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Engagement Levels During Implementation of Co-Teaching Models

Cathy Lee Eschete

Louisiana State University and Agricultural and Mechanical College

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ENGAGEMENT LEVELS DURING IMPLEMENTATION OF CO-TEACHING MODELS

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The School of Education

by

Cathy L. Eschete

B.A., Louisiana College, 2004

M.A., California State University Stanislaus, 2011

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This dissertation is dedicated to my husband, Dylan Eschete and my three daughters,
Isabella, Presley Kate, and Kennedy.

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ABSTRACT

Student engagement in the classroom is a priority for educators and policy makers because disengaged students are more likely to perform poorly in school. Students with disabilities, particularly those with high-incidence disabilities, are a subset of that population of potentially disengaged and definitely poor-performing students. When attending school, they are served increasingly in inclusive, co-taught settings, allowing for inquiry into engagement practices in these instructional arrangements. One purpose of this study was document levels of student engagement for six commonly described co-teaching models implemented in a teacher education course for both special education and general education preservice teacher candidates and inservice special education teachers. A single subject alternating treatments design was implemented to address the following research question: What are the levels, variability, and trends of total (active and passive) engagement for six co-teaching models described in the professional literature? A second overall purpose of the study was to ascertain participant preferences and perceptions of co-teaching models after implementing and/or observing implementation. Three research questions were addressed descriptively and qualitatively: (a) what do participants view as benefits/strengths of co-teaching? (b) what do participants view as weaknesses of co-teaching? and (c) what model(s) do participants prefer? A third overall purpose was to ascertain if there were statistically significant and meaningful differences in gain scores across co-teaching models for content taught using the models during the teacher education course. Overall findings indicated that, first, engagement levels of students were higher in co-teaching models that reduced the teacher to student ratio. Second, station teaching and teaming were the most preferred models of

the participants surveyed. Common themes in the identification of strengths and benefits included co-teaching increasing the amount of individual attention, allowing for a variety of teaching methods, and allowing for collaboration between teachers. Noise level and unequal distribution of tasks were the common themes identified as weaknesses of co-teaching. Finally, measurement of participant gain scores across repeated co-teaching model implementations indicated that statistically significant and small in magnitude differences were noted across models. Research limitations are presented as are implications for co-teaching practice and teacher education.

CHAPTER 1: INTRODUCTION

The present description of findings from an academic semester-long study of engagement practices and participant perceptions and understandings of collaboration knowledge and practice is situated within four distinct literatures. The first is the school engagement literature. In the academic arena, Coates (2007) has broadly defined engagement as comprising circumstances in which students are active and collaborative learners, participants in challenging academic activities and enriching educational experiences, and able to feel like legitimate contributors to learning by instructors and the larger learning community. In a given academic setting, engagement is evidenced as students attending to classroom teacher discourse and actively working with peers and materials to complete a task. Critically, engagement, however broadly or narrowly defined, is important because of its association with student achievement (Parsons, Nuland, & Parsons, 2014). More actively stated, increasing student engagement in academic instruction is vital to promoting positive student academic and behavioral outcomes (Hollo & Hirn, 2015); and for teachers, then, it is a variable that educators can effectively manipulate in pursuit of better outcomes for children. That consideration is especially important to educators who work with students with disabilities.

A second important literature describes the achievement of students with disabilities, and more germane to the present study, students with high-incidence disabilities. These are students with verifications in the areas of learning disability, emotional disturbance, speech-language impairment, mild intellectual disability, and other health impairment. Overall, students with disabilities can be expected to lag behind their non-disabled peers at the point in time at which they begin receiving special education services because of the nature of their circumstance. That is, there has been an

adverse impact on educational performance of the given disability category or categories that has resulted in the need to provide specialized instruction designed to meet the unique needs of the student.

Specialized, individualized, intensive instruction, that is outlined in a student's individualized education program and implemented with fidelity is supposed to result in improved educational outcomes. Yet data suggest those suppositions are not being realized. In introducing a series of articles designed to offer practical suggestions for teachers in working with students with disabilities with long-term learning and behavioral challenges, Danielson and Rosenquist (2014) provided some telling statistics pointing to the struggles of the special education field. First, the National Assessment of Education Progress (*NAEP*, National Center for Education Statistics, 2011) results indicated that approximately two-thirds of fourth- and eighth-grade students with disabilities lacked basic reading or math skills, considerably greater than proportions reported for the general education sample tested. Second, the National Longitudinal Transition Study (Wagner, Newman, Cameto, Garza, & Levine, 2005) results indicated that one-third of high school students with disabilities had had a school discipline problem, one-fourth had dropped out of school, and four-fifths were unemployed or under-employed as young adults (Danielson & Rosenquist, 2014). Given that students with disabilities may under-achieve and that engagement practices can impact academic achievement, and further, that there are instructional practices in promoting student engagement that are documented across student populations (e.g., Harbour, Evanovich, Sweigart, & Hughes, 2015) there is reason to connect these two literatures in inquiry.

A third literature relates to a common service delivery model presently utilized by school professionals in serving the vast majority of students with high-incidence disabilities in public schools, namely co-teaching. In special education over the past 20 years, legislative pressure has challenged educators to find efficient and effective ways to provide high-quality instruction including elements such as active engagement for students with disabilities within the general education setting (Solis, Vaughn, Swanson, & McCulley, 2012). Since the passage of what is now the Individuals with Disabilities Education Improvement Act (IDEIA, 2004), school personnel must determine what supports are necessary to ensure that students are appropriately educated in the general education setting to the greatest extent possible, otherwise known as the Least Restrictive Environment (LRE) mandate (Solis et al., 2012). In order to meet many of the requirements, such as placing students in a LRE, many districts have resorted to utilizing inclusion settings (Friend, Cook, Hurley-Chamberlin, & Shamberger, 2010) for student placement. Inclusion is supposed to bring the special education services to the student in the general education classroom instead of bringing the student to the special education services. The service delivery option commonly used to provide this service is co-teaching (Murawski & Swanson, 2001).

Cook and Friend (1995) defined co-teaching as “two or more professionals delivering substantive instruction to a diverse, or blended, group of students in a single physical space” (p.2). Similarly, Zigmond, Magiera, Simmons, and Volonino (2013) defined co-teaching as two educators accommodating the needs of students with and without disabilities together. As general education classrooms have continued to become increasingly populated with diverse learners who are expected to meet annual

achievement benchmarks, co-teaching has been advocated as a way to enhance instruction and facilitate learning for all students, but especially those with disabilities (Zigmond et al., 2013). What Friend and colleagues (2010) described as the complexity of implementation emerges, however, when the promotion of the practice is weighed against the fact that there is only a small body of evidence to support the practice's positive impact on student outcomes (e.g., Cook & Cook, 2011; Murawski & Swanson, 2001). Moreover, it is likely difficult to uniformly implement co-teaching models and/or practices given that there is very little guidance beyond narrative model descriptions in textbooks and the professional literature. Given the small body of evidence supporting co-teaching's efficacy and the large mass of advocacy and logic supporting its implementation in core curricula for students with and without disabilities, there is also reason to target this literature (and practice) for exploration.

The final literature base with relevance to the present inquiry is that of teacher education. Teacher preparation as a whole has received a tremendous amount of criticism in recent years. Principal among the concerns of opponents of traditional teacher education as a whole has been the length and cost of such programs as well as a belief that they are not focused on what is believed to be the critical component of developing teacher subject matter knowledge (Leko, Brownell, Sindelar, & Murphy, 2012). Also contributing to the climate of concern is a realization that research demonstrating a link between teacher training, teacher practice, and student outcomes has been hard to locate and communicate clearly (e.g., Goe, 2006), thereby making it more difficult to defend the aforementioned length and cost associated with programs. In special education teacher preparation, specifically, changes in how special education is

conceptualized and organized over time have contributed to greater heterogeneity in preparation program structures, leading Brownell, Sindelar, Kiely, and Danielson (2010) to posit that there has been a loss of teacher training program focus. All of these teacher preparation program factors contribute to a need to link training with practice and outcomes and conduct research that documents the connections or lack thereof of the educational elements.

In the teacher education literature, of recent interest has been the emergence of collaboration as a target for research in special education teacher preparation. For example, Leko and colleagues (2012) reviewed teacher and special education journals for research articles published from 2000 to 2011 in order to answer questions related to quality teacher preparation. The first decade of the 21st century was reportedly chosen because changes in policy have put teacher effectiveness under the microscope (Leko et al., 2012). One of their primary findings was that a growing number of research studies focused on two areas of inquiry, one of those related to knowledge and skills necessary for effective collaboration. Further, Leko and colleagues indicated that some of the strategies used to develop collaborative skills included placing general and special preservice teachers in collaborative teaching situations and training preservice teachers in specific collaborative skills. According to the authors, the most promising strategies in these research summaries were those that taught collaboration skills and provided an opportunity for working together (Leko et al., 2012). Extending the collaborative structures evaluated to include co-teaching arrangements appears to be a logical next step in teacher education inquiry, particularly given that the preservice and inservice teachers

involved in such research will likely need to collaborate in planning, delivery and evaluation of instruction for students with disabilities in inclusive public school settings.

Educational Context and Need for the Study

The present study took place with the aforementioned literatures serving as a backdrop with which to discuss its findings. While its ultimate goal was to inform research and practice on co-teaching instructional arrangements often utilized with students with high-incidence disabilities, its more immediate goal was to influence thinking and practice in the co-teaching and teacher education environments. These areas were chosen because the study evaluated engagement levels of six co-teaching models within the confines of a teacher education course. Participants were students in a teacher education course originally designed to provide undergraduate and graduate students seeking special education certification and/or advancement with knowledge of collaborative school-based practices. The course was the last in a sequence of courses that grades 1-5 teacher education candidates could take in pursuit of certification as a teacher of students with mild and/or moderate disabilities. It was also one of the courses graduate students could take in pursuit of an advanced degree in special education. And for the first time, the course was required of general education candidates accepted into a program that provided a fifth-year student teaching experience and initial grades 1-5 certification at the master's level. Such a setup provided the researcher with an opportunity to have students pursuing general and special education certifications to learn and work together on course-related activities. Equally important from a scholarly impact standpoint, it provided a teacher education program at a research-intensive university the chance to meaningfully link teacher training, teacher practice, and student outcomes,

something Goe (2006) suggested is a rarity. Preservice teachers, in particular, were part of an experimental inquiry that allowed them to experience and evaluate different forms of an instructional service delivery model in a supported setting. Moreover, measures of their own engagement and learning were compared to help determine if different forms of the co-teaching service delivery model resulted in different engagement levels and achievement scores. Through systematic inquiry, then, present and future teacher participants were able to experience as well as evaluate co-teaching in a richer manner than they would have by simply hearing it described and modeled as part of instruction or evaluating its impact on students as part of their evaluation of a particular lesson.

A second related reason to conduct the study was to inform the collaboration literature in both teacher education and higher education. That is, in their literature review on the use of collaborative teaching for teacher educators, Nevin, Thousand, and Villa, (2009) found that more research is needed to determine the impact of co-teaching in teacher education preparation programs with respect to student achievement. And while student achievement in the Nevin et al. study involved college students, data have demonstrated the continuing need in special education teacher preparation to ready candidates to work with students with disabilities whose collective success in the general education curriculum has fallen short. The limited research on co-teaching has generally targeted the K-12 setting (Garderen, Stormont, & Goel, 2012; Klingner, Vaughn, Hughes, Schumm, & Elbaum, 1998; Solis et al., 2012). Few studies have been conducted to evaluate the benefits of co-teaching in postsecondary settings (Scantlebury, Gallo-Fox, Wassell, 2006; Walters & Misra, 2013). The present study evaluated levels of

engagement and content knowledge differences in co-teaching practices in a collaboration-focused college education course.

A final reason establishing a need for the study was the potential impact that improved instructional practice might have on academic and behavioral outcomes of students with higher-incidence disabilities, the students for whom course participants were being trained to plan, provide, and evaluate specialized and individualized instruction. Outcomes for students with disabilities overall have been described as abysmal, and those outcomes are supposed to be the results of specialized, research-based, individualized, goal-oriented, and intensive programming (Scott, Hirn & Alter, 2014). There is a large body of effective instructional practices that can facilitate success for students with disabilities (Scott et al., 2014) and these practices must be incorporated into the co-teaching service delivery model that students with disabilities are experiencing for content instruction. The body of instructional practices that increase student engagement practices are logical tools for co-teachers to utilize and the present research provides a baseline for more experimental research examining direct manipulation of these and other instructional practices.

Prior to providing a review of the relevant literature, description of the research methodology, study results, and a discussion of the findings, the following definitions of terms are provided:

Definition of Terms

- **Behavioral Observation of Students in Schools (BOSS):** An observational behavioral assessment system that is designed specifically to directly measure academic engagement (Shapiro, 2004).

- **Co-teaching:** Two or more professionals delivering substantive instruction to a diverse, or blended, group of students in a single physical space (Cook & Friend 1995).
- **Engagement:** Comprised of active and collaborative learning, participation in challenging academic activities, formative communication with academic staff, involvement in enriching educational experiences, and feeling legitimated and supported by university learning communities (Coates, 2007).
- **Inclusion:** The placement of students with disabilities in the general education classroom with peers without disabilities (Yell, 2012).
- **Least Restrictive Environment (LRE):** To the maximum extent appropriate, children with disabilities, including children in public or private institutions or other care facilities, are educated with children who are not disabled, and that special classes, separate schoolings, or other removal of children with disabilities from the regular educational environment occurs only when the nature or severity of the disability is such that education in regular classes with the use of supplementary aids and services cannot be achieved (IDEIA, 2004).

CHAPTER 2: REVIEW OF LITERATURE

This chapter opens with a discussion of inclusion of students with disabilities in public school settings. A summary of research on co-teaching in public school and university settings follows, as well as a summary of the research on student engagement and class size reduction as a predictor of academic success. It closes with a rationale for the present study, building on the commentary provided in the introduction (i.e., Chapter 1).

Inclusion

Special education is driven by federal legislation and IDEIA is the law that guides the decisions made in special education. The most recent reauthorization of Public Law 94-142, IDEIA states that all students, regardless of disability, are entitled to a free appropriate public education. In addition, it states that students with disabilities must be educated alongside their peers without disabilities to the maximum extent appropriate. Special classes, separate schools, or other removal of students from the general education classroom should occur only when the severity or nature of a child's disability is such that his or her education in a general education classroom with the use of supplementary aids and services cannot be achieved satisfactorily (Beattie, Jordan, & Algozzine, 2006). The practice of teaching students with disabilities alongside their non-disabled peers is known today as inclusion (Stainback & Stainback, 1992; Yell, 2012).

The proportion of students with disabilities who are receiving inclusionary educational services continues to increase. As of 2011-12, a total of 94.9% of students ages 6 through 21 were educated in regular classrooms for at least some portion of the day. The proportion of students with disabilities who receive the majority of their instruction in the general education classroom has steadily increased since the original

passage in 1975 of what is now titled IDEIA. According to Thousand, Villa, and Nevin (2006), these trends can be expected to increase given the national trends of the past three decades and IDEIA's requirement to include students with disabilities as full participants in rigorous general education curriculum and assessment.

Over the past 20 years, legislative pressure has challenged educators to find efficient yet effective ways to provide high-quality instruction for students with disabilities (Solis et al., 2012). Due to the increasing demands of IDEIA regarding including all students in general education settings to the maximum extent that is appropriate, both special educators and general educators have a responsibility to do their best to reorganize the general education environment to serve students with disabilities along with students without disabilities. Expectations have moved beyond providing students with disabilities access to the general education curriculum to producing meaningful academic growth for students with disabilities in the general education curriculum. There is a need for increased collaboration among school staff to comply with the legal mandates set before them. Thousand et al. (2006) suggested that co-teaching is one cost-efficient, legally available, supplementary aid and service that can be brought to general education to serve the needs of students with (and without) disabilities through IDEIA. Co-teaching has also been proposed as a mechanism teachers and schools can use to address the LRE mandate.

