form of coaching. More levels of support are available to promote improvement and performance if needed. This requires ongoing observation and reflection by the co-teachers themselves and a third party like an administrator. By implementing a multi-tiered system, a co-teaching pair will get the least invasive and more individualized support, which aligns with CEC (2012) recommendation for teacher evaluation. Also, there is a consistent finding in the research that co-teaching often relied on one co-teaching model, when the research clearly shows the advantages of using multiple models (Dieker, 2001; Friend, 2014; Friend et al., 2010; Murawski & Swanson, 2001; Volonio and Zigmund, 2007). Considering this, there should be a focus on increasing the number of and quality of implementation of these models when coaching co-teachers. Such support could lead to overall better quality of co-teaching, characterized by the use of multiple co-teaching models, more small group instruction, more equal partnerships among co-teachers, and higher levels of student engagement.

Tiered system of supports

Kennedy & Lees (2015) made use of a multi-tiered system of supports for the pre-service teachers who participated in their study that responded to the level of performance throughout the study, and provided additional support through targeted and intensive support to those who did not meet specific criteria throughout the study. This use of multi-tiered systems of support (MTSS) is

reflective of the approach schools are supposed to take in supporting students through universal support of high quality instruction in general education settings. Then, adding additional layers of support for students who need assistance beyond what is happening in whole group general education settings by implementing research-based practices and interventions, with an emphasis on data collection and progress monitoring (NECTAC, 2012). MTSS principles show promise when applied to professional development for teachers (i.e. Winton, 2010). In these instances, professional development for teachers targeted the use of a specific strategy (i.e. praise), provided training to the teachers, then intensive individualized supports were put in place when teachers did not meet criteria to support their improvement with the strategy.

In terms of coaching co-teaching, the literature may provide a basis in which to apply a multi-tiered system of supports. The interventions within the literature have varying levels of invasiveness that could be applied to such a multi-tiered system. Peer coaching is used multiple times in the included studies, and part of the basis for using this type of coaching is that logistically it is easier as a coach, supervisor or administrator cannot always be present. There is no need for an outside person to come observe when a peer or co-teacher is present and is able to give feedback to their partner more often through peer coaching. Such an approach would require some training on what and how to provide feedback, but once there is training, co-teachers could give one another feedback on a consistent basis that is likely unrealistic for an outside individual and would be less invasive to the co-teachers and the classroom. Next, traditional coaching where an observer is present and gives feedback to the co-teachers could be implemented if the co-teachers are not improving enough in their performance with peer coaching. This is more of a business as usual approach to coaching, but it provides a way in which the co-teachers can ask specific questions, role play, and potentially gain a more objective view of their teaching as the feedback is not coming from a peer. The most intensive intervention in the included studies is the use of BIE. While the participants in the two studies that used BIE (Ploessl & Rock, 2014; Scheeler et al., 2010) reported that they found the intervention acceptable, the idea of having someone talking to you through a device while teaching is much more invasive than coaching sessions after a lesson. This is also more cost with BIE as there is technology needed whereas the other interventions do not require any special materials during the observations. While these different types of coaching exist in the research literature, there is not a consideration to adapt these different coaching methods as tiers to support co-teachers that match the level of need. By implementing this multi-tiered system of

supports, there is a clear progression of invasiveness as well as the commitment of resources that a school or university could apply to supporting teachers.

Coaching specific models of co-teaching

While there are multiple co-teaching models allowing for more small group instructional options, the research in this area shows there is not enough use of these models to increase the amount of small group instruction, teacher-student interaction, and student engagement (Boudah, Deshley, Schumaker, Lenz, & Cook, 1997; Magiera & Zigmund, 2005; Murawski & Swanson; Weiss & Brigham, 2000; Zigmond, 2006; Zigmond & Matta, 2005). Essentially, co-teachers are often just using the one-teach, one-assist model, wherein the general education teacher leads instruction, and the special education teacher assists students and manages behavior during the instruction.

Ploessl and Rock (2014) aimed to support co-teaching dyads in increasing the number of co-teaching models planned for and used in lessons. There was only a clear effect in improving the number of co-teaching models in one of the three dyads, although the fidelity of using the planned models of co-teaching in a lesson increased in all three dyads. The authors think that there was a ceiling effect since participants knew that they were participating in a co-teaching study that they may have intentionally implemented more models. Also, there were not model-specific criteria for rating performance. Although the dyads were trained on the different models and coached on how to use them, there was not a measure of how well the models were used, although the study tracked the use of accommodations, modifications and the use of PBIS strategies. Instead of focusing on the number of models used, it may be helpful to focus on a specific model that makes use of small group instruction, increases student-teacher interaction and engagement, and measure the quality of how the co-teachers implement the model.

Lack of student outcomes

One included some sort of student outcome as one of its dependent variables (Duchaine et al., 2011). The outcome in this study was tracking on-task behavior as the coaching focused on increasing the use of BSP of the co-teachers. Unfortunately, there was not a clear effect for improving on-task behavior as a result of the coaching. With only one study tracking this, there

should be more inquiry to identify if there is a connection between supporting co-teachers through coaching and improving outcomes for student behavior. Also, it is worth noting that this only considers student behavior and not academic outcomes. While academic outcomes are crucial, student behavior likely has a direct relationship with academics. If students are disengaged, they are less likely to learn and could be a distraction for their peers, further prohibiting learning. Additionally, the research on co-teaching supports the claim that quality co-teaching supports student engagement (Bouck, 2007; Dieker, 2001; Volonio & Zigmund, 2007; Zigmund & Matta, 2005). Therefore, it is worth considering how coaching co-teachers also affects students' level of engagement.

Conclusion

After reviewing the literature related to coaching and co-teaching, there is a need for additional rigorous research to determine which interventions are most effective in improving co-teaching practices. There is a consistent gap between the literature in recommending varied use of the multiple models of co-teaching and in practice where co-teachers often use the one teach, one assist model (Friend, 2014; Murawski, 2009; Murawski & Lochner, 2010; Walther-Thomas, 1997). This model does not take full advantage of having two professionals in the classroom to increase small group instruction, improve student engagement, and increase teacher-student interaction (Magiera & Zigmund, 2005). Additionally, overuse of this model can lead to perceptions of inequality of co-teachers by students as typically the special educator is in the assist role and is not viewed as the "real teacher" (Friend, 2014). A model that co-teachers should use more frequently to engage in more small group instruction and potentially increase student engagement and student-teacher interaction is parallel teaching (Friend, 2014). Parallel teaching involves dividing the class into two groups where each teacher leads instruction with his or her respective group, and the content of these groups is similar in that students learn and practice the same skills or standards, with some room for differentiation either individually or between groups (Friend, 2014; Friend & Bursuck, 2009). It is recommended that this model be used frequently because it engages students in more small group instruction, helps to promote equity between co-teachers as both individuals are leading instruction, and allows for more opportunities for differentiation than one teach, one assist (Friend, 2014).

Additionally, there is some promise in the application of a multi-tiered system of supports (MTSS) or Response to Interventions (RTI) approach (NECTAC, 2012) of providing an appropriate amount of support to teachers based on their needs through a MTSS that targets areas of professional development (Kennedy & Lees, 2015; Winton, 2010). This MTSS is applied first through a universal support, then targeted training and in some cases, intensive individualized supports are applied when there is not progress or growth on the targeted area (see figure 2). Based on the review of the literature in coaching co-teaching, a good option for universal support or tier one is peer coaching, where co-teachers are trained in how to give each other feedback on their teaching practices (Hasbrouck & Christen 1997; Kennedy & Lees, 2015; Pierce & Miller 1994; Tschantz & Vail, 2000). This is a universal support largely because it is not invasive to the co-teachers, and can be easily carried out if there is not someone available to observe and provide coaching support. To utilize peer coaching, those who engaged in this type of coaching attended or received some training on how to evaluate and provide feedback to their co-teacher. This type of coaching has shown some positive effects in increasing behaviors like providing BSP or improving classroom management (Kennedy & Lees, 2015; Pierce & Miller, 1994; Tschantz & Vail, 2000), and is seen as highly acceptable by those engaged in coaching one another (Hasbrouck & Christen, 1997). This type of coaching can be easily rolled out to co-teachers, but there is a possibility that peer coaches may be lenient on evaluating or not give as specific of feedback as a third party.

Considering invasiveness to the co-teachers and their classrooms, the next tier is traditional coaching by an observer. This directly involves another individual who needs to be present to observe (or watch via video feed or recording) the lesson. After the lesson, the coach and co-teachers review the rating of the coach and discuss how to improve in targeted areas based on the evaluation. This is a typical model for coaching and evaluation of teachers and has some promise in improving teacher behaviors like BSP, classroom management, and adapting curriculum (Duchaine et al., 2011; Hasbrouck & Christen, 1997; Miller et al., 1991; Pierce & Miller 1994). This requires additional logistics of planning to have three individuals present to debrief the observed lesson and engage in coaching, not to mention that this would need to be ongoing and the observer would need to observe multiple lessons to help facilitate improvement in teaching practices. Also, this type of coaching is focused on discussing issues after they occur, with the hope that the co-teachers can apply feedback and improve in their next lesson. If peer coaching

and traditional coaching are not effective in improving teaching practice, then an intensive intervention is likely necessary.

The use of BIE technology is used in the literature as a more invasive intervention by a coach observing a lesson (in person or via a video stream) and talking directly to the co-teachers to provide them feedback on targeted behavior(s) (Ploessl & Rock, 2014; Scheeler et al., 2010). These studies showed some promise for increasing co-teaching behaviors like number of co-teaching models used, use of accommodations and modifications, and BSP. While these studies report that participants indicated they were comfortable using the BIE technology, it is much more invasive that peer or traditional coaching. It is possible that teachers and students could be distracted by someone speaking directly to the teacher with a BIE device, particularly if the coach is physically present in the room. Also, there are potential issues and costs associated with using technology like a BIE device.

CHAPTER 3. METHOD

The purpose of this study is to determine the effectiveness of an MTSS model of coaching for co-teachers in their application of parallel teaching and student engagement. By applying an MTSS to support co-teaching practice in quality application of parallel teaching, the research questions for this study are:

1. How does peer coaching affect the quality of co-teachers' use of parallel teaching? If not responsive to peer coaching, is more intensive coaching within MTSS necessary using first traditional coaching then BIE coaching?
2. Does co-teaching coaching lead to changes in student engagement?
3. How acceptable do participants find the use of a MTSS for coaching co-teachers in parallel teaching?
4. How likely are participants to continue to use peer coaching with their co-teacher after the conclusion of the study?

Design

A single case multi-probe across dyads design (Kennedy, 2005) was used for this study. The multi-probe design allowed for experimental control by moving one dyad at a time into the intervention phase, while reducing the intrusion of being observed in co-taught classrooms for an extended amount of time without any support offered. In order to meet WWC standards without reservation, each phase included at least five sessions of data. Specifically, for the multi-probe design there were at least three consecutive probe points during baseline prior to the introduction of the intervention, and each dyad still in baseline must have a probe point when a new dyad enters intervention. Additionally, at the beginning of the study, all dyads were observed five times in baseline prior to moving any dyad into intervention. Once each dyad entered intervention, the dyad experienced at least five sessions at that level of intervention. After five sessions, if there were not at least three sessions with a rating of 11 out of 14 possible points on the PTOS with a positive or stable trend, the dyad moved into the next tier of the intervention. If the dyad met the criteria of at least three sessions of at least 11 out of 14 points on the PTOS with a positive or stable trend and an intervention effect, based on visual analysis, the study ended for the dyad as they received the level of support they needed to improve their practice (see Figure 6 for example of potential data).

Dependent variables and measures

In order to have a tool to evaluate the performance of co-teachers specific to parallel teaching, the Co-Teaching Core Competencies Observation Checklist (Murawski & Lochner, 2017) was adapted with unique aspects of parallel teaching (Friend, 2014; Friend & Bursuck, 2009) to develop the PTOS. When using the PTOS, the author was present in the classroom and marked each criterion on the scale as met or not met (see Table 5 for coding appendix).

Co-teacher performance on PTOS. To evaluate (criterion 1) that the teacher is in the same classroom the entire time the observer noted if each teacher is in the classroom when class and/or the observation session begins and ends, as well as all instruction taking place within the classroom. This criterion was coded as partially met if all instruction took place in the classroom, but if the teacher was not in the classroom the entire observation.

To evaluate (criterion 2) that there is evidence of intentional grouping, there needs to be a way to divide students beyond just arbitrarily splitting the class in half. Ideally, this would be done through data analysis, skill level, or some other intentional means to put students into groups, and this may not always be clear during a lesson. If there were predetermined groups, then the co-teachers met this criterion. If it was unclear how co-teachers decided to create their groups, the observer asked after the lesson to clarify, and if there was prior planning to the grouping, the co-teachers marked this criterion as satisfied. There is no partially met option for this criterion as teachers either did intentional grouping or not.

To evaluate whether (criterion 3) both teachers engaged with and assisted all students in their group, the observer tracked that there was at least one teacher-student interaction between the co-teacher who led the group and each student in the group through asking a question, providing one on one assistance, checking the work of a student, or any other direct interaction between the teacher and the student. The criterion was partially met if at least half of the students in the group had an interaction with their teacher during group instruction but not all students had such an interaction. The criterion was not met if fewer than half of the students in the group had a one-on-one interaction with the teacher.

