A Professional Development Training Model for Improving Co-Teaching Performance

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Abstract
Co-teaching is a promising practice for educating students with disabilities in regular education classes. However, teachers often report being given co-teaching assignments without requisite training. Without adequate preparation, many teachers have difficulty conceptualizing co-teaching as a model and working collaboratively as teaching partners, often creating a division of labor that relegates special educators to a "helper" role in the classroom. This experimental study utilized a randomized pretest-posttest control group design to study the effects of a professional development training package on the collaborative teaching performance of regular and special education teachers. Analysis of covariance showed that teachers who participated in professional development training on co-teaching had significantly higher posttest scores on a co-teaching performance assessment than those who did not participate in training.

Keywords: *co-teaching, collaboration, professional development, teacher education, teacher training, inclusion, students with disabilities, special education, effective teaching, research*

Introduction

An increasing number of students with disabilities receives instruction in regular education classrooms, with 62 percent of all students with disabilities in the U.S. receiving the majority of their instruction in regular education classes in the 2013-14 school year (U.S. Department of Education & National Center for Education Statistics, 2016). At the same time, regular education teachers report that they are inadequately prepared to instruct students with disabilities (Kahn & Lewis, 2014; Reinke, Stormont, Herman, Puri, & Goel, 2011; Stormont,

Thomas, & VanGargeren, 2012) possibly because of insufficient coursework and experience at the pre-service level (Rosenzweig, 2009). Regular educators also report they are not informed about the needs of their students with disabilities and do not receive necessary support to address those needs (Allday, Neilsen-Gatti, & Hudson, 2013; Grskovic & Trzcinka, 2011; Vitelli, 2015).

Regular and special education teachers come to co-taught classrooms with different backgrounds, training and experiences, and may have dissimilar perspectives on classroom management, instruction and assessment. Having distinct sets of skills, regular educators specialize in delivering content, and special educators' expertise centers on individualizing instruction for students with disabilities (Friend, 2008; Grskovic & Trzcinka, 2011; Shippen et al., 2011). As co-teachers, both regular and special educators may lack adequate administrative support, professional development training, and time in their schedules to plan and coordinate work with their counterparts (Reinke, Stormont, Hermon, Puri, & Goel, 2011; Shippen et al., 2011; Stormont et al., 2012).

Several collaborative models have emerged to meet the instructional challenges of educating students with disabilities in the regular education classroom, including teacher collaboration, consultation, peer coaching, collaborative learning communities and co-teaching (McDuffie, Mastropieri, & Scruggs, 2009). Of these, co-teaching has become the most popular collaborative approach for providing instruction to students with disabilities in regular education classrooms (Magiera & Zigmond, 2005; McDuffie, Mastropieri, & Scruggs, 2009). Simply defined, co-teaching is a model that involves paired regular and special education teachers working together to plan, instruct, and monitor progress for a heterogeneous group of students, with and without disabilities, in the same classroom (Kloo & Zigmond, 2008).

Although research on co-teaching is limited (Magiera & Zigmond, 2005; Murawski & Swanson, 2001), some studies have shown it to be a promising practice for effectively educating students with disabilities in regular education classes (Fontana, 2005; Fore et al, 2008; Murawski & Swanson, 2001). Barriers to effective implementation of co-teaching practices include: (1) lack of training for co-teachers, (2) lack of time for collaborative planning and assessment, (3) lack of fidelity in implementation of co-teaching methods, (4) lack of special education services given to students with disabilities in co-taught classes and (5) lack of parity between co-teachers (Keefe & Moore, 2004; Magiera, Smith, Zigmond, & Gebauer, 2005; Moin, Magiera, & Zigmond, 2009; Murawski, 2009; Rivera, McMahon, & Keys, 2014).

Professional development is one avenue for providing practicing teachers with skill development in co-teaching. However, research on the effectiveness of professional development programs to produce positive teacher and student outcomes is relatively new (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Snow-Renner & Lauer, 2005). Evidence from a small set of empirical studies indicates that effective professional development is characterized by five key elements: sufficient duration, content focus, coherence, active learning, and collective participation (Darling-Hammond et al., 2009; Garet, Porter, Desimone, Birman & Yoon, 2001; Snow-Renner & Lauer, 2005; Wei et al., 2009; Weiss, Banilower, Overstreet, & Soar, 2002; Yoon, Duncan, Lee, Scarloss, & Shapely, 2007). Researchers also have identified the need for observation, practice and feedback in teacher professional development programs to ensure fidelity in the implementation of instructional practices (Harris

et al., 2012; Stormont et al., 2012). There is a much smaller research base related to professional development for educators working with students with disabilities (Birman et al., 2007; Darling-Hammond et al., 2009; Parsad, Lewis, & Ferris, 2001), and very few published research studies on the effect of professional development on co-teaching (Sankar, 2009; Bond, 2011).