Co-teaching

Co-teaching is defined as two or more professionals delivering substantive instruction to a diverse or blended group of students in a single space (Friend & Cook, 1995). Although the definition of co-teaching seems simple enough, the implementation of co-teaching is operationalized more broadly (Solis et al., 2012). The elements of co-

teaching consist of a common, publicly agreed upon goal, a shared belief system, demonstration of parity, distribution of tasks and relationship functions across all co-teaching group members, and use of a cooperative process (Friend & Cook, 2013; Thousand et al., 2006). Co-teaching is often referred to as a “professional marriage” because of the importance of building a strong and parity based relationship (Kohler-Evans, 2006; Scruggs, Mastropieri, & McDuffie, 2007). Teachers must collaborate to provide instructional services to students with disabilities. In co-teaching, collaboration involves issues such as planning and teaching lessons, preparing and organizing instructional materials, choosing complementary instructional structures, identifying appropriate assessments, and grading (Solis et al., 2012). For example, Solis et al. (2012) point out that there are many models that are used to implement co-teaching and the roles of the general educator and special educator can vary greatly from one model to the next. In a model commonly referred to as “one teach/one assist,” the general educator takes the primary role of teaching while the special educator takes on a monitoring role. In another model, “teaming,” the class is taught together with teacher parity being demonstrated. Due to the variability in the implementation of co-teaching and as a way to promote the success of co-teaching, it is crucial that professional relationships be formed between teachers prior to and throughout the co-teaching experience (Ploessl, Rock, Schoenfeld, & Blanks, 2010). Trent et al. (2003) found that a mutually satisfying co-teaching relationship emerged when teachers focused on the technical aspects of planning.

To better understand co-teaching, researchers have sought to characterize the evidence base associated with collaborative models of instruction (Solis et al., 2007). Using a similar organizational structure to reviews of literature conducted by Solis et al.

(2007), Friend et al. (2010), and Scruggs et al. (2007), the following describes important findings related to co-teaching in the areas of (a) attitudes, beliefs, and perceptions; (b) benefits; (c) teacher supports; (d) collaborative models; and (e) effectiveness.

Attitudes, Beliefs, and Perceptions

Researchers have found that teachers' beliefs are likely to influence teachers' motivation and thus the quality of their collaboration (Solis et al., 2012). The overall perceptions of co-teaching generally seem positive (Friend et al., 2010; Murawski & Dieker, 2008; Scruggs et al., 2007). Prior to 1994, teacher attitudes towards inclusion were not favorable, but later surveys indicated that teachers began to have more positive attitudes towards inclusion (Avramidis & Norwich, 2002). Solis et al. (2012) found that teachers' support of inclusion varied according to the severity of the disability for students participating in inclusion. Teachers tended to report more positive attitudes toward the inclusion of students with physical or sensory impairments than those with learning or behavioral disabilities (Avramidis & Norwich, 2002).

Scruggs et al. (2007) summarized the body of qualitative research syntheses and found that teachers generally had positive beliefs about their co-teaching experiences in the areas of content knowledge, increased student cooperation, and ability to provide additional attention to students. Austin (2001) found that general education teachers believed that co-teaching contributed positively to their professional development in the areas of classroom management and curriculum adaptation skills through interactions with the special educator. Although overall teachers reported positive attitudes, beliefs, and perceptions of co-teaching, many cautioned about forced co-teaching and strongly

suggested that co-teaching should be voluntary with professional relationships determined through teacher compatibility (Scruggs et al., 2007).

Benefits

Scruggs et al. (2007) reported that teachers commonly noted increased cooperation among their students in a co-teaching classroom. For example, Salend, Johnsen, Mumpet, Chase, Pike, and Dorney (1997) quote a general education kindergarten teacher who reported, “Norma fell off her chair today and Robert immediately asked, “Are you okay?” in a concerned caring way. Lee then got up to help her pick up her crayons – it was wonderful” (p.8), but no analyzable observational data was reported.

Walther-Thomas (1997) conducted a three-year study of 18 elementary and 7 middle school teaching teams. They noted that a number of teachers reported that students with disabilities discovered that they had skills that actually exceeded those of their non-disabled peers. One teacher in the study noted, but no analyzable observational data was reported:

It had been 4 years since Sean had been in a regular class. He was truly amazed to find that he could do OK in here. He discovered that there were many things that he could do that he didn't think he could – and a lot of things that some of the other kids in the class couldn't do. When he realized all of this, he was willing to work harder than he ever had in his self-contained classes. He really rose to meet our expectations and his own (p. 399).

Another commonly found benefit to co-teaching is the ability to provide students with more individualized attention during instruction. Norris (1997) interviewed a general education teacher, who responded, “The best thing about co-teaching is having another person in the classroom ... knowing that there are targeted students in the classroom who need extra help and having either the co-teacher or myself address those while the other teacher is doing something else” (p. 84-85). In Drietz (2003), a student

reported, “I like that there are two people to help out, and you don’t have to wait too long to get your question answered” (p. 28). On the other hand, a student interviewed in Dieker (2001) stated, “You can’t get away with anything” (p.17).

Austin (2001) found that the majority of teachers surveyed identified cooperative learning and the use of small groups as the two instructional techniques they found most effective, due to a reduced teacher to student ratio. In addition, the co-teachers interviewed also noted having another teacher’s expertise and viewpoint was very beneficial (Austin, 2001).

Teacher Supports

Friend and Cook (2013) indicated that the amount of noise and movement during instruction is a common concern expressed about the co-teaching models, specifically those that break the instruction into smaller groups, such as station teaching, parallel teaching, and alternative teaching. Walther-Thomas (1997) noted that scheduled planning time, student scheduling, caseload, administrative support, and staff development as overall areas of concern related to co-teaching.

Murawski and Swanson (2001) found an overall concern with effective scheduling practices, a lack of administrative support, and time to engage in co-planning efforts. Throughout the literature on co-teaching, teachers consistently expressed the need for adequate planning time for all staff involved in co-teaching (Manset & Semmel, 1997; Murawski & Swanson; Scruggs et al., 2007). Murray (2004) indicated that general education teachers consistently noted a common planning time as a critical factor in co-teaching.

Along with planning time, teachers consistently noted the need for training on the co-teaching models (Avramidis & Norwich, 2002; Scruggs et al.). Friend and Cook (2007) stated that special educators must understand how their knowledge and skills facilitate learning in co-teaching, as well as know how to utilize collaboration skills that enable them to negotiate roles and responsibilities. Also noted was the importance of general educators having the same preparation and understanding. Hudson and Glomb (1997) asked the question: “If it takes two to tango, then why not teach both partners to dance?” (p. 442).

Collaborative Models

Co-teaching models (see Figure 1) are implemented in a variety of arrangements: Whole class single teacher led, two heterogeneous groups, two homogenous groups, station teaching, whole class plus small group, and whole class team teaching (Sileo, 2011). Research suggests that the most commonly utilized model is the whole class, teacher led model, also more commonly known as “one teach/one assist,” with special educators taking on the “assist” role (Scruggs et al., 2007). Research suggests that many

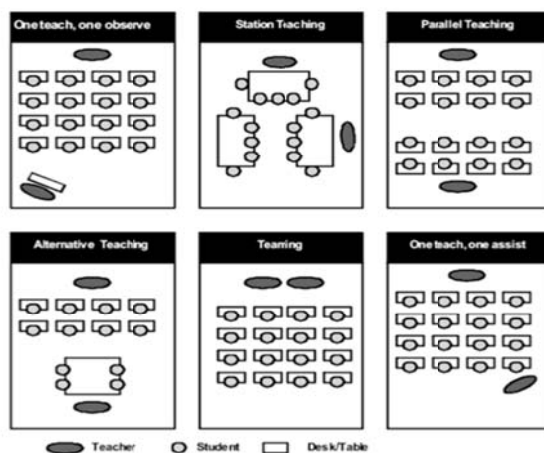


Figure 1. Co-teaching Models (Friend, et al., 2010)

special education teachers claim that is their role (Scruggs et al., 2007; Weis & Lloyd, 2002) in spite of the fact that co-teaching proponents suggest that team teaching is best (Cook & Friend, 2013). Similarly, Austin (2001) found that the majority of teachers agreed that the general educator did more than their special education partner and the special educator was often viewed as a visitor in the classroom.

Manset and Semmel (1997) found that when a special educator functioned in the role of assistant that there was no clear indication that effective strategies or beneficial use of the special educator was occurring. They concluded that an instructional program that supported inclusion would consist of modified curriculum, formative evaluations, redistribution of resources, and a specific plan for collaboration. Scruggs et al. (2007) also asserted that the implementation of co-teaching did not often incorporate effective instruction or best teaching practices.

Effectiveness of Co-teaching

A significant proportion of the co-teaching literature has focused on perceptions of practice. A much smaller body of empirical research has targeted student outcomes of co-teaching. Murawski and Swanson (2001) conducted a meta-analysis of co-teaching research. After a comprehensive literature search, they were only able to identify six studies (Klingner et al., 1998; Lundeen & Lundeen, 1993; Rosman, 1994; Self, Benning, Marston, & Magnusson, 1991; Vaughn, Elbaum, Schumm & Hughes, 1998; Walsh & Snyder, 1993) that met their inclusionary criteria. Those criteria required that the research studies include sufficient quantitative data that would enable the researcher to calculate effect sizes for the intervention, descriptive characteristics that identified the intervention as a form of co-teaching, and a co-teaching treatment condition that lasted for more than

a two-week period, not including pre- and post-testing (Murawski & Swanson, 2001). Overall, Murawski and Swanson found co-teaching to be a moderately effective procedure for influencing student outcomes. Their meta-analysis concluded with an overall mean effect size of 0.40.

The actual influence on the specific outcomes for students varied in each study analyzed. Vaughn et al. (1998) conducted a study of 185 third through sixth grade students, of which 59 were identified with learning disabilities (LD). The study was conducted at two public schools across seven different classrooms. Three of the classrooms were implementing co-teaching practices, while the other four utilized consultation and collaboration to meet the needs of their students with disabilities. The researcher sought to measure peer acceptance, reciprocal friendships, self-concept, friendship quality, and social skills of students. The overall findings suggested that students from all groups in the consultation and collaboration setting performed well socially (Vaughn et al., 1998). Murawski and Swanson (2001) reported a mean overall effect size of 0.08 for the Vaughn et al. study.

Self et al. (1991) conducted a three-year study on the effects of co-teaching at an urban elementary school that served kindergarten through third grade students. They evaluated the effects of co-teaching on oral words read correctly learning rate, average performance, special education referrals, and teacher attitude. In first grade, the authors reported an average slope of improvement of 0.94 words read correctly per minute in the non-co-taught class and 3.11 in the co-taught class. In second grade, they reported an average gain per week of 0.40 correct words in the non-co-taught class and a 0.73 in the co-taught class. In the third grade, the average gain was 0.40 during the non-co-taught

class and 2.30 correct words per week during the co-taught class. Researchers also sought to decrease the number of special education referrals through the implementation of co-teaching. In year 1 of the study, the school screened 128 students and found 108 were eligible to receive additional assessments for special education services.

Implementation of co-teaching began to attempt to provide more services to these at-risk students. By year 3, of the remaining students that had been placed in co-teaching groups, only 8 students were considered eligible for special education assessments. Murawski and Swanson (2001) reported an overall mean effect size of 0.95 for the Self et al. study.

Walsh et al. (1993) utilized 9th grade minimum competency test scores and classroom grades of students in co-taught classes and those in comparison classes with similar profiles and backgrounds as below average students. In language arts, the students in the co-taught class earned significantly lower grades than the non-co-taught class. On the 9th grade competency test, the students in the co-taught class scored slightly higher as a total group than those in the non-co-taught class.

Klingner et al. (1998) compared pre- and post-test scores on the academic outcomes in math and reading in a co-taught classroom. They compared scores for learning disabled students with those who were considered to be low to average ability and also those who were considered high ability. In the area of reading, the effects size for all groups of students compared were statistically significant, however, for math, the effect size for learning disabled students was considerably lower than those of the other groups. Similarly, Rosman (1994) also provided pre- and post-test data on students with disabilities in a co-taught setting; however, no comparison data were provided. They

reported that students in the co-taught setting had higher math achievement scores.

Murawski and Swanson (2001) reported an overall mean effect size of 0.24.

Lundeen and Lundeen (1993) compared grades of high school students in classrooms that utilized a team teaching approach to those with only one adult leading the classroom. They found that grades of students in the class that utilized team teaching increased. Murawski and Swanson (2001) reported an overall mean effect size of 0.25.

In 2011, Cook, McDuffie-Landrum, Oshita, and Cook conducted a critical analysis of the empirical literature on co-teaching. In addition to the six studies identified by Murawski and Swanson (2001), they identified two additional studies that occurred subsequent to Murawski and Swanson's meta-analysis. Fontana (2005) evaluated math and English grades of students with learning disabilities in a co-teaching setting. No significant improvement was noted for students with learning disabilities; however, they calculated an effect size of 0.81 for English grades and 0.40 for math grades in favor of co-teaching. Murawski (2006) evaluated the relation of co-teaching, for learning disabled students, to results on standardized tests of spelling, vocabulary, math, reading comprehension, and writing. An overall effect size of -.04 was computed for co-teaching in comparison to only one adult teaching on standardized test results for students with learning disabilities.

Solis et al. (2012) synthesized co-teaching and inclusion findings from six syntheses completed between 1990 and 2010. They identified 146 studies for their synthesis of syntheses. The inclusion criteria required that the research syntheses include the following components, investigations that focused on co-teaching or inclusion, reviews included either quantitative or qualitative studies and investigations were peer-

reviewed. Of the 146 studies identified, only 17 included information specific to student outcomes, and of those 17 only 6 studies reported on student outcomes in a co-taught setting, the same studies identified in Murawski and Swanson (2001).

Co-teaching and Teacher Training

Another component of co-teaching concerns its integration with other school reforms and improvement efforts (Friend et al., 2010). Roth and Tobin (2002) stated that reforms in teacher education have promoted the establishment of learning communities at the classroom level for teachers, as well as the importance of becoming a community member as an element of professionalism. Co-teaching offers a practical method for preparing teachers that emphasizes responsibility, reflection, and mutual respect (Tobin & Roth, 2006).

Scantlebury, Gallo-Fox, and Wassell (2006) conducted a study on the implementation of co-teaching as an innovative approach for preparing preservice secondary science teachers. They defined co-teaching as multiple teachers teaching together in a shared environment, while sharing responsibility for teaching and planning (Scantlebury et al., 2006). During the student teaching practicum, interns taught five classes a day, of which four classes were taught with a combination of at least two of their peers and two cooperating teachers. Each intern also taught various grade levels of science content, as well as one class a day solo. Scantlebury et al. found that by placing student interns into an established, collegial, professional community co-teachers were provided with multiple resources for teaching. Interns reported that they drew on the resources and experiences from their co-taught classes to enhance their solo class, and tried out other strategies gained from their co-teaching arrangements. Juck and Scantlebury (2006) found that all of the first year teachers who had co-taught sought

and/or established communities of practice to provide support for their teaching when they moved into their own classrooms.