To meet both teachers engage in classroom management strategies (criterion 4), both teachers must have engaged in addressing misbehavior in the classroom, provided praise for meeting behavioral expectations, reminded students of behavioral expectations, or any other practice related to classroom management within his or her own group. There should not be one

teacher who handled all misbehavior. The criterion was partially met if both teachers engaged in some classroom management strategies, but one teacher handled the majority of the classroom management responsibilities for the whole class. The criterion was not met if one teacher handled all classroom management responsibilities for the entire class.

To meet the questioning at different levels criterion (criterion 5), each teacher must have asked questions beyond simple recall or asked for answers to a math problem. If the teacher asked four or more questions where students are asked to explain or defend their answer, apply a concept beyond the question or problem presented, make predictions, or anything beyond just answering base level questions of recall, the next step, or an answer to a math problem, the criterion was met. If the teacher asked between one and three questions where students are asked to explain or defend their answer, apply a concept beyond the question or problem presented, make predictions, or anything beyond just answering base level questions of recall, the next step, then the criterion was partially met. Asking no such questions did not meet criteria.

To meet the evidence of prior planning between co-teachers (criterion 6), both teachers must have operated independently of one another during their parallel teaching. If the teachers were able to independently teach within their groups, then the criterion was met. If the co-teachers stopped to confer with each other one or two times during the lesson, the criterion was partially met. If the co-teachers conferred with each other three or more times during the lesson, the criterion was not met.

The next criterion was met if the co-teachers used parallel teaching for at least 15 consecutive minutes during a lesson (criterion 7). Co-teachers must have divided the class into two groups where there was instruction, review or practice of the same or very similar content between the two groups. If the co-teachers used parallel teaching between 10:00 and 14:59, the the criterion was partially met. The criterion was not met if parallel teaching was used for 9:59 or less. Any time transitioning into parallel teaching groups counted towards meeting this criterion.

Student engagement

On-task behavior was defined as a student engaging in an active task like writing, reading, verbally answering a question, talking with classmates about their assignment (group work), volunteering to answer a question during a lesson, looking at their teacher or their assignment, but was not engaged in an activity like writing, reading, verbally answering a question, talking with

their classmates about an assignment (group work), and/or volunteering to answer a question during a lesson. Off-task behavior was defined as a student not looking at the teacher or their assignment, but not engaged in conversation with others, was sitting in their seat or remaining in their assigned area, was actively talking to other students about something other than their assignment, and/or was out of their seat or assigned area for purposes other than engaged with the lesson (See Table 4). Momentary time sampling (Kennedy, 2005) at the end of each minute in the lesson was used to determine if a randomly selected student was on task for that interval. For example, at 1:00 during the lesson, the observer(s) would watch a previously randomly selected student then code his or her level of on task behavior. The students were randomly selected by the author before each observation. When a secondary observer was present, the author shared the randomly selected 15 different students, so that both observers were coding the same student at the end of each minute throughout the lesson. The reason for the momentary time sampling and the random select is twofold. First, this allows for a sampling of students to reduce the likelihood of skewing the student engagement data. By randomly selecting a student for each of the 15 intervals, it is likely more representative of the whole class's behavior. Second, this simplified the IRB approval process as this random selection of students prevents any way to tie the student engagement data to any particular student, which was deemed adequate in not requiring participant consent and assent forms for students in these classrooms and their parent(s)/guardian(s).

Inter-Observer Agreement

In order to establish agreement in rating on the PTOS between the two observers prior to intervention, any secondary observers were trained by the author on the coding procedures, then each secondary observer watched a 15-minute video of parallel teaching and independently rated the co-teachers on the PTOS. The rating of each secondary observer was compared to the author's rating of the same video. There must be 90% agreement or better between the ratings in order for the secondary observer to provide reliability data during the study. If the secondary observer had below 90% agreement with the author, the author discussed areas of disagreement with the secondary observer, then repeated the process of rating a different video of parallel teaching. This cycle continued until the secondary observer had 90% agreement or better in order for the secondary observer to provide inter-observer agreement (IOA) data during the study. Likewise, to establish reliability on student engagement data, the secondary observers were trained on the codes

for student engagement, then independently rated the same 15-minute video but focusing on student engagement with momentary sampling at the end of each minute of the video (i.e. 1:00, 2:00) and rated the level of engagement of each student. Then, the secondary observers' ratings were compared to the author's ratings, and if a secondary rater had 90% or higher agreement with the author, he or she was able to provide reliability data for the study. If not, the disagreements were discussed, the codes clarified, and the process repeated until there was 90% or greater agreement between the two ratings.

Social validity

To establish the social validity of this MTSS with the co-teachers, the co-teachers who participated completed a modified version of the Treatment Acceptability Rating Form (TARF; Reimers & Wacker, 1988; see Figure 3) at the conclusion of the study. By completing this questionnaire, the co-teachers gave a sense of the acceptability of their participation in the study, their willingness to continue to use these practices, and the likelihood that they would recommend to other co-teachers to either participate in such a study or use these coaching practices themselves. Prior to the study, the author interviewed the participants to learn about their previous experience in co-teaching, and training and professional development they received specific to co-teaching.

1. How clear is your understanding of the coaching procedures from the study?

Not at all Neutral Very clear

2. How acceptable to you find the procedures in coaching you to be a better co-teacher?

_____ _____ _____ _____ _____ _____ _____

Not at all Neutral Very much

3. How reasonable do you think it was to participate in this study?

_____ _____ _____ _____ _____ _____ _____

Not at all Neutral Very reasonable

4. How costly would it be to implement coaching like this in your school?

_____ _____ _____ _____ _____ _____ _____

Not at all Neutral Very much

5. How disruptive was participation in this study to your class?

_____ _____ _____ _____ _____ _____ _____

Not at all Neutral Very much

6. How much discomfort did you experience in participating in this study?

Not at all Neutral Very much

7. How likely are you to use peer coaching with your co-teacher in the future?

_____ _____ _____ _____ _____ _____ _____

Not at all Neutral Very much

8. How likely are you to use traditional coaching with your co-teacher in the future?

_____ _____ _____ _____ _____ _____ _____

Not at all Neutral Very much

9. How likely are you to use BIE coaching with your co-teacher in the future?

_____ _____ _____ _____ _____ _____ _____

Not at all Neutral Very much

10. How likely would you be to recommend to another teacher to implement the coaching strategies from this study?

_____ _____ _____ _____ _____ _____ _____

Not at all Neutral Very much

Figure 1 *Adapted Treatment Acceptability Rating Form (TARF)*

Participants

There were three co-teaching dyads, one a SET and the other a general education teacher. All classrooms in which the observations took place were general education classrooms (where most of the students were not identified as a student with a disability) with a minority of the class

enrollment being students with disabilities. With the majority of students enrolled in these classrooms not identified with a disability, this was considered a general education setting. Participants were recruited by first receiving consent from district or school administration to contact co-teachers regarding the study. Administrators made recommendations of co-teachers to participate, but a teacher's decision to participate had no bearing on his or her formal evaluation, decisions for promotion or retention, and data from the study was not shared with any member of administration to protect the participants. Any co-teacher who participated had to give their written consent separately from their co-teaching partner, and both co-teachers had to consent in order to be included in the study. Participants were allowed to revoke their consent and no longer participate at any time in the study without fear of any consequences. During recruitment, participants were told this was a co-teaching coaching study to help them improve their practices with ongoing support. There was no training provided prior to the study, nor were participants exposed to any instruments used to measure their performance or student engagement. This was to reduce the likelihood of behavior changes in baseline due to such exposure.

Dyad one co-taught kindergarten in a large, urban district in the Midwest. Enrollment in this school was 773 students, where the racial demographics were 51.1% Latino, 26.3% Black, 18.9% White, 2.7% Multiracial, and 0.5% Native American. Regarding socio-economic status, 81.5% of students received free or reduced lunch. Regarding special populations, 10.9% of students received special education services and 39.5% of students were English Learners. The general education teacher, Katie was in her 11th year of teaching, and in her third year of co-teaching. She holds a bachelor's degree in elementary education and a license in elementary education. The SET, Penny was in her fourth year of teaching, but her first year as a co-teacher. She holds a bachelor's degree and licenses in elementary education and special education for students with mild disabilities. This pair was teaching together for the first time this school year, but they were together the entire school day in the same classroom. Katie indicated she has been trained in co-teaching by district personnel with observations of her and previous co-teachers, as well as professional development sessions on co-teaching. According to Penny, she has had no specific training about co-teaching.

Dyad two co-taught 5th grade in a large, urban district in the Midwest. Dyad two was in the same school as dyad one (school demographic information previously discussed). The general education teacher, John was in his fifth year of teaching with this as his first year co-teaching. He

holds a bachelor's degree with a license in elementary education, focused on English Language Arts. The SET, Daniel was in his 14th year of teaching, but this was also his first year as a co-teacher. He holds a bachelor's degree with a license in special education to service students with mild disabilities. John has had no training before about co-teaching, and Daniel has received professional development trainings in the past on the different models of co-teaching.

Dyad three co-taught high school algebra (9th grade students) in an urban high in the Midwest. In this school, enrollment was 695 students, where the racial demographics were 46% White, 28.6% Black, 15.4% Latino, 7.8% Multiracial, and 2.2% Asian. Regarding socio-economic status, 100% of students received free or reduced lunch. Regarding special populations, 21% of students received special education services and 8.9% of students were English Learners. The general education teacher, Allan was in his first year teaching and is a member of Teach for America (TFA). His bachelor's degree is in chemistry and political science, and he has a transition to teaching license as part of his transition to teaching program. The SET, Isaac was in his third year of teaching, and was a member of TFA, but he has completed that program. He earned a master's degree in special education, which was part of the requirements for TFA Corps Members in this region. His license is in special education for students with mild disabilities. Isaac has co-taught during all three years of his teaching career, but this is his first year as a co-teaching partner with Allan. Both have had some training in co-teaching, with Isaac having more experience and training as part of his master's program with a course on collaboration, which focused on co-teaching.

Setting

Observations took place in the participants' classrooms, and then feedback from the observation occurred either in the classroom or somewhere else in the school building, depending on convenience and availability for the participant. Each individual school/district gave permission before conducting sessions. Each observation session focused on 15 minutes of the participants using the parallel teaching model. This 15-minute observation ensured that parallel teaching was used for some extended amount of time during the lesson, but did not restrict the participants to just this model of co-teaching when being observed. During intervention, a session was not complete until after the coaching session. This meant co-teachers were not observed until they

received feedback and coaching from the previously observed lesson. There were no more than five sessions per week for each dyad and no more than two per day.

Materials

The rubric for student engagement (adapted from Junod et al., 2006) allowed for observers of lessons to code the level of engagement at active engagement, passive engagement, passive disengagement, or distraction for each student present using momentary time sampling.

Table 1 *Student Engagement Data Chart*

On Task- student engaging in an active task like writing, reading, verbally answering a question, talking with classmates about their assignment (group work), volunteering to answer a question during a lesson, looking at their teacher or their assignment, but is not engaging in an activity like writing, reading, verbally answering a question, talking with their classmates about an assignment (group work), and/or volunteering to answer a question during a lesson.

Off Task- student is not looking at the teacher or their assignment, but is not engaging in conversation with others, is sitting in their seat or remaining in their assigned area, actively talking to other students about something other than their assignment, and/or out of their seat or assigned area for purposes other than engaging with the lesson.

Record the total number of students each minute at the different levels of engagement.

Time	On Task	Off Task
1:00		
2:00		
3:00		
4:00		
5:00		
6:00		
7:00		
8:00		
9:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		

The training protocols for peer coaching educated participants on the Parallel Teaching Observation Scale (PTOS) and how to rate a lesson.

Table 2 *Parallel Teaching Observation Scale (PTOS)*

Observer: _____ Date: _____ Co-Teacher Observed:_____			
	Not Met (0)	Partially Met (1)	Met (2)
1. **The teacher is in the same classroom the entire lesson.**	Any instruction takes place outside of the classroom.	Both teachers may not be in the same classroom the entire time, but all instruction for all students takes place in the same classroom.	When class begins, both teachers are in the classroom. Both teachers remain in the same space for the entire lesson, so there are no pull out services.
2. **Evidence of intentional grouping.**	No evidence of intentional grouping. Teachers arbitrarily divide class in half.	NA	Groups have been determined in advance (e.g. numbering of students, any predetermined organizational system for grouping)
3. **The teacher engages with and assist all students in their group.**	The teacher has an interaction with fewer than half of the students in his/her group. This can be a verbal interaction (e.g. asking and answering questions) or the teacher checks in with each student during practice time (Whole group instruction does not count as an interaction with individual students).	The teacher has an interaction with at least half of the students in his/her group but not all. This can be a verbal interaction of asking and answering questions, or the teacher checks in with each student during practice time (Whole group instruction does not count as an interaction with individual students).	The teacher has an interaction with every student in his/her group. This can be a verbal interaction of asking and answering questions, or the teacher checks in with each student during practice time (Whole group instruction does not count as an interaction with individual students).
4. **The teacher engages in classroom management strategies.**	One teacher handles all classroom management responsibilities (i.e. addressing problem behavior, establishing behavioral expectations, rewarding students for meeting behavioral expectations)	Both teachers engage in some classroom management strategies(i.e. addressing problem behavior, establishing behavioral expectations, rewarding students for meeting behavioral expectations), but one teacher handles the majority of classroom management responsibilities for the whole class.	Both teachers engage in classroom management strategies (i.e. addressing problem behavior, establishing behavioral expectations, rewarding students for meeting behavioral expectations) in their respective groups with minimal classroom management strategies outside of each teacher's respective group.