In the current environment where the majority of students with disabilities receive instruction in regular education classrooms for the majority of their school day and co-teaching is the predominant model for including students with disabilities in regular education classes, the absence of peer-reviewed literature on professional development training specific to co-teaching is surprising and points to an area of vital interest for investigation. The purpose of this study was to examine the effects of professional development training on the co-teaching performance (co-planning, co-classroom management, co-instruction, co-behavior management and co-assessment) of regular and special education co-teachers. Also, of interest were the extent to which co-teacher dyads use a variety of co-teaching methods and the extent to which co-teachers work collaboratively to effectuate co-teaching practices.

Method

Participants

Participants in this study included 48 regular and special education teachers in 24 co-teaching dyads from four middle schools and three high schools in two urban and two suburban school districts in the northeast region of the United States. To be eligible for this study, teachers had to be co-teaching at least one class in the current academic year and agree to participate as a dyad with their co-teaching partners. For the purposes of this study co-teaching was defined as the delivery of instruction to a heterogeneous group of students, with and without disabilities, in a single classroom by an assigned teaching dyad, consisting of a licensed regular education teacher and a licensed special education teacher. Pairs of participants were randomly assigned to treatment and control groups.

The majority of teachers had at least a Master's degree (87.5%) and had been teaching longer than ten years (70.8%). Yet, as a group, they had very little training in co-teaching. The majority of teachers (68.8%) had no college coursework in co-teaching, and 72.9% had six or fewer hours of professional development training in co-teaching. None of the teachers in the study were dually certified in regular and special education.

Design

This experimental study employed a randomized pretest-posttest control group design to examine the effects of a professional development training package on the observed co-teaching performance of co-teacher dyads over a 15-week period. Participants completed a *Demographic Survey* at the outset of the study to provide information about their education, prior experience and training in instructing students with disabilities and co-teaching. Data were also collected via classroom observations during pre- and post-treatment phases of the study. Co-teaching dyads were observed for approximately 55 minutes during a regularly scheduled class period, prior to and upon completion of professional development training. The observation period began as

students entered the classroom and ended when students left the room at the end of the class period. The researcher-developed *Performance Assessment for Co-Teachers* (PACT) instrument was used to assess each dyad's performance in areas of co-planning, co-classroom management, co-instruction, co-behavior management and co-assessment. Guided by the PACT, the observer noted evidence of co-teaching practices, such as which special education services were delivered to students with disabilities, how often each teacher took lead and support instructional roles, and whether teachers shared responsibility for all students. Information gathered was used to rate the dyad's performance on each co-teaching practice item on the PACT.

Research-based professional development training for treatment group participants began after pre-treatment observations were completed. During the first phase of the eight-week training period, treatment group participants received five two-hour professional development sessions, which included instruction and practice in five areas of co-teaching performance. The treatment group was divided into five sub-groups to allow participants from the same school to be trained together. In the second phase of treatment, the researcher observed each treatment dyad in their co-taught classes. After the observation, the researcher met with the teachers to provide feedback on their co-teaching performance, constituting the final training session. Teachers in the control group continued their normal co-teaching routines during the treatment period and did not participate in professional development provided through this study.

Description of Professional Development Training Design

The training curriculum used in this study was designed by the researcher based on empirically-validated best practices in professional development. The training package incorporated six elements of professional development training—sufficient duration, collective participation, content focus, coherence, active learning, and observation and feedback—which are described below and summarized in Table 1.

Sufficient Duration. While brief workshops (less than one day) tend to be the norm for professional development in educational settings (Birman et al., 2007; Darling-Hammond et al., 2009; Fennick & Liddy, 2001; Parsad, Lewis, & Farris, 2001), change in instructional practices in the classroom is more likely to occur when professional development is completed as on-going training, including more hours over a longer period of time (Darling-Hammond et al., 2009: Garet et al., 2001; Snow-Renner & Lauer, 2005; Weiss, Banilower, Overstreet, & Soar, 2002; Yoon et al., 2007). Treatment participants in this study received on-going professional development, consisting of just over eleven hours of formal training in six sessions, over an eight-week period

Collective Participation. Professional development is enhanced by collective participation, which involves the contemporaneous training of more than one person from a school, allowing a support system for learning, validating and adopting teaching practices (Darling-Hammond et al., 2009; Snow-Renner & Lauer, 2005). In this study, teachers were trained as co-teaching pairs, with multiple dyads of regular and special educators participating from selected schools.