Walters and Misra (2013) also studied the usefulness of co-teaching in a postsecondary setting, more specifically doctoral programs. The researchers sought to determine if co-teaching could improve graduate teacher training efforts through intensive supports and engagement as well as improve the teaching experience of faculty and the learning experience of undergraduates. Outcomes were reportedly positive. Undergraduate students in the co-taught classes rated the co-teachers using a five-point scale, with 1 being the lowest or worst and 5 the highest or best score. Graduate students received a 4.5 or higher on preparation for class, explaining course material well, clearing up points of confusion, using class time well, showing interest in helping students learn, inspiring interest in the course material, and providing useful feedback on student performance, methods of evaluating student work, stimulating student participation, and overall rating of instructors' teaching. In comparison to non-co-taught classes in the same department, they scored higher on all areas of the evaluation, except stimulating participation and methods of evaluating work, where they fell in the average range.

Cordner, Klein, and Baiocchi (2012) also evaluated co-teaching at the graduate level. Graduate students who had previously completed a course with a faculty member worked with the faculty member to select books, develop a syllabus, and teach the course in a workshop style. All students reported positive experiences from the co-taught graduate course. In addition, this led other faculty members to repeat the co-design and co-teaching model in future courses.

Engagement

Student engagement is the current “buzzword” in educational circles, as it is increasingly being researched, theorized, and debated as growing evidence of teacher effectiveness and its critical role in student achievement and learning (Kahu, 2013). According to the National Research Council and Institute of Medicine (2004), students’ engagement in school plays a critical role in their academic and life success. While there are many variations in definitions of engagement and no consensus on which should be utilized (Lee, 2014), several researchers commonly references engagement as being multifaceted and divide it into three types: behavioral engagement, emotional engagement (also known as affective or psychological), and cognitive engagement (Fredricks, Blumenfeld, & Parish, 2004; Fredricks & McColskey, 2012; Jimerson, Campos, & Grief, 2003; Parsons et al., 2014; Wang & Fredricks, 2014).

Behavioral engagement is defined as participation and task involvement in academic activities (Fredricks et al., 2004) According to Bundick, Quaglia, Corso, and Haywood (2014), examples of behavioral engagement may include participation in school-related activities, attending classes, contributing to classroom discussion and assignments, compliance with school rules, completing assignments, and showing effort in studying and concentrating on academics. Lee (2014) included examples of behavioral engagement as class attendance, avoiding disruptive behavior, following directions and class rules, level of concentration, effort, persistence and contribution in class work and discussions, asking questions, completing homework, and spending extra time on school related learning.

Emotional (affective) engagement is defined as a student's sense of belonging in the classroom, as well as their enthusiasm and curiosity about topics and assignments (Fredricks & McColskey, 2012). This includes how students feel about their relationships with their peer and teachers, as well as their overall sense of belonging in school as it relates to their relationships (Bundick et al., 2014). Lee (2014) states that feelings of belonging relate to students feeling accepted, respected, and valued by their peers and teachers at school.

Cognitive engagement is defined as engagement that is self-regulatory and strategic (Fredricks et al., 2004). Examples include an individual who plans, monitors, and evaluates one's own thinking (Bundick et al., 2014). Connell and Wellborn (1991) stated that problem solving, preference for hard work, and positive coping in the face of failure all represent examples of cognitive engagement.

Kahu (2013) identified engagement as a being both complex and multidimensional; a central agenda that intends to combine research that seeks to explain student success. While there are multiple views to look at engagement, for the purposes of this study we will focus on behavioral engagement, as it relates to teaching practices; more specifically co-teaching.

Reyes, Brackett, Rivers, White, and Salovey (2012) stated that student engagement is vital to academic success, as engaged students are attentive and active participants in classroom discussions and activities, as well as demonstrate interest and motivation to learn. Klem and Connell (2004) conducted a study of engagement in middle school students. Those students who demonstrated higher levels of engagement were 75% more likely to have higher grades and attendance than those with lower levels

of engagement. Similar results were noted in a study conducted by Duncan et al. (2007), in which they examined six large-scale longitudinal studies and found that academic engagement, along with math and reading skills at school-entry are consistently the strongest predictors of achievement.

Disengaged students are more likely to drop out of school, struggle with academic performance, and exhibit problem behaviors (Fredricks et al., 2004). Klem and Connell (2004) found that between 40% and 60% of high school students are chronically disengaged. Quaglia Institute for Student Aspirations (2013) found that more than half of 10th grade students are bored at school, and less than half report to enjoy school. Lee (2014) acknowledged that while academic failure and dropout rates are not isolated events, enhancing student engagement may help prevent these outcomes.

Sweigart and Landrum (2015) hypothesized that co-taught classrooms would show higher levels of student engagement, as well as reduce off-task or disruptive behavior, which would in turn lead to better student educational outcomes. They conducted an exploratory study of the differences observed in co-teaching classrooms, which they defined as classrooms with more than one adult, versus classrooms with only one adult. They examined students time engaged and rates of disruption, along with teachers' rates of positive and negative feedback, opportunities to respond, as well as their time spent in one on one or small group settings in classrooms with one adult versus classrooms with more than one adult. Findings indicated that classrooms with more than one adult saw a greater rate of opportunities to respond. However, contradictory to their hypotheses, they observed higher levels of student engagement in classrooms with only one teacher. Sweigart and Landrum did indicate several explanations to the finding on

engagement, which represented key limitations in their study. The researchers did not have access to demographic information about the classrooms they were observing. They speculated that when two adults were present in the classroom, this was due to greater student needs, and potentially accounted to observed differences in engagement rates in classrooms with multiple adults versus classrooms with only one adult. The authors referenced Scruggs and colleagues (2007), who noted that many students included in co-taught settings were deficient in the basic skills teachers felt they needed to be successful in the general education environment. Additionally, the researchers indicated that the number of students in the class could have required an additional adult's presence; therefore a classroom of 35 students would likely require an additional adult versus a classroom with 20, which could have accounted for observed differences.

Student engagement with instruction has continued to be identified as potentially one of the best predictors of student success (Berliner, 1990; Hirn & Scott, 2014). Skinner and Pitzer (2012) referred to engagement as strong predictor of student's academic progress, particularly in grades, achievement, test scores, retention, and graduation. A student's level of engagement is influenced by the specific context and situation (Parson et al., 2014). With that being said, it is important that the teacher's role utilizes practices that increase the likelihood of student engagement with the curriculum, which increases the probability of academic achievement (Hattie, 2009), such as reduction in class size Halbach, Ehrle, Zahorik, & Molnar, 2001). With special education students demonstrating academic deficits, it is imperative that we seek to identify the best practices that promote higher levels of engagement.

Class Size Reduction

Research has consistently shown that reducing the student to teacher ratio has documented greater achievement gains for students compared to peers in larger classes (Biddle & Berliner, 2002; Egelson, Harman, & Achielles, 1996; Halbach et al., 2001). However, critics of class reduction have stated that it is potentially one of the most expensive reforms in education; therefore, less costly educational reform measures tend to be considered instead (Halbach et al., 2001; Hruz, 1998).

The state of Wisconsin piloted a statewide effort in 1996 known as SAGE (Student Achievement Guarantee in Education) to increase academic achievement by reducing class sizes to a 15:1 student to teacher ratio. Results of the pilot indicated a reduction in discipline problems, more time for instruction, more opportunities for individualization, ability to vary instructional strategies, as well as an increase in the students who exceeded grade level requirements (Molnar, Smith, Zahorik, Palmer, Halbach, & Ehrle, 1999).

Similarly, the state of Tennessee conducted a study known as STAR (Student Teacher Achievement Ratio) to compare the achievement of early-grade students assigned randomly to one of three conditions: standard classes (one certified teacher and more than 20 students), supplemented classes (with one certified teacher and a full time non-certified teachers aide), and small classes (with one teacher and about 15 students) (Biddle and Berliner, 2002). Results on standardized tests were similar for students who were in the standard and supplemental classes; however, results for the small classes were substantially higher. Furthermore, results showed that gains became greater the longer the students were in small classes (Biddle & Berliner, 2002).

In a study of elementary school students, Bosworth (2014) found that students who struggle in school appear to benefit more from class size reduction than students in the top achievement distribution. Though reduction in student to teacher ratio has been criticized due to its cost, it is important to note there are multiple ways to reduce class sizes. (Halbach et al., 2001). For example, three of the six models of co-teaching reduce the student to teacher ratio. Friend and Cook (2013) noted that station teaching, parallel teaching, and alternative teaching all lower the student to teacher ratio.

Station teaching involves two educators in instruction and traditionally divides the class into a minimum of three groups. The educators lead two stations, and the third station may be used for students to complete independent work, participate in peer tutoring, or to work under supervision of another adult if available (Friend & Cook, 2013). The students rotate from one station to another according to a planned schedule. In a classroom of 33 students, the student to teacher ratio would be reduced to 11:1.

Parallel teaching also involves two educators in instruction, but the teachers do not exchange groups as in station teaching. The teachers jointly plan instruction, but each delivers it to a heterogeneous group comprised of half the students in the class (Friend & Cook, 2013); therefore, in a class of 33 students, the student to teacher ratio would be reduced to as much as 16:1 or 17:1.

Alternative teaching involves two educators in instruction, but is utilized to work with a small group of students that need to receive instruction that is different from the large group. Friend and Cook (2013), suggest that this model is appropriate for students with special learning needs who may need some preteaching, those who need support of

their knowledge or skills, English Language Learners (ELL), or those who learn best from repetition.

Study Rationale

The demand for effective inclusive practices has grown over the past 40 years. Research has described positive perceptions and academic outcomes targeting collaborative and co-teaching practices across public school and postsecondary environments. And in special education particularly, there is at present an emphasis in the teacher training literature on improving collaborative practice. That said, 25 years ago Fender and Fiedler (1990) reported that preparation of teacher candidates has not kept up with the demands for inclusion. Recently, Hamman (2015) echoed those sentiments, reporting that the situation has not improved. That is, Hamman asserted that teacher education programs continue to inadequately prepare new, general-education teachers to instruct students with disabilities and often leave special education preparation either to general education faculty without expertise in the area or bundle it with courses that address multicultural and language-minority issues.

One area where research in teacher training can be targeted is the development of collaboration and co-teaching skills in students pursuing general and/or special education certification. There are a number of reasons why targeting such an area of inquiry can be beneficial. First, it allows for the supported development of collaboration and/or co-teaching skills in preservice teacher candidates and/or inservice teachers. For all teacher candidates it provides additional knowledge and skills related to working with students with disabilities, something Hamman (2015) asserted is lacking in teacher education. Second, it builds on the co-teaching research. As has been documented, there is a dearth

of research in co-teaching overall and particularly as research relates to academic outcomes. Incorporating inquiry into a teacher training course allows teacher candidates to experience, compare, and evaluate the different models promoted in the co-teaching literature, again in a supported setting. Third, research in teacher training allows for study of effective co-teaching practices to be conducted, something Scruggs et al. (2007) noted was lacking in the qualitative research on co-teaching that they synthesized.

One potential target of effective instructional practice is student engagement. According to Connor and Pope (2013), research continuously has linked student engagement to positive social, psychological, and physical development. Engagement in academics is an important predictor of academic achievement (Fredricks et al., 2004; Lee & Shute, 2010; Saklofske, Austin, Mastora, Beaton, & Osborne, 2012). Academic engagement is active and collaborative learning, participation in rigorous academic activities, communication, seeking out enrichment activities, and a feeling of support from learning communities” (Coates, 2007). Students are observed to be actively engaged in their learning when writing, participating in classroom tasks, reading aloud, reading silently, talking about academics, and asking and responding to questions (Vile-Junod, DuPaul, Jitendra, Volpe, & Cleary, 2006). It is a critical component in effective instructional programming.

Research indicates that when students are engaged during instruction, they encounter increased opportunities to respond to academic tasks, which enhances their rate of learning (DiPerna, Volpe, & Elliott, 2001). Engagement occurs when students make an personal investment in learning. They show effort and take pride in successful performance indicators (i.e., grades), but also in internalizing the material and applying it

to their lives. (Newmann, 1992). Numerous studies have concluded that engagement is positively related to grades, mastery of material, and staying in school (Salanova, Schaufeli, Martinez, & Bresim, 2010; Schlenker, Schlenker, & Schlenker, 2013). Hirn and Scott (2014) suggest that engagement with instruction may be the best predictor of student success.

Teachers can positively influence students' academic engagement. Parsons and colleagues (2014) acknowledged that student engagement is malleable and teachers have the ability to encourage student engagement through creating a classroom that is collaborative, efficient, and caring. Hattie (2009) found that despite the fact that students enter the classroom with their own issues and histories; the probability of academic success is greatly influenced by teacher instructional behavior. The teacher's role is to use instructional practices that increase the likelihood of student engagement with the curriculum, which would provide the best probability of academic achievement (Berliner, 1990). When teachers utilize effective instructional practices, students are more engaged in learning, teacher-student relationships are positive, and the overall classroom atmosphere is improved (Conroy & Sutherland, 2012). Teachers can actively engage students with the curriculum and one another through discussions, questions, and participation during instruction (Ahlfeldt, Mehta, & Sellnow, 2005).

Research indicates that engagement rates are related to teacher effectiveness (Sweigart & Landrum, 2015). Whether in a postsecondary teacher training setting or a K-12 classroom, an effective teacher should utilize strategies that produce higher levels of student engagement no matter the age of the population.

Co-teaching is a preferred method for including students with disabilities in general education classroom settings. It is promoted as a means to provide students with disabilities an appropriate education. It is even required content in accredited teacher training programs. However, there is scant evidence to support its implementation and its impact on a student's or students' academic programming. The lack of student engagement at school has been a serious concern for educators and policy makers because disengaged students are more likely to struggle academically, drop out of school, and exhibit problem behaviors (Lee, 2013). These concerns are especially relevant to students with disabilities, who by definition are behind academically, and who are more likely today to be served by general and special education teachers. Student engagement has been widely recognized as an important influence on achievement and learning (Kahu, 2013).

The present study utilized an adapted form of co-teaching because the study took place in a teacher training classroom and not a public school setting. There were two primary reasons to attempt this inquiry within the umbrella of the Cook and Friend (1995) and Zigmond et al. (2013) conceptualizations yet outside the public school classroom and without targeting K-12. First, as Sweigart and Landrum (2015) noted and has been documented herein, in spite of the theoretical and logical arguments for the instructional arrangement and the benefits that proponents trumpet in the literature, there is a limited empirical base supporting co-teaching that needs to be developed. To that end, the researcher could pair educators pursuing general and special education certifications together within a given educational space and direct them to plan, implement, and evaluate a lesson designed specifically address the needs of students with

and without named disabilities (e.g., learning disability) even though such students were not in the student audience during implementation. Second, given the teacher training context for the course, the decision was made to conduct the implementation of co-taught lessons in the teacher training setting versus the K-5 elementary school classroom because co-teaching as a service delivery model was new to all but the graduate special education students and would have presented logistical challenges that might have overshadowed the experience desired of the teacher education candidates. That is, groups of university students would have had to develop a relationship themselves, then locate a K-5 teaching team to work with and develop a relationship with. Specific lessons then would have needed to be developed, implemented, and evaluated later in a spring semester, conceivably at the time or after statewide accountability testing, which was not considered ideal for training purposes. The setting chosen allowed for a comprehensive educational experience and process that was supported and still allowed participants with a preliminary experience in planning, implementing, and evaluation differentiated instruction designed for a specific category of student with a disability. Further, the setting allowed for participants to experience, through implementation and/or observation, all of the co-teaching service delivery models that they read about in their textbook.

