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Co-Teaching in Secondary Field Experience Practica

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ABSTRACT

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The purpose of this mixed methods study was to determine the impact on students, teacher candidates, and classroom teachers of applying a co-teaching model to the field experience practica prior to student teaching compared to traditional field experience practica in one secondary teacher preparation program. Participating partner schools were randomized either to receive professional development on co-teaching with a teacher candidate or to the control group. A total of 43 cooperating teachers and 30 teacher candidates participated in the study. The co-teaching treatment group consisted of 18 cooperating teacher-teacher candidate pairs. Quantitative data collection included limited student achievement data from curriculum-based pretests and posttest and teacher candidate self-reported log sheets of time spent in various activities throughout the semester in their field experience practica. Qualitative data focused on the impact of the co-teaching professional development on cooperating teacher perceptions of benefits and challenges of working with a teacher candidate collected from end-of-semester open-ended surveys. Classroom observations also provided qualitative data on the implementation of co-teaching strategies.

The co-teaching initiative did not significantly affect the percentage of time teacher candidates spent in the various activities (observation, assisting students, assisting with instruction, assisting with non-instructional tasks, and co-planning). The type of instruction used prevalently in the classrooms, either student-centered or teacher-

centered, appears to be a confound variable in this study; teacher candidates placed in student-centered classrooms, regardless of experimental group, appeared to be more actively involved with students and instruction than teacher candidates placed in teacher-centered classrooms. Insufficient student achievement data were available to determine any impact of teacher candidates or co-teaching on secondary student achievement.

Co-teaching was observed more often in the treatment classrooms than in the control classrooms. Co-teaching strategies commonly employed included One Teach, One Assist; Station Teaching; and two forms of Team Teaching. Cooperating teacher in the treatment group generally had positive responses to the initiative, were more likely to recognize the instructional and management benefits of hosting a teacher candidate, and recognized the importance of co-planning. Cooperating teacher in the control classrooms commonly expressed frustration with the lack of communication of program expectations by the university for the teacher candidates and were more focused on their own students rather than on the development of their teacher candidate.

The co-teaching initiative appears to have potential for improving the quality of field experience practica prior to student teaching for both cooperating teachers and teacher candidates. Questions remain related to the role of the cooperating teacher's instructional style on teacher candidate experience and related to the effects of co-teaching and teacher candidates on secondary student achievement.

Key words: co-teaching, field experience practica, clinical practice, teacher preparation, pre-service teachers, teacher candidates

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CHAPTER I

INTRODUCTION

Introduction and Background

Learning to teach is a complex and challenging endeavor (Goodnough, 2013) in which much of the skill of making effective decisions about what and how to teach emerges in the context of actual teaching practice [American Association of Colleges of Teacher Education (AACTE), 2010]. The American Association of Colleges of Teacher Education (2010) recommended viewing teaching as a clinical practice profession similar to medicine or clinical psychology which are learned largely through engaging in the practices themselves and incorporating strong clinical preparation into teacher preparation in order to promote student success. Education researchers (e.g. Darling-Hammond, 2006a; Darragh, Picanco, Tully, & Henning, 2011; Dunn, Ehrich, Mylonas, & Hansford, 2000; Rabe, 2012; Wasburn-Moses, Kopp, & Hettersimer, 2012) have echoed the value of strong clinical practice, or *field experience practica*, in teacher preparation.

Teacher preparation has received increased attention recently as the quality of teaching has been recognized as an important aspect of *student* learning (AACTE, 2010). The National Council for Accreditation of Teacher Education (NCATE, 2010) called for radical change in teacher education by stating that "the education of teachers in the United States needs to be turned upside down" (p. ii). In part, calls for change are based

on the lack of college and career readiness of high school graduates which has been attributed to their teachers (Wiseman, 2012).

Statement of the Problem

What constitutes strong clinical preparation is not agreed upon in the educational research community or in teacher education (Zeichner, 2010), however, extensive time in primary and secondary classrooms has been advocated (Chesley & Jordan, 2012; Darling-Hammond, 2006b; Goodnough, 2013; Rabe, 2012), but the quality of that time and experience has also been suggested to be important (Chastko, 1993). The effectiveness of the classroom teachers working with *teacher candidates* likely plays a predominant role as placement with an ineffective teacher may result in negative outcomes (Wasburn-Moses et al., 2012). Securing high quality placements with effective classroom teachers, however, may be difficult, especially if a large number of teacher candidates need placements (Kain, Hays, & Wunderlich, 2012).

Additionally, historically there has been a lack of communication between higher education and school districts which has led to a lack of coordination between the didactic and practicum components of teacher preparation programs (Zeichner, 2010). As a result, AACTE (2010) has recommended that school districts and universities collaborate on the design and supervision of clinical practice. Darling-Hammond (2006a) had previously emphasized the importance of integrating coursework with clinical practice to create a cohesive program. A chasm often exists between higher education faculty and school district personnel (Wiens, 2013) due to a lack of understanding by both sides of what happens in the other setting and a failure to value the contribution of the other (Zeichner, 2010). Zeichner (2010) recommended the creation of hybrid spaces,

or neutral ground, where higher education and school districts could come together in new less hierarchical ways to coordinate teacher preparation programs in order to integrate both academic knowledge and practical knowledge.

Rationale for the Study

Need for Student Outcomes Research

Galway (2013) noted that change has been the norm in education, at all levels, for much of the history of education. However, he also cited a lack of quality research to determine the effectiveness of many changes that have been adopted and then abandoned over time and therefore, called for authentic research to evaluate and adjust teacher preparation programs to produce effective teachers. Wiseman (2012) corroborated this sentiment by stating the need for research on what components of teacher education lead to the preparation of effective teachers.

The United States Department of Education (2011) further specifies the types of research that should be used to evaluate teacher preparation programs with a change of focus from inputs, such as course syllabi and program organization, to outputs, such as elementary and secondary students' academic growth. Wiseman (2012) stated that teacher education, as a whole, has not yet shown conclusive evidence that clinical experiences have contributed to student achievement, and Wasburn-Moses et al. (2012) called for research on of all types of clinical placement, from early field experiences to the culminating clinical practice generally referred to as *student teaching*. This study will look at the effect of having teacher candidates present in secondary classrooms on student achievement and will also determine the effect of one potentially useful alternative to traditional field experience practica, co-teaching.

Co-Teaching

Co-teaching, generally defined as when two or more educators share the instructional responsibility for a single classroom (Friend & Cook, 1996), has been used extensively in primary and secondary classrooms to assist general education teachers and *special service providers* in coordinating instruction for students identified with special needs within the general education classroom (e.g. Bauwens & Hourcade, 1995; Friend & Cook, 1996, 2013; Murawski, 2009; Villa, Thousand, & Nevin, 2004). Co-teaching has also been used in teacher preparation courses to model techniques for teacher candidates in order to better prepare them for collaboration needed to successfully co-teach in inclusive settings (e.g. Graziano & Navarrete, 2012; Kroeger et al., 2012; Waters & Burcroff, 2007; York-Barr, Bacharach, Salk, Frank, & Beniek, 2004). In addition, co-teaching has been used to facilitate collaboration between university faculty and classroom teachers to improve the integration of the didactic and practicum components of teacher preparation (King-McKenzie, Delacruz, Bantwini, & Bogan, 2013) as well as an instructional technique to promote learning of content by teacher candidates (McCain, 2005).