Content Focus. Content-focused training addresses specific instructional and assessment skills identified as necessary for effective teaching (Darling-Hammond & McLaughlin, 1995;

Snow-Renner & Lauer, 2005; Wei et al., 2009). The professional development curriculum for this study consisted of best practices in the five areas of co-teaching performance—planning, classroom management, instruction, behavior management and assessment (Friend, 2008; Howard & Potts, 2009; Murawski, 2009). The planning, implementation, management and assessment of special education services to students with disabilities, such as accommodations, modifications and specialized instructional and behavior strategies, were integral components of the co-teaching model applied in this study.

Coherence. Coherence is the congruence of professional development curriculum with state and district standards and school and classroom goals and practices (Darling-Hammond et al., 2009; Garet et al., 2001; Snow-Renner & Lauer, 2005). The intervention applied in this study was consistent with current state education reform initiatives emphasizing evidence-based instructional practices, academic achievement for all students, assessment and continuous monitoring of student progress, and the provision of academic and behavior supports to meet the needs of all students.

Active learning. Opportunities to learn through participation and practice provide an active-learning experience, which contributes to development, refinement and mastery of skills (Garet et al., 2001; Ross & Bruce, 2007; Wei et al, 2009). In this study, co-teaching pairs worked together to complete hands-on activities and practice skills developed through training, supervised co-planning, self-assessment, observation and feedback.

Observation and feedback. Observation and feedback provide critical information to guide correction and further refinement of instructional skills (Ross & Bruce, 2007; Spencer & Logan, 2003; Stormont, Thomas, & Van Garderen, 2012). The professional development training program applied in this study included classroom observations conducted by the researcher, with feedback provided to dyads in the treatment group prior to the final observation.

Table 1. Best Practices in Professional Development Training

Component	Best Practices	Application in Training
Sufficient Duration	• On-going training over period of time is more effective than one-day workshops • Allows participants to process, practice and integrate material	• 6 sessions over 8-week period • 2 hours/session
Collective Participation	• Contemporaneous training of more than 1 person from a school	• Co-teachers trained together • Multiple dyads from same school trained together
Content Focus	• Training addresses specific instructional and assessment skills identified as necessary for effective teaching	• Training covers 5 areas of co-teaching performance • Delivery of special education services (e.g., accommodations, specialized instruction) embedded in 5 areas of co-teaching

Coherence	• Congruence of PD curriculum with state & district standards and initiatives, and school/classroom goals and practices	• PD consistent with current state reform initiatives • Research-based, differentiated instruction • Assessment and ID of students not meeting standards • Academic and behavior support to meet needs of all students
Active Learning	• Opportunities to learn through participation and practice	• Teachers work together to complete activities and practice skills through training, co-planning and self-assessment
Observation and Feedback	• Provide critical information to guide correction & refinement of instructional skills	• Co-teaching dyads observed and given feedback on co-teaching practices

Description of Professional Development Training Content

The content of the training included five areas of co-teaching—planning, classroom management, instruction, behavior management and assessment—which are described below and summarized in Table 2. Training in co-teaching methods was designed to foster parity between co-teaching partners, and to provide teachers with research-based strategies to effectively instruct students with disabilities.

Planning. Co-teachers who plan lessons together maximize instructional effectiveness in the classroom (Friend, 2008; Gately & Gately, 2001; Howard & Potts, 2009; Murawski, 2009). Training established the need and provided strategies for co-teachers to (1)co-plan lessons by contributing from their areas of expertise (Friend, 2008), (2) include accommodations and modifications to meet the needs of students with disabilities (Howard & Potts, 2009; Murawski, 2009) and (3) share equal responsibility for planning for all students (Friend, 2008). Treatment participants worked in small groups to identify barriers to and "brainstorm" potential solutions for effective co-planning. Participants worked with their partners to establish a regular meeting schedule and agenda that included a variety of communication opportunities for co-planning, and explore materials to support the co-planning process (e.g., sample co-planning agenda, lesson plan format). Finally, participants were provided with supervised co-planning time (20-30 minutes) during each training session so they could practice planning lessons that incorporated best co-teaching practices (co-managing the class, using variety of co-instruction methods, co-managing behaviors and co-assessing student performance).