Problem Statement

As shown in this literature review, there is a significant gap in both the research conducted and the scholarly articles that have been published in the area of student outcomes on co-teaching. The lack of outcome data is indicative that there is a need for greater emphasis on empirical research. In addition to focus on academic outcomes, an area that is worthy of study is the subject of student academic engagement because of its

clear association with teacher effectiveness (Diperna et al., 2002; Hirn & Scott, 2014; Newmann, 1992; Vile-Junod et al., 2006). The examination of the usefulness of co-teaching models on student engagement and academic outcomes in post-secondary settings are relevant targets for scholarly inquiry. The utilization of scientifically based instructional practices in our schools is imperative and mandated by law (IDEIA, 2004; No Child Left Behind, 2002). The results of this study will contribute to the limited body of quantitative research on co-teaching and will determine the impact, if any, of the co-teaching models on student engagement and academic outcomes in a teacher education class. Results may also inform the co-teaching perceptions of the models. At this point, co-teaching advocates suggest that team teaching is the best of all the models – and certainly preferred over one teach/one assist – without evidentiary support for such a claim. Moreover, findings at the postsecondary level (Walters & Misra, 2013) suggest that co-teaching models may not positively impact discussion or engagement as proponents might suggest.

Purposes and Research Questions

The purpose of this study was to investigate whether differences in variables including student engagement, academic outcomes, and teacher preferences existed in six co-teaching models introduced during a teacher education course for both special education and general education teachers. Five research questions were explored. The first was, what are the levels, variability, and trends for total engagement across co-teaching models? Although numerous authors currently advocate for co-teaching, very few provide experimental data to show its usefulness in impacting student outcomes. The second was, after teaching and/or watching the six models of co-teaching, what do participants view as the benefits/strengths of co-teaching? The third was, after teaching

and/or watching the six models of co-teaching, what do participants view as the weaknesses of co-teaching? The fourth was, after teaching and/or watching the six models of co-teaching, what model do participants prefer? Their responses to these questions adds a preservice teaching perspective to the existing body of research on co-teaching that has historically only included professional perspectives. The fifth was, are there significant differences in achievement on subject matter content tests for students taught with the different co-teaching groups? Findings would add to the small body of research describing academic outcomes.

CHAPTER 3: METHOD

The purpose of this chapter is to describe the methodological approach that was utilized in this research study. This study examined participant engagement, perceptions, and achievement across six co-teaching models for enrollees in a teacher education course at a university in the southeastern United States. The sections of this chapter describe the setting, participants, independent and dependent measures, procedures, research design, and data analysis.

Setting and Participants

The study utilized data that were collected during the spring semester of a teacher education course focused on collaborative practices for educators. The setting was a classroom that had seats for approximately 60 students on a university campus. All teacher presentations of content took place in the classroom. During the experimental conditions, when participant teams broke into smaller than whole-class groupings, participants had the opportunity to present information in two hallways or in an adjacent classroom. All presentations took place in the classroom, however.

Table 1 includes detailed participant demographic information of the sample ($N = 45$). The majority of undergraduate students ($n = 31$) were grades 1-5 teacher candidates who were completing their final undergraduate semester and have forgone a one-semester student teaching experience in order to complete a fifth-year master's program. None of these participants had taken any special education coursework beyond a single introduction to exceptionalities course. The remaining undergraduates were in the process of completing a dual certification, grades 1-5 program that would eventually allow them to be certified as general educators and special educators with mild-moderate (largely high-incidence) disabilities. All five graduate students were pursuing advanced

coursework or certifications in special education. All participants consented to be involved in the study.

Table 1. Characteristics of Participants

Demographic Information	N	%
Male	2	4
Female	43	96
Graduate	5	11
Undergraduate	40	89
Graduate Special Education	5	100
Graduate General Education	0	0
Undergraduate Special Education	9	23
Undergraduate General Education	31	77

Independent Variables

The independent variable is the characteristic of an experiment that is manipulated or changed. In the present study, it is the presentation of co-teaching model that will be systematically changed. As Sweigart and Landrum (2015) indicate, co-teaching is a service delivery model or instructional arrangement and should not be considered an intervention. Yet it can be delivered differently depending upon the presentation model that is chosen. Cook and Friend (1995, 2005) and Friend and Cook (2013) have described six unique models. Each co-teaching model was implemented on multiple occasions during the present study. Following is a more detailed description of the six models (i.e., one teach/one assist, station teaching, teaming, one teach/one observe, alternative teaching, and parallel teaching):

One teach/one assist. One teacher takes a clear lead in the delivery of instruction while the other circulates among the students observing and offering individual assistance as needed (Cook & Friend, 1995).

Station teaching. Instruction is typically divided into three non-sequential parts, with students arranged in three groups. Students or teachers rotate from station to station. Two of the stations are traditionally teacher led stations, and the third station is created in which students work alone or with peers on a related project or assignment. The two teachers prepare and teach different material; however instruction is repeated to each group as they circulate, so that each group has an opportunity to hear the material that each teacher is presenting (Cook & Friend, 1995).

Teaming. Both teachers co-lead large-group instruction. For example, you may see both teachers standing side by side alternating whole group discussion, or one may speak while the other demonstrates or models a concept or takes notes on a projection instrument. They also may model and role play asking and responding to questions (Cook & Friend, 1995).

One teach/one observe. One teacher leads the large-group instruction while the other gathers data on specific students or the class. The teacher observing, is typically seated in a location in the classroom where they are able to observe a specific student or the class as a whole (Cook & Friend, 1995).

Alternative teaching. One teacher provides instruction to most students (i.e., $\frac{3}{4}$ of the class) while the other works in a separate location (i.e., back of the classroom) with a small group for possible remediation, enrichment, assessment, preteaching, or another

designated purpose. Both are delivering instruction simultaneously, but the instruction is different (Cook & Friend, 1995).

Parallel teaching. Two teachers each take half the class and present the same material simultaneously, for the primary purpose of instructional differentiation and increasing student participation by lowering the student to teacher ratio. (Cook & Friend, 1995)

Dependent Variables

The dependent variable is the variable in the study that is being measured in the hopes that it indicates changes due to implementation of the independent variable. In the present study there were three dependent measures incorporated.

The first of dependent measure was participants' mean level of total (both active and passive) engagement. It was directed at the first research question. The level of engagement was to be evaluated using visual inspection as per single-subject design rules. Engagement was determined through use of the Behavioral Observation of Students in Schools (BOSS; Shapiro, 2004) behavioral assessment system. The BOSS was designed to assess student academic behavior in the classroom environment (Shapiro). It is an observation system in which engaged and non-engaged behaviors are operationally defined and then observed using a momentary time sampling procedure. According to the BOSS, engaged time is defined as those times when the student is actively attending to the assigned work (i.e., writing, reading aloud, raising hand, talking to the teacher about the assigned material, talking to a peer about the assigned material, looking up a word in a dictionary) or when the student is passively attending to assigned work (i.e., listening to a lecture, looking at the blackboard during teacher instruction, listening to a peer respond to a question)(Shapiro). Proportions of different behaviors are

calculated following each observation. Momentary time sampling breaks down a time period into specified segments, such as 15 second intervals. At a specific point in each time segment, the observer makes a determination as to the type of behavior that is noted for a specific observed student. For this study the 15th second interval was utilized to record whether or not the student was engaged or not.

While there are no data available supporting the convergent validity of the BOSS, there are some data supporting the ability of the BOSS to discriminate between children with ADHD and typically developing children (Volpe, DiPerna, Hintze, & Shapiro, 2005). DuPaul et al. (2004) found that the BOSS significantly discriminated between children with ADHD who had academic problems and typically developing peers, in a variety of subject areas. Effect sizes for these variables ranged between 0.53 and 1.25 (Volpe et al.). The BOSS system was utilized in the present study because it could document a measure of engagement as well as be sensitive to engagement proportional differences, if observed, across co-teaching models.

The second dependent variable was qualitative and/or descriptive in nature and targeted informal participant written responses to requests for co-teaching model preferences and perceptions. It was designed for the second, third, and fourth research questions. Data were collected on two occasions, with preference data collected from an examination question on the course final and perception data (relative to model strengths/benefits and weaknesses) collected from a post-experiment anonymous survey. Collectively, participants were asked to identify the co-teaching model they preferred, list strengths or benefits to co-teaching, and list weaknesses to co-teaching. Descriptive statistics were calculated related to the preference question and reported for the total

population as well as for general education and special education sub-populations.

Themes were identified relative to the strengths and weaknesses questions via a review and summarization of survey data.

The third of dependent variable was quantitative and academic in nature and targeted gain scores for pre- to post-test on repeated multiple-choice quizzes that participants completed for each week of co-teaching model implementation (N = 5). Each quiz consisted of 30 items and included 5 questions per unit of content (for 6 units each week). That is, student teams were assigned to teach a section of content from the course text and deliver that instruction via an assigned co-teaching model. The questions were developed by the researcher and her teaching colleague, who was the instructor of record for the course. During the experiment, all students, prior to the first co-teaching lesson implementation, would complete a pretest. Once the final (sixth) lesson was taught during class, then all students would again take a post-test that was identical to the pretest. Since the content was unique to the course and no formal test of co-teaching model implementation was available for use, the decision was made to use the informal tests even though there was no technical adequacy (reliability and validity) data to support their use. The informal measurement technology was also used because it allowed for a natural and independent 'test' of content knowledge growth in participants as a result of co-teaching model implementation. That is, it was natural in that one way to evaluate whether learning has occurred is to compare pre- and post-test scores from a test consisting of the content of concern, which is what occurred in this case. It was independent in that the implementers of each co-teaching lesson were not responsible for developing this test and so it allowed the researcher to determine what she believed the

most important content of the lesson should be and test whether or not that content was learned as a result of the participant teams' implementation of a content-focused co-teaching model lesson. Determination of gain scores allowed for the use of repeated measures analysis of variance (ANOVA), because the tests were given to the same participants five times over the course of the study. This will be discussed further in the data analysis section of this chapter.

Treatment Fidelity

Treatment fidelity data were only collected for the first dependent measure. To ensure treatment fidelity of the independent variables, a direct observation measure, Co-Teaching Models Checklist (Appendix C) was utilized, along with a second observer. The second observer was identified and chosen due to their experience of working in the field of higher education, as well as knowledge of the subject matter. The measure assessed the utilization of the characteristics of each of the co-teaching models, as defined by Cook and Friend (1995) and Friend and Cook (2013). Agreement for the co-teaching models was calculated by using an interval agreement formula. An agreement was scored when two observers placed a check mark in the box indicating that the characteristic was present in the video and then the number of agreements is divided by the number of agreements plus disagreements and multiplied by 100($A/A+D$) (Alberto & Troutman, 2009).

Prior to the beginning of data collection, the two observers reviewed the Co-Teaching Models Checklist (Appendix C). Review of the checklist consisted of each observer independently reading the items on the checklist. This was preceded by one observer orally reading the checklist aloud, stopping after each model to provide an

opportunity for both observers to give an example of what they thought a visual indicator would be for each item on the checklist. This allowed for potential misinterpretation to be identified. Though no misinterpretations occurred, had they, the researcher had provided a copy of *Interactions: Collaboration Skills for School Professionals* (Friend & Cook, 2013) for both parties to review the text on the co-teaching model descriptions and discuss misinterpretations.

Each observer independently watched videos of all six co-teaching models, in their entirety, and completed the Co-Teaching Models Checklist. Observers were aware of the model type prior to watching the video for each of the six co-teaching models. The model name was stated at the beginning of each video. The observer was instructed to watch the video in its entirety and place a check mark next to the characteristics observed for the corresponding model. Training was completed when the observers documented an agreement of 80% or greater on the Co-Teaching Models Checklist. Observers reached 100% agreement following the first training, though had they not reached the 80% criterion, then observers would have collectively watched the model(s) where there was disagreement and reached a consensus as to what constituted the characteristics listed on the checklist. Following consensus generation, the observers completed another round of watching 6 of the co-teaching models videos, until at least 80% consistency was reached.

Once training was completed, the primary observer observed all 30 of the co-teaching lessons. The secondary observer observed 30% (9 lessons) of the 30 co-teaching lessons. Both observers followed the same instructions as in training. They watched the video in its entirety and placed a check mark next to the characteristics observed for the corresponding model. Upon completion total agreement was calculated.

Interobserver Agreement

Interobserver agreement procedures were focused primarily on the first dependent measure. To provide that the dependent variable calculations were reliably accurate, the same second observer collected interobserver agreement (IOA) data on 30% of the co-teaching lessons. According to Volpe et al. (2005), IOA for the BOSS has been consistently high. Ota and DuPaul (2002) reported a total agreement ranging between 90% and 100%. DuPaul et al. (2004) reported kappas ranging from 0.93 to 0.98 for observations in a large sample of children with ADHD and normal comparison children. Interobserver agreement should be calculated at a minimum between 20-25% of observations (Cooper, Heron, & Heward, 2007). Miles and Huberman (1994) recommend that the consistency of the coding be in agreement at least 80% of the time.

Agreement for engagement was calculated using an interval agreement formula. An agreement is scored when both observers record on-task behavior during each interval and then the number of agreements is divided by the number of agreements plus disagreements and multiplied by 100 ($A/A+D$) (Alberto & Troutman, 2009). Prior to beginning data collection, the two observers reviewed the operational definition of active and passive engagement, and the data collection procedures for momentary time sampling as described by Alberto and Troutman.

To record data, the observers utilized a series of boxes representing the 15-second intervals of time (Appendix B). Within each box, the observer recorded one notation at the end of each interval to indicate if the student was demonstrating either passive or active engagement or not engaged. If the student was engaged either actively or passively at the end of the 15-s interval, a check mark was placed in the box. If the student was not engaged at the end of the 15-s interval, an x was placed in the box. Alberto and Troutman

(2009) suggest using a timer at the end of the interval to indicate when it is time to observe the behavior. For this study, the observers utilized a repeating interval timer that provided an audible beep every 15 seconds.

Interobserver agreement procedures related to the second and third variable sets were much less involved. For the second dependent variable, a second observer and the teaching colleague of the researcher in the collaboration course also recorded the individual participant co-teaching model preferences. Agreement for preferences was 100%. For the achievement data, two independent graduate students graded the weekly pre- and post-test scores. Pre- and post-test scores were then compared across participants for agreement. Any disagreement in terms of score was then re-graded by the principal researcher and then that score used for data entry. Tests were returned to one of the two independent graduate student scorers who created the database of scores used for analysis.

Training

Following review of the engagement definitions and momentary time sampling procedures, the observers created procedures for what to view in a videotape. The video provided a frontal view of the classroom. To ensure the secondary observer was collecting data on the same person at the same time as the primary observer, before beginning data collection, the video was paused so that the students were visible. Each student was labeled with a row number, seat number, and color shirt (i.e., 1,1, Black). Certain videos required students to move into smaller groups, in this case rows were not applicable; instead students were in a semi-circle or circle arrangement. For this type of arrangement, the observers started with the participant closest to the left side of the

screen and labeled them with a seat number and color shirt (i.e., 1, Red). This coding was then transferred on each block of the data collection sheet, providing a systematic chart to ensure that the correct student was being observed for each increment of time. If all of the students were visible, then observers began with the row furthest to the left and the first student on that row. They then moved systematically down each row through the body of participants in collecting engagement data every 15 seconds. A repeating interval timer iPhone application was utilized to provide an audible beep every 15 seconds to indicate to the observer to record whether or not the student being observed was engaged.