Co-teaching has also been applied to the final semester of teacher preparation, the student teaching practicum, to assist a classroom teacher in working with a teacher candidate (e.g. Bacharach, Heck, & Dahlberg, 2010; Perl, Maughmer, & McQueen, 1999; Thousand, 2013). Co-teaching has been proposed as an alternative to traditional student teaching in which the teacher candidate, after some period of observation, assumed total responsibility for the classroom for an extended period of time with little assistance from the classroom teacher (Thousand, 2013). It has also been applied to year-long internships

that extend student teaching to a full school year (Cardullo & Forsythe, 2013; Roth & Tobin, 2002). Although co-teaching is widely being used during student teaching (e.g. Belanger, 2015; Bernhart, Koester, Collins-Sullivan, 2015; Tracy, 2015; Wagner, Accardi, & Viner, 2015), only one group (Bacharach et al., 2010) has reported results on student achievement during co-taught student teaching experiences, but only in elementary classrooms and only in a convenience sample of classrooms.

There are also anecdotal claims of using co-teaching in earlier field experience practica prior to student teaching (Ingraham & Karsted, n.d.; Murphy & Beggs, 2006; Murphy, Beggs, Carlisle, & Greenwood, 2004), but few details have been documented.

Theoretical Framework

The concept of learning through experience is fundamental to describing teacher preparation as a clinical practice profession. The situated cognition learning theory, described by Brown, Collins, and Duguid (1989), explains the theory behind learning through experience. These authors use the analogy of tool use to explain how schooling often fails to facilitate true learning. It is very possible to acquire tools but still not be able to use them. This concept applies both to actual physical tools as well as knowledge, concepts, or skills that can be applied in various situations. When people are provided the opportunity to actively use the tools of their craft rather than just learn about them, true learning occurs, making learning and acting indistinguishable.

Brown et al. (1989) based much of their theory on apprenticeship models that are common in training to perform a craft or trade. They apply practices from traditional apprenticeships to learning activities in schools in order to provide authentic learning opportunities for students that are coherent, meaningful, and purposeful, but also describe

the difficulties in providing authentic activities within a classroom setting. Roth (1998) applied the concept of traditional apprenticeships to teacher preparation with specific emphasis on co-teaching.

Co-teaching between a *cooperating teacher* and a teacher candidate can provide the apprentice with the experience new teachers need to become competent professionals. The theory of situated cognition is at the core of what teacher preparation clinical practica are intended to provide as it differentiates between learning to teach and learning about teaching (Roth, 1998). Learning to teach is a complex task that can best be learned by being involved in the task itself since part of what must be learned cannot be explicitly stated (Roth, 1998; Roth & Tobin, 2004). Clinical practica may allow teacher candidates to be acculturated to teaching through participation in practice in such a way that they learn to act meaningfully and purposefully in the moment (Brown et al., 1989; Roth, 1998) resulting in learning that occurs naturally and as situations arise in the context of practice (Brown et al., 1989; Roth & Tobin, 2004).

Learning to teach using this type of apprenticeship model requires teacher candidates to have access to skilled practitioners (Rabe, 2012; Roth, 1998). In the current political environment of schools with a focus on accountability, master teachers often have no incentive to volunteer to work with teacher candidates. Co-teaching can provide master teachers with an incentive to work with a teacher candidate by providing tools that take advantage of the additional human resources present in the teacher candidate such as different grouping strategies that allow for more individual student attention and support.

Differentiation and innovative instruction can also be more easily facilitated in diverse classrooms with more than one teacher supporting the process. In addition to

providing teacher candidates with access to high-quality cooperating teachers, co-teaching also provides techniques coordinating the process of two teachers working together in the classroom so that they can both learn from each other. Roth and Tobin (2004) emphasized that professional growth from co-teaching occurs for both experienced teachers as well as novices.

Purpose

The purpose of this mixed methods study, therefore, was to determine the impact on students, teacher candidates, and classroom teachers of applying a co-teaching model to the field experience practica prior to student teaching compared to traditional field experience practica in one secondary teacher preparation program.

Research Questions

Q1 Do secondary students benefit academically from having a teacher candidate in their classroom in addition to their assigned classroom teacher compared to only having their assigned teacher present?

Q2 Do secondary students benefit academically from having their assigned classroom teacher attend professional development on co-teaching with a teacher candidate as compared to students in classrooms where their assigned classroom teacher receives no professional development on co-teaching?

Q3 Does the effect on student achievement of having a teacher candidate present differ between classrooms where the assigned classroom teacher attended professional development on co-teaching with a teacher candidate and classrooms where the assigned classroom teacher did not attend professional development on co-teaching?

Q4 Are teacher candidates more active in their field experience practica, prior to student teaching, if their cooperating teachers have attended professional development on co-teaching with a teacher candidate than if they work with a cooperating teacher who has not attended professional development on co-teaching with a teacher candidate and is there a difference across the different levels of field experience?

Q5 Do classroom teachers perceive benefits from attending professional development on co-teaching with a teacher candidate, prior to student teaching, compared to working with a teacher candidate without attending professional development on co-teaching?

Limitations

The intervention in this study was the provision of professional development on co-teaching techniques for practicing teachers within secondary schools. This served as the intervention because it was possible to randomize schools to either participate in professional development on co-teaching or not. The actual intervention of interest, however, was co-teaching between a cooperating teacher and a teacher candidate in the treatment schools. It would be difficult, however, to randomize schools to implement co-teaching. Therefore, this research measured the effect of participation in professional development on co-teaching with a teacher candidate rather than actual co-teaching. The qualitative component of this study attempted to determine the degree to which co-teaching was implemented in the participating classrooms.

The impact of co-teaching during teacher preparation on the teacher candidates' teaching practice was also of interest. However, the finite length of this study as well as many confounding variables did not allow for teaching practice to be evaluated. Secondary teacher candidates took college courses from different professors and in different content areas, participated in different content methods courses, and participated in multiple field experience practica. Isolating the effect of one or two semesters of field experience on overall teaching practice would be difficult even if time permitted. Therefore, the activities in which teacher candidates participated during field experience practica was measured instead. It is believed that teacher candidates who are more

involved with students and with the practice of teaching during their field experience practica will become more effective teachers.

Summary

The situated cognition learning theory provides the theoretical framework for approaching teacher preparation as a clinical practice. Co-teaching is a model that has potential for assisting classroom teachers and teacher candidates in collaborating effectively in the classroom to create effective field experience practica. In this experimental study, the effect of providing professional development on co-teaching to practicing teachers on the teacher candidates, cooperating teachers, and secondary students will be investigated during field experience practica prior to student teaching.