Instruction. Effective co-teaching utilizes a variety of instructional strategies to support needs of all students, improves intensity and continuity of instruction and provides more opportunities for student participation, all of which result in improved outcomes for all students (Cook & Friend, 1995). Training established the need and provided strategies for teachers to (1) participate equally in the delivery of instruction, (2) utilize a variety of co-teaching methods, equally sharing lead and support roles and (3) provide specialized instruction to all students with disabilities, as needed (Friend, 2008; Murawski, 2009). Treatment participants worked in small groups to identify advantages and challenges of co-teaching methods, to identify potential sources of conflict in co-instruction, to use strategies to solve problem scenarios involving co-instruction and to explore instructional materials (e.g., resource lists, graphic organizers and

teacher self-assessment forms). Finally, participants worked with their partners to co-plan and implement a lesson using research-based instructional strategies and graphic organizers.

Classroom management. Co-teachers need to agree on classroom structures and routines to establish an organized, consistent approach to managing teaching and learning tasks (Friend, 2008; Gately & Gately, 2001; Wong, Wong, Rogers, & Brook, 2012). Training in this area established the need and provided strategies for co-teachers to establish professional parity in (1) the physical classroom environment, (2) interactions with students and (3) the daily management of classroom rules, routines and expectations (Friend, 2008; Murawski, 2009). Treatment participants worked in small groups to identify advantages and challenges of classroom management strategies, identify potential sources of conflict in co-classroom management and use strategies to solve problem scenarios involving co-classroom management. They were given materials to create (or further develop) a co-classroom management plan or improvement plan with their co-teaching partners. Finally, participants worked with their partners to co-plan and implement a lesson in a way that demonstrates parity in teacher-student relationships and the management of structures and routines.

Behavior management. Co-teachers must work collaboratively to develop strategies to establish a consistent, unified approach to manage challenging student behaviors and minimize disruptions in learning activities in co-taught classrooms (Friend, 2008; Gately & Gately, 2001; Murawski, 2009; Potts & Howard, 2011). Training in this section established the need and provided strategies for co-teachers to establish parity in the development and implementation of (1) positive reinforcement, (2) redirection of off-task behaviors and (3) reactive behavior strategies in their classrooms to reduce classroom disruptions and inappropriate behaviors (Friend, 2008; Murawski, 2009). Treatment participants worked in small groups to identify advantages and challenges of behavior management strategies and use strategies to solve problem scenarios involving co-behavior management. Co-teachers were given materials to create (or further develop) a differentiated instruction and behavior plan to meet learning and behavior needs of a student with challenging behavior(s). Finally, treatment participants worked with their partners to co-plan and implement a lesson using research-based behavior strategies.

Table 2. Best Practices in Co-Teaching

Component	Best Practices	Application in Training
Co-Planning	• Teachers plan lessons together—each contributing from area of expertise • Include individual accommodations/ modifications • Share equal responsibility for all students	• Materials to support co-planning • Provide co-planning time each session (20-30 min.) • Identify potential accommodations/ modifications, co-teaching methods
Co-Classroom Management	• Agreement on class management structures and routines • Parity in physical environment (desk, storage, materials) • Parity in classroom management (lead & support roles)	• Discuss advantages & challenges of classroom management methods • Identify potential sources of conflict and problem-solving strategies • Include materials to develop or improve classroom management plan

Co-Instruction	• Share lead & support roles equally in instruction • Use variety of co-teaching methods • Provide specialized instruction to students with disabilities	• Discuss pros and cons of co-teaching methods • Identify potential sources of conflict and problem-solving strategies • Include instructional strategies for students with disabilities
Co-Behavior Management	• Agreement for consistent approach to behavior management • Parity in development and implementation of strategies (e.g., positive reinforcement and manage inappropriate behaviors)	• Discuss pros and cons of particular behavior strategies • Self-assessment of collaborative development and implementation of behavior management • Include use of differentiation for behavior management
Co-Assessment	• Collaborative development & implementation of assessment and progress monitoring activities • Adjustment of instruction when students not making progress	• Discuss pros and cons of assessment strategies • Self-assessment of collaborative development and implementation of assessment strategies • Include materials to develop/ improve assessment plans for their classroom