Table 2 continued

5. **The teacher engages students in questions at a high level.**	The teacher does not ask questions in which students are asked to explain or defend their answer, make a prediction, and/or make a connection to another topic.	The teacher asks one to three questions in which students are asked to explain or defend their answer, make a prediction, and/or make a connection to another topic.	The teacher asks four or more questions in which students are asked explain or defend their answer, make a prediction, and/or make a connection to another topic.
6. **There is evidence of prior planning between co-teachers by the pace of the lesson and the familiarity with the content.**	The teachers stop to confer with each other three or more times during the lesson.	The teachers stop to confer with each other one or two times during the lesson.	The teachers do not stop to confer with each other at any point in the lesson.
7. Use of parallel teaching model.	Co-teachers use parallel teaching for 9:59 or less. Transition time to groups is considered parallel teaching time.	Co-teachers use parallel teaching between 10:00 and 14:59. Transition time to groups is considered parallel teaching time.	Co-teachers use parallel teaching for entire 15:00 observation period. Transition time to groups is considered parallel teaching time.

The inter-observer agreement (IOA) protocol addresses ensuring that other observers were able to observe a lesson and provide a reliable rating on the PTOS and for student engagement. First, observers were trained on the PTOS, then they watched a 15-minute lesson of parallel teaching and rated the lesson on the PTOS.

Table 3 *Parallel Teaching Coding Appendix*

Criteria	Conditions to Meet Criteria
1. **Both teachers remain in the same space.**	Both teachers must remain in the classroom for the entirety of the lesson. If one group leaves the space or classroom at any time, the criteria is not met.
2. **Evidence of intentional grouping.**	If during or after lesson there is any indication of pre-determined groups, the criteria is met.
3. **Both teachers engage with and assist all students in their group.**	There must be at least one teacher-student interaction with each student in a co-teacher's respective group. This can be talking specifically to a student during instruction or checking in with a student while students work in groups or independently.
4. **Both teachers engage in classroom management strategies.**	Both co-teachers should be active in classroom management practices. To meet this criterion, both teachers must address problem behavior, provide praise for meeting or exceeding behavioral expectations, set behavioral expectations, or any other practice related to classroom management. If one teacher handles all problem behavior or classroom management issues, the criterion is not met.
5. **Both teachers engage students in questions at a variety of levels.**	Both teachers must ask questions beyond simple recall or asking for answers to a question. If both teachers ask questions where students are asked to explain or defend their answer, apply a concept beyond the question or problem presented, make predictions, or anything beyond just answering base level questions of recall, the next step, or an answer to a question, the criterion is met
6. **There is evidence of prior planning between co-teachers by the pace of the lesson and the familiarity with the content.**	Both teachers are able to operate independently in his or her respective group without having to ask questions or clarify with their partner during the lesson.
7. **Parallel Teaching is used for at least 15 minutes during the lesson to provide instruction, review, and/or assistance to students while they practice a skill.**	Co-teachers must divide the class into two groups where there is instruction, review or practice of the same or very similar content between the two groups for a minimum of 15 minutes.

If there was not 90% agreement, the observers did this for additional lessons until there is 90% agreement. Likewise, the observers were trained on how to rate student engagement using the four levels of engagement and momentary time sampling. This process repeated until there was 90% agreement as well. Additionally, the protocols for the different types of coaching are included (see Figure 5). By using specific protocols, implementation fidelity could be tracked at each point throughout the study, to improving the quality and results of this study, while increasing the likelihood and ease of replicating and building upon this work. The adapted Treatment Acceptability Rating Form (TARF, Reimers & Wacker, 1988; see Figure 3) helped determine the social validity of this study in the eyes of its participants by asking them directly about the acceptability of these procedures and the likelihood that they would continue using these practices.

Procedure

During this study, observers used the PTOS (adapted from Friend & Bursuck, 2009; Murawski & Lochner, 2017), the rubric for rating student engagement (adapted from Junod et al., 2006), the training protocols for peer coaching and IOA, the protocol for traditional coaching, the protocol for implementing BIE coaching during lessons, and the adapted Treatment Acceptability Rating Form (TARF, Reimers & Wacker, 1988). The PTOS included aspects of co-teaching from the Co-Teaching Core Competencies Observation Checklist (Murawski & Lochner, 2017) that are considered good co-teaching practices regardless of the co-teaching model.

Baseline

During baseline, the co-teachers were rated on their co-teaching practices on the PTOS regardless of the co-teaching model they employed. The co-teaching models that the dyad used were recorded for observational notes. A ceiling effect in the intervention was possible if the co-teachers knew specifically they were being rated on their use of one co-teaching model as they may have adjusted their typical teaching to use parallel teaching, which would not have been an accurate representation of their performance prior to intervention, so the co-teachers did not know what co-teaching model was the focus prior to or during baseline. For each baseline session, co-teachers were observed and rated on the PTOS without any coaching or feedback. After a minimum of five baseline sessions, if the data were stable or there was a negative trend, the dyad moved into

the peer-coaching phase. If the data was not stable or negative trend, data collection in baseline continued. Each dyad had at least three consecutive baseline sessions prior to entering intervention, and each dyad not yet in intervention had one baseline session that coincides with when a new dyad enters intervention.

Intervention procedures

After a dyad completes the baseline phase of the study, the co-teachers were trained on the PTOS by the author and how to utilize parallel teaching in their classrooms. This training lasted approximately 15 minutes for each dyad. After explaining the different criteria on the PTOS, each dyad had the opportunity to ask any clarifying questions about how they will be rated. The author made it clear that after each observed lesson, the co-teachers were to rate their own performance, then they would compare their ratings with their partner.

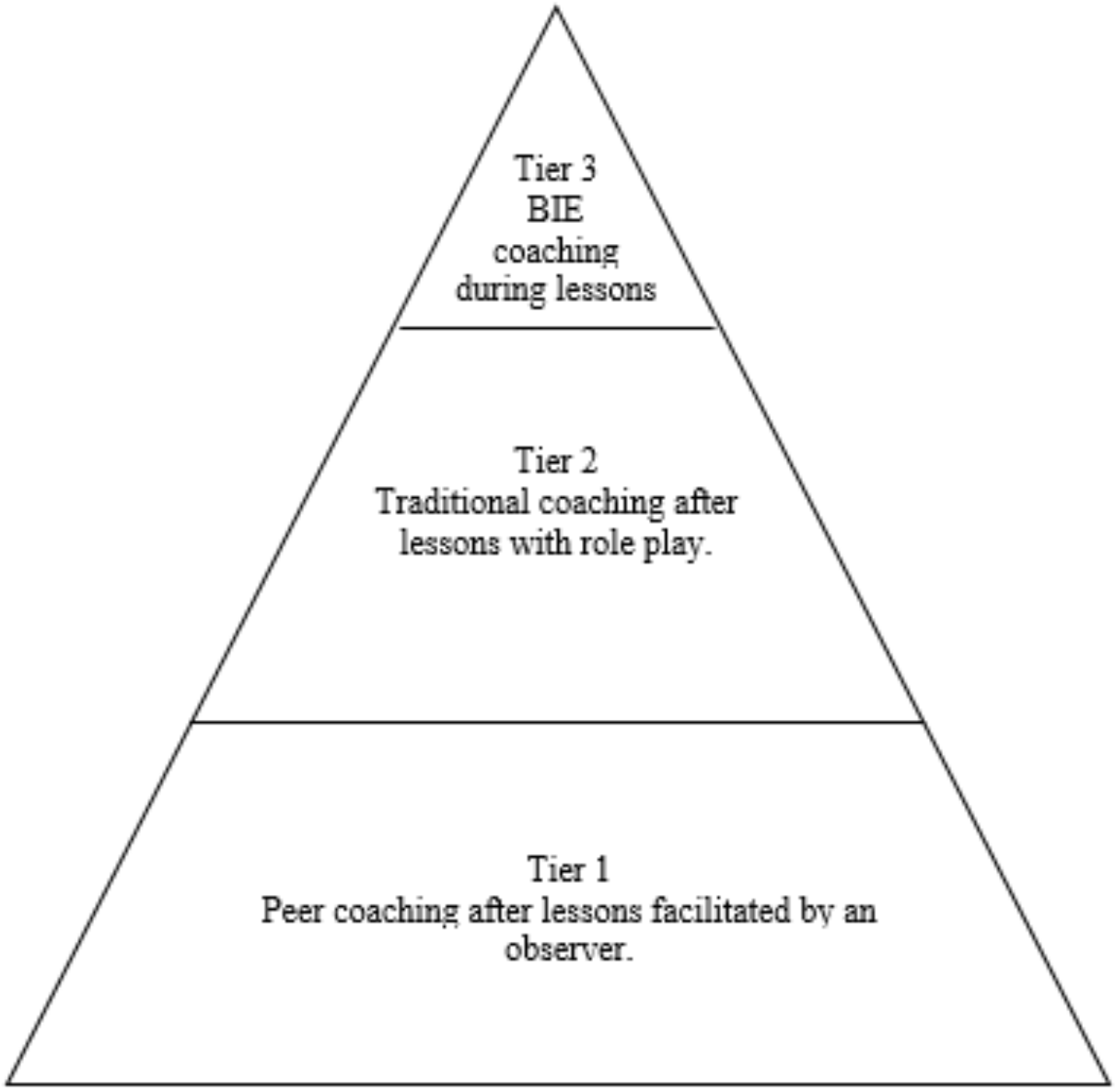

Figure 2 *Tiers of Intervention*

Peer coaching

During the first tier of the intervention, each co-teacher rated the observed lesson and engaged in a peer coaching session where both co-teachers discussed why they rated the lesson as they did, particularly discussing any areas of disagreement with their co-teacher or areas in which they did not satisfy a criterion, although these peer ratings were recorded, the official rating of the lesson was the author's. For example, if one co-teacher rated the lesson as showing evidence for

intentional grouping and the other did not, then the co-teachers discussed why each rated this differently and how to be sure to use intentional grouping in the future. If both agreed that there was not intentional grouping, then the co-teachers discussed how they would satisfy this criterion in the future. During these peer coaching sessions, the rating of the lesson was not shared with the participants and only clarifying questions about the observation scale were answered. After a minimum of five sessions in the peer coaching phase, if the rating was not 11 out of 14 on the PTOS for three or more sessions with a stable or positive trend, the dyad moved into the traditional coaching phase. The criteria of 11 out of 14 was decided upon by the author as it allows the participants some flexibility on what is an acceptable level of performance. This not an unreachable standard, yet it requires each co-teacher to fully meet at least four of the seven criteria on the PTOS with three partially met criteria. With only a 15-minute window of observation, it may be difficult to fully meet each of the seven criteria, but a score of 11 or higher shows that the majority of the criteria were fully met.

Peer Coaching Procedures

1. Say to the co-teachers, "thank you for taking the time to participate in this peer coaching session today."
2. Give the co-teachers the PTOS and ask them to complete it separately.
3. After co-teachers finish rating their lessons, ask them to compare their ratings.
4. For each criterion where there is a disagreement or both teachers rated a criterion as not met, the co-teachers need to discuss why the criterion was not met and how it will be met in the future.
5. The rating of the lesson will not be shared.
6. Only answer questions about the rating scale will be answered.
7. There will be no suggestions on how to meet criteria in the future other than clarifying the rating scale.

Traditional Coaching Procedures

1. Say to the co-teachers, "thank you for taking the time to participate in this coaching session today."
2. Give the co-teachers the PTOS and ask them to complete it separately.
3. After co-teachers finish rating their lessons, ask them to compare their peer and observer ratings.
4. For each criterion where there is a disagreement or all rated a criterion as not met, the co-teachers will be asked if they have any questions about how the criterion is rated.
5. The co-teachers will be asked how they can satisfy the criterion in the future. The coach will tell the co-teachers if their ideas will satisfy the criteria or not and offer recommendations to meet the criterion if necessary.
6. The co-teachers will engage in role play to practice what they need to do to meet criteria.
7. The co-teachers will be asked if they have any additional questions. Once questions are answered, the co-teachers will be thanked for their time.

BIE Coaching Procedures

1. During the lesson, the coach will use the BIE device to provide behavior-specific praise to the co-teachers as they satisfy criteria on the PTOS.
2. If co-teachers identified specific areas for feedback during the previous coaching session, then, the coach will provide feedback on these criteria during the lesson.
3. Before the coaching session, say to the co-teachers, "thank you for taking the time to participate in this coaching session today."
4. Give the co-teachers the PTOS and ask them to complete it separately.
5. After co-teachers finish rating their lessons, ask them to compare their ratings and the ratings of the coach.
6. For each criterion where there is a disagreement or all rated a criterion as not met, the coach will ask if the co-teachers have any questions about how the criterion is rated.
7. The coach will ask the co-teachers how they can satisfy the criterion in the future. The coach will tell the co-teachers if their ideas will satisfy the criteria or not and offer recommendations to meet the criterion if necessary.
8. The coach will have the co-teachers engage in role play to practice what they need to do to meet criteria.
9. The coach will ask the co-teachers if there are specific criteria in which they want BIE feedback during the following lesson. The coach will take note of these criteria and will give the relevant feedback during the next lesson.
10. The coach will ask the co-teachers if they have any additional questions. Once questions are answered, the coach will thank the co-teachers for their time.