Definition of Terms

Cooperating teacher: mentor teacher: elementary or secondary school classroom teachers who host teacher candidates in their classroom and facilitate field experience practica

Co-teaching: two or more educators in a single physical space working together to enhance student learning in a manner that would not be accomplished individually

Inclusion: a philosophy behind ensuring that all students are integrated into the schools and classrooms they would attend if they did not have a disability (Friend & Cook, 1996)

Field experience practicum: clinical practice, internship: a variety of early and ongoing field-based opportunities in which teacher candidates may observe, assist, tutor, instruct, and/or conduct research (NCATE, 2014)

Special service provider: includes special education teachers, speech-language specialists, school psychologists, Title I teachers (Murawski & Swanson, 2001); teacher of gifted, librarian, technology integration specialist, reading specialist, English language learner teacher (Murawski & Dieker, 2013)

Student: elementary (grades K to 6) or secondary (grades 6 to 12) pupil attending a public, private, or other type of school

Student teaching: the final, traditionally full-time, culminating field experience practicum in teacher preparation

Teacher candidate: or pre-service teacher: general term for a college student who is enrolled in a teacher preparation program

CHAPTER II

REVIEW OF LITERATURE

Teacher Preparation

Teaching is a complex activity (Darling-Hammond, 2006b). During a typical class period, teachers must:

> Keep track of 25 or more learners as they move through the content, keep their eye on the learning goals, attend to the integrity of the subject matter, manage individual student behavior and maintain a productive learning environment, pose strategically targeted questions, interpret students' work, craft responses, assess, and steer all of this toward each student's growth. (Ball & Forzani, 2009, p. 501).

Teaching effectively requires the integration of multiple types of knowledge and skills (Darling-Hammond, 2006b; Goodnough, 2013) as well as making hundreds or thousands of decisions each day (Heck, Bacharach, & Dahlberg, 2008). Therefore, teachers are diagnosticians who must assess situations and apply the most appropriate tools rather than simply transferring information (Darling-Hammond, 2006b).

This complex set of activities can be learned to a high level of skill with appropriate preparation (AACTE, 2010). However, older paradigms that emphasized exhibiting certain behaviors are insufficient as they did not address the intellectual and decision making aspects of teaching (Clift & Brady, 2005; Cochran-Smith & Fries, 2005). The diagnostic aspects of teaching distinguish teaching as a professional practice from teaching as a technical skill that can be copied from a veteran (Darling-Hammond, 2006b). Historically, this change in philosophy was also accompanied by a change in

nomenclature from *training* teachers to preparing professionals or learning to teach (Cochran-Smith & Fries, 2005).

The goal of teacher preparation programs is, therefore, to provide teacher candidates with the experiences necessary to develop these complex skills for facilitating learning (Huling, 1998). This process includes facilitating the transition of pre-service teachers from traditional views of teaching as telling to contemporary views of learning as active and engaged; the process is not complete until the teacher candidates also utilize teaching practices consistent with the newer views (Clift & Brady, 2005). Initial teacher preparation programs cannot achieve this complex task but rather lay the foundation for continual learning and development of skills throughout the teachers' professional careers (Fowler, Smith, & Sterling, 1991).

Teacher preparation programs meet this goal in various ways (National Research Council, 2010), although most secondary preparation programs have traditionally involved both university coursework in a specific academic discipline and in education along with practical experience in secondary classrooms (Darling-Hammond, 2006a; Roth & Tobin, 2002). The coordination and integration of theoretical coursework with practical experiences in the field has been widely recommended (Baldwin & Keating, 1996; Darling-Hammond, 2006b: Fowler et al., 1991; National Research Council, 2010; Tobin, Seiler, & Smith, 1999) with recent calls for change envisioning teacher preparation as a clinical practice profession similar to clinical psychology or medicine where high-quality clinical practice is the central focus of preparation (AACTE, 2010).

Historically, teacher preparation programs initially prepared teachers on university campuses independent of practical experience in secondary classrooms, and

then student teachers spent their final semester student teaching in a secondary classroom where they were expected to apply everything they had learned in their coursework (Huling, 1998; Killian & McIntyre, 1986). It was not until the 1980s that field experience practica were commonly incorporated into teacher preparation programs to offer practical experience in secondary classrooms throughout the preparation program rather than as a culminating activity (Applegate & Lasley, 1982; Killian & McIntyre, 1986; Wasburn-Moses et al., 2012).

Field Experience Practica

Clinical practice is an essential component of teacher preparation (AACTE, 2010; American Council on Education, 1999; Darling-Hammond, 2006a; Dunn et al., 2000). Darling-Hammond (2006b) conducted an in-depth case study of seven teacher preparation programs selected based on traditions of producing teachers that were highly sought out for teaching positions. All of these highly effective teacher preparation programs include clinical practice throughout their entire programs (Darling-Hammond, 2006b). Many different purposes have been suggested for field experience practica prior to student teaching. Field experience practica are an opportunity for teacher candidates to apply knowledge and theories to practical situations (Darling-Hammond, 2006a; Dunn et al., 2000; Fowler et al., 1991; National Research Council, 2010), practice skills (Clift & Brady, 2005; Dunn et al., 2000; Fowler et al., 1991; National Research Council, 2010), and build relationships with students and other teachers (Fowler et al., 1991). They are also an opportunity for teacher candidates to gain knowledge of teaching as a profession such as the various elements involved in teaching (Darling-Hammond, 2006b), the school system as a whole (Fowler et al., 1991; Union University, 1975), state and national issues

affecting teaching, and the realities of actual teaching (Dunn et al., 2000). Field experience practica can also assist teacher candidates in developing as a professional as they build confidence in their abilities, determine what strategies and techniques work well for them, and develop their own teaching style (Dunn et al., 2000). Finally, practical experience with teaching early in the teacher preparation program allows teacher candidates to determine if teaching is a good fit for them (Brunson, 1968; Dunn et al., 2000; Union University, 1975).

Although the purposes of field experience practica prior to student teaching are generally agreed upon, there is little agreement on how to achieve those purposes. The National Research Council (2010) stated there was no empirical support for recommendations related to when field experience should take place in the course of teacher preparation, the length of such experiences, or what the experiences should include. Chastko (1993) emphasized that the amount of time was not as important as the quality of the time spent in field experience practica.

Activities

The very first field experience practica often involved teacher candidates being sent out to observe (Huling, 1998). However, historic programs described by Chamberlin (1969) and Union University (1975) included activities for teacher candidates beyond observation including assisting teachers with various tasks and participating in activities outside of the classroom such as attending meetings or observing in administrative offices. Chamberlin (1969) also included supervising children and teaching aides, assisting children with their work, participating in planning for various types of instruction, and under supervision, working with students in large, medium, and small

groups. The types of activities included in field experience practica prior to student teaching appear to be extremely variable across programs and over time.

Observation. Observation of the practices of skilled teachers and of students has been a mainstay for field experience practica (Darling-Hammond, 2006b) to the extent that field experience practica prior to student teaching have been referred to simply as *observations* (Killian & McIntyre, 1986). Killian and McIntyre (1986) investigated the activities teacher candidates were involved in during two field experience courses by having the teacher candidates submit a list of the activities and interactions they participated in each week in the field. These authors then quantified the list of activities submitted by teacher candidates to represent the percentage of the classroom visits that included each activity. They found that throughout the first two field experience practica, between 81% and 92% of all secondary classroom visits involved observation of the cooperating teacher. The percentage of class visits involving observation decreased from the first half of each semester to the last half of each semester but remained high throughout the two semesters. They concluded that in many situations, early field experience practica were primarily passive exercises in observation with little opportunity to practice teaching skills or receive feedback on performance. Al-Bataineh (2009) reported that teacher candidates in his program typically spent 20 to 30 hours out of 55, or 36% to 55% of their time, in an early field experience practica simply observing. Time does not appear to have diminished the reliance on passive observation in early field experience practica.