Assessment. It is essential for co-teachers to work collaboratively to develop strategies to assess student understanding and performance, monitor student progress and adjust instruction to meet the needs of all students (Friend, 2008; Gately & Gately, 2001; Murawski, 2009; Potts & Howard, 2011; Salvia, Ysseldyke, & Bolt, 2013). Training in this section established the need and provided strategies for co-teachers to achieve parity in the development and implementation of (1) data collection and assessment activities, (2) monitoring student work and responses, (3) making modifications to instruction when students fail to make satisfactory progress (Murawski, 2009; Potts & Howard, 2011). Treatment participants worked in small groups to identify advantages and challenges of assessment strategies and used strategies to solve problem scenarios involving co-assessment. Co-teachers were given materials to create (or further develop) an assessment plan for their classrooms. Finally, treatment participants worked with their co-teaching partners to co-plan and implement a lesson using identified assessment strategies.

Measures

An extensive review of the literature failed to identify an observation instrument that could measure all five areas of co-teaching performance addressed in this investigation—co-planning, co-classroom management, co-instruction, co-behavior management and co-assessment. Therefore, data collection instruments were designed by the researcher for this study—a demographic survey and a co-teaching observation instrument—based on the research literature describing best practices for co-teaching.

Demographic survey. To establish baseline data about treatment and control participants, a *Demographic Survey* was administered to both groups at the beginning of the

study. This instrument, consisting of eleven multiple-choice items, was used to collect information about participants' teaching certification, level of education, and years of experience teaching, co-teaching and teaching with current co-teaching partner. Participants were asked to identify the number of college courses taken as well as the number of hours of professional development training they had received in the areas of regular education, special education and co-teaching. The surveys were identical for regular education and special education teachers.

Performance assessment for co-teachers. The *Performance Assessment for Co-Teachers* (PACT) is a scaled instrument designed to measure the degree to which co-teaching dyads collaboratively use co-teaching best practices in their classrooms. The instrument contains 15 items in five areas of co-teaching: co-planning, co-classroom management, co-instruction, co-behavior management and co-assessment. Each co-teaching dyad was observed and given a performance rating for each PACT item, using a four-point scale to indicate the degree to which teachers collaboratively used best practices in co-teaching. The PACT yielded a total score, with a score range of 15-60, and five subscale scores, each having a score range of 3-12.

To evaluate content validity, the PACT instrument was reviewed by an expert panel consisting of eight special educators with advanced degrees and co-teaching experience in K-12 classrooms and a senior university faculty member. Other than recommendations for minor revisions, the instruments were found by the panel to be appropriate for their intended purposes. Scale reliability was assessed for the PACT instrument using Cronbach's Alpha. The Cronbach's Alpha for the PACT = .755, which is within the conventional standards for scale reliability. To examine the potential for observer bias, a second observer was trained to conduct pre-treatment PACT observations for 30% (n=7) of treatment and control dyads, but was blind to the assigned treatment condition. Inter-rater reliability between the researcher and second observer on the PACT was assessed using a percent agreement consensus estimate. Interrater agreement was 85.7% for the PACT.

Fidelity of implementation. Four tools were used to ensure that professional development training was consistently implemented across the five treatment subgroups. A detailed training calendar/schedule was used as a checklist to document the implementation of 36 treatment dyad observations and 30 training sessions. A set of five checklists was used to document the implementation of content for each training session. A set of five activity folders containing the activity-related materials and instructions for each training session served as an additional checklist to ensure the inclusion of all intended activities at each training session. Finally, feedback to participants was guided by a detailed rubric (checklist) used during teaching observations. The only deviation from the original plan was the rare rescheduling of sessions in response to weather-related cancelations or participant illness.

Results

Comparison of Demographic Characteristics of Participants
The Pearson chi-square test was used to identify differences in demographic characteristics between groups. No significant differences were found between treatment and control groups.

There were no significant differences between regular and special educators in education levels, number of years teaching and co-teaching, number of years teaching with current co-teaching partner or training in their respective disciplines. However, special educators had significantly more college courses and professional development training in co-teaching than the regular educators (p = .047 and p = .006, respectively), as shown in Table 3.