Figure 3 *Intervention Procedures for Implementation Fidelity*

Traditional coaching

The second tier of the intervention was traditional coaching. In traditional coaching, the author's rating was added to the co-teachers' self-ratings. Each coaching session took place after every observed lesson, either in the classroom where the lesson took place or another space in the co-teachers' school. These sessions lasted no more than 30 minutes, and the session began by reviewing the rating of the lesson by the author and co-teachers. Any disagreements between the three parties or unsatisfied criteria from the author's rating was discussed with opportunities to improve performance on these criteria in future lessons. For each of these disagreements or unsatisfied criteria, the co-teachers were asked if they have any questions about how the criterion was rated. Second, the co-teachers were asked how they think they can satisfy this criterion in the future, and they received feedback based on their description if their solution would satisfy the criterion or not and offer any relevant suggestions. Third, the co-teachers were asked to engage in a brief role play of how this would look in their classroom. For example, if the co-teachers were struggling with asking questions at different levels from recall to higher ordered thinking, the co-teachers selected a future math problem and practice asking questions about the problem at these different levels. One co-teacher acted as the student in these role plays, then the author and co-teachers debriefed after with feedback on the co-teacher's performance as it would be rated on the PTOS. After a minimum of five sessions in the traditional coaching phase, if the rating was not 11 out of 14 on the PTOS for three or more sessions with a stable or positive trend, the dyad moved into the BIE phase (See Figure 4 for task analysis and example of coaching session).

Bug in Ear Coaching

During the third tier of the intervention, co-teachers received coaching feedback as they were teaching. This extra layer of support was added to the ongoing coaching sessions that would continue to happen as in the traditional coaching phase. All feedback was specific to teacher behavior related to the PTOS. The focus was to provide the co-teachers with BSP as they satisfied criteria on the PTOS. Using BSP with BIE for co-teachers showed some promise in Ploesl & Rock (2014), so focusing on providing praise for satisfying criteria during the observation was this study's tier three intervention. Additionally, if the co-teachers identified any specific area(s) they wanted BIE feedback in lessons from the previous lesson's coaching session, there was specific

feedback on this during BIE coaching. For example, if one teacher tended to manage all of the behavior challenges in the classroom and the co-teachers needed a reminder that both co-teachers should be doing this, when a behavior that needed to be addressed occurred, the feedback was something like, "remember, both of you need to engage in classroom management." If the co-teachers acted on this feedback and demonstrated that they both are engaging in classroom management, then the coach provided BSP saying, "nice work, you have satisfied the classroom management criterion." After a minimum of five sessions in the BIE phase, if the rating was not 11 out of 14 on the PTOS for three or more sessions with a stable or positive trend, the intervention continued with ongoing visual analysis to determine if there was a stable or positive trend during this phase. Once there was a positive or stable trend or if there was not an effect after progressing through these three tiers of intervention, the study ended for this dyad.

1. Thank each co-teacher for attending the coaching session.
2. Ask the co-teachers for their PTOS.
3. Compare the co-teachers' ratings to the observer's.
4. Where the co-teachers do not meet criteria on observers PTOS or there is disagreement between the the three ratings, the observer will ask the co-teachers if they understand how the criterion is rated.
5. If the co-teachers have questions about the rating, the observer will explain how to meet criterion and why the lesson did not meet criterion.
6. After answering the question (if there is one), the observer will ask the co-teachers how they will meet any criteria not met in their next lesson.
7. If necessary, the observer will either confirm or correct the recommendation of the co-teachers.
8. Once there are examples of how co-teachers will meet criteria in the future, the co-teachers will role play a scenario from a future lesson where they can meet the missing criteria.
9. The observer will ask if there are any clarifying questions from the co-teachers and answer them.
10. The observer will thank the co-teachers for their time and end the coaching session.

Observer: "Thank you both for coming today. Let's look at our ratings on the PTOS (co-teachers and observers look at the PTOS forms). Based on my rating, I have you not meeting criteria on both teachers engage in classroom management strategies, assisting all students in your group, and both teachers engage students in questions at a variety of levels. I do not see any disagreements between your ratings. Do you have any questions about how these criteria are rated?"

Co-teacher 1: "I don't"

Co-teacher 2: "How can we both engage in classroom management strategies when the students with disabilities respond best to me?"

Observer: "The goal is that both of you engage in addressing classroom management issues to avoid one teacher only having that role. It may make sense for one of you to address the problem behavior of particular students based on relationships, but ideally both of you share in this role, which should result in students being more responsive to both of you when addressing these issues. In this lesson, I only saw you (co-teacher 2) addressing problem behavior and setting behavioral expectations, so you did not meet criteria."

Co-teacher 2: "Thank you. That helps."

Observer: "How do you plan to meet these criteria in your next lesson?"

Co-teacher 1: "I need to make a point to address behaviors and not just rely on you (co-teacher 2) to handle all of that."

Figure 4 *Coaching Task Analysis and Example*

Figure 4 continued

Co-teacher 2: "What about assisting all students in our group? Do we just meet that by making sure we talk individually to each student in our group at some point in the lesson, or is there something more specific that we need to do?

Observer: "Yes, that would work. I am watching to see that you have an interaction with each of the students in your group. This can be a verbal interaction where you ask the student a question, check in with the individual student during independent practice. You generally teaching the whole group does not satisfy this unless you have a specific interaction with each individual student. You can script out questions for individual students if you are having trouble satisfying this.

Co-teacher 1: "Ok, do you want to do the part of Friday's lesson, where we re-teach systems of equations then release them to do group work?"

Co-teacher 2: "Sure, you do the mini lesson, then I will set up the expectations for the group activity."

Co-teacher 1: "Ok, everyone, remember last week when we introduced how to solve a system of equations using elimination, where you can cancel out a variable, then create a new equation to solve for the remaining variable? We are going to review that today, then Mrs. Smith and I will be checking in with each of you as you work in groups. You can solve these equations with elimination or substitution, remember I prefer substitution and Mrs. Smith is our elimination expert."

Observer: "Yea, I like elimination, it's way faster. I can get done with my homework faster then play on my computer longer. I'm going to get a new game soon…"

Co-teacher 2: "Let's stay focused on the lesson now. We can talk about that later."

Co-teacher 1: "Let's look at one example of elimination to refresh your memory before you work in groups. Looking at these equations, which variable should we eliminate?"

Observer: "I think we should eliminate the x's."

Co-teacher: "Yes, why is that the best variable to eliminate at first?"

Observer: "Because one equation has a positive two x and the other a negative two x. So when you add the equations together, the x's eliminate and you can solve for y."

Co-teacher 1: "Fantastic answer, then we can solve for y and we get a value of 3. Then we are done, right?"

Observer: "No, we need to solve for x too."

Co-teacher 1: How do you know that? What about our answer for these systems makes us need two answers?"

Observer: "I'm not sure. I know that there are two variables in these equations."

Co-teacher 1: "Think about how we can show these answers visually beyond just numbers."

Observer: "You can graph these points on a graph, and you need two numbers for a point."

Co-teacher 1: "Excellent, I like how you stuck with that until you got the right answer, keep up that effort, everyone. So we can take our y value, and put it in an equation then, we solve for x, giving us an ordered pair (x, y) answer. In your groups, you are going to work through a few

Figure 4 continued

different types of these systems. As a reminder, we want voice levels low so we all can work, and conversations should be on topic. Mrs. Smith has some more detail about the activity."

Co-teacher 2: Yes, your groups are working together to solve these equations, and each person has a different role, one person will be the leader whose job is to make sure you are working together and on task. We have already spoken to the leaders of each group. Leaders, raise your hands. On the left of the leader is the groups, substitution specialist, on the leader's right is your elimination specialist. The specialists will take the lead on solving problems of their respective types. The substitution specialist will solve a problem your group decides is best for substitution and likewise for the elimination specialist. The last person in your group is quality control. Your job is to make sure work is done correctly and the best method is chosen. You have 15 minutes to complete this activity. Any questions?"

Observer: "Ok, that was great. I like how you consistently used we language throughout and reiterated the specialty of each teacher and that both of you are available to help. For classroom management, this would meet the criterion because Mrs. Jones set the behavioral expectations and used praise for effort. As long as you get around to each student, you will satisfy the interaction criteria for each student. Also, you would meet the questions at multiple levels criteria because you asked why questions to get further explanation after a correct answer was given. Any questions about this role play or the ratings?"

Co-teacher 1: "No."

Co-teacher 2: "No."

Observer: "Great. Thank you for your hard work. I look forward to the next lesson I see. I have it on my schedule to see you on Tuesday at 11. Does that work for you?"

Co-teacher 2: "Yes that will work, my IEP meeting got rescheduled to 1 pm, so I will be there."

Observer: "Great. See you then."

Data Analysis

All the data collected was analyzed through visual analysis. As the primary dependent variable, the participants' ratings on the PTOS determined if there were to be a phase change or completion of the study. The criteria of a rating of 11 out of 14 or higher for three or more sessions with a positive stable trend was set as the completion criteria. The use of visual analysis allows for some flexibility to continue in a phase prior to ending the study or a phase change, as long as there are at least five data points in a phase. This analysis was done by the author and the dissertation committee chair. Both individuals had to agree prior to any decision relating to phase change or completion of the study. Additionally, Tau-u calculations were done for both PTOS and student engagement data. This allows for more specific analysis of the data beyond visual analysis between phases.

Inter-Observer Agreement

In order to meet WWC standards, IOA data was collected for at least 20% of sessions in each phase for each dyad and for student engagement. This was the minimum, so whenever a trained secondary observer was available to attend a session, IOA was collected. Agreement was calculated by dividing the number of agreement by the sum of the number of agreements and disagreements and multiplying by 100 to get a percentage. An acceptable level of agreement was 80% or higher.

Implementation fidelity

To meet CEC (2014) Standards for Evidence-Based Practices in Special Education, implementation fidelity data was tracked for at least 20% of all coaching sessions for each dyad in each phase to ensure that the intervention procedures were followed as written. A secondary observer verified that interventions were implemented with 100% fidelity for at least 33% of sessions within each tier of the intervention (see Figure 5).

CHAPTER 4. RESULTS

There were a total of four research questions in this study.

1. How does peer coaching affect the quality of co-teachers' use of parallel teaching? If not responsive to peer coaching, is more intensive coaching within MTSS necessary using first traditional coaching then BIE coaching?
2. Does co-teaching coaching lead to changes in student engagement?
3. How acceptable do participants find the use of a MTSS for coaching co-teachers in parallel teaching?
4. How likely are participants to continue to use peer coaching with their co-teacher after the conclusion of the study?

The primary dependent variable was teacher performance on the PTOS. Using a multi-probe design, all dyads experienced five sessions of baseline at the beginning of the study. After this, dyad one began intervention, and the interventionist and secondary observers collected a baseline data point for the other two dyads to coincide with dyad one beginning intervention. Prior to each dyad beginning intervention, there were three consecutive baseline data points. Due to the timing of participation withdrawal of one dyad, dyad three began intervention on session 14 rather than session 12 because dyad three needed three consecutive data points before beginning intervention.

Impact on Quality of Co-Teachers' Use of Parallel Teaching

In Figure 7, the rating on the PTOS corresponds to the y-axis, with each observation session corresponding to the x-axis. Classroom observations of co-teaching were conducted prior to baseline for all teachers. Dyad one was observed by the first author to engage in station teaching and one-teach-one-assist during the five baseline sessions. Both teachers in dyad one had the same ratings during these five sessions with a mean of 4 (range 3-6). After five sessions, the data were stable, since the rating never exceeded the score of 6 from session two. Dyad two was observed by the first author using the one teach, one assist model in all baseline sessions. Ratings during baseline were a mean of 3.75 (John; range 0-6) and 3.875 (Daniel; range 0-6). The data were stable after eight sessions as each teacher earned a rating of 6 in session six, then for the two sessions immediately following, both teachers earned a rating of 4.

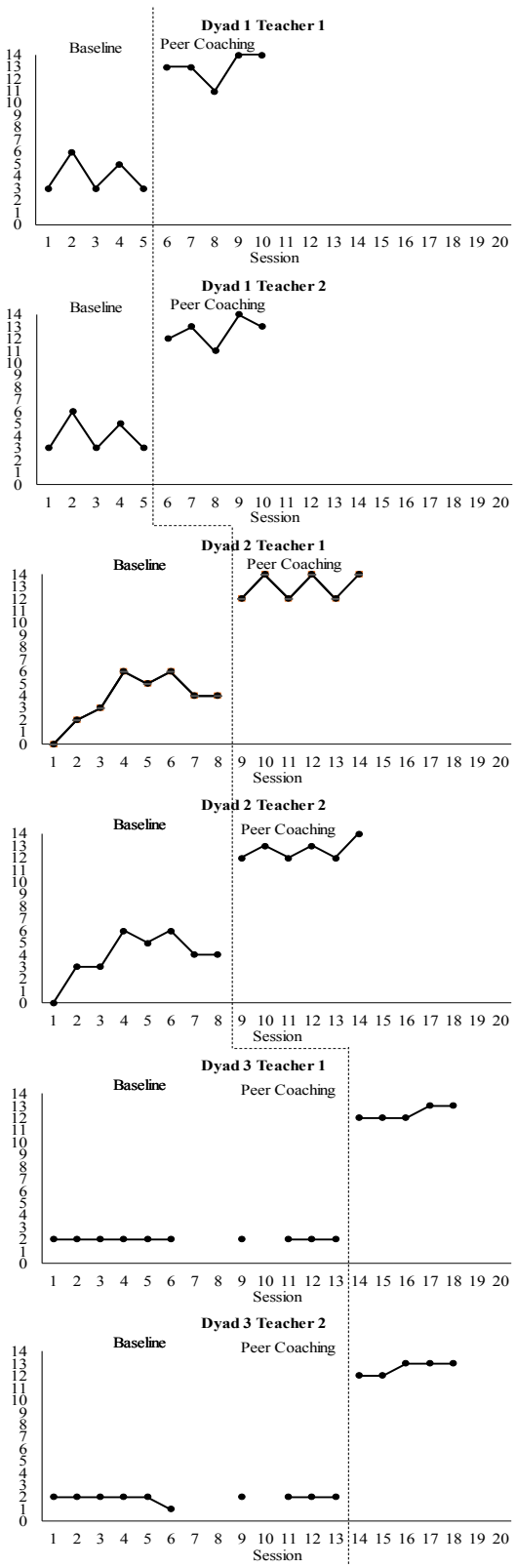

Figure 5 *Co-teachers' Performance on Parallel Teaching Observation Scale*

Dyad three used a one teach, one assist model during all baseline sessions, with a mean of 2 (Isaac; range 1-2) and 1.9 (Allan; range 1-2). The baseline data were stable with the rating of 1 or 2 for each session. There were 10 baseline sessions with this dyad as it was the last to enter intervention based on the multi-probe design. After these baseline sessions, each dyad received training from the first author on the PTOS and how to implement parallel teaching in their classroom.