Darling-Hammond (2006b) identified one purpose for classroom observations as assisting teacher candidates in learning how to collect detailed observation data on

students to use in decision making. She also included various specific activities that teacher candidates should observe including how experienced teachers begin a lesson, introduce new concepts, transition from one topic or activity to another, employ management and discipline strategies, and account for students' individual learning needs and styles.

Henning, Gut, and Beam (2015) conducted an interview study of 18 experienced cooperating teachers who had mentored teacher candidates in various types of field experiences and used the results to create a Developmental Curriculum for Clinical Experiences (DCCE) that described a sequence of progressive clinical activities appropriate for teacher candidates as they gain more clinical experience. The DCCE includes seven standards: student, content knowledge, assessment, instruction, learning environment, communication, and professional development. It is also divided into five developmental levels: Exploring, Exploring/Engaging, Engaging, Engaging/Emerging, and Emerging. The authors stated that the Emerging level is expected for student teaching. There are 113 different activities listed in the first four developmental levels, and the authors suggested that these activities are appropriate for field experience practica prior to student teaching. Of these 113 activities, only three involve simply observing and an additional three involved collecting data that would involve observing.

Planning. Twenty-seven of the 113 pre-student teaching activities on Henning et al.'s (2015) DCCE are related to planning; two types of planning activities are included: independent lesson planning and planning with the cooperating teacher. Independent lesson planning in field experience practica prior to student teaching has also been recommended by Al-Bataineh (2009), Chamberlin (1969), Darling-Hammond (2006b),

Fowler et al. (1991), and Huling (1998). Specifically, Henning et al. (2015) include designing instruction based on state standards, integrating technology into instruction, and using formative assessment data to guide planning. Recommendations for co-planning activities include creating materials, collaborating, and co-planning a unit with the cooperating teacher.

The amount of time spent planning or co-planning for teacher candidates in field experience practica prior to student teaching appears to have varied over time and by course. Killian and McIntyre (1986) found that only 4% of secondary teacher candidates' visits to classrooms in the first half of the first field experience course included individual planning which increased to 15% for the second half of the second field experience course. Co-planning was a bit more prevalent with 24% of secondary visits in the first half of the first field experience course including co-planning along with 34% of visits in the second half of the second field experience course. Even at 34%, teacher candidates are still not involved in planning during the majority of their visits to secondary classrooms. Al-Bataineh (2009) paints a more optimistic picture by estimating that teacher candidates typically spend 12 hours out of 55, or 22% of their time, involved with planning.

Assessment. Assessment related activities accounted for 15 of the 113 activities recommended for teacher candidates prior to student teaching (Henning et al., 2015). Initially, teacher candidates are recommended to develop a pre-assessment, participate in formative assessment, and co-assess student work with the cooperating teacher. Later, teacher candidates could develop test questions of various types, develop checklists or rubrics for assessment, or design, implement, and evaluate summative assessments.

Darling-Hammond (2006b) also recommended the development of various assessments for early field experience candidates whereas Chesley and Jordan (2012) recommended working with the cooperating teacher or larger teacher groups to collect and analyze assessments.

Non-instructional tasks. Henning et al. (2015) included 12 non-instructional activities in their list of 113 recommended activities prior to student teaching including grading papers with a key, recording grades, taking attendance, organizing files, passing out papers or assignments, and constructing bulletin boards. Others have also recommended teacher candidates' participation in non-instructional tasks (Darling-Hammond, 2006b; Huling, 1998). Huling (1998) stated that more than 75% of elementary and secondary teacher preparation programs participating in a 1997 survey reported that their teacher candidates engaged in non-instructional tasks such as grading papers and preparing bulletin boards. Killian and McIntyre (1986) also reported high levels of involvement of teacher candidates in field experience practica prior to student teaching in non-instructional tasks with between 34% and 50% of teacher candidates' visits to secondary classrooms involving participation in non-instructional tasks. These authors concluded that non-instructional activities were predominant activities for early field experience teacher candidates, second only to observation in both the first and second field experience courses.

Instruction. Henning et al. (2015) included two categories of instructional activities: whole class instruction with 11 activities and small group instruction with 4 activities. Killian and McIntyre (1986) specified that teacher candidates in the first two field experience courses should not be given complete responsibility for planning and

delivering instruction, but they encouraged teacher candidates to assist with instructional activities under close supervision. Fowler et al. (1991) listed appropriate activities for early field experience teacher candidates: presenting information, doing a demonstrations, leading a discussion, introducing an activity, introducing a video, or reviewing homework, assignments, or graded tests. Henning et al. (2015) also included co-teaching with their cooperating teacher, teaching a routine part of a lesson, and supervising students during group times during the first two developmental levels followed by creating and leading classroom activities, creating and implementing lessons, and assuming leadership of the class for short periods of time in the higher developmental levels.

Whole-class instruction has been frequently documented in field experience practica prior to student teaching. More than 75% of teacher preparation institutions completing a survey reported their teacher candidates were engaged in this type of instruction (Huling, 1998). Only 6% of secondary teacher candidate classroom visits in the first half of their first field experience course involved large group teaching which increased to 41% by the second half of the second field experience course (Killian & McIntyre, 1986). Al-Bataineh (2009) stated teacher candidates in his program spent three hours out of 55, or 5% of their time, on instruction of any type. Many teacher preparation programs require whole-class instruction only in the final field experience practica prior to student teaching (Baldwin & Keating, 1996; Darling-Hammond, 2006b).

Small group instruction has also been advocated by Siry (2011). Small group instruction could include reviewing assignments with a small group of students, facilitating small group discussions, or creating and implementing a lesson for a small

group (Henning et al., 2015). More than 75% of respondent teacher preparation programs reported teacher candidate involvement in small group instruction (Huling, 1998). However, only 4% of secondary teacher candidate visits during both the first half of their first field experience and the second half of their second field experience including small group instruction (Killian & McIntyre, 1986).

Assisting students. Henning et al. (2015) included eight activities related to assisting students that are appropriate for teacher candidates prior to student teaching including helping students make up work, providing students with assistance in finding information or resources, answering individual questions or re-stated directions for individuals, and assisting students with technology. Siry (2011) documented early field experience teacher candidates involved in working with students one-on-one. Teacher candidates in the two early field experiences participated in assisting individual students in approximately a quarter of their visits to secondary classrooms, but most of this experience involved assisting students with homework during the last few minutes of class (Killian & McIntyre, 1986).

Classroom management. Classroom management activities for field experience practica prior to student teaching could include giving directions or explaining procedures, explaining the reason for a rule or policy, using appropriate classroom management, explaining a new classroom routine, organizing groups for an activity, or planning and executing transitions between activities (Henning et al., 2015). Secondary teacher candidates in two early field experience courses spent time assisting with classroom management during between 15 and 25% of their classroom visits (Killian & McIntyre, 1986).