For videos in which all students were not visible, the observers followed the row number, seat number, and color shirt as designated on each block of the data sheet. Students who were not visible were skipped and the next person on the row who was visible was utilized for data collection. Observers independently viewed 5-minute segments of each co-teaching model type and calculated total engagement proportions (i.e., active and passive or not engaged) for each of the model observations utilizing the Momentary Time Sampling Data Sheet (Appendix B). Training was completed when observers documented total engagement proportion agreement on greater than 80% (i.e., 5) of the 6 observations. In this case, observers did not reach 80% criterion the first time. In the case of not meeting 80% criterion, the observers collectively watched the segments where there were disagreements and determined they were not watching the same students at the same increments of time. This prompted the observers to code the participants by row number, seat number, and shirt color or seat number and shirt color for semi-circle or circle seating. This coding was implemented following the first training. Following consensus generation, then observers completed another round of six

5-minute observations of each of the models at which time at least 80% consistency was reached.

Once training was completed, the primary observer observed all 30 co-teaching lesson videos and the secondary observer observed 30% (9 lessons) of the co-teaching lessons utilizing the Momentary Time Sampling Data Sheet (Appendix B) and calculated total agreement.

Procedures

As part of the course requirements, the general and special education teacher education candidates taught co-teaching lessons to a class of their peers utilizing the course curriculum. All lessons were videotaped by a third party, who was also one of the graduate students who graded the weekly pre- and post-tests. Six co-teaching models were completed each week, with each participant engaging in two lesson implementations over the course of five weeks. Each group consisted of a minimum of two preservice teachers and was randomly assigned to a co-teaching model for each of their co-teaching lessons. The content of their lessons consisted of assigned course material from the course textbook, *Interactions: Collaboration Skills for School Professionals* (Friend & Cook, 2013). While all six co-teaching models were taught in one class period, the order of model implementation was randomly assigned.

Students were given a survey following the completion of the last set of co-teaching lessons. They responded to the following written questions:

- What were some of the benefits or strengths of the co-teaching lessons that you observed?

- What were some of the weaknesses of the co-teaching lessons that you observed?

In addition, at the completion of the course, students were asked on their final exam to respond to the following question:

- After watching and implementing the co-teaching models, which did you prefer?

Prior to the beginning of each set of co-teaching lessons, all students were administered a pre-test on the subject matter content in which they received instruction that day. The pretest was divided into 6 sections, and consisted of 5 questions for each of the 6 co-teaching lessons to be delivered that day. The primary researcher and a colleague created the pretest. The highest score possible was 5 on each section of the pre-test. The students were also given the same test at the completion of a set of lessons.

Consent

Consent procedures used to obtain informed consent were approved and accepted by the Institutional Review Board (IRB) of a university in the southern United States. Consent was obtained for all 45 participants (Appendix A).

Research Design

This study used a single case alternating treatments design. According to Alberto and Troutman (2009), an alternating treatments design is defined as a single subject experimental design that allows for comparison of the effectiveness of two or more treatments. This design provided several advantages in that baseline data were not available, a withdrawal was not necessary, and the order effects were minimized. It also provided a disadvantage in that there were no controls for extraneous variables and statements cannot be made about absolute effects of treatment, only relative ones

(Alberto & Troutman). The researcher examined participant engagement, perception, and effect for a group of students enrolled in a preservice teacher education course on collaborative practices that includes introduction and practice in the following six co-teaching models: (a) one teach/one assist; (b) station teaching; (c) teaming; (d) one teach/one observe; (e) alternative teaching; and (f) parallel teaching.

Data Analysis

For the first question, the researcher used a visual analysis to evaluate level, trend, and variability of the data paths within and across the 5 weeks of co-teaching lessons. Visual analysis is the process of looking at a graph of the data in order to judge effectiveness of the intervention (Cooper et al., 2007). According to Alberto and Troutman (2009), evaluation of the level of performance refers to the magnitude and direction of the change in student performance from the end of one phase to the beginning of the next. The level of the data relates to the “position” of the data on the y-axis. Data can fall into a high, moderate, or low level, or even potentially separated further into “low to moderate” or “moderate to high” (Cooper et al., 2007). Evaluating a trend focuses on systematic and consistent increases or decreases in data (Alberto & Troutman, 2009). The use of a trend line assists with determining trends of data with visual inspection. According to Alberto and Troutman, trend lines provide an indication of the direction of change in the past and give a prediction of the direction of change for the future. Variability of data relates to how spread out the distribution of data points is. Variability of data is often referred to as “stable,” “variable,” or even “extremely variable” (Cooper et al., 2007).

In this study, there were 30 lessons across 5 weeks with each of the 6 co-teaching models being utilized 5 times. The researcher graphed the class’s level of engagement as

a whole for each lesson of the co-teaching models. Visual evidence of engagement was measured using momentary time sampling in 15 second increments, (observing a different participant each increment of time) with the overall time engaged divided by total class time multiplied by 100 to get a percentage of overall engagement. Visual analyses were completed for each model individually as well as for large- versus small-group pairings. Large-group models were identified as teaming, one teach/one assist, and one teach/one observe, whereas small-group models were identified as station, alternative, and parallel teaching.

For the second and third research question, the researcher read each student's written response to the following questions administered in the survey at the completion of the co-teaching lessons and looked for themes regarding engagement and efficacy in the strengths and weaknesses questions.

- What are some of the benefits or strengths of the co-teaching lessons that you observed?
- What were some of the weaknesses of the co-teaching lessons that you observed?

According to Ryan and Bernard (2003), themes come both from the data and from the investigator's prior theoretical understanding of the material. For this study, the researcher utilized repetition to identify themes in the student's responses. All of the students' responses were grouped into categories based on the similarity of their responses to others. For example, a student who stated "noise" as a weakness to co-teaching would be grouped into a list of other students who had indicated weaknesses of "loudness of students talking" or "two teachers talking at the same time." After all of the

students responses were grouped, the researcher was able to look back at the groupings and determine groupings that showed commonality across multiple students. From this the researcher created a list of common themes identified by students as strengths/benefits and weaknesses.

For the fourth research question, the researcher calculated descriptive statistics on the students' responses to their preference of the six co-teaching models. Descriptive statistics describe, show, and summarize the data in a meaningful way (Miles & Banyard, 2007).

For the fifth research question, to evaluate the effect of the co-teaching method and to account for the correlation present within subjects when they are tested repeatedly, the pretest score was subtracted from the posttest score, to create 5 "gain scores" for a total of 5 (for the 5 weeks of instruction) which were then analyzed with a repeated measures analysis of variance. Gain scores were chosen due to the research question being asked, namely, what is the effect of the co-teaching method. Fitzmaurice, Laird, and Ware (2004) posit that a gain score addresses the "question of whether the two groups differ in terms of their mean change over time" (p.124). Changes in group means is the intent of this gain score analysis. This differs from the intent of an analysis of covariance (ANCOVA) in that ANCOVA tests differences in scores that have been adjusted by a covariate, and tests whether we can reject the hypothesis that participants who have same or similar pretest scores improve at the same rates. The distinction is that gain scores focus more on the group effect where ANCOVA considers the question of whether an individual in a group is expected to change more or less than an individual in another group, given they have same or similar baseline scores (Fitzmaurice et al., 2004).

Since the present research question involves those students in the same group receiving a certain co-teaching practice, gain scores were chosen. Descriptive statistics were computed for each teaching method.

Hypotheses

Hypotheses are reported below for the first and fifth research questions, both of which are experimental in focus.

First Research Question

Ho: Visual analysis will indicate that there will not be differences in patterns of engagement across co-teaching models.

H_A: Visual analysis will indicate that there will be differences in patterns of engagement across co-teaching models.

Second Research Question

Ho: Participants will identify individual attention as the most common strength and benefit to co-teaching.

H_A: Participants will not identify individual attention as the most common strength and benefit to co-teaching.

Third Research Question

Ho: Participants will identify planning as the most common weakness to co-teaching.

H_A: Participants will not identify planning as the most weakness to co-teaching.

Fourth Research Question

Ho: Teaming will be the most preferred co-teaching model.

H_A: Teaming will not be the most preferred co-teaching model.

Fifth Research Question

Ho: There are no significant differences in achievement on subject matter content tests for students taught with the different co-teaching groups.

H_A: There will be significant differences in achievement on subject matter content tests for students taught with the different co-teaching groups.

CHAPTER 4: RESULTS

Treatment Fidelity and Interobserver Agreement

A direct observation measure, Co-Teaching Models Checklist (see Appendix C), was used to assess treatment fidelity of the implementation of the six co-teaching models. The measure assessed the utilization of the characteristics of each of the co-teaching models, as defined by Cook and Friend (1995, 2013). The primary researcher completed direct observations for each of the co-teaching lessons to determine the total percentage of characteristics included. The overall mean percentage of characteristics included was 100% in all co-teaching lessons.

A secondary observer was identified and utilized due to his (or her) experience working in the field of higher education. Upon satisfactory completion of training the first round, interobserver reliability measures were conducted by the secondary observer on 30% (9 lessons) of the treatment fidelity measures. The secondary observer watched the 9 lessons in their entirety and completed the Co-Teaching Models Checklist (Appendix C) during the observation. Interobserver reliability was calculated by dividing the number of agreements plus disagreements and multiplied by 100 ($1/A+D$) (Alberto & Troutman, 2009). The mean percentage of interobserver reliability of the utilization of the characteristics of each of the co-teaching models was 100%.

A direct observation measure was also utilized to evaluate the participant's level of engagement during each of the co-teaching lessons. Direct observations were completed utilizing momentary time sampling, in 15-second intervals for the length of the lesson (approximately 15-30 minutes) for all of the co-teaching lessons. This was conducted by the primary researcher to determine percentage of engagement.

To provide that the measures of the dependent variable were accurate, the secondary observer, upon completion of satisfactory training after two rounds, was again utilized to collect interobserver reliability on 30% (9 lessons) of the co-teaching lessons. The mean percentage of interobserver reliability of the dependent variable was 93% (range 89% - 97%).

Engagement Across Co-teaching Models

Results are presented comparing the levels of student engagement across six co-teaching models for students enrolled in a teacher education course (see Table 2). The researcher used a visual analysis to evaluate level, trend, and variability of the data paths within and across the five weeks of co-teaching lesson implementation. Figures 2 through 8 shows the mean percentage of student engagement for each of the lessons conducted utilizing the co-teaching models for one teach/one assist, station teaching, teaming, one teach/one observe, alternative teaching, and parallel teaching, respectively.

Table 2. Mean Percentage Engagement by Co-teaching Model

Model	Week					All
	1	2	3	4	5	
Alternative	92	93	97	78	76	87.2
One Teach/One Assist	77	85	81	65	76	76.8
One Teach/One Observe	77	79	82	79	79	79.2
Parallel	90	89	100	92	99	94.0
Station	100	98	90	99	91	95.6
Teaming	82	78	78	86	85	81.8

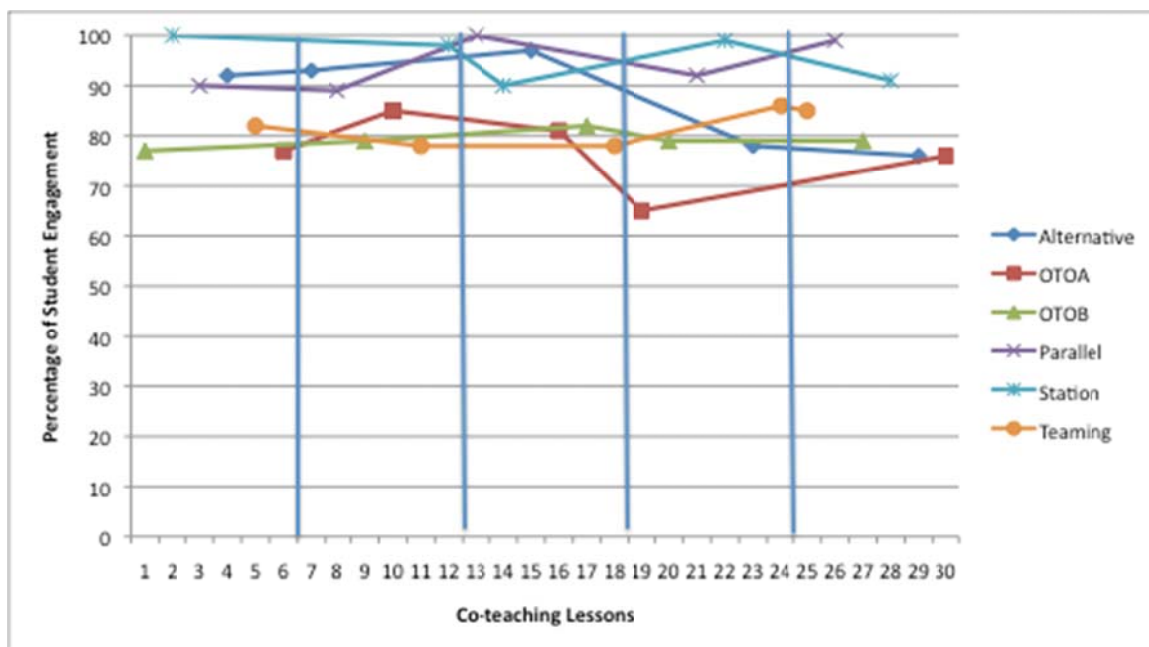


Figure 2. Mean Percentage of Engagement for Co-teaching Models

Engagement during one teach/one observe varied from 77% to 82%. The mean engagement was 79.2% across all 5 lessons observed. The variability of the data was stable, as they were not significantly spread out. The level of the data on the y-axis fell into a moderate to high level, as suggested by a visual breakdown of levels provided by Cooper et al., 2007). The trend line for one teach/one observe when analyzed using a split middle trend yielded no trend, indicating from lesson 1 to lesson 5 that the engagement level did not change.

Engagement during teaming varied from 78% to 86%. The mean engagement was 81.8% across all 5 lessons observed. The variability of the data was stable, as they were not significantly spread out. The level of the data on the y-axis fell in a high level. The trend line for teaming when analyzed using a split middle trend yielded a slight upward trend, indicating from the beginning of the semester that the engagement level increased.

Engagement during parallel teaching varied from 89% to 100%. The mean engagement was 94% across all 5 lessons observed. The variability of the data was stable, as they were not significantly spread out. The level of the data on the y-axis fell in a high level. The trend line for parallel teaching when analyzed using a split middle trend yielded a slight upward trend.

Engagement during station teaching varied from 90% to 100%. The mean engagement was 95.6% across all 5 lessons observed. The variability of the data was stable, as they were not significantly spread out. The level of the data on the y-axis fell into a high level. The trend line for station teaching when analyzed using a split middle trend yielded a slightly downward trend, indicating that from the beginning of the semester the engagement level decreased.

Engagement during one teach/one assist varied from 65% to 85%. The mean engagement was 76.8% across all 5 lessons observed. The variability of the data set was variable, as there was inconsistency in the spread of the data in relation to the data points to each other. The level of the data on the y-axis fell into a moderate-to high level. The trend line for one teach/one assist when analyzed using a split middle trend yielded a downward decrease in engagement, indicating that from the beginning of the semester that the engagement level decreased.

Engagement during alternative teaching varied from 76% to 97%. The mean engagement was 87.2% across all 5 lessons observed. The variability of the data set was variable, as there was inconsistency in the spread of the data in relation to the data points to each other. The level of the data on the y-axis fell in a high level. The trend line for alternative teaching yielded a downward trend.