Upon implementing peer coaching, dyad one increased their performance on the PTOS, with a mean of 13 (Katie; range 11-14) and 12.6 (Penny; range 11-14). Both teachers in dyad one demonstrated and intervention effect and stable trend. There was an immediate increase to a rating of 13 and 12 respectively. In session eight, both teachers earned a rating of 11, a decline from other intervention sessions, but both teachers earned ratings of 13 or 14 in the final two sessions to stabilize. Both teachers met or exceeded the criteria of 11 out of 14 on the PTOS each of the five sessions, when the criteria for completion was an 11 or better in at least three sessions. The Tau-u score between baseline and intervention was 100%.

For dyad two, there was an immediate effect upon introducing peer coaching as both teachers earned a rating of 12. During this phase, the mean ratings were 13 (John; range 12-14) and 12.67 (Daniel; range 12-14). The data were stable for both teachers as the rating never dropped below the first intervention data point, and both teachers earned a rating of 14 in the fifth intervention session after a rating of 12 for both in the fourth intervention session. Both teachers exceeded the criteria for completion by earning a rating of 11 or higher in all five sessions. The Tau-u score between baseline and intervention was 100%.

For dyad three, there was an immediate effect upon introducing peer coaching as both teachers earned a rating of 12. During this phase, the mean ratings were 12.4 (Isaac, range 12-13) and 12.6 (Allan; range 12-13). The data were stable as there was a slight positive trend, increasing ratings from 12 to 13 with no regression. The dyad exceeded the criteria for completion of the study as each teacher earned a rating of 12 or 13 in all intervention sessions. The Tau-u score between baseline and intervention was 100%.

The overall Tau-u score for all three dyads between baseline and intervention was 100%.

Co-teachers' peer coaching ratings

As part of the peer coaching intervention, each teacher rated their own performance on the observed lesson, then discussed with their partner areas of disagreement or when they did not meet

the criteria on the PTOS to identify how to meet the criteria in the following observation. In comparing the teachers' ratings with the author's, there was a high degree of agreement. For each rating, the number of agreements were divided by the number of ratings, then multiplied by 100 to get a percentage of agreement between the teacher's self-evaluation and the first author's. For Katie, there were three disagreements out of the 35 ratings, resulting in 91.4% agreement. For Penny, there were four disagreements out of the 35 ratings, resulting in 88.6% agreement. For John, there were three disagreements out of the 42 ratings, resulting in 92.6% agreement. For Daniel, there were five disagreements out of 42 ratings, resulting in 88.1% agreement. For Allan, there were two disagreements out of 35 ratings, resulting in 94.3% agreement. For Isaac, there was one disagreement out of 35 ratings, resulting in 97.1% agreement.

Impact of Coaching Co-Teachers on Student Engagement

The second dependent variable is student engagement, to determine if there is a relationship with teacher performance and the level of student engagement. Students were rated as either on-task or off-task during observations. A random student was selected each minute, and using momentary time sampling (Kennedy, 2005) the level of engagement was coded at the end of every minute. Unlike teacher performance, there is only data set per dyad, not separated by teacher. Since every observation was 15 minutes long, the highest possible rating for student engagement is 15 students on-task.

During baseline, dyad one's mean for student engagement was 8.8 (range 7-11). The data had a negative trend, with the first session having the highest rating, then stabilizing at 8 in the fifth session. Dyad two's mean was 7.5 (range 3-10). The data were stable after eight sessions. In the final four sessions, the student engagement rating was 8 each time. Dyad three's mean was 8.7 (range 4-15). These data were less stable than the other dyads with the large range of ratings, and the higher ratings. After 10 baseline sessions, the ratings were somewhat stable with at 7 with two consecutive sessions at this rating.

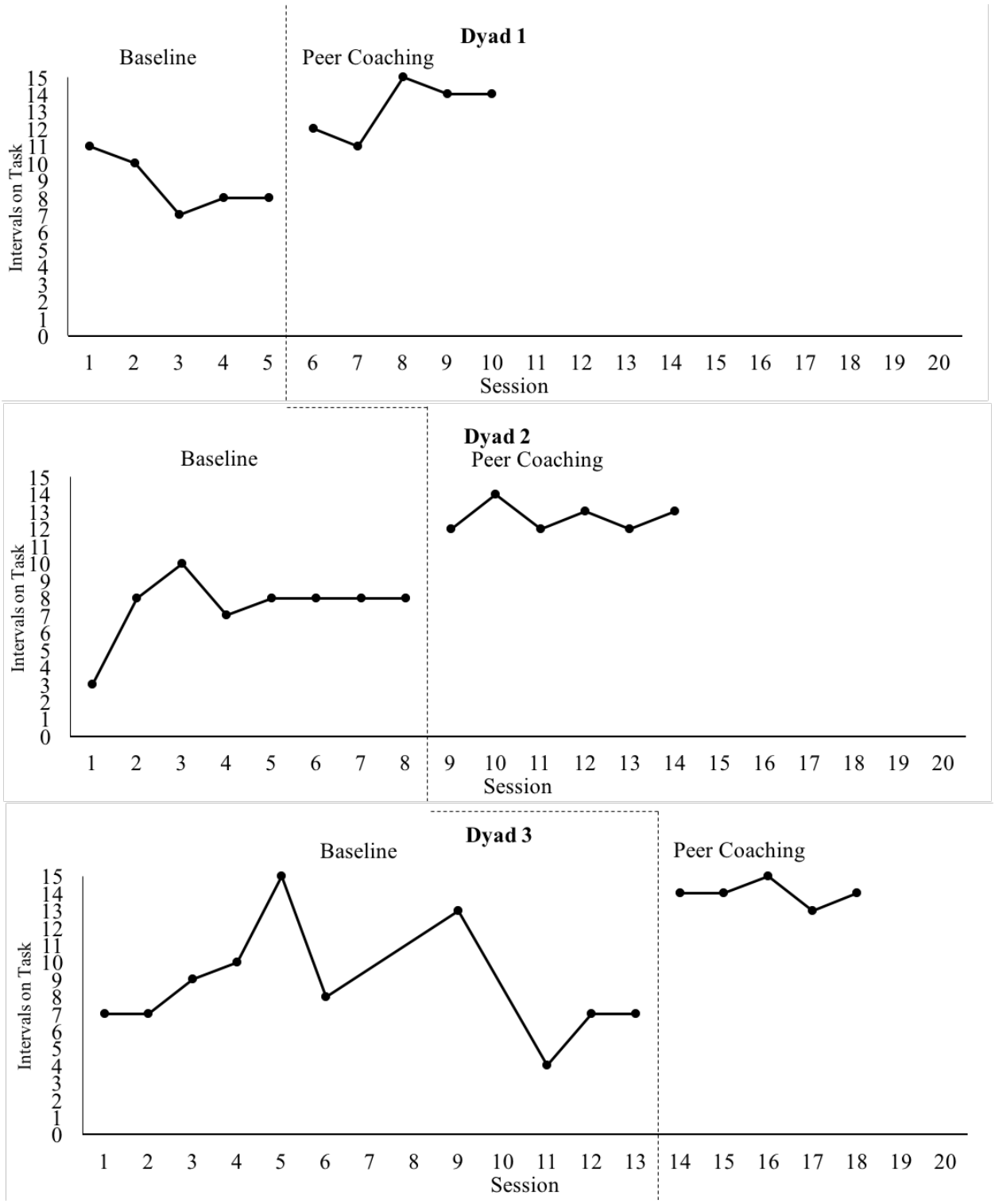

Figure 6 *Student Engagement Data*

After implementing the peer coaching intervention, dyad one increased student engagement to a mean of 13.2 (range 11-15). There was a positive trend in the intervention phase, and the data stabilized in the final two sessions with a rating of 14 each time. Between baseline and intervention there was a Tau-u score of 96%. After intervention, dyad two increased student engagement to a mean of 12.67 (mean 12-14). The data were stable after the six intervention sessions as all data was within a range of three and did not continue decreasing in the sixth session, after a decrease in the fifth session. Between baseline and intervention, there was a Tau-u score of 100%. After intervention, dyad three increased student engagement to a mean of 14 (range 13-15). The data were stable after five sessions as there was a range of three, and the rating rose to 14 in the fifth session after a rating of 13 in session four. There was a Tau-u score of 80% between baseline and intervention. Overall for all three dyads, there was a Tau-u score of 91.8%.

Inter-Observer Agreement

On the PTOS, inter-observer agreement data were collected for each teacher in each phase for a minimum of 33% of sessions. These sessions were to exceed the WWC research standards criteria of a minimum of 20% of sessions in each phase. Whenever a secondary observer was available, he or she came and collected IOA data. The number of agreements were divided by the number of ratings, then multiplied by 100 to get an agreement percentage. For dyad one, IOA was collected for 60% of baseline sessions with 95.2% agreement for both teachers. In intervention, IOA data was collected for 40% of sessions with 92.8% agreement for Kelly and 100% agreement for Penny. For dyad two, IOA data was collected for 37.5% of baseline sessions with 95.2% agreement for both John and Daniel. In intervention, IOA data was collected for 33% of sessions with 92.8% agreement for both John and Daniel. For dyad three, IOA data was collected for 60% of baseline sessions with 100% agreement for both Allan and Isaac. In intervention, IOA data was collected for 40% of sessions with 100% agreement for both Allan and Isaac.

Table 4 *Inter-observer Agreement on PTOS Data*

PTOS IOA	Teacher	Baseline Reported	Agreement	Range	Intervention Reported	Agreement	Range
Dyad 1	Kelly	60%	95.2%	85.7% - 100%	40%	92.8%	85.7% - 100%
	Penny	60%	95.2%	85.7% - 100%	40%	100%	100%
Dyad 2	John	37.5%	95.2%	85.7% - 100%	33%	92.8%	85.7% - 100%
	Daniel	37.5%	95.2%	85.7% - 100%	33%	92.8%	85.7% - 100%
Dyad 3	Allan	60%	100%	100%	40%	100%	100%
	Isaac	60%	100%	100%	40%	100%	100%

For student engagement, inter-observer agreement data were collected for each teacher in each phase for a minimum of 33% of sessions. The number of agreements were divided by the number of ratings, then multiplied by 100 to get an agreement percentage. For dyad one, IOA was collected for 60% of baseline sessions with 97.7% agreement. In intervention, IOA data was collected for 40% of sessions with 100% agreement. For dyad two, IOA data was collected for 37.5% of baseline sessions with 97.7% agreement. In intervention, IOA data was collected for 33% of sessions with 93.3% agreement. For dyad three, IOA data was collected for 60% of baseline sessions with 100% agreement. In intervention, IOA data was collected for 40% of sessions with 100% agreement.

Table 5 *Inter-observer Agreement on Student Engagement Data*

Student Engagement IOA	Baseline Reported	Agreement	Range	Intervention Reported	Agreement	Range
Dyad 1	60%	97.7%	93.3% - 100%	40%	100%	100%
Dyad 2	37.5%	97.7%	93.3% - 100%	33%	93.3%	86.6% - 100%
Dyad 3	60%	100%	100%	40%	100%	100%

Treatment Fidelity

During intervention, treatment fidelity data were collected to ensure that peer coaching intervention procedures were followed. For dyad one, treatment fidelity data was collected for 40% of sessions with 100% fidelity. For dyad two, treatment fidelity data was collected for 33% of sessions with 100% fidelity. For dyad three, treatment fidelity data was collected for 40% of sessions with 100% fidelity.

Table 6 *Treatment Fidelity Data*

Dyad	Teacher	Treatment Fidelity (percentage of sessions)	Treatment Fidelity
Dyad 1	Kelly	40%	100%
	Penny	40%	100%
Dyad 2	John	33%	100%
	Daniel	33%	100%
Dyad 3	Allan	40%	100%
	Isaac	40%	100%

Social Validity

Social validity data was collected to answer the research questions pertaining to the acceptability and the likelihood of continued use of these coaching interventions after the conclusion of the study. At the conclusion of the study, each of the six teachers who participated completed a TARF rating form adapted for this study (see Figure 3). A Likert scale allowed for ratings between 1 (not at all) to 7 (very much) on the various questions. The form included questions about the likelihood of continued use for traditional and BIE coaching. Since no dyad progressed to these tiers of coaching, those questions were removed.