Reflection. Clift and Brady (2005) stated that reflection on instruction was a main focus of field experience practica, and Al-Bataineh (2009) stated that traditionally field experience candidates spent from five to 10 hours out of 55 total hours of field experience reflecting on instruction with their cooperating teachers. Henning et al. (2015) only included reflective activities that focused on instruction whereas Killian and McIntyre (1986) included reflection on general education topics, the cooperating teacher's management of instruction, individual students, and the teacher candidate performance. Reflection on these various topics was included in between 2 and 32% of the secondary teacher candidates classroom visits (Killian & McIntyre, 1986).

Other activities. Activities outside of the assigned placement classroom have also been recommended for teacher candidates in field experience practicum prior to student teaching. The cafeteria, media center, nurse's office, principal's office, school library, and special education classroom have been suggested as alternate recommended locations for teacher candidates to spend time, especially in the initial field experience course (Darling-Hammond, 2006b). Teacher candidates might benefit from also attending data assessment meetings, faculty meetings, in-service meetings, parent-teacher conferences, or extracurricular activities (Henning et al., 2015). Supervising students on field trips (Huling, 1998) and assisting with student government or parent-teacher groups (Union University, 1975) have also been recommended.

Progression. The types of activities in which teacher candidates participate should progress throughout their field experience courses in a manner that increases intensity and responsibility (Wasburn-Moses et al., 2012). Many programs have specified the types of activities and level of participation expected for their field experience teacher

candidates (Darling-Hammond, 2006b; Henning et al., 2015). As an example, teacher candidates might progress from simply observing to working one-on-one with students to assisting with classroom tasks to co-planning and co-teaching with their cooperating teacher to finally teaching independently (Darling-Hammond, 2006b). Instructionally, teacher candidates might begin by leading instruction for short periods of 15 to 20 minutes and then progress to assuming responsibility for longer segments and transitions (Fowler et al., 1991). It has also been suggested that the focus of teacher candidates should move from concentrating on themselves and their own needs to concentrating on students' needs and their learning (Darling-Hammond, 2006b).

Placements

School-university partnerships of various kinds facilitate placement of teacher candidates in secondary schools for field experience practica. Effective teacher preparation programs often partner with and assist in developing placement sites where research-based teaching practices are commonly implemented (Clift & Brady, 2005; Darling-Hammond, 2006b). School administrators recommended that teacher preparation programs partner with a limited number of schools and place teacher candidates in classrooms specifically to participate in and observe specific practices (Chesley & Jordan, 2012). Effective programs also select their placement sites carefully in order to allow teacher candidates to observe particular practices, work with expert teachers, work with students with particular characteristics, and experience a range of community and school types (Darling-Hammond, 2006b).

It is recommended that cooperating teachers be selected based on a rigorous set of criteria (AACTE, 2010). Effective teacher preparation programs often require deep

expertise along with a willingness to share that expertise with a novice (Darling-Hammond, 2006b). Some programs select specific cooperating teachers to work with specific teacher candidates, some commonly place teacher candidates with their own program graduates, and some only utilize veteran teachers (Darling-Hammond, 2006b). Other programs select cooperating teachers based on seniority, favoritism, or parity but not based on the quality of their practice (Darling-Hammond, 2006b). Negative outcomes have been documented for teacher candidates placed with poor teachers as well as with teachers whose philosophy and/or practices are not aligned with those of the teacher preparation program (Wasburn-Moses et al., 2012).

Locating or creating partnerships with schools where university approved practices are implemented has proved difficult (Darling-Hammond, 2006b). Teacher preparation programs often struggle to find desirable placements for all of their field experience candidates (Metcalf & Kahlich, 1996). Programs with larger numbers of candidates to place experience increased difficulty (Huling, 1998; Kain et al., 2012).

Cooperating Teacher Preparation

A wide variety of different procedures exist for preparing classroom teachers to serve as cooperating teachers. Although some sort of preparation for cooperating teachers has been recommended (AACTE, 2010), some teacher preparation programs offer no assistance to their cooperating teachers for field experience practica prior to student teaching (Applegate & Lasley, 1982; Killian & McIntyre, 1986). Other programs have provided some sort of written information such as a packet of guidelines (Fowler et al., 1991), forms (Applegate & Lasley, 1982), handbooks or manuals (Darling-Hammond, 2006b), a list of potential activities for the teacher candidate to be involved in (Kain et

al., 2012), or syllabi or reading lists for the accompanying on-campus course (Darling-Hammond, 2006b). A few programs only provided evaluation or assessment forms that can serve to communicate the types of activities to be included (Darling-Hammond, 2006b). Formal professional development has been recommended (Huling, 1998; Killian & McIntyre, 1986) and may take the form of a single large group meeting, a multiple-day workshop, some sort of on-going professional development, or a full-semester course (Darling-Hammond, 2006b). Activities included in formal preparation sessions have included practicing techniques for analyzing and describing classroom events in objective language (Killian & McIntyre, 1986), and common topics have included mentoring skills (Darling-Hammond, 2006a), university curriculum, clinical curriculum, expectations (Darling-Hammond, 2006b), roles, and skills to encourage (Applegate & Lasley, 1982).

Supervision of Teacher Candidates

Cooperating teachers assume the role of teacher educator when they agree to host a teacher candidate for any field experience practicum (Chastko, 1993; Zeichner, 2010). This role has been recommended to include modeling student engagement practices, the use of a variety of instructional strategies, and the engagement of students in real-world problems (Chesley & Jordan, 2012). Cooperating teachers have also been expected to support teacher candidates by assisting them in planning, providing feedback on their strengths and weaknesses, and determining when they are ready to take on more responsibility (Fowler et al., 1991). Feiman-Nemser (1998) recommended cooperating teachers engage in think aloud activities where they say out loud everything that is going on in their mind in order to make their thinking accessible to their teacher candidate. Cooperating teachers also play an evaluative role; for teacher candidates in the initial

field experience course, feedback on level of engagement and dispositions should be included on easy to administer formative and summative evaluation tools (Henning et al., 2015). As teacher candidates move into later field experience courses, summative evaluation of teacher candidate performance has also been recommended (Fowler et al., 1991), in addition to feedback on advanced dispositions and engagement in activities at higher developmental levels (Henning et al., 2015).

It has been recommended that university personnel play an active role in field experience practica prior to student teaching (Dunn et al., 2000). Huling (1998) reported that more than 90% of secondary teacher preparation programs who responded to their survey provided in-field support in some form from university personnel; 87% of these secondary programs used classroom visits as means of support. However, only 4% of secondary programs reported that university personnel were available on a regular basis at placement schools. One of the seven highly effective teacher preparation programs assigned university faculty who taught the education courses that accompanied the practica experiences to supervise the teacher candidates in the field (Darling-Hammond, 2006b). Another of the highly effective programs had university faculty and graduate student supervisors observe when the teacher candidates in the final field experience prior to student teaching taught a unit of instruction (Darling-Hammond, 2006b). When university personnel are available, they can assist in managing the requirements of the field experience practica as well as providing communication between the university and the cooperating teachers (Darling-Hammond, 2006b).