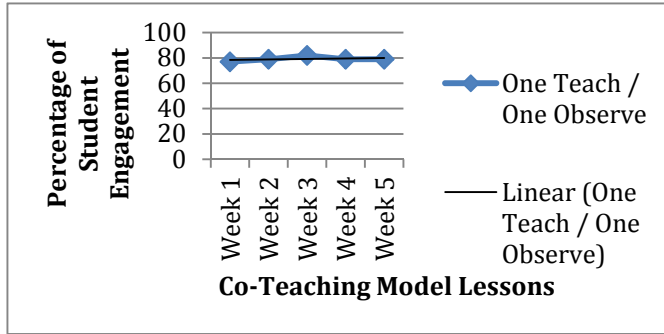


Figure 3. Mean Percentage of Engagement for One Teach / One Observe

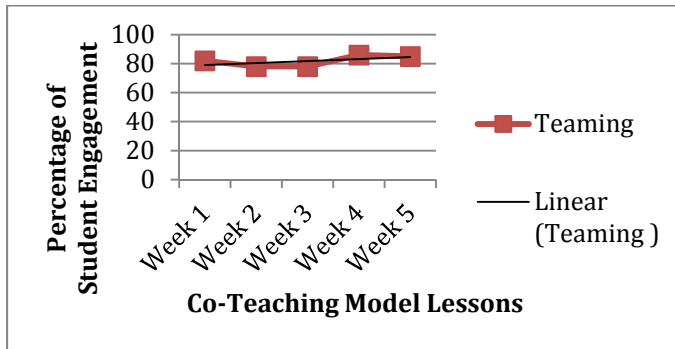


Figure 4. Mean Percentage of Engagement for Teaming

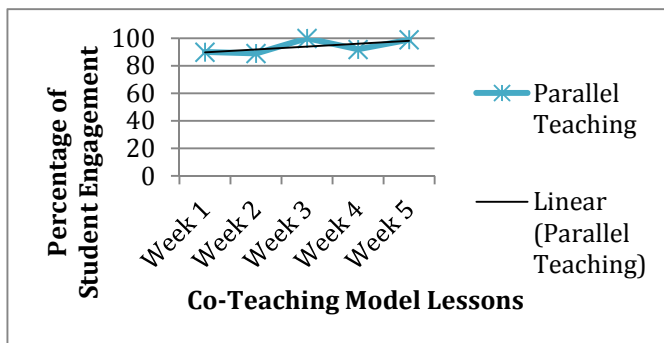


Figure 5. Mean Percentage of Engagement for Parallel Teaching

Figure 9 shows the mean engagement rate of students' during co-teaching models that reduced the student to teacher ratio, called here "Small Group" (i.e., station, parallel, and alternative) and those that did not, referred to as "Large Group" (i.e., one teach/one assist, one teach/one observe, teaming). Engagement when the ratio of student to

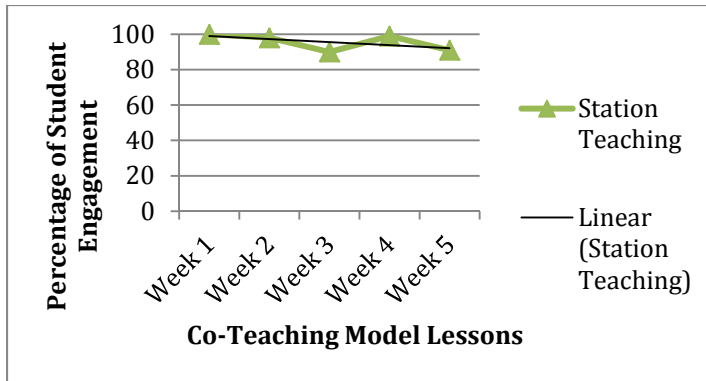


Figure 6. Mean Percentage of Engagement for Station Teaching

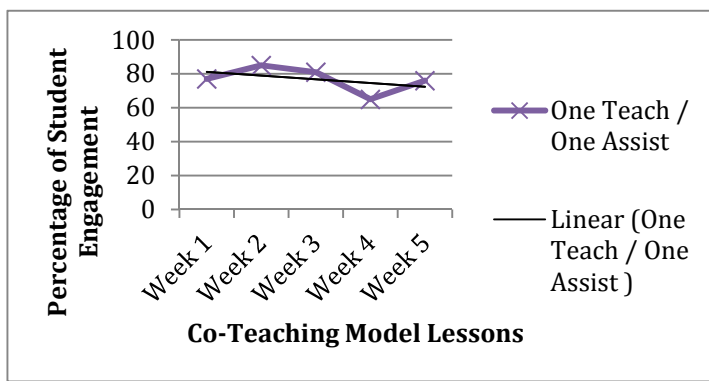


Figure 7. Mean Percentage of Engagement for One Teach / One Assist

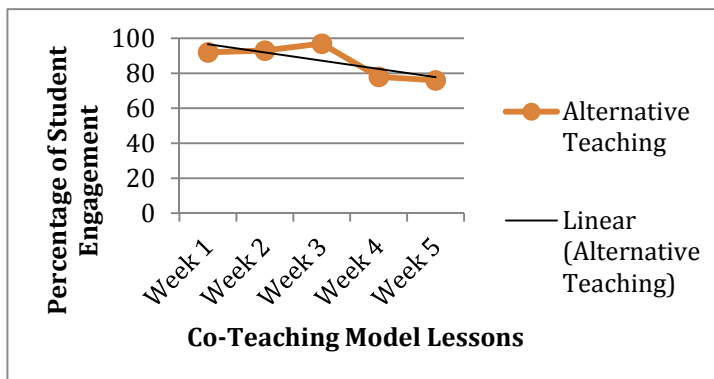


Figure 8. Mean Percentage of Engagement for Alternative Teaching

teacher was reduced varied from 88% to 95%. The variability of the data were stable, as they were not significantly spread out. The mean engagement was 92%. Engagement when the ratio of student to teacher did not change and remained approximately 45:1 varied from 78% to 80%. The mean engagement was 79%. Visually inspecting the figure,

however, shows clearly that while the effect of both small and large groups did not change over time, the small group instruction produced consistently higher levels of engagement over the course of the study.

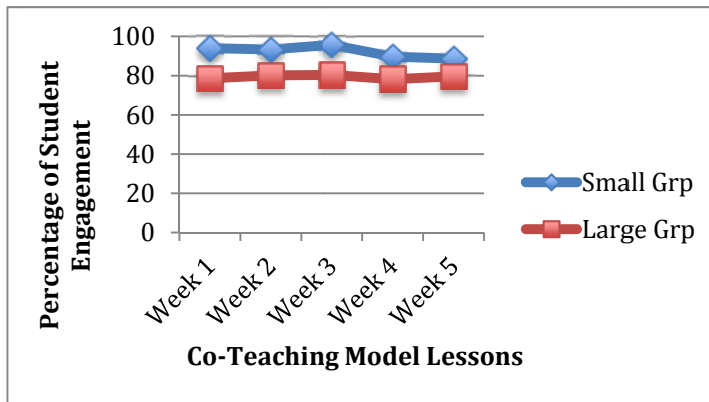


Figure 9. Mean Percentage of Engagement Across Small Group and Whole Group Co-teaching Lessons

Student Perceptions of the Co-teaching Models

Results are presented showing students' preference of the co-teaching models following having taught and/or observed all 6 models on five occasions. Table 3 shows the number of co-teaching model preferences for the general and special education teacher participants. Overall, the most preferred co-teaching model was teaming, followed closely by station teaching. One teach/one observe showed the lowest preference and was not chosen at all as a preferred model. Teaming and station teaching were also the most chosen method for general education teacher candidates, whereas special education teacher candidates and teachers preferred alternative and parallel teaching in addition to station teaching.

Following having participated in 30 co-teaching lessons as the teacher and/or student, participants were asked to identify benefits or strengths of co-teaching lessons.

Table 3. Number and Proportion of Participant Preferences for Co-teaching Models

Model	Education Type		
	General	Special	All
	N (%)		
Alternative	1 (2.1)	4 (8.5)	5 (10.6)
One Teach/One Assist	2 (4.3)	1 (2.1)	3 (6.4)
One Teach/One Observe	0 (0)	0 (0)	0 (0)
Parallel	4 (8.5)	3 (6.4)	7 (14.9)
Station	12 (25.5)	3 (6.4)	15 (31.9)
Teaming	15 (31.9)	2 (4.3)	17 (36.2)
Total	34 (72.3)	13 (27.7)	47 (100)

Increase in individual attention, smaller group sizes, having someone to collaborate with, ability to cover more material, and utilization of a variety of methods during teaching were common themes identified by students as strengths and benefits of co-teaching.

Several common themes noted in the participants' identification of strengths and benefits of co-teaching related closely to station teaching. For example, 13 of the 38 participants who submitted surveys all identified the increased amount of individual attention as a strength and benefit to co-teaching. One participant stated, "...[I]t felt more intimate and inviting for discussion." Another participant stated, "It allows teachers to be more helpful and attentive to the students and their needs." A variety of teaching methods was another common theme identified by students as a strength and benefit of

co-teaching. One participant stated, “It allows a lot of information to be taught different ways.” Another stated, “More topics can be covered in further details in the time allotted.”

Collaboration was the most common strength and benefit identified by students. One participant stated, “If there is something left out (extra detail or explanation), the other teacher is there to help or add in.” Another participant stated, “Combining strengths creates great lessons.” Similarly another participant stated, “One teacher’s strengths could be another teacher’s weakness. Teachers can play off of each other.”

Common weaknesses identified during co-teaching were noise level, unequal distribution of tasks, and time management. One of the most common weaknesses identified about co-teaching was the noise level. One participant stated, “I like station teaching, but the noise level is very distracting.” Another participant said, “In parallel and station teaching the teaching that was going on in the other part of the classroom was very distracting. Maybe one group could go to another class.” Station, parallel, and alternative teaching all include two teachers teaching at the same time, which supports the participants’ observations of the potential noise level as a weakness.

Unequal distribution of tasks and time management were also common themes identified by participants as weaknesses. One participant stated, “Co-teaching takes a lot of planning and trust, maybe more time to get to know one another.” Another stated, “Unequal work distribution can be a problem. People should be held more accountable for what they need to be doing for a co-teaching lesson.”

Mean Differences Across Co-teaching Models and Groupings

To investigate further the effects of the different co-teaching models, students were given a pretest and a posttest for each lesson. In the pretest, the students were tested on material they had not been presented before and the material came from the lesson in the co-teaching models presented. The results of their posttest can be attributed to the co-teaching model that was presented on the day of the test. Descriptive statistics were computed for each teaching model and are reported in Table 3.

A repeated measures ANOVA with a between subjects factor (co-teaching model) was conducted to compare the effect of co-teaching type on student achievement on a subject matter test given to students before and after being taught with one of six co-teaching models. A pretest was given before instruction and a posttest was given after instruction, and gain scores were utilized for these analyses. There was a significant difference among the time periods Wilks Lambda = .89, $F(4, 133) = 4.27$, $p = .003$, partial eta squared = .14 as well as for the interaction of time and co-teaching model. Wilks Lambda = .54, $F(20, 544) = 4.49$, $p = <.001$ partial eta squared = .14. Mauchly's test of sphericity was not significant indicating that there was homogeneity of variances. Post hoc tests were conducted using the Tukey method and only the station teaching method was significantly different than the other co-teaching methods at all time periods. Tests of within subjects indicate a significant interaction between time and method $F(20, 544) = 5.35$, $p = <.001$, partial eta squared = .16. Tests of within subjects polynomial contrasts indicate that the interaction between time and method are not linear, but rather cubic $F(5, 136) = 4.42$, $p = .003$, partial eta squared = .14. This can be observed in Figure 10. These results suggest that there is a difference

Table 4. Descriptive Statistics for Co-teaching Model

Model		1	2	3	4	5
Alternative	N	43	41	35	35	41
	M	1.12	.76	-.16	.72	.76
	SD	1.23	1.16	.89	.97	.77
One Teach/One Assist	N	38	41	35	35	41
	M	.57	.19	.14	.00	.90
	SD	1.12	1.16	.35	1.26	1.81
One Teach/One Observe	N	43	41	35	35	41
	M	.92	.36	.08	.04	.24
	SD	1.15	1.38	.57	1.30	1.05
Parallel	N	43	41	35	35	41
	M	.28	.40	.00	.08	.72
	SD	1.13	.81	.91	1.32	.93
Station	N	43	41	35	35	41
	M	.68	2.88	1.80	.72	.16
	SD	.74	1.39	1.95	1.51	.98
Teaming	N	38	41	35	35	41
	M	.29	.43	.38	.48	.38
	SD	1.05	.92	1.20	.87	1.43

between station teaching and other types of co-teaching models, but with the interaction it depends on what time the students were tested.

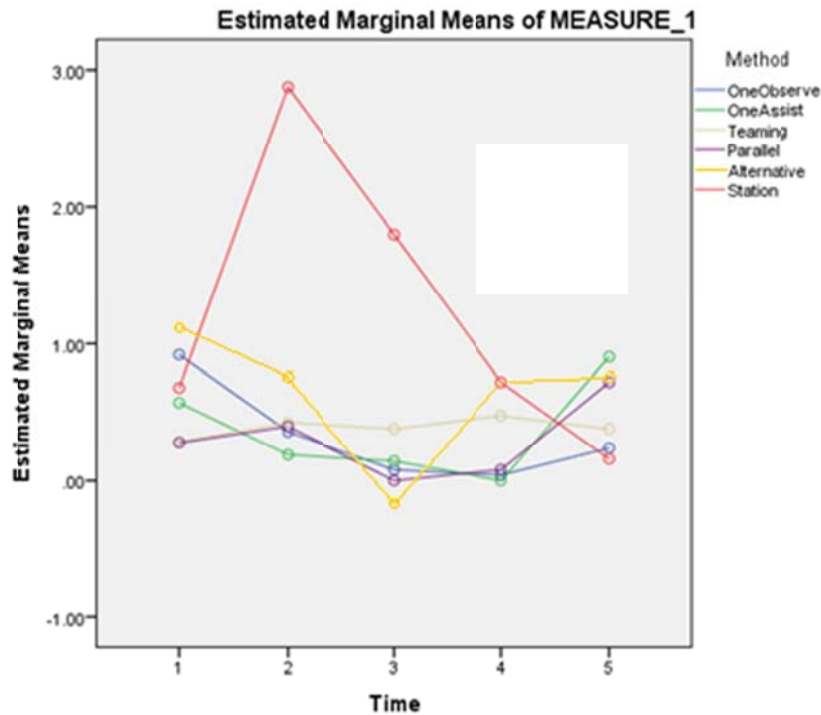


Figure 10. Profile Plot of Co-teaching Models Over the Five Time Periods

To investigate the relationship of the three co-teaching methods that utilize small group instruction (parallel, alternative, and station) and large group instruction (one teach/one observe, one teach/one assist, and teaming) the co-teaching methods were coded for small or large group and the repeated measures analysis was conducted. Descriptive statistics are reported in Table 5.