Participants responded positively to the following questions: (a) "How clear is your understanding of the coaching procedures from the study?" (M = 6.67); (b) "How acceptable do you find the procedures in coaching you to be a better co-teacher?" (M = 6.67); (c) "How reasonable do you think it was to participate in this study?" (M = 7); (d) "How likely are you to use peer coaching with your co-teacher in the future?" (M = 5.83); (e) "How likely would you be to recommend to another teacher to implement the coaching strategies from this study?" (M = 6.67). With seven as the highest possible rating for all of these questions, participants indicated positive feelings toward the acceptability, how reasonable participation was, likelihood of continued use, and likelihood of recommending the intervention to colleagues. The participants indicated low levels of agreement with the following questions: (a) "How costly would it be to implement coaching like this in your school?" (M = 2.67); (b) "How disruptive was participation in this study to your class?" (M = 1.33); (c) "How much discomfort did you experience in participating in this study?" (M = 2.33). With a rating of one as the lowest possible response, the participants indicated low levels of perceived cost, disruption, and discomfort.

CHAPTER 5. DISCUSSION

Impact of Peer Coaching on Co-Teacher Performance

The purpose of this study was to determine how effective different models of coaching were in affecting co-teacher performance by applying different tiers of support based on co-teachers' needs. Also of interest was how this coaching affected the level of student engagement. Lastly, the level of acceptability and the likelihood of continued used of the coaching was of interest. This study is unique in that it addresses the research to practice gaps related to overreliance on the one teach, one assist model by focusing specifically on parallel teaching. This focus on parallel teaching was because this model highlights aspects of quality co-teaching, forcing small group instruction and facilitates more student to teacher interaction, which should increase student engagement (Bouck, 2007; Dieker, 2001; Friend et al., 2010; Little & Dieker, 2009; Volonio & Zigmund, 2007; Zigmund & Matta, 2005). Additionally, this was the first study to implement an MTSS model for coaching specifically with practicing co-teachers of P-12 students. The MTSS model was adopted for tiers of coaching support to be as minimally invasive as possible and provide co-teachers the appropriate level of support. The three tiers of support were first peer coaching, then traditional coaching, and finally BIE coaching. If co-teachers did not meet criteria on the PTOS, then they would move to the next tier of coaching support. Fortunately, all three pairs of co-teachers met criteria for completion in tier one, peer coaching, showing a strong effect (Tau-u = 100%). Additionally, there was an effect on student engagement (Tau-u = 91.8%), and the co-teachers indicated high levels of acceptability and likelihood of continued use of peer coaching. The results of this study show some promise in using peer coaching as a method to improve teacher performance, specifically for co-teachers.

The findings from this study support the findings of previous research in terms of the effectiveness of coaching practices to improve teacher performance. Kraft, Blazer, and Hogan (2018) conducted a meta-analysis of 60 randomized controlled trials and found coaching to produce positive effects on instructional practices (pooled effect size of .49) and student academic achievement (pooled effect size of .18). Most of the included studies in the analysis focused on literacy coaching in elementary schools, with some studies examining the coaching effects on classroom management and universal instruction practices related to student outcomes (Fabiano,

Reddy, & Dudek, 2018; Reddy, Dudek, & Lekwa, 2017). These positive findings regarding instructional coaching in the research literature are consistent with the results of this study as there were effects on both instructional practices and classroom management.

A challenge of implementing instructional coaching is that it can be difficult logistically for administrators to fit this in their schedule, or schools create positions specifically for instructional coaches. Instead of relying on someone outside of the classroom, a major benefit of the results in this study is that co-teachers were able to coach each other on how to improve their practices. From the interventionist perspective, all that took place was educating the co-teachers on the PTOS and facilitating the peer coaching. The co-teachers who participated were able to meet and exceed the criteria of the PTOS with this level of coaching only. This is encouraging for the ability of teachers to coach each other, rather than labor-intensive coaching, which may not always be feasible in practice. By teachers coaching each other, there is more opportunity for feedback than what would be typical for coaching and evaluation practices. If both teachers are fully engaged in co-teaching (co-planning, co-instructing and co-assessing), then one could assume that reflecting on their teaching practices would be a normal practice. By providing some co-teaching specific guidance (i.e. PTOS), peer coaching within the co-teaching partnership could have more impact on teacher performance. The participants in this study had minimal training and knowledge of co-teaching models and practices, so the PTOS set the expectation for what co-teachers would do in terms of using parallel teaching, interacting with students in groups, and asking higher ordered thinking questions. Based on this results in the study, one can infer that this had an effect on improving teacher performance, which may have more of a benefit than a traditional workshop on co-teaching models and practices.

Something to consider about the effectiveness of this intervention is the role of the PTOS as the mechanism for the effect. The PTOS was not introduced to participants until the training after baseline. Since the participants were unaware that they were specifically being evaluated on their use of parallel teaching. Had they known this, they may have changed their behavior in baseline. This was intentional in the design so that the baseline phase would represent “business as usual” in these classrooms. All dyads used the one teach, one assist model in baseline, with dyad 1 using some station teaching. Additionally, the PTOS sends a clear message about what is important to the observer. This may mean that the rubric itself caused the change in behavior, not

necessarily the peer coaching aspect where co-teachers reflected on the lesson. By providing these co-teachers with a rubric, they had opportunity to self-monitor their goals based on the criteria. These criteria can also function as a prompt or reminder for teachers. For example, if the co-teachers were working on higher ordered questioning, they now had a common language and understanding of this criterion which may differ from other evaluation tools or expectations from administration.

Application of MTSS Model in Instructional Coaching

The intent of this study was to test MTSS for coaching co-teachers. Results show improvement with tier 1 support (peer coaching). While this study did not require the use of the MTSS system, there may be instances where co-teachers would not improve their performance to the same degree with only peer coaching. All the co-teachers who participated in this study were able to meet the criteria for completing study with peer coaching only. This is largely due to the eagerness of all participants to understand and apply the PTOS.

Instructional coaching has become a popular professional development approach for administrators to employ since it has advantages over traditional workshop-based professional development and the limitations of this model in transferring knowledge and skills to the classroom (Denton & Hasbrouck, 2009; Gulamhussein, 2013). The research cites a consistent gap between what should be happening in co-taught classrooms and what is actually happening. Instead of multiple models of co-teaching with a focus on small group instruction and high levels of teacher-student interactions, there is consistently a reliance on the one teach, one assist model (Friend, 2014; Murawski, 2009; Murawski & Lochner, 2010; Walther-Thomas, 1997). This study shows that co-teachers can utilize peer coaching to encourage the use of parallel teaching specifically, which was chosen because it inherently requires small group instruction and more equal roles between co-teaching partners. In these three classrooms, the co-teachers were trained on how to utilize the PTOS and empowered to close this research to practice gap. Each co-teaching pair quickly internalized the PTOS and began using parallel teaching immediately in the intervention phase.

What is interesting about how the different co-teachers internalized and applied the PTOS is that the participants represent different types of training and experience. Dyads one and two are represented by traditionally trained teachers, with two teachers with over ten years of experience

and two with five or fewer years of experience. Then, dyad three is completely different with two teachers with ARC backgrounds, one a teacher in his first year and the other in his third year. All of these co-teaching pairs were in their first year of co-teaching with their partner as well. Given the various levels of experience, type of training, and inexperience in co-teaching with their respective partners, the fact that all three dyads demonstrated an effect is quite promising.

Past research has supported the use of peer coaching as an alternative to traditional coaching (Brengelman, Gertsen, & Morvant, 1995; Goor & Schween, 1997; Nierengarten, 2013; Villa, Thousand, & Nevin, 2008). Co-teachers should observe other co-teaching teams, meet to discuss what they observed and brainstorm ways to try new strategies and techniques (Goor & Schwenn, 1997). The advantage of doing peer coaching with co-teachers is that partners can engage in feedback and reflection with each other, although if other teachers can observe and provide feedback, this is also encouraged. By pushing some of the responsibility for professional development on the co-teachers themselves, they have opportunity to set their own professional development goals and receive support, feedback and encouragement from one another (Villa, Thousand, & Nevin, 2008).

Additionally, there is the consideration that SETs professional development should be differentiated based on their specific role, with an emphasis on ongoing formative feedback, as voiced by the CEC's (2013) position paper on SET evaluation. By utilizing peer coaching or other forms of coaching based upon a co-teaching specific rubric, these recommendations would be satisfied. A rubric such as the PTOS or a similar instrument would be helpful in evaluating the performance of co-teachers as opposed to using the same teacher evaluation tool as one would use for a classroom teachers working alone. Coaching puts a focus on growth and professional development, rather than a summative evaluation, which is the common practice in teacher evaluation.

In future research or in practice, co-teachers may need more support in the form of traditional or BIE coaching. This is why, even if co-teachers are engaged in peer coaching, there should be additional accountability to provide some validity to the way co-teachers are evaluating their performance. It is possible that co-teachers may think they are employing the co-teaching model and/or satisfying other criteria, but an impartial observer like an instructional coach, colleague, or administrator should conduct observations in case more intensive coaching support is needed.

BIE coaching was not needed in this study since all participants met criteria in peer coaching, but BIE coaching is a well-researched method to support teachers. While BIE may seem invasive, those receiving this type of coaching typically have positive attitudes toward the coaching and improve their performance (Leko, Brownell, Sindelar, & Kiely, 2015; Rock, Gree, Ploessl, Maughn, Gable, & Zigmond, 2009; Scheeler, McAfee, Ruhl, & Lee, 2006). Also, there is an opportunity to employ eCoaching when logistics are challenging, utilizing the capabilities of technology to provide BIE coaching at a distance (Dieker, Kennedy, Smith, Vasquez, Rock, & Thomas, 2014). BIE coaching is something that should be considered when co-teachers need more immediate feedback than one would get in peer or traditional coaching.

Impact of Peer Coaching on Student Engagement

While there was not as drastic of an intervention effect on student engagement, there are topics that warrant further exploration. Based on the socioeconomic status (SES) of the students in the participants' schools, poverty emerged as a key discussion point as it relates specifically to classroom management. Along with this, classroom management can be challenging, especially for beginning teachers, as managing student behavior is often cited as a common reason teachers leave the profession (i.e. Gonzalez, Brown, & Slate, 2008). By providing ongoing coaching support, co-teachers can adjust their teaching models to increase student engagement. The results in this study support the claims of others that use of various co-teaching models to facilitate small group instruction will increase student engagement (Bouck, 2007; Dieker, 2001; Volonio & Zigmund, 2007; Zigmund & Matta, 2005).

There is a well-documented relationship between SES and school achievement. A longitudinal study of 25,000 eighth graders found that income level was a significant predictor of student achievement (Grissmer, Flanagan, Kawata, Williamson, LaTourette, 2000). This study examined the National Assessment of Education Progress (NAEP) and found that SES at the state level explained 75% of the variation across states. Other studies have shown that students from families with low SES are less likely than more affluent peers to become proficient in reading or math (Aikens & Barbarin, 2008; Braswell, Lutkus, Grigg, Santapau, Tay-Lima, Johnson, 2001; Denton & West, 2002; Donahue, Finnegan, Lutkus, Allen, & Campbell, 2001; Lee & Reeves, 2012). Hirn, Hollo and Scott (2018) compared teacher practices between high performing schools

and low performing schools, and found more frequent use of opportunities to respond (OTR) to prompts and questions and more feedback from teachers to students. In comparing the SES of students in these schools, generally the lower performing schools have higher rates of poverty. The researchers assert in these environments, it is especially critical for teachers to use empirically supported strategies that will maximize student engagement.

Teachers can increase student engagement through active instruction (Bransford, Brown, & Cocking, 2000; Hattie, 2009). Also, by providing high rates of academic prompts and feedback to students, teachers can decrease disruptive or off-task behavior (Haydon et al., 2010; Harbour, Evanovich, Sweigart, & Hughes, 2015). The increase in academic prompts and feedback are much easier to accomplish when the teacher-student ratio is lower, and since the participants knew they were rated on interactions with students, this likely contributed to the increase in engagement. With the expectation that co-teachers would use parallel teaching, they engaged in this model that naturally addresses the shortcoming of depending on the one teach, one assist model. This model does not utilize both co-teachers in a way to promote small group instruction, thus reducing student engagement and teacher-student interactions (Magiera & Zigmund, 2005). While using the momentary time sample of students may have some shortcomings in measuring student engagement, it did show that students were overall more engaged when the co-teachers began using peer coaching where parallel teaching was always used.

Limitations

The first limitation of this study is the small sample size. With single-case research designs, there are inherently fewer participants, and this study employed the minimum to show an effect with three pairs. The primary reason for this was that many administrators and teachers were hesitant to take on such a commitment of time as participation required. The requirement of frequent observations and coaching sessions between each observation once intervention began was a factor in the low numbers of participants. One thing to consider, however are the responses of the co-teachers who participated related to social validity. The participants all gave the highest possible response (M = 7) for how reasonable participation was in the study. Additionally, there were responses related to high levels of acceptability (M = 6.67), likelihood of continued use (M = 5.87), and lower levels of agreement related to discomfort (M = 2.33), disruption (M = 1.33),

and cost (M = 2.67). While this type of approach may not be the norm, with some coaching, it is feasible to implement. The adoption of the MTSS approach to instruction can reduce the invasiveness and disruption by providing an appropriate and responsive amount of support based on teacher performance. Along with this issue, there is a limitation that two of the pairs are elementary co-teachers and one at the secondary level. Ideally, all of the co-teachers would have been teaching at the same level to allow for an easier comparison across pairs, but this issue was due to the intensive nature of the study and the hesitancy of administrators to allow teachers to participate and for co-teachers to consent. A final limitation related to the participants is the difference between traditionally trained teachers and ARC teachers. With the secondary co-teachers both coming from ARC programs, this is a notable difference of training from the co-teachers in the other two dyads.