Impact of Field Experience Practica

Common sense along with anecdotal comments from principals, teacher educators, and teacher candidates indicate that teacher candidates who spend more time in field experience practica during teacher preparation will be more prepared to teach (Huling, 1998). However, it is difficult to predict the impact of a specific course or field experience on teacher candidate development (Clift & Brady, 2005), particularly when there is little consistency in the experiences of teacher candidates in the field (Henning et al., 2015). Metcalf and Kahlich (1996) stated, "teacher education students are increasingly involved in more field-based experiences of greater duration when the effects of the experiences at best are marginal and, more likely, are negative" (p. 98). There does not appear to any consensus on the impact of field experience practica prior to student teaching on teacher candidate development at this time. The amount of variability in experiences, as well as in other components of teacher preparation, makes it difficult to determine impact.

Co-Teaching Defined

Co-Teaching for Inclusion

Co-teaching, or coteaching, has also commonly been called collaborative teaching, cooperative teaching, team teaching, or teaming (Murawski, 2002) as well as shared teaching (Bartholomay, Wallace, & Mason, 2001), though the use of these terms over time has not been consistent. Bauwens, Hourcade, and Friend (1989) appear to be the first to use the term co-teaching, as a shortened form of cooperative teaching, to indicate:

> an educational approach in which general and special educators work in a coactive and coordinated fashion to jointly teach academically and behaviorally heterogeneous groups of students in educationally integrated settings (i.e., general classrooms) (p. 18).

This definition reflects the original application of co-teaching for the *inclusion* of special education students in general education classrooms.

Cook and Friend (1995) presented a refined definition for co-teaching in inclusive settings, which has been widely used, and elaborated upon the key components that differentiate co-teaching from other forms of collaboration or teaming. They 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). The first important component of this definition of co-teaching was that it involved two or more professionals, which could include teachers as well as specialists such as speech and language therapists but excluded paraprofessionals, parent volunteers, or older students. Secondly, co-teaching had to involve substantive instruction where both professionals were actively involved in the classroom and thus excluded non-instructional tasks such as supervision of study halls, consultation, and participation in planning teams or individualized educational program (IEP) meetings as well as tasks routinely performed by paraprofessionals such as working exclusively with a single student. Finally, co-teaching had to include diverse students including students with identified disabilities and had to be conducted predominantly in a single physical space, thus excluding coordination of instruction that would take place in separate classrooms or pull-out forms of providing special education services. These authors did allow, on occasion, for a small group of students to be taken to a separate location for a specific instructional purpose but only for a limited time (Friend & Cook, 1996).

Previously, *team teaching* had been used to describe cooperative teaching relationships that were distinct from co-teaching as defined by Cook and Friend (1995). In the 1960s, a school reform movement called team teaching focused on making more efficient use of teachers as resources, as well as emerging technology, by combining several classes for large group instruction by a single master teacher followed by various types of small group work and individual activities in separate locations facilitated by less experienced teachers and other assistants (Shaplin, 1964; Tyler, 1967; Warwick, 1971). Flexibility in scheduling and grouping of students were common in these team teaching arrangements, and teaching teams commonly planned together to coordinate instruction and assessment (Shaplin, 1964). This form of team teaching, however, focused on division of labor rather than combining expertise which differentiates it from co-teaching. However, Armbruster and Howe (1985) adopted the term *team-teaching* to describe collaboration between a general educator and a special educator in inclusive classrooms that would fit the Cook and Friend (1995) definition of co-teaching so there has been no clear delineation of terms.

A few significant additions to the Cook and Friend (1995) definition of co-teaching in inclusive education have been proposed along with some additional specifications. Villa et al. (2004) specified that each co-teaching partner should bring unique and needed expertise to the classroom thus highlighting the value-added aspect of co-teaching. Murawski (2009) followed a strict definition of co-teaching and excluded student teachers from participation while Villa et al. (2004) adopted a more open interpretation of who could be involved allowing for any person with an instructional role

in the classroom to co-teach thus including paraprofessionals and volunteers along with students.

Several groups added specifications in the area of instruction. Friend, Reising, and Cook (1993) indicated that the purpose of co-teaching for inclusion was the development and implementation of innovative teaching strategies that were impossible for a single teacher to execute alone, thus highlighting another value-added component. Friend and Cook (1996) called for instruction that would lead to increased engagement and participation of students and later (2010) endorsed active learning and increased instructional intensity. Murawski (2002) emphasized the need to maximize the benefit of having two teachers in the classroom by making sure that both were actively engaged with students throughout the lesson, which contributed to both teachers being perceived by students as "real" teachers (Murawski, 2009).

Murawski and Dieker (2013) noted that the shared instructional component of co-teaching was often missing in schools where co-teaching for inclusion was supposedly occurring. Activities not considered as co-teaching included teachers taking turns teaching so the other could work on grading, photocopying, or other administrative tasks (Murawski, 2002); one teacher teaching one subject followed by the other teaching a different subject (Villa et al., 2004); one teacher teaching on certain days or for given weeks and then alternating (Friend & Cook, 2010); or one person dominating the partnership and making all decisions about instruction independently (Villa et al., 2004).

Gately and Gately (2001) expanded the work done by co-teachers to include sharing in planning, presentation, evaluation, and classroom management rather than just instruction. Murawski and Swanson (2001) conducted a meta-analysis to synthesize the

quantitative research on the effect of co-teaching for inclusion and included co-planning as a criterion for study inclusion. Murawski's (2008) definition of co-teaching had also specified co-planning, co-instruction, and co-assessment of students. Villa et al. (2004) again offered a slightly different focus for co-teaching by suggesting a distribution, or division, of responsibilities for planning, instruction, and evaluation among co-teachers rather than collaboration on these activities.

Cramer, Liston, Nevin, and Thousand (2010) provided additional rationale for the inclusion of diverse learners in co-taught classes by citing standards for understanding how learners differ and adjusting teaching practice accordingly; such standards have been proposed by three national educational agencies: Interstate New Teacher Assessment and Support Consortium (INTASC), National Council on the Accreditation for Teacher Education (NCATE), and National Board for Professional Teacher Standards (NBPTS). Differentiating instruction has also been included as an aim of co-teaching with a focus on making instruction responsive to student needs (Cramer et al., 2010). The idea is that two teachers can often provide increased opportunities for differentiating instruction including establishing a more culturally responsive environment (Dieker & Murawski, 2003). One example presented by Dieker and Murawski (2003) would be to divide a class into two groups based on their interest in studying either South or North America in the 1800s, provide activities or information focused on South America in one group and on North America in the other group, and then return to a large group to share the information with the other group.

Murawski (2012) brought together many of the additions and specifications to the original Cook and Friend (1995) definition of co-teaching by introducing an essential

question: “How is what we are doing together substantively different, and better for students, than what one of us would do alone?” (p. 8). Co-teaching for inclusion, therefore, has emphasized a value-added approach for maximizing the human resources available for teaching all students, with special emphasis on students identified with special needs who are placed in general education classes. This same quest to maximize human resources, but in teacher preparation, is at the root of this study.