A repeated measures ANOVA with a between subjects factor (Small vs. Large group) was conducted to compare the effect of co-teaching models that utilize large group instruction vs. those that break the large group into smaller groups and decrease the student to teacher ratio on student achievement on a subject matter test given to students before and after being taught with either the small group or large group models. A pretest was given before instruction and a posttest was given after instruction, and gain scores were utilized for these analyses. There was a significant difference among the

groups Wilks Lambda = .89, $F(4, 137) = 4.39$, $p = .002$, partial eta squared = .14 as well as for the interaction of time and small vs. large group models Wilks Lambda = .92, $F(4, 137) = 3.08$, $p = .02$, partial eta squared = .08. Mauchly's test of sphericity was significant indicating that there was heterogeneity of variances; therefore the Huyhn-Feldt correction for violations of sphericity was used. Because there were now only two

Table 5. Descriptive Statistics for Small vs. Large Coteaching Groups

	Small vs. Large	Mean	SD
Time 1	Large Group	.61	1.12
	Small Group	.69	1.10
Time 2	Large Group	.32	1.17
	Small Group	1.34	1.58
Time 3	Large Group	.19	.78
	Small Group	.54	1.60
Time 4	Large Group	.16	1.17
	Small Group	.50	1.30
Time 5	Large Group	.49	1.44
	Small Group	.54	.93

groups, post hoc tests were not conducted. Examining the means and standard deviations in table 5, it is evident that the small group showed larger gains at all time periods. Tests of within subjects effects indicate a significant interaction between time and method $F(3.85, 560) = 3.40$, $p = .01$, partial eta squared = .03 (Huyhn-Feldt). Tests of within subjects polynomial contrasts for small vs. large group also indicate that the interaction between time and model are cubic rather than linear $F(1, 140) = 4.35$, $p = .038$, partial eta squared = .03. This can be observed in Figure 11. These results suggest that there is a difference between co-teaching models that utilize the large group or small group, and that the students receiving their instruction in small groups show stronger gains than

those taught in larger groups, but due to the significant interaction between time and model that these differences depend on the time that students were tested.

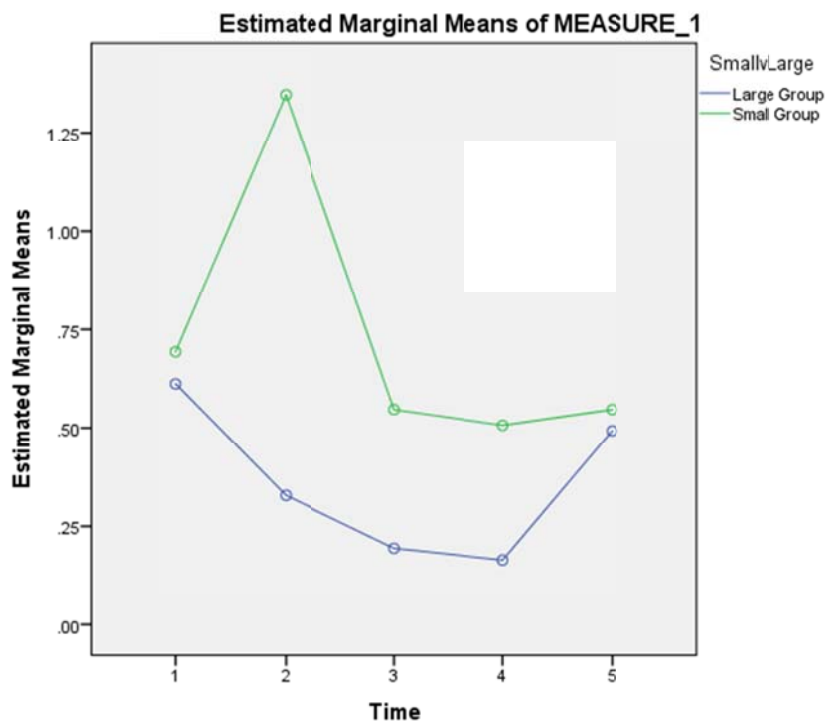


Figure 11. Profile Plot of Small vs. Large Co-teaching Models Over the Five Time Periods

CHAPTER 5: DISCUSSION

Literally hundreds of articles have been published in the professional literature in the last two decades that describe the instructional service delivery system known as co-teaching, offer suggestions for improving instruction utilizing co-teaching, or share stories about teachers' co-teaching experiences (Friend, 2007). Less than a dozen of those scholarly works have provided an experimental analysis of outcome data. Findings from the present inquiry build on that small database, providing some potentially positive results and providing co-teaching advocates and education practitioners and researchers with a rationale for promoting further systematic inquiry of this increasingly popular practice. Outcome data were collected related to student engagement levels as well as academic achievement. While many studies that have evaluated the engagement rates of students in education, few have looked at engagement rates of students with disabilities (Hirn & Scott, 2014; Ota & DuPaul, 2002; Vile-Junod et al., 2006). Similarly, only one other study has evaluated engagement rates in what could be construed as a "co-taught" (defined as two adults in a classroom) setting versus a setting with only one adult (Sweigart & Landrum, 2015). The present study is believed to be the first study that examined engagement rates and academic achievement by co-teaching model. Overall, findings pointed to differences across the six co-teaching models that were evaluated in terms of levels of student engagement and student academic achievement. Data from the five research questions posited in the present study are summarized in the order in which the research question was presented.

One finding was that visual analysis of engagement rates for each individual co-teaching model indicated generally high student engagement across the board for

participants in a teacher education course. Across 30 lessons, the median level of engagement was 85%, with nearly two-thirds of the observations ($n = 19$) above 80% and more than one-third (40%; $n = 12$) at or above 90% (see Table 1). Engagement rates were most distinct (see Figure 10) when the six models were grouped in terms of small- versus large-group format. That is, station teaching, parallel teaching, and alternative teaching all reduce the student to teacher ratio during delivery of instruction, whereas in one teach/one assist, one teach/one observe, and teaming, the ratio of student to teacher remains the same throughout. For example, in the present study, station teaching reduced the student to teacher ratio on average from 45:1 to 15:1. When measuring patterns of engagement, station teaching consistently produced the highest level of engagement with a mean of 95.6%. Parallel teaching reduced the student to teacher ratio on average from 45:1 to 23:1. It had the second highest mean of engagement at 94%. Alternative teaching also reduced the student to teacher ratio on average from 45:1 to 40:1 and 5:1, depending on the group selected. It had the third highest mean of engagement at 87.2%. And when the small- versus large-group co-teaching model engagement rates were combined, a clear separation was evident, with the average small-group engagement rate at 92% and the large-group at 79%. Engagement rates were the highest when the ratio of student to teacher was the lowest.

A second finding was that there were similarities and differences in preferences for participants pursuing general or special education certification routes. As hypothesized, teaming was the most preferred model for all participants. One similar preference in co-teaching model across the co-teaching groups was station teaching, which was the second choice of each group and the second most preferred overall. Just

over one-third of the general educator choices (i.e., 12 of 34) and one-fifth of the special educator choices (i.e., 3 of 13) identified the small-group model (see Table 1). The most preferred choice was teaming, which garnered 36.2% of the choices overall. However, differences in choice were evident by teacher type. Whereas 44.1% of the general educators favored teaming, only 15.4% of the special educator choices selected the large-group process. Overall, special educators favored the smaller-group formats, with more than three-quarters of the selections (i.e., 77%; $n = 10$ of 13) targeting alternative, parallel, and station teaching. Interestingly, only 3 of 47 selections were for one teach/one assist, which research has indicated is likely the most commonly implemented co-teaching model.

Third, in terms of the participants' perceived strengths and weaknesses of the models, there was an indication that differences in co-teaching model formats mattered. Several common themes noted in the participants' identification of strengths and benefits of co-teaching related closely to the smaller group models of co-teaching. For example, 13 of the 38 participants who submitted surveys identified the increased amount of individual attention as a strength and benefit to co-teaching. As hypothesized, individual attention was identified the most common strength/benefit of co-teaching as identified by participants. Of the six models of co-teaching, station teaching reduces the student to teacher ratio the greatest, which in turn provides greater opportunity for more individual attention.

Similar indication that model format mattered was noted in the identification of perceived co-teaching weaknesses. The fourth finding was that the most common weakness also related closely to the smaller group models of co-teaching. For example,

15 of the 38 participants who submitted surveys all identified “noise level” as a weakness to co-teaching, particularly when the smaller group models were utilized. Noise was the most common weakness noted by participants, not planning concerns as had been hypothesized. The smaller group models reduce the student to teacher ratio, but this requires that two teachers are leading instruction at the same time in different parts of the classroom, which could potentially be a distraction to some students.

While the participants in this study commonly agreed some of the most notable strengths were found in the co-teaching models that utilized small group, they also commonly noted that these same models have weaknesses. Friend and Cook (2013), showed agreement with this when they stated, “students generally benefit from the lower student to teacher ratio, but some students and teachers may be bothered by having two teachers talking at the same time.”

A fifth finding pointed to the potential impact of how co-teaching is implemented in classrooms. Similar to the results of engagement rates during the co-teaching models, station teaching was significantly different than the other co-teaching models at all time periods; however, due to an interaction it depended on what time the students were tested. When scores were collapsed to incorporate small versus large models, statistically significant findings were indicated. Small groups showed larger gains at all time periods. This suggests that there is a difference between the co-teaching models that utilize small group or large group. Students who receive instruction in small groups show stronger gains than those taught in large groups, but due to a significant interaction between time and model, these differences depended on the time students were tested.

Relationship to Previous Research

A number of discussion points are described in relationship to the present study's findings and those of the larger literature. First, and of particular importance, was the high levels of engagement levels reported in the present study. The high levels of engagement were comparable to research that has recently been reported as a result of a large-scale systematic direct observation of public school teachers' instructional behaviors and that effect on student engagement and disruption (Scott, Hirn, & Alter, 2014). Even though the observational techniques differed, with a single randomly-chosen teacher-student dyad per classroom observed in Scott et al. (2014) and all students in a particular sequence observed in the present study, student engagement rates remained high. Scott et al. reported overall engagement rates across 1,197 observations of 85%, with 95% reported for elementary grades observations and 82% for the more common middle/high school observations. These findings compare to the median of 85% engagement reported in the present study. In both inquiries, total engagement (active plus passive) rates were utilized, with Scott et al. indicating that their rationale was because they could not get observers reliable enough in differentiating the two conditions to track them. In the present exploratory findings, the researcher chose to chart total engagement because it had not been attempted to date. Scott et al. provided a caveat to their findings of high engagement rates, and that was that those rates were reported in situations where there want not high rates of teacher instruction taking place. Therefore, there were actually lesser levels of student engagement as a percentage of the entire observation period because teachers were not teaching throughout, so that students, could

not by definition be considered to be engaged. Data on the percentage of time that teachers in the present study were actually teaching were not collected.

Hollo and Hirn (2015) and Sweigart and Landrum (2015) also analyzed data from the body of 1,197 observations with regard to separate issues that were relevant to the present findings. A major finding of Hollo and Hirn was that while whole-group instruction was the most frequently used format across elementary, middle, and high school settings, that student engagement was greatest during small-group lessons, whether teacher- or peer-mediated. Sweigart and Landrum compared observations in which one adult versus more than one adult was involved, which may or may not have been co-teaching depending upon who the adults in the multi-person grouping were. They also distinguished between elementary and middle/high school settings. Their findings indicated that, for elementary settings, while opportunity to respond, positive feedback, and negative feedback rates for students and small-group and one-to-one grouping percentages were higher for multi-adult arrangements, the active engagement percentages were higher in one adult settings. Combined, the two sets of findings seem to suggest, as did the findings in the present study, that instructional groupings that reduced the student-to-teacher ratio coincided with higher levels of student engagement.

A second comparison related to the dearth of outcomes related to the practice of co-teaching. Previous public school student outcome data for co-teaching sought to analyze the effects of co-teaching in areas such as, social skills (Vaughn et al., 1998), learning rate, average performance, special education referrals, teacher attitude (Self, et al., 1991), test scores, and classroom grades (Walsh et al., 1993). In the postsecondary arena, a small body of collective teaching studies supported co-teaching practices in that

context without specific focus on improving student outcomes (e.g., Scantlebury et al., 2006; Walters & Misra, 2013). The present findings expanded a small body of research that suggests that co-teaching is a moderately effective procedure for influencing student outcomes (Murawski & Swanson, 2001; Solis et al., 2012) by indicating that there may be effects related to specific model combined with content/time.

Third, the present findings also extended the literature related to professional perceptions of co-teaching. Teacher views on co-teaching generally have been positive historically (Solis et al., 2012) and speak highly to the benefit of collaboration; however, the need for more planning time, training and resources is consistently expressed across the literature as a concern weakness (Manset & Semmel, 1997; Scruggs & Mastropieri, 1996; Scruggs et al., 2007). The perception literature was extended by the present findings in that participants, after having viewed and/or participated in a collection of co-teaching models, expressed a preference for a specific model. Two points were noteworthy in the present findings. First, there seemed to be differences in preferences across the general and special education teacher candidates/teachers surveyed, with general educators preferring the teaming model much more so than special educators. Both groups did express appreciation for station teaching, however. Second, despite a literature that indicated that the most commonly implemented practice was one teach/one assist, the interest for that model was minimal in the present participant pool. Across six models, one teach/one assist was the collective fifth choice, only chosen more frequently than one teach/one observe, which received no preference support.

Fourth, in terms of the teacher education literature, there was a demonstration that courses can, first, effectively and efficiently bring general and special education teacher

candidates/teachers together to build content and skill knowledge in a supportive setting. One of the complaints directed at teacher education has been that seemingly lengthy and costly programs fail to focus on developing subject matter knowledge, which is believed to be a critical component in effective teaching/teachers (Leko et al., 2012). Moreover, there is believed to have been a dearth of research that demonstrates a link between teacher training, teacher practice, and student outcomes (Goe, 2006). The present study combined the elements of teacher training, teacher practice, and student outcomes in a manner that brought together general and special education teacher education candidates/teachers, taught specific collaborative content and co-teaching skills, and reported findings that suggest a benefit to utilizing small-group co-teaching formats in educational settings.

Finally, the present findings extended the teacher education collaboration literature that Leko et al. (2012) previously summarized. One of the Leko et al. findings was that successful outcomes were increased when collaborative skills or structures were taught to teacher education candidates. The present results extended the Leko et al. findings related to co-teaching structure by introducing and having students observe and participate in a body of co-teaching models in a supported setting.

Implications

With study findings discussed and related to the literature, there are a number of implications that span the fields of both teacher education and public school education. One major theme is highlighted here that brings together both entities and promotes systematic and collaborative inquiry and practice going forward. That is, it makes sense to continue to bring together professional efforts to strengthen the link between teacher

training, teacher practice, and student outcomes (Leko et al., 2012), for a number of reasons. First, it provides teacher education with a strong foundation to promote itself as a valuable entity across the educational lifespan. Yes, teacher training can be both costly and lengthy, but it can be useful when there is a systematic and scientific approach to developing teacher subject matter mastery and skill competence in an area of critical importance, that is, the education of students with or at risk for disabilities. Consider the historical rise in the proportion of students with disabilities who receive the bulk of their instruction following placement in special education in the very location in which they struggled. Add to that research-informed concerns about inclusive education, the fact that research-based practices were not often observed in these settings (Scruggs et al., 2007), that the achievement of students with disabilities on national tests is stagnant (Danielson & Rosenquist, 2014), and that co-teaching does not have the empirical support to have it deemed an evidence-based practice in special education (Cook & Cook, 2011). Strengthening the link between teacher training, teacher practice, and student outcomes could allow collective teacher education and special education teacher training specifically to have – or regain (Brownell et al., 2010) – a meaningful focus.

With co-teaching such a professionally promoted while still not empirically validated program, it makes sense to continue to systematically build the evidence base. Friend et al. (2010) suggested that researchers needed to ensure that co-teaching is clearly defined and researchers need to be confident that what is being implemented is definitively co-teaching and that it is consistently practiced. Instruction in co-teaching practices was supported in the present study because content was taught to teams of general and special educators and practiced within the context of a college course.

Practice was afforded potential future practitioners outside of the public school setting. Systematic and scientific extensions of co-teaching could be developed and evaluated that begin with in-course understanding and practice that are followed, provided there is demonstration of mastery, by supported application in public school settings. In this approach, support for teacher education candidates as well as the public school students who are being taught in this manner, is clearly evident. Such extensions of the present inquiry may be well suited for Professional Development School settings, wherein university and public school relationships have already been established and are continuously evaluated. Such a systematic and scientific delivery system would allow for needed collection and evaluation of more extensive outcome data (e.g., high stakes tests, curriculum based measures, discipline referrals, and attendance information) so that the impact of co-teaching practices can be ascertained (Friend et al., 2010).