The design of this study was to use a MTSS approach with multiple tiers of interventions as needed. While one can view this in a positive way, since all three dyads met criteria for completion with the first tier, tier two and three interventions were unnecessary. The issue here is that this study only supports the use of peer coaching, when it set out to offer a responsive approach to professional development for co-teachers to match the level of support they needed. What is not clear is if the three dyads of co-teachers are exceptions and only required the first tier because of their skill and willingness to participate or if peer coaching would have these types of results for all co-teachers. This is not to say that traditional and BIE coaching are ineffective, it is just that they were not needed in this study.

Momentary time sampling was the method used for collecting student engagement data. This method could have some limitations because it inherently only examines a student's behavior for a brief moment (Meany-Daboul, Roscoe, Bourrey, & Ahearn, 2007). That means a student could have been off task for 59 seconds, then, at the precise moment, he or she was on task at the moment of coding the student's behavior, showing an instance of on task behavior. While there are other ways of measuring student engagement, the reason for this method is that it allows for a random selection of students in the class to get a sense of engagement, and it allows the focus to remain on teacher performance as this was the primary dependent variable.

Another issue to consider is the setting in which this study and all co-teaching takes place. The push for inclusion of students with disabilities with their typically developing peers means that this instruction takes place in the general education setting. What is likely an unforeseen

circumstance is that this setting may contribute to the unequal roles between the general education teacher and the SET. Since the SET is coming into the general education classroom, there is a strong possibility that the general education teacher views this classroom as his or hers, shifting the balance of power toward the special education teacher. This power dynamic could shift if co-teaching were to take place in the SET's classroom, since that is their space. The overreliance on the one teach, one assist model could be a byproduct of the SET not wanted to overstep on the general education teacher's space, making it easier to act in an assistant role. The PTOS does not require that all instruction take place in the general education classroom, just the same classroom. Therefore, if co-teaching were to take place in the special education classroom and both teachers were present and all instruction took place there, these criteria would be met and all other criteria would not be affected either.

A final limitation of this study is the lack of any academic outcomes for the students in these classes. The only student outcome recorded was student engagement, so that there was some measure of the impact the intervention had on students. This was primarily because of the literature's focus on how small group instruction in a co-taught class should increase student engagement (i.e. Friend, 2014). One could argue, however that it would be more appropriate to determine the effectiveness of the co-teachers' performance with some sort of academic outcome for the students. While this is a valid observation, and one that should be considered in the future, the scope of this study focused on the relationship between co-teachers using parallel teaching and how that impacted student engagement.

Implications for Practitioners

Peer coaching is something that schools can employ as a professional development tool for little to no cost. As used in this study, the co-teachers were trained on the PTOS, then they gave feedback to each other by rating themselves on the PTOS on an observed lesson. The participants in this study never saw how the interventionist or a second rater rated their lesson until after they completed the study. The primary role of the interventionist in the coaching sessions was to only clarify the PTOS based on questions from the co-teachers, and to ensure that the co-teachers followed the steps of discussing any areas of disagreement or where a criterion was not met. Schools and districts could make use of this practice with co-teachers and provide them with the PTOS or some co-teaching specific rubric, some training on understanding the rubric, then walking

them through how to rate themselves and discuss after a lesson. This does not require a third party to come and observe lessons, which would likely be appealing to administration and potentially less stressful for co-teachers.

A major reason for highlighting parallel teaching in this study is that it requires co-teachers to employ small group instruction and for both teachers to be prepared to lead instruction (implying some sort of co-planning). With the predominate model of co-teaching in practice being one teach, one assist, and the consistent recommendation in the literature to use more small group instruction in co-teaching, the procedures of this study helped to close the research to practice gap in these classrooms. The hope is that schools could use these procedures and have similar results to address this research to practice gap.

Since there are various levels of experience, types of training, and all co-teachers were in their first year co-teaching with their partner, there is potential widespread application of these procedures in practice. If peer coaching with a co-teaching specific rubric (PTOS) was able to facilitate this type of effect, then practitioners should consider employing these procedures for any pair of co-teachers who want to implement more parallel teaching and/or small group instruction in their classrooms.

Directions for Future Research

In future research, it would be beneficial to do some sort of replication of this study. With only three dyads, there are only three replications of an effect. Either multiple studies or a study with many more participants would be helpful to determine if these results can be replicated, shedding light on the viability of these intervention procedures. There are measures of co-teaching that would be beneficial to capture, specifically the co-planning and co-assessing/reflection process. This study focused on the co-instructing process with some reflection afterwards with coaching. Since true co-teaching addresses the full instructional process of co-planning, co-instructing, and co-assessing, it is worth considering this in experimental design to capture the full process and trying to impact these other areas. Another future variable to consider in research with co-teaching would be the group dynamics as co-teachers engage in small group instruction. This study asked co-teachers to engage in intentional grouping, meaning if groups were predetermined, then they met the criterion. It may be worth investigating this further with more intentional grouping and the impact of the group members on both teacher and student behavior. Also, one

may want to consider more than the parallel teaching model of co-teaching and modify the PTOS or create different rubrics to rate different co-teaching models. The reason for this is that one co-teaching model should not necessarily be used all the time, so providing some flexibility to co-teachers for the type of model they use based on the lesson may be helpful and more realistic. The inclusion of some sort of academic outcomes for the students in these classes would be very beneficial to determine if students are benefitting from this type of instruction beyond their engagement. If the ultimate goal of co-teaching is learning, then there should be some consideration of how these different methods affect student learning.

Another group to consider in terms of research are school and district administrators (principals, other administrators, special education directors). The findings of this study can help to improve research and practice for these groups as they work to train, supervise and evaluate co-teaching in schools. By working with these groups who are responsible for making major decisions on how to implement best practices and adhere to state and national laws in their schools and districts, much can be learned on how to best support co-teaching practices, the learning of all students in inclusive environments, and how to appropriately and fairly evaluate co-teaching as it is inherently different than a classroom with one teacher.

REFERENCES

Aikens, N. L., & Barbarin, O. (2008). Socioeconomic differences in reading trajectories: The contribution of family, neighborhood, and school contexts. *Journal of Educational Psychology*, 100(2), 235–251. doi:10.1037/0022- 0663.100.2.235

Aragon, S. (2016). Teacher shortages: What we know. *Education Commission of the States*. Accessed from https://www.ecs.org/wp-content/uploads/Teacher-Shortages-What-We Know.pdf

Benedict A. E., Thomas, R. A., Kimerling, J., & Leko, C. (2013). Trends in teacher evaluation. *Teaching Exceptional Children, 45*(5), 60-68. doi: 10.1177/004005991304500507

Bouck, E. C. (2007). Co-teaching… Not just a textbook term: Implications for practice. *Preventing School Failure, 51*(2), 46-51. doi: 10.3200/PSFL.51.2.46-51

Boudah, D. J., Deshler, D. D., Schumaker, J. B., Lenz, B. K., & Cook, C. (1997). Student centered or content-centered? A case study of middle school teacher's lesson planning and instruction in inclusive classes. *Teacher Education and Special Education*. *20*(3), 189-203. doi: 10.1177/088840649702000302

Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.) (2000). How people learn: Brain, mind, experience, and school. Washington, DC: National Research Council, National Academy Press.

Braswell, J. S., Lutkus, A. D., Grigg, W. S., Santapau, S. L., Tay-Lima, B., & Johnson, M. (2001). The Nation's Report Card: Math 2000 (NCES Document No. 2001–499). Washington, DC: National Center for Education Statistics.

Brengelman, S., Gertsen, R., & Morvant, M. (1995). Close to the classroom is close to the bone: Coaching as a means to translate research into classroom practice. *Focus on Exceptional Children, 62*(1), 52-67.

Brownell, M. M., & Jones, N. N. (2015). Teacher evaluation in special education: Approaches, supporting research, and challenges confronted. *Journal of Special Education Leadership*, *28*(2), 63-73.

Council for Exceptional Children standards for evidence-based practices in special education. (2014). *Teaching Exceptional Children, 46*(6), 206-212. doi: 10.1177/0040059914531389

The Council for Exceptional Children's position on special education teacher evaluation. (2013). *Teaching Exceptional Children, 45*(3), 73-76.

Croft, A., Coggshall, J. G., Dolan, M., & Powers, E. (2010). Job-embedded professional development: What it is, who is responsible, and how to get it done well. *National Comprehensive Center for Teacher Quality Issue Brief.* Accessed from https://eric.ed.gov/?id=ED520830

Darling-Hammon, L. (2014). Strengthening clinical preparation: The holy grail of teacher education. *Peabody Journal of Education, 89*(4), 547-561. doi: 10.1080/0161956X.2014.939009

Denton, C. A., & Hasbrouck, J. (2009). A description of instructional coaching and its relationship to consultation. *Journal of Educational & Psychological Consultation, 19,* 150 –175. doi: 10.1080/104 74410802463296

Denton, K., & West, J. (2002). Children's reading and mathematics achievement in kindergarten and first grade. *Educational Statistics Quarterly*. Retrieved from http://nces.ed.gov/pubs2002/quarterly/spring/q3-1.asp

Dieker, L. A. (2001). What are the characteristics of "effective" middle and high school co taught teams for students with disabilities? *Preventing School Failure, 46*(1), 14-23. doi: 10.1080/104598880109603339

Dieker, L. A., Kennedy, M. J., Smith, S., Vasquez III, E., Rock, M., & Thomas, C. N. (2014). Use of technology in the preparation of pre-service teachers (Document No. IC-11). Retrieved from University of Florida, Collaboration for Effective Educator, Development, Accountability, and Reform Center website: http://ceedar.education.ufl.edu/tools/innovation-configurations/

Donahue, P. L., Finnegan, R. J., Lutkus, A. D., Allen, N. L., & Campbell, J. R. (2001). The nation's report card for reading: Fourth grade. Washington, DC: National Center for Education Statistics.

Duchaine, E. L., Jolivette, K., & Fredrick, L. D. (2011). The effect of teacher coaching with performance feedback on behavior-specific praise in inclusion classrooms. *Education and Treatment of Children*, *34*(2), 209-227. doi: 10.1353/etc.2011.0009

Erchul, W. P. (2015). Put me in, coach: Observations on selected studies implementing supportive interventions to teachers. *School Mental Health, 7,* 74–79. doi: 10.1007/s12310-015-9144-1

Fabiano, G. A., Reddy, L. A., & Dudek, C. M. (2018). Teacher coaching supported by formative assessment for improving classroom practices. *School Psychology Quarterly, 33,* 293304. doi: 10.1037/ spq0000223

Favazza, P. C., Phillipsen, L., & Kumar, P. (2000). Measuring and promoting acceptance of young children with disabilities. *Exceptional Children, 66*(4), 491-508. doi: 10.1177/001440290006600404

Fennick, E., & Liddy, D. (2001). Responsibilities and preparation for collaborative teaching: Co teachers' perspectives. *Teacher Education and Special Education, 24*(3), 229-240. doi: 10.1177/088840640102400307

Friend, M. (2014). Co-teaching: Strategies to improve student outcomes. *National Professional Resources Inc./Dude Publishing.*

Friend, M, & Bursuck, W. D. (2009). *Including students with special needs: A practical guide for classroom teachers, 5th edition.* Pearson.

Friend, M, & Cook, L. (2007). Co-teaching: Strategies to improve student outcomes. Accessed from http://blog.nprinc.com/downloads/coteaching-strategies-to-improve-student outcomescoio.pdf

Friend, M, Cook, L., Hurley-Chaberlain, D., & Shamberger, C. (2010). Co-teaching: An illustration of the complexity of collaboration in special education. *Journal of Educational and Psychological Consultation, 20*(1), 9-27. doi:10.1080/10474410903535380

Gonzalez, L. E., Brown, M. S., & Slate, J. R. (2008). Teachers who left the teaching profession: A qualitative understanding. *Qualitative Report, 13*(1), 1-11. Retrieved from http://www.nova.edu/ssss/QR/QR13-1/gonzalez.pdf

Goor, M.B., & Schwenn, J.O. (1997). Preparing principals for leadership in special education. *Intervention in School and Clinic, 32*(3).

Grissmer, D. W., Flanagan, A., Kawata, J. H., Williamson, S., & LaTourrette, T. (2000). Improving student achievement: What state NAEP test scores tell us. Santa Monica, CA: Rand Corporation.

Gulamhussein, A. (2013). The core of professional development. *The American School Board Journal, 197,* 22–26.

Harbort, G., Gunter, P. L., Hull, K., Brown, Q., Venn, M. L., Wiley, L. P., & Wiley, E. W. (2007). Behaviors of teachers in co-taught classes in a secondary school. *Teacher Education and Special Education, 30*(1), 13-23. doi: 10.1177/08888406407030000102

Harbour, K. E., Evanovich, L. L., Sweigart, C. A., & Hughes, L. E. (2015). A brief review of effective teaching practices that maximize student engagement. Preventing School Failure: Alternative Education for Children and Youth, 59(1), 5–13. doi:10.1080/1045988X.2014.919136

Harris, P. P., Pollingue, A. B., & Hearington, D. (2014). Effects of training on pre-service special educators' abilities to co-teach math vocabulary in preparation for inclusion settings. *Journal of the International Association of Special Education, 15*(2), 94-99. Accessed from http://www.iase.org/Publications/2014%20JIASE%20TOPICAL%20EDITION%20FINL.pdf#page=96

Hasbrouck, J. E., & Christen, M. H. (1997). Providing peer coaching in inclusive classrooms: A tool for consulting teachers. *Intervention in School and Clinic, 32*(3), 172-177. doi: 10.1177/105345129703200308

Hattie, J. (2009). Visible Learning: A synthesis of 800 meta- analyses relating to achievement. New York, NY: Routledge Publishing.