Co-Teaching in Teacher Preparation

Dynak, Whitten, and Dynak (1997) at Western Michigan University appear to be the first group to suggest that the co-teaching model, which emerged out of special education inclusion, could be applied to the preparation of general education teachers in order to facilitate the collaboration of cooperating teachers and teacher candidates during student teaching. These authors did not offer a unique definition of co-teaching in student teaching.

Perl et al. (1999) at Kansas State University defined co-teaching in student teaching as “a student teacher and a cooperating teacher working together with groups of students and sharing the delivery of instruction and physical space” (p. 7). This definition emphasized two of the four key components identified by Cook and Friend (1995): joint instruction and shared physical space. However, this definition does not emphasize the diversity of students in the classroom and, as previously stated, student teachers were not considered appropriate participants for co-teaching by some (Murawski, 2009), but would be included by others (Villa et al., 2004).

Bacharach, Heck, and Dank (2004, as cited in Heck & Bacharach, 2010), at St. Cloud State University, further developed the definition of co-teaching in student

teaching to include “two teachers (teacher candidate and cooperating teacher) working together with groups of students; sharing the planning, organization, delivery and assessment of instruction, as well as the physical space” (p. 7). This definition expanded the activities involved in co-teaching to include the full range of teaching activities and reflected the changes Gately and Gately (2001) made to the co-teaching for inclusion definition. The St. Cloud State University definition, and model, of co-teaching in student teaching has been widely used (e.g. Belanger, 2015; Darragh et al., 2011; Hartigan, 2014; Ingraham & Karsted, n.d.; Merk, Waggoner, Carroll, & Weitzel, 2014; Tracy, 2015; Wagner et al., 2015; Yopp, Ellis, Bonsangue, Duarte, & Meza, 2014).

An independent application of co-teaching to student teaching, and teacher education more generally, was developed by Tobin and Roth (2005) who focused specifically on science teacher education, initially at the University of Pennsylvania and the University of Victoria, Canada, respectively. They defined co-teaching as when “two or more individuals work at each other’s elbows to enhance the learning experience of students” (Roth, Tobin, & Zimmerman, 2002, p. 7). Whereas Dynak et al. (1997), Perl et al. (1999), and Heck and Bacharach (2010) confined co-teaching to student teaching involving one cooperating teacher working with one teacher candidate, Roth and Tobin’s more general definition encompassed a variety of participants: a student teacher working with another student teacher or a student teacher working with a university faculty member (Tobin et al., 1999). They also applied their co-teaching model to the professional development of classroom teachers through pairing with a visiting teacher, a researcher, a university faculty member, and/or a teacher candidate (Roth et al., 2002). Many institutions have used the co-teaching model of Roth and Tobin (e.g. Arshavskaya,

2014; El Kadri & Roth, 2015, Goodnough, Osmond, Dibbon, Glassman, & Stevens, 2009; Murphy & Beggs, 2006; Scantlebury, Gallo-Fox, & Wassell, 2008; Siry, 2011).

A few other researchers have offered definitions of co-teaching in student teaching that have not yet been widely adopted by others. Scantlebury et al. (2008) defined co-teaching as "when multiple teachers (interns and cooperating) teach together in a classroom" (p. 971) and specify that all participants share the responsibility for both preparation for teaching and actual instruction. Merk et al. (2014) stated co-teaching occurs when "a cooperating teacher and teacher candidate simultaneously have responsibility for a common group of P-12 learners" (p. 1) and included sharing in classroom management, planning, instruction, and assessment. Neither of these definitions varies significantly from the St. Cloud State University (Heck & Bacharach, 2010) definition. Ingraham and Karsted (n.d.) used the St. Cloud State University (Heck & Bacharach, 2010) definition of co-teaching but added an additional interpretation not specified by the St. Cloud State group: the cooperating teacher retains responsibility for content, implementation, and management and serves as the final authority regarding the class.

Lastly, Thousand (2013), who was active in the research involving co-teaching for special education inclusion (Cramer et al., 2010; Villa et al., 2004), defined co-teaching as involving "two or more people sharing responsibility for all of the students assigned to them for instruction" (p. 140) and extended the application of co-teaching to teacher preparation by stating that "in the case of clinical practice or student teaching, the co-teachers are the teacher candidate and the cooperating teacher" (p. 140). As previously stated, this group of researchers had adopted less restrictive definitions of co-teaching for

inclusion and more universal applications so their endorsement of co-teaching in student teaching is not surprising. However, Friend and Cook (2003, 2010, 2013) as well as Murawski (2009) with Dieker (2013) maintained their more restrictive definition of co-teaching throughout their work.

Co-Planning

Importance

Co-planning has commonly been identified as an important component of co-teaching (e.g. Bacharach et al., 2010; Hourcade & Bauwens, 2003; Murawski, 2009; Thousand, 2013). The lack of adequate planning time has been seen as a barrier to co-teaching (Pugach & Winn, 2011) that may have negative effects on both teachers and their students (Murawski, 2009). Co-planning, however, has also been considered the most difficult component of co-teaching because it requires coordinating schedules and extra time (Murawski, 2012).

Logistics

Scheduling adequate time to co-plan was seen by co-teachers as both the biggest challenge to implementing co-teaching as well as the best solution to successful co-teaching (Beninghof, 2012). Co-teachers in all types of schools have struggled to find adequate time for co-planning (Brownell & Walther-Thomas, 2002). Many researchers have advocated for scheduling specific time to co-plan on a daily (Argüelles, Hughes, & Schumm, 2000; Cole & McLeskey, 1997; Friend & Cook, 1996; Villa, Thousand, Nevin, & Malgeri, 1996) or weekly basis (Murawski, 2002). The cooperating teachers from the MidValley Consortium for Teacher Education (2000) also recommended daily co-planning when co-teaching with a student teacher.

The amount of time needed for co-planning likely varies for each set of co-teachers; in Dieker's (2001) study, the average amount of planning time for co-teaching pairs was 45.5 minutes per week, which is 9.1 minutes per day, with a range of 18.5 to 84.5 minutes per week. However, the same co-teachers would have preferred on average to have 25.7 minutes per day, rather than the 9.1 minutes per day they had, with the desired times ranging from 18 to 43.5 minutes per day (Dieker, 2001). Murawski (2009) emphasized that co-teachers will need more time at the beginning of their co-teaching relationship with the amount of time needed tapering off as partners learn to work together and to divide planning tasks. It has also been recommended that co-teachers decide prior to the start of the school year when, where, and how they will co-plan throughout the year (Beninghof, 2012; Thousand, 2013; Villa, Thousand, & Nevin, 2008).

Many researchers have suggested ways to find time to co-plan. These suggestions include meeting before or after school (Caron & McLaughlin, 2002; Cook & Friend, 1995), during lunch or recess, or on professional development days (Caron & McLaughlin, 2002). Thousand (2013) also suggested capitalizing on shared interests such as walking together as an alternative to sitting down together to plan. Using technology has also been widely advocated when in-person planning cannot occur as well as a means of communicating between in-person co-planning sessions. E-mail (Caron & McLaughlin, 2002; Murawski, 2009), phone conversations, text messages, instant messages (Murawski, 2009), and Skype (Beninghof, 2012) have all been recommended. Conderman, Bresnahan, and Pedersen (2009) also recommended posting lesson plans and other planning documents on interactive web sites so both co-teachers can have access.