Table 3. Comparison of Demographic Characteristics for Special and Regular Educators

Characteristic	Special Educators (n=24)	Regular Educators (n=24)	Pearson Chi-Square	df	p-Value
Co-Teaching College Courses					
None	13	20			
1 class	3	4	9.627	4	0.047
2 classes	4	0			
3 classes	2	0			
More than 3	2	0			
Co-Teaching PD					
None	3	15			
1-3 hours	5	5			
4-6 hours	6	1	16.343	5	0.006
7-10 hours	3	2			
11-20 hours	6	1			
More than 20	1	0			

Comparison of Observed Co-Teaching Performance

Post-treatment PACT scores were compared to identify differences between dyads that received co-teaching training and those that did not. Table 4 shows mean and standard deviations for pretest and posttest scores on the PACT for treatment and control groups. The treatment group's mean posttest PACT score (M=39.83, SD=5.09) was higher than the mean for the control group (M=28.83, SD=3.56), showing that dyads receiving co-teaching training had higher scores on their co-teaching performance. One-way analysis of covariance (ANCOVA) was used to compare mean differences in posttest PACT scores between treatment and control group dyads, adjusting for variations in pretest scores. ANCOVA results, shown in Table 5, revealed that the difference in posttest PACT scores between groups was significant, $F (1, 21) = 76.584$, $p < 0.001$) and the effect size was large ($\eta_p^2 = .785$).

Table 4. PACT Pretest and Posttest Means (Standard Deviations) and Adjusted Posttest Means for Treatment and Control Groups

Scale	Treatment (n=12 pairs)	Control (n=12 pairs)
Total		
Pretest	28.33 (4.05)	28.33 (3.89)
Posttest	39.83 (5.09)	28.83 (3.56)
Adjusted Posttest	39.83	28.83

Table 5. Analysis of Covariance on PACT Posttest Scores between Treatment and Control Groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	952.258[a]	2	476.129	50.226	.000	.827
Intercept	55.869	1	55.869	5.894	.024	.219
Pre-Observation Total	226.258	1	226.258	23.867	.000	.532
Group Type	726.000	1	726.000	76.584	.000	.785
Error	199.076	21	9.480			
Total	29442.000	24				
Corrected Total	1151.333	23				

[a] R Squared = .827 (Adjusted R Squared = .811)

Comparison of Co-Teaching Methods Used

Item 8 on the PACT measured the extent to which co-teachers used a variety of co-teaching methods (i.e., *one teach/one observe, parallel teaching, station teaching, alternative teaching, team teaching* and *one teach/one assist*). A comparison was made between the pre- and post-treatment performance of dyads in the treatment and control groups. As shown in Table 6, the majority of co-teaching dyads in both groups relied exclusively or heavily on *one teach/one support* co-teaching methods (i.e., *one teach/one assist* and *one teach/one observe*) at pretest. At posttest, however, more co-teaching dyads in the treatment group used co-teaching methods other than *one teach/one support* than their counterparts in the control group.

Table 6. Pretest-Posttest Comparison of Co-Teaching Methods for Treatment and Control Groups, as Measured by PACT, Item 8

Parity	Treatment (n = 12)		Control (n = 12)	
	Pretest	Posttest	Pretest	Posttest
Co-Teaching Methods				
1) 1 Teach/1 Support for all instruction	9 (75%)	5 (41.7%)	9 (75%)	11 (91.7%)
2) 1 Teach/1 Support methods for the majority of instruction	2 (16.7%)	3 (25%)	3 (25%)	1 (8.3%)
3) Other than 1 Teach/1 Support for most instruction; 1 teacher leads more often	1 (8.3%)	4 (33.3%)	0 (0.0%)	0 (0.0%)
4) Teachers utilize variety of methods and equally sharing lead and support roles	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Comparison of Collaborative Co-Teaching Practices

To determine the extent to which co-teachers worked collaboratively to effectuate co-teaching practices, the observed pre- and post-treatment dyad performance on five PACT items related to collaborative engagement, or parity, was examined for both treatment and control groups. The five items included: co-planning responsibility for students, management of classroom structures and routines, delivery of instruction, management of inappropriate behaviors and checking for student understanding. As shown in Table 7, the majority of teachers in both groups exhibited very low levels of parity at pretest, as measured by these items. At posttest, however, co-teaching dyads in the treatment group appeared to engage in behaviors that represented parity more frequently than their counterparts in the control group.

Discussion

Observation of Co-Teaching Performance

Information about the observed collaborative performance of co-teaching dyads in the five areas of co-teaching (co-planning, co-instruction, co-classroom management, co-behavior management, and co-assessment) was collected using the *Performance Assessment of Co-Teaching* (PACT) instrument. The effect of the training on co-teaching practices of the treatment group was measured by comparing treatment and control groups' total posttest scores on the PACT, controlling for pretest performance. Results showed that teachers who participated in professional development training on co-teaching had significantly higher posttest scores on the PACT than those who did not participate in training. From this outcome, it appears that the model of professional development training designed for this study was successful at improving the co-teaching performance of regular and special education teachers.