Haydon, T., Conroy, M. A., Scott, T. M., Sindelar, P. T., Barber, B. R., & Orlando, A. M. (2010). A comparison of three types of opportunities to respond on student academic and social behaviors. Journal of Emotional and Behavioral Disorders, 18(1), 27–40. doi:10.1177/1063426609333448

Hirn, R. G., Hollo, A., & Scott, T. M. (2018) Exploring instructional differences and school performance in high-poverty elementary schools. *Preventing School Failure*, 62(1), 37 48. doi: 10.1080.1045988X.2017.1329197

Holdheide, L. G. (2015). Same debate, new opportunity: Designing teacher evaluation systems that promote and support educators' practices that advance all students' learning. *Journal of Special Education Leadership, 28*(2), 74-81.

Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004)

Johnson, K. A. (2013, January 1). Are two better than one? Implications of the co-teaching service delivery model on high-stakes, standards-based assessments for students with educational disabilities. *ProQuest LLC.*

Junod, R. E. V., DuPaul, G. J., Jitendra, A. K., Volpe, R. J., & Cleary, K. (2006). Classroom observations of students with and without ADHD: Differences across types of engagement. Journal of School Psychology. 44. 87-104. 10.1016/j.jsp.2005.12.004.

Kames, M. W., Susko, J. P., & Elliot, J. S. (2013). Evaluation and supervision of co-teaching: A study of administrator practices in New Jersey. *NASSP Bulletin, 97*(2), 166-190. doi: 10.1177/0192636513476337

Kennedy, A. S., & Lees, A. T. (2015) Preparing undergraduate pre-service teachers through direct and video-based performance feedback and tiered supports in early Head Start. *Early Childhood Education Journal, 44*(4), 369-379.

Kennedy, C. H. (2005). *Single-case designs for educational research.* Pearson.

Kraft, M. A., Blazer, D., & Hogan, D. (2018). The effect of teacher coaching on instruction and achievement: A meta-analysis of the causal evidence. *Review of Educational Research, 88,* 547–588. doi: 10.3102/0034654318759268

Kurz, A., Reddy, L. A., & Glover, T. (2017). A multidisciplinary frame- work for instructional coaching. *Theory into Practice, 56,* 66 –77. doi: 10.1080/00405841.2016.1260404

Lee, J., & Reeves, T. (2012). Revisiting the impact of NCLB high-stakes school accountability, capacity, and resources: State NAEP 1990–2009 reading and math achievement gaps and trends. *Educational Evaluation and Policy Analysis*, 34(2), 209–231. doi:10.3102/0162373711431604

Leko, M. M., Brownell, M. T., Sindelar, P. T., & Kiely, M. T. (2015). Envisioning the future of special education personnel preparation in a standards-based era. *Exceptional Children, 82*(1), 25-43. doi: 10.1177/0014402915598782

Levenson, N. (2011). Academic ROI: What does the most good? *Educational Leadership, 69*(4), 34-39.

Little, M. E., & Dieker, L. (2009). Co-teaching: Two are better than one. *Principal Leadership: Middle Level Edition, 9*(8), 42-46.

Ma, N., Xin, S., & Du, J. Y. (2018). A peer coaching-based professional development approach to improving the learning participation and learning design skills of in-service teachers. *Educational Technology & Society, 21* (2), 291–304.

Magiera, K., & Zigmond, N. (2005). Co-teaching in middle school classrooms under routine conditions: Does the instructional experience differ for students with disabilities in co-taught and solo-taught classes? *Learning Disabilities Research and Practice, 20*(2), 79-85. doi: 10.1111/j.1540-5826.2005.00123.x

Mason-Williams, L. (2015). Unequal opportunities: A profile of the distribution of special education teachers. *Exceptional Children, 81*(2), 247-262. doi: 10/1177/0014402914551737

Meany-Daboul, M., Roscoe, E., Bourret, J., & Ahearn, W. (2007). A comparison of momentary time sampling and partial-interval recording for evaluating functional relations. *Journal of Applied Behavior Analysis. 40*(3), 501-14. doi: 10.1901/jaba.2007.40-501

Miller, S. P., Harris, C., & Watanabe, A. (1991). Professional coaching: A coaching method for increasing effective and decreasing ineffective teacher behaviors. *Teacher Education and Special Education,14*(3), 183-191. doi: 10.1177/088840649101400305

Moin, L. J., Magiera, K., & Zigmond, N. (2008). Instructional activities and group work in the US inclusive high school co-taught science class. *International Journal of Science and Mathematics Education, 7*(4), 677-697. doi: 10.1007/s10763-008-9133-z

Murawski, W. W., & Lochner, W. W. (2010). Observing co-teaching: What to ask for, look for, and listen for. *Intervention in School and Clinic, 46*(3), 174-183. doi: 10.1177/1053451210378165

Murawski, W. W., & Lochner, W. W. (2017). *Beyond co-teaching basics: A data-driven, no fail model for continuous improvement.* Alexandria, VA, ASCD.

Murawski, W. W., & Swanson, H. L. (2001). A meta-analysis of co-teaching research: Where are the data? *Remedial and Special Education, 22*(5), 258-267. doi: 10.1177/074193250102200501

Murawski, W.W. (2008). Five keys to co-teaching in inclusive classrooms. *School Administrator, 65*(8), Accessed from http://www.aasa.org/SchoolAdministratorArticle.aspx?id=4906

Myers, D. M, Simonsen, B., Sugai, G. (2011). Increasing teachers' use of praise with a response to-intervention approach. *Education and Treatment of Children, 34*(1), 35-59.

National Early Childhood Technical Assistance Center (NECTAC; 2012). *Response to Intervention in Early Childhood.* Retrieved from http://nectac.org/topics/RTI/TRI.asp

Nierengarten, G. (2013). Supporting co-teaching teams in high schools: Twenty research-based practices. *American Secondary Education, 42(1)*, 73-83.

Noell, G. H., Roane, H. S., VanDerHeyden, A. M., Whitmarsh, E. L., & Gatti, S. L. (2000). Programming for the generalization of communication to the classroom following assessment training outside of the classroom. *School Psychology Review, 29*(3), 429-442.

Pierce, T., & Miller, S. P. (1994). Using peer coaching in preservice practica. *Teacher Education and Special Education, 17*(4), 215-223. doi:10.1177/088840649401700402

Ploessl, D. M., & Rock, M. L. (2014). eCoaching: The effects of co-teachers' planning and instruction. *Teacher Education and Special Education, 37*(3), 191-215. doi: 10.1177/0888406414525049

Rea, P. J., McLaughlin, V. L., & Walther-Thomas, C. (2002). Outcomes for students with learning disabilities in inclusive and pullout programs. *Exceptional Children, 68*(2), 203 222.

Reddy, L. A., Dudek, C., & Lekwa, A. J. (2017). Classroom strategies coaching model: Integration of formative assessment and instructional coaching. *Theory Into Practice, 56,* 46–55. http://dx.doi.org/10.1080/ 00405841.2016.1241944

Reimers, T. M., & Wacker, D. (1988). Parents' ratings of the acceptability of behavioral treatment recommendations made in an outpatient clinic: A preliminary analysis of the influence of treatment effectiveness. *Behavioral Disorders, 14*(7), 7-15.

Ritter, C. L., Michel, C. S., & Irby, B. (1999). Concerning inclusion: Perceptions of middle school students, their parents, and teachers. *Rural Special Education Quarterly, 18*(2), 10.

Rock, M. L. (2005). Use of strategic self-monitoring to enhance academic engagement, productivity, and accuracy of students with and without exceptionalities. *Journal of Positive Behavior Interventions*, 7(1), 3–17.

Rock, M. L., Gregg, M., Howard, P. W., Ploessl, D. M., Maughn, S., Gable, R. A., & Zigmond, N. P. (2009). See me, hear me, coach me. *Journal of Staff Development, 30*(3), 24-31.

Scheeler, M. C., Congdon, M., & Stansbery, S. (2010). Providing immediate feedback to co teachers through bug-in-ear technology: An effective method of peer coaching in inclusion classrooms. *Teacher Education and Special Education, 33*(1), 83-96. doi: 10.1177/0888406409357013

Scheeler, M. C., McAfee, J. K., Ruhl, K. L., & Lee, D. L. (2006). Effects of corrective feedback delivered via wireless technology on preservice teacher performance and student behavior. *Teacher Education and Special Education: Journal of the Teacher Education Division of the Council for Exceptional Children*, 29(1), 12–25.

Scruggs, T. E., Mastropieri, M. A., & McDuffie, K. A. (2007). Co-teaching in inclusive classrooms: A metasynthesis of qualitative research. *Exceptional Children, 73*(4), 392 416. doi: 10.1177/001440290707300401

Siedel, T., Sturmer, K., Blomberd, G., Kobarg, M., & Schwindt, K. (2011). Teacher learning from analysis of videotaped classroom situations: Does it make a difference whether teachers observe their own teaching or that of others? *Teaching and Teacher Education, 27*, 259-267. doi: 10.1016/j.tate.2010.08.009

Tschantz, J. M., & Vail, C. O. (2000). Effects of peer coaching on the rate of responsive teacher statements during a child-directed period in an inclusive preschool setting. *Teacher Education and Special Education, 23*(3), 189-201. doi: 10.1177/088840640002300302

Villa, R. A., Thousand, J. S., & Nevin, A. I. (2008). A guide to co-teaching: Practical tips for facilitating student learning (2nd ed.). Thousand Oaks, CA: Corwin and Council for Exceptional Children.

Volonio, V., Zigmond, N. (2009). Promoting research-based practices through inclusion? *Research in the Service of Practice, 46*(4), 291-300. doi: 10.1080/00405840701593873

Walther-Thomas, C. S. (1997). Co-teaching experiences: The benefits and problems that teachers and principals report over time. *Journal of Learning Disabilities, 30*(4), 395-407. doi: 10.1177/002221949703000406

Weiss, M. P., & Brigham, F. J. (2000). Co-teaching and the model of shared responsibility: What does the research support? *Educational Interventions, 14*(1), 217-245).

Weiss, M. P., & Lloyd, J. L. (2002). Congruence between roles and actions of secondary special educators in co-taught and special education settings. *Journal of Special Education, 36*(2), 58-69. doi: 10.1177/00224669020360020101

Welch, M. (2000). Descriptive analysis of team teaching in two elementary classrooms: A formative experimental approach. *Remedial and Special Education, 21*(6), 366-376. doi: 10.1177/074193250002100606

Winton, P. J. (2010). Professional development and quality initiatives: Two essential components of an early childhood system. In P. Wesley & V. Buysse (Eds.), The quest for quality: Promising innovations for early childhood programs (pp. 113 129). Baltimore, MD: Brookes.

Wischnowski, M. W., Salmon, S. J., & Eaton, K. (2004). Evaluating co-teaching as a means for successful inclusion of students with disabilities in a rural district. *Rural Special Education Quarterly, 23*(3), 3-14.

What Works Clearinghouse (2014) Procedures and standards handbook: Version 3.0. Accessed from https://ies.ed.gov/ncee/wwc/Docs/referenceresources/wwc_procedures_v3_0_standardsndbook.pdf

What Works Clearinghouse (2017) Procedures and standards handbook: Version 4.0 Accessed from https://ies.ed.gov/ncee/wwc/Docs/referenceresources/wwc_standards_handbook_v4.pdf

Zigmond, N. (2003). Where should students with disabilities receive special education services? Is one place better than another? *The Journal of Special Education*, *37*(3), 193-199. doi: 10.1177/002246690303037003

Zigmond, N. (2006). Reading and writing in co-taught secondary school social studies classrooms: A reality check. *Overcoming Learning Difficulties, 22*(3), 249-268. doi: 10.1080/10573560500455711

Zigmond, N., & Baker, J. M. (1995) Is the mainstream a more appropriate educational setting for Randy? A case study of one student with learning disabilities. *Learning Disabilities Research & Practice, 9*(3), 108-117.

Zigmond, N., Matta, D. (2005). Value added of the special education teacher on secondary school co-taught classes. *Research in Secondary Schools, 17*(2), 55-76.

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2017 Adjunct Faculty and Teaching Supervisor, Marian University. Taught master's level course in special education assessment and supervised two master's level students in transition to teaching program.

2014 – 2016 Director of Special Education, Crossing Educational Center. Collaborate with instructional staff and public school districts to ensure special education compliance and quality in services. Responsible for working with Indiana DOE to maintain accreditation. Assist and advise instructional staff in obtaining and renewing state of Indiana teaching licenses.

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PUBLISHED MANUSCRIPTS

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Roberts, C. A., Benedict, A., Tandy, J. A., Kim, S., (2018). Using lesson study to prepare preservice special educators. *Intervention in School and Clinic*, *53*(4), 237-244.

Roberts, C. A., Tandy, J., Kim, S., & Meyer, N. (in press). A content area literacy intervention for high school students with moderate intellectual disability using adapted science text. *Education and Training in Autism and Developmental Disabilities.*

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Tandy, J. A., & Rispoli, M. Social validity in research with students with emotional and behavioral disorders.

PRESENTATIONS

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