Long-term Planning

Cole and McLeskey (1997) recommended taking time to plan together for the semester overall before the school year begins. This long-term planning should include discussion of content (Beninghof, 2012; Cook, 2004; Heck & Bacharach, 2010; MidValley Consortium, 2000; Villa et al., 2004), pedagogy, individual student needs (Heck & Bacharach, 2010; Villa et al., 2008), and lesson planning procedures (Beninghof, 2012). The expectations of each co-teacher (Dieker, 2001; MidValley Consortium, 2000) as well as how responsibilities will be coordinated (Murawski, 2012) should also be discussed. Finally, it has been considered helpful to discuss each co-teacher's strengths and weaknesses, particularly related to time management, planning, classroom management, and content knowledge (Murawski & Dieker, 2008) as well as the resources each co-teacher brings to the partnership (Villa et al., 2004). Thousand and Villa (1990) also recommended discussing how to use each co-teacher's areas of expertise to benefit the students as well as to assist the other co-teacher in growing as a professional.

Short-term Planning

Daily or weekly planning sessions should include discussions of many of the same topics that were covered in the long-term planning session(s) such as content, pedagogy, student needs, and roles, but will be focused on finer details of specific lesson plans and responsibilities. Both co-teachers should share ideas, possible instructional or assessment strategies, and which co-teaching strategies may be appropriate for each co-planned lesson (Heck & Bacharach, 2010). The cooperating teacher will likely take the lead in co-planning at the beginning of the semester, but the teacher candidate should

gradually take on more responsibility during co-planning (Bacharach et al., 2010). Discussions of pedagogy, or how the learning of the content will be facilitated, should include which co-teaching instructional strategies will maximize the use of both co-teachers present (Murawski & Dieker, 2004; Villa et al., 2004) as well as who will be responsible for which aspects of the lesson (Beninghof, 2012; Villa & Thousand, 1994).

Co-planning for co-teaching does not mean that everything needs to be done jointly (Murawski, 2012). Once an overall plan has been decided upon, tasks can be divided (Murawski, 2012) with each co-teacher taking responsibility for preparing components of the lesson (Cook & Friend, 1995). In particular, teacher candidates will need additional time for independent planning if they will be taking the lead in a lesson or will be responsible for preparing an activity (Bacharach et al., 2010).

Co-Teaching Instructional Strategies

Overview

Most of the researchers who have investigated co-teaching, both for inclusion and for teacher preparation, have specified various ways in which teachers can work together during instruction. Tobin and Roth (2005) and those who adopted their model of co-teaching are the exception. The terminology used to specify these ways of working together as well as the number of options provided have varied greatly, but common ideas permeate the literature.

Terminology

Co-teaching for special education inclusion produced a variety of terms and options. Bauwens et al. (1989) presented three potential cooperative teaching *arrangements*: Complementary Instruction, Team Teaching, and Supportive Learning

activities, and Bauwens and Hourcade (1991) described the same three but called them *program options*. Friend et al. (1993) delineated five co-teaching *structures* (One Teach, One Assist; Station Teaching; Parallel Teaching; Alternative Teaching; and Team Teaching) which they later termed co-teaching *approaches* (Cook & Friend, 1995) and expanded to six by subdividing the One Teach, One Assist approach into One Teaching, One Observing and One Teaching, One Drifting (Friend & Cook, 2000). More recently, Friend (2015) delineates 6 co-teaching approaches: One Teach, One Observe; One Teach, One Assist; Station Teaching; Parallel Teaching; Alternative Teaching; and Teaming. Villa et al. (2004) adopted the approaches terminology but presented four options: Supportive Teaching, Complementary Teaching, Parallel Teaching, and Team Teaching, and Murawski (2009) also used the term approaches and presented the same five options as Cook and Friend (1995) but defined them differently. Bauwens and Hourcade (1997) added *pictures of possibilities* to their three approaches and later focused solely on the pictures of possibilities without specifying approaches (Hourcade & Bauwens, 2003).

Vaughn, Schumm, and Arguelles (1997) identified five *models* of co-teaching that they called Plans A, B, C, D, and E. Chapman and Hyatt (2011) proposed three models (Complementary, Side-by-Side, and Walking the Talk) with unique names but not unique ideas; similarly, Beninghof (2012) presented nine models (Lead and Support, Speak and Add, Complementary Skills, Parallel Teaching, Skill Groups, Station Teaching, Learning Style, Adapting, and Duet Model) that were not really new ideas. Fattig and Taylor (2008) did not provide names for their co-teaching options but delineated three different possible ways of co-teaching.

Hughes and Murawski (2001) applied co-teaching to working with students identified as talented and gifted and proposed five models adjusted for working with this unique population: Lead and Support, Rotation Teaching, Simultaneous Instruction, Tiered Instruction, and Team Teaching.

Co-teaching for teacher preparation adopted some different terminology but retained many of the co-teaching options from the research on inclusion. Dynak et al. (1997) purposefully changed from *approaches* to *models* to allow for more specificity but delineated five models: Complementary Teaching, Station Teaching, Parallel Teaching, Alternative Teaching, and Shared Teaching. The MidValley Consortium (2000) retained the approaches terminology but also promoted five options: One Teach, One Support; Parallel Teaching; Alternate Teaching; Station Teaching; and Team Teaching. Thousand (2013) retained the same four approaches for co-teaching in teacher preparation as her group had used for co-teaching in inclusion (Villa et al., 2004).

Bacharach et al. (2010) presented seven co-teaching *strategies* (One Teach, One Observe; One Teach, One Assist; Station Teaching; Parallel Teaching; Supplemental Teaching; Alterative or Differentiated Teaching; and Team Teaching) which were also used by others (e.g Darragh et al., 2011; Ingraham & Karsted, n.d.; Yopp et al., 2014). Murphy and Beggs (2006) used the Tobin and Roth (2005) definition of co-teaching for teacher preparation but presented as a result four common enactments of co-teaching (Equal Teaching Roles, One Leading Under the Guidance of Another, One Teaching and the Other Assisting, and One Leading as the Other Observes) similar to the options promoted by others.

The term *co-teaching instructional strategies*, or co-teaching strategies, seems the most appropriate term to describe the different ways co-teaching can be implemented in the classroom and thus will be used throughout this paper to avoid confusion. Teachers are familiar with other types of instructional strategies, which are generally viewed as different options for presenting content or facilitating student learning which can be used as needed when appropriate. Both the terms *models* and *approaches* give the impression that one should be chosen or followed rigidly rather than allowing for all to be implemented.

Selection

Cook and Friend (1995) stated that no one co-teaching strategy was better or worse than any other but that each had its appropriate use. They suggested basing selection on the characteristics and needs of students, the preferences of the teachers, the demands of the curriculum, and the logistics within the classroom such as the space available. Likewise, Villa et al. (2004) stated that no