Table 7. Pretest-Posttest Comparison of Selected PACT Items on Four-Point Scale Relating to Parity for Treatment and Control Groups

Parity	Treatment (n = 12)		Control (n = 12)	
	Pretest	Posttest	Pretest	Posttest
Co-Planning Responsibility for Students				
1) Special educator takes responsibility for students with disabilities; regular educator responsible for rest of students	3 (25%)	0 (0.0%)	1 (8.3%)	1 (8.3%)
2) Teachers sometimes share responsibility for all students in classroom	5 (41.7%)	1 (8.3%)	8 (66.7%)	8 (66.7%)
3) Teachers share responsibility for all students in classroom most of the time	4 (33.3%)	7 (58.3%)	3 (25%)	1 (8.3%)
4) Teachers share equal responsibility for all students in class	0 (0.0%)	4 (33.3%)	0 (0.0%)	2 (16.7%)

Classroom Management

1) 1 Teacher manages classroom structures and routines	7 (58.3%)	0 (0.0%)	3 (25%)	3 (25%)
2) 1 Teacher manages classroom structures and routine; 2nd manages infrequently	3 (25%)	2 (16.7%)	9 (75.0%)	8 (66.7%)
3) Both teachers manage classroom, but 1 teacher does less frequently	2 (16.7%)	9 (75.0%)	0 (0.0%)	1 (8.3%)
4) Both teachers manage classroom structures and routines equally	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Delivery of Instruction

1) 1 Teacher delivers all instruction	5 (41.7%)	0 (0.0%)	4 (33.3%)	3 (25%)
2) 1 Teacher delivers most of the instruction; 2nd instructs infrequently	5 (41.7%)	0 (0.0%)	6 (50.0%)	6 (50.0%)
3) Both teachers deliver instruction, but 1 teacher does less frequently	2 (16.7%)	11 (91.7%)	2 (16.7%)	3 (25%)
4) Both teachers equally participate in the delivery of instruction	0 (0.0%)	1 (8.3%)	0 (0.0%)	0 (0.0%)

The finding of a higher mean PACT score for those who received training also has implications for parity. According to Friend (2008), successful co-teaching relationships are founded on parity, or equality, in roles, responsibilities and instructional behaviors between co-teaching partners. When parity is absent, co-teaching, as understood in the education literature, is not taking place. Lack of parity in the co-teaching relationship generally relegates one teacher to the role of "helper" in the classroom (Murawski, 2006). Parity between co-teachers was measured on 13 of 15 items on the PACT by the extent to which teachers collaboratively shared responsibility in co-teaching practices in the classroom (e.g., plan and deliver instruction, manage classroom structures and routines, monitor and assess student understanding). Lower scores on these individual co-teaching items (1-2 points) indicated that one teacher was observed to perform/take lead role in the activity for all or most of the observation; higher scores (3-4 points) indicated that both teachers were observed to equally perform/take lead role in the activity for all or most of the observation.

Pre-treatment observations revealed little evidence of parity between co-teaching partners. For example, in the majority of dyad observations for both treatment and control groups, one teacher managed all or most classroom structures and routines (91.7%), provided all or most of the instruction in the classroom (83.3%), managed all or most inappropriate behaviors of students (58.3%), and monitored all or most student responses and work for understanding (66.7%). Additionally, at pretest, only 29.2% of co-teaching dyads in both groups shared co-planning responsibility for all students most of the time. These findings are consistent with findings from previous studies that have shown lack of parity among practicing co-teachers with little training in co-teaching (Keefe & Moore, 2004; Magiera et al.; 2005; Moin et al., 2009).

At posttest, the treatment group's PACT scores appeared to be consistently higher than those of their control group counterparts across all five areas of co-teaching. This strongly suggests that there was more evidence of collaborative engagement, or parity, in co-teaching practices among those who received training. For example, at post-treatment, co-teachers in the treatment group exhibited higher levels than co-teachers in the control group of sharing co-planning responsibility for all students in the classroom equally or most of the time (91.6% v. 25%, respectively), sharing classroom management of activities equally or most of the time (75% v. 8.3%), sharing in the delivery of instruction equally or most of the time (100% v. 25%), sharing in the management of inappropriate behaviors of students equally or most of the time (75% v. 16.7%), and sharing in monitoring for student understanding equally or most of the time (91.2% v. 41.7%).