A second reason why strengthening the link between teacher training, teacher practice, and student outcomes surrounding the area of co-teaching is that it provides multiple stakeholders the opportunity to bring their own areas of expertise to bear on a major issue, which is improving the academic outcomes for students with disabilities in public school settings. As previously mentioned, co-teaching is a widely implemented practice and observations of co-teaching implementation have indicated that delivery often lacks the inclusion of research-validated practices (Scruggs et al., 2007). Fuchs, Fuchs, and Compton (2012) have gone so far as to label such practices as “special education as accommodation (or, perhaps special education lite)” (p. 274). With so much collaborative effort necessary for effective implementation to take place, be it principals providing planning time or teachers developing parity-laden relationships to facilitate

meaningful lesson planning, implementation, and evaluation, it makes sense to systematically build on the strengths of varied professionals. University faculty can bring their knowledge of evidenced-based practices and research methodology. Teachers, principals, and other professionals can incorporate their understanding of students and contexts. Collective effort can, then, be devoted to determining efficient and effective collaborative instructional delivery systems for implementation and evaluation in the multi-tiered systems of support that are being promoted and implemented in public school settings.

Lastly, co-teaching is one of the most preferred methods for including students with disabilities in the general education classroom (Friend & Cook, 2013). Research strongly supports that the more students are engaged the higher their success rate in academics (Hirn and Scott, 2014). Students with disabilities generally have academic deficits; therefore, if success in the classroom is attributed to higher levels of engagement, it is even more so imperative that students with disabilities are educated utilizing the models of co-teaching that produce the highest levels of engagement.

Limitations

Limitations that should be considered regarding the present study relate to participants, setting, sample type, size and treatment fidelity. The primary limitation relates to participants and setting. The participants in this study consisted largely of preservice teachers in a postsecondary setting. This presents a threat to the external validity of the findings presented in this study. According to Creswell (2005), threats to external validity involves the inability to draw correct inferences from the sample data to other persons, settings, and past and future situations. This study is limited in its ability to

generalize beyond the postsecondary setting to a typical K-12 classroom where co-teaching is more frequently utilized (Scantlebury et al., 2006). It is also limited in its ability to generalize to certified teachers and K-12 population, due to the fact that the “teachers” that were co-teaching were preservice teachers and the “students” participating in the co-taught lesson were also preservice teachers. The population typically providing co-taught lessons is certified general and special education teachers, and the participants in co-taught lessons are generally K-12 students (Solis et al., 2012). However, it should be noted that there are similarities to both populations. For example, both are “students” participating in coursework for a grade. In addition, student engagement is related to teacher effectiveness and though the population is different than the typical K-12 population, if the teacher is promoting the level of engagement, the age of the population should not matter. The initial results of this study support further research with a sample representative of the target population of K-12 students and certified general and special education teachers in order to draw more generalizable conclusions.

In evaluating whether or not there were significant difference in achievement on subject matter content test for students taught with the different co-teaching groups, the fact that there were significant interactions for the different models investigated individually, as well as for small group versus large group and time do not lead to definitive conclusions about the effect of co-teaching models. There are definitely differences in the models, and evidence to suggest that the models that create small groups are more successful than those that keep the group large, but this effect is confounded by the time in which they were measured.

Another limitation relates to sample type and size. The current study utilized convenience sampling and was limited to a post-secondary course for preservice general and special education teachers. According to Creswell (2005), in convenience sampling the researcher pulls from participants that are willing and available to be studied; however, the researcher cannot say with confidence that the individuals are representative of the population. In addition, the sample size was limited to the 45 students enrolled in the teacher education course. Future research should utilize more appropriate samples and larger sizes, so that the sample is more likely to be a good estimate of the characteristics of the population. Instead of convenience sampling, simple random sampling would have been a superior choice. According to Creswell (2005), simple random sampling is the most rigorous form of probability sampling, because the researcher selects participants from the sample so that any individual within the population has an equal probability of being selected. In addition, the larger the sample, the less likely the sample will be different from the population (Creswell, 2005).

Finally, the last limitation relates to treatment fidelity. In determining treatment fidelity of the 6 co-teaching models, observers were aware of the model type prior to watching the video for each of the six co-teaching models. The model name was stated at the beginning of each video, which could have resulted in a bias. Without this prompt, the treatment fidelity may not have been as high.

Future Research

Future research should consider replication of the present study given the significant gap in the research conducted in the area of student outcomes on co-teaching. More specifically, replication in a K-12 setting with certified teachers would add

additional outcome data to the existing body of research in a setting where co-teaching is utilized regularly to meet the requirements of IDEIA (2004). Due to the recent increase in utilizing co-teaching in postsecondary settings (Cordner et al., 2012; Harde & Burris, 2012; Walters & Misra, 2013) it would also be beneficial to replicate the study in another postsecondary setting to continue to evaluate its usefulness in teacher preparation and student outcomes.

In addition to the above mentioned future research, there is significant need for a checklist or similar evaluation tool to determine fidelity of implementation for the co-teaching models. Upon embarking on the current study, it was determined that there was no existing checklist or similar evaluation tool to determine treatment fidelity on the implementation of the co-teaching models. The present research study utilized the co-teaching model definitions by Friend and Cook (2013), both well-published in the area of co-teaching, to create a checklist to evaluate treatment fidelity on implementation of the co-teaching models.

Conclusion

The utilization of scientifically based instructional practices in schools is mandated by law (IDEIA, 2004; No Child Left Behind, 2002). According to Friend and Cook (2013), co-teaching is continuing to become the popular service delivery model to meet the LRE requirements imposed by IDEIA (2004). While this study utilized a different population than those in a traditional inclusive classroom setting, the outcome data did indicate the co-teaching models that create smaller group sizes have better outcomes in student engagement and stronger gains in content depending on time tested. That said, it is imperative that co-teaching is recognized as an instructional service

delivery model and not an intervention. There must continue to be research conducted on student outcomes to show that such instructional arrangements can positively impact teaching practice and student engagement, thereby increasing the likelihood of positive outcomes for students with and without disabilities. Sweigert and Landrum (2015) promoted systematic inquiry in the area of co-teaching implementation, noting that if effective co-teaching models are to be developed, validated, and promoted, then researchers must remain focused on examining first how all teachers can be better trained and supported in the use of evidence-based practices within the confines of co-teaching, particularly for students with disabilities, so that these practices can be used effectively in co-taught settings. Research similar to the present study and that which systematically evolves from it must continue. In that way, the necessary scientific attention and effort will systematically inform a practice that will likely continue to impact K-12 and teacher education for multiple student and stakeholder populations for the foreseeable future. Such an agenda might help alleviate the concerns of Fuchs et al. (2012) and others about the effectiveness of co-teaching practices, allow for there to be a clear focus to teacher training in special education (Brownell et al., 2010), as well as continue the type of research described herein that merged the critical areas of teacher training, teacher practice, and student outcomes (Leko, et al., 2012).

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APPENDIX A
CONSENT FORM FOR PARTICIPANTS

Institutional Review Board (IRB) # _____

1. Title: Engagement Levels During Implementation of Co-teaching Models
2. Performance Site: Louisiana State University and Agricultural and Mechanical College
3. Investigators: Contact Cathy Eschete, 225-614-1544, cesche1@lsu.edu and/or Paul Mooney, 225-578-2360, pmooney@lsu.edu, Available 8 a.m.-5 p.m. Monday-Friday.
IRB Contact: This study has been approved by the LSU IRB. For questions about participants' rights, please contact the chair, Dr. Robert Matthews, 578-8692, or irb@lsu.edu.
4. Purpose: The study examines student engagement rates during the presentation of up to six co-teaching instructional models.
5. Participants: Students in EDCI 4710: Consultation, Collaboration, and Co-teaching.
6. Research Procedures: Students will be videotaped as they teach or observe a series of brief (i.e., 15 to 30 minutes in length) course-assigned co-teaching lessons. Students will either be randomly assigned to teach one of six co-teaching models and specific course content as part of a group or expected to observe and participate in the co-taught lessons. The videotapes will later be critiqued by researchers in order to evaluate the level of teacher-initiated actions (e.g., number/rate of positive reciprocal instruction interactions; number/rate of praise statements) and learner engagement (e.g., actively engaged time; passively engaged time; off-task verbal; off-task motor; off-task passive as defined by the Behavioral Observation of Students in Schools, BOSS; Pearson Education). Students will also be asked to complete evaluative questionnaires and complete content-oriented quizzes as a part of the research project.
7. Potential Benefits: There are believed to be no immediate benefits to students from the research activities beyond that which will be gained from completing the class-assigned activity.
8. Potential Risks: There are believed to be no risks to participants. All videotapes will be stored in a secure location when not being viewed for class or research purposes.

9. Right to Refuse: Participation in the research study is voluntary. While students are expected to complete the assignments for course grades, students can request that their videos not be included as part of the research study at any time without penalty. Your relationship with the researchers or LSU will not be damaged in any way if you choose to not participate or quit the study.

10. Privacy: The confidentiality of your reply will be ensured. Names will only be released to research team members (i.e., investigators). Documents will be maintained in a locked file cabinet when not being gathered. Entered data on teacher actions and student engagement, perceptions, and/or achievement will not include student names and will remain on the office computers of the principal investigators or statistician. Results of the study may be published, but no names or identifying information will be included in any publication.

11. Financial Information: There will be no financial compensation for participating.

12. Signatures: “I have been fully informed of the above-described procedures, its possible benefits and risks, and I give my permission to participate in the study.”

Participant

Printed Name: _____ Signature: _____

Date: _____

Institutional Review Board
Dr. Robert Mathews, Chair
David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu | lsu.edu/irb

APPENDIX B **MOMENTARY TIME SAMPLING DATA SHEET**

Appendix B **Momentary Time Sampling** **Data Sheet**

Co-Teaching Model Used: _____
Video/Group Info: _____
Start Student/Row Number: _____

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Total Intervals Observed: _____
Total Intervals Demonstrating Engagement: _____
Percentage of Engagement: _____

APPENDIX C CO-TEACHING MODELS CHECKLIST

Co-Teaching Models Checklist

One Teaching /One Observing		
✓	Components	Notes
	2 or more educators in the same classroom	
	One educator is leading instruction while the other is observing (i.e., taking data on a specific student(s), observing the teacher leading instruction, etc...) The educators can switch roles, though not required.	
Station Teaching		
✓	Components	Notes
	2 or more educators in the same classroom	
	Instructional content is divided so that each educator has a role in teaching a portion of the content	
	Students or educators should move from one station to another according to a predetermined schedule	
	A minimum of 2 - 3 stations should be utilized. Stations that exceed the number of teachers can be utilized for students to complete independent work assignments, participate in peer tutoring, etc...	
Parallel Teaching		
✓	Components	Notes
	2 or more educators in the same classroom	
	Each educator has a role in teaching	
	Class is divided into 2 heterogeneous groups and remain with the same educator throughout instruction	
	All students are receiving the same instructional content in a lower teacher-student ratio	
Alternative Teaching		
✓	Components	Notes
	2 or more educators in the same classroom	
	Each educator has a role in teaching	
	A small group of students is selected to receive instruction that is different from that in which the large group is receiving	
Teaming		
✓	Components	Notes
	2 or more educators in the same classroom	
	Educators equally provide instruction to ALL students (i.e., a large group, monitoring students working independently, or facilitating groups of students working on shared projects)	
	Parity and equity is demonstrated	
One Teaching / One Assisting		
✓	Components	Notes
	2 or more educators in the same classroom	
	One educator is leading instruction while the other supports the instructional process (i.e., assisting students who need redirection or who have questions about their work)	

APPENDIX D INTERNAL REVIEW BOARD APPROVAL

Application for Exemption from Institutional Oversight

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/ projects using living humans as subjects, or samples, or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.



Institutional Review Board
Dr. Robert Mathews, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu | lsu.edu/irb

– Applicant, Please fill out the application in its entirety and include the completed application as well as parts A-F, listed below, when submitting to the IRB. Once the application is completed, please the completed application to the IRB Office or to a member of the Human Subjects Screening Committee. Members of this committee can be found at <http://sites01.lsu.edu/wp/ored/human-subjects-screening-committee-members/>.

– A Complete Application Includes All of the Following:

(A) A copy of this completed form and a copy of parts B thru F.

(B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1&2)

(C) Copies of all instruments to be used.

*If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment material.

(D) The consent form that you will use in the study (see part 3 for more information.)

(E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB. Training link: (<http://phrp.nihtraining.com/users/login.php>)

(F) IRB Security of Data Agreement: (<https://sites01.lsu.edu/wp/ored/files/2013/07/Security-of-Data-Agreement.pdf>)

1) Principal Investigator: Cathy Eschete

Rank: Graduate Student

Dept: Special Education

Ph: 225-614-1544

E-mail: cathyfeelc@aol.com

2) Co Investigator(s): please include department, rank, phone and e-mail for each

*If student, please identify and name supervising professor in this space

Paul Mooney, Associate Professor, Special Education, 225-578-2360, pmooney@lsu.edu

IRB# <u>E8698</u>	LSU Proposal # _____
<input checked="" type="checkbox"/>	Complete Application
<input checked="" type="checkbox"/>	Human Subjects Training
<input checked="" type="checkbox"/>	IRB Security of Data Agreement

3) Project Title: Effects of Co-teaching Models on Student Level of Engagement

STUDY EXEMPTED BY:

Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
130 David Boyd Hall
225-578-8692 / www.lsu.edu/irb

4) Proposal? (yes or no) no

If Yes, LSU Proposal Number _____

Also, if YES, either

☐ This application completely matches the scope of work in the grant

OR

☒ More IRB Applications will be filed later

Exemption Expires: 2/26/2017

5) Subject pool (e.g. Psychology students):

Pre-service General Education and Special Education Teachers

*Circle any "vulnerable populations" to be used: (children <18; the mentally impaired, pregnant women, the ages, other). Projects with incarcerated persons cannot be exempted.

6) PI Signature

Cathy Eschete

Date 2-5-14

(no per signatures)

** I certify my responses are accurate and complete. If the project scope or design is later changes, I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. If I leave LSU before that time the consent forms should be preserved in the Departmental Office.

Screening Committee Action: Exempted ☒ Not Exempted _____ Category/Paragraph 1

Signed Consent Waived? Yes / No No

Kristin A. Gansle

Reviewer

Roll

Signature

Kristin A. Gansle

Date

2/27/2014

VITA

Cathy Lee Eschete is a native of Opelousas, LA. After completing her school work at Acadian Preparatory School in 2000, Cathy attended Louisiana College and earned a Bachelor of Arts with a major in Elementary and Special Education in 2004. During the following two years, she served as a resource and inclusion teacher in Ascension Parish. In June of 2006, Cathy relocated to Modesto, CA and served as a Clinical Supervisor for Therapeutic Pathways/ The Kendall School, an early intervention program for children diagnosed with Autism. During her time in CA, she earned a Masters degree in Special Education from California State University Stanislaus. In January of 2012, Cathy relocated back to Louisiana and began pursuing her PhD in Curriculum and Instruction with a focus in Special Education at Louisiana State University. She currently is serving as an Assistant Professor of Education and Director of Field Experience at her alma mater, Louisiana College. She serves as a course instructor for Introduction to Education (ED 190), Exceptional Children (ED 198), and oversees all field experience for the education undergraduate and graduate programs at Louisiana College. She also serves on a variety of committees at Louisiana College, including Retention, Financial Aid Appeals, and Recruiting.