In the pre-treatment phase the majority of co-teaching dyads—91.7% in the treatment group and 100% in the control group—were observed by the researcher to rely on the *one teach/one support* co-teaching method (i.e., *one teach/one assist* and *one teach/one observe*) with whole group instruction for all or the majority of their instruction. These findings are consistent with previous studies that have shown co-teachers overuse whole group instruction and the *one teach/one assist* co-teaching method (Keefe & Moore, 2004; Magiera et al., 2005; Moin et al., 2009; Murawski, 2006). At posttest, 33% of the co-teaching dyads in the treatment group, compared to 0% in the control group, used co-teaching methods other than *one teach/one support* for most instruction.

Limitations of the Study

This study, conducted with the gracious cooperation of several school districts, was subject to several limitations, including the small number of participants. Participation in this study was dependent on at least four levels of cooperation—school districts, local school administrations, individual teachers and their co-teaching partners. Although the study began with 56 participants in 28 co-teaching dyads, four dyads that either were ineligible or made ineligible by changes in teaching assignments had to withdraw from the study. As a result, the power to detect significant differences between treatment and control groups in the study was lessened. Therefore, some caution should be used when interpreting the results of this study.

According to Rosenthal (1994), researchers can inadvertently influence the results of a study simply by having expectations about the outcomes of the study. There were two ways that the researcher attempted to reduce potential bias in observations. First, the researcher made every attempt to objectively rate the co-teaching performance of participant dyads. The researcher recorded data about co-teaching behaviors throughout the observation (e.g., how often each teacher took the lead role, what co-teaching methods were used) that were used to rate the co-teaching performance of dyads in the five areas of co-teaching. The second way the researcher attempted to reduce the potential for researcher bias was to enlist a second observer for 30% of the pretest observations and then compare differences in scores between the primary observer and the second observer, who had been trained to use the PACT observation form. High inter-rater agreement between the two observers suggests minimal bias on the part of the observer. However, this conclusion could have been made stronger had the second observer also participated in posttest observations.

A strength of the training program was its coherence as a "treatment package" that incorporated best practices in professional development. At the same time, this limited the ability to attribute effects to individual components of the training package.

Conclusions and Implications for Practice

Regular and special education teachers are largely unprepared for the co-teaching role, despite the great extent to which co-teaching has been adopted in public schools. The presence of co-taught classrooms is not a guarantee that the desired effects of co-teaching will be realized in the form of student outcomes. Therefore, ensuring that regular and special education teachers receive training in co-teaching best practices is an imperative for the field of education. The professional development model utilized in this study went beyond the traditional brief workshop to meet the best-practice standard of providing more training hours over a longer period of time—demonstrating that extended training for co-teaching can be successfully implemented within public school systems. This study also provides evidence that this model of training can improve the fidelity with which teachers employ co-teaching practices in co-taught classrooms. Improving the performance of co-teachers should result in better student outcomes.

The finding that teachers' co-teaching behaviors can change with effective professional development training should be a call to action to school administrators who are responsible for fostering growth among teachers and learning among students. However, school administrators may not have had the advantage of co-teaching training and therefore may not have a full understanding of and appreciation for what is necessary to support co-teachers. Providing training for administrators could create a school environment in which co-teaching is more fully understood, more deeply valued and more appropriately supported. For example, this study underscores the importance of ensuring co-planning time for co-teaching partners, which the participants reported was rarely available to them outside of this study. Without co-planning time, co-teachers are forced to act independently, which completely undermines the co-teaching model.

Beyond its application in this study, the *Performance Assessment for Co-Teachers* can be used to assess need for professional development training, and it also can support on-going evaluation to form more accurate observations of classroom performance as a basis for feedback and furthering collaboration between co-teaching partners.

Findings also have implications for the preparation of regular and special educators at the university level. First, preparation of pre-service teachers must include specific instruction in co-teaching if future teachers are to be prepared for a co-teaching role. Second, university faculty can play a lead role in the continuing education of practicing teachers through provision of professional development trainings, such as the one described in this study.

Future research could further refine this approach to training by replicating this study or examining potential enhancements, such as training provided by co-teachers, use of video-taping for reflective feedback, and training that takes place over a longer period of time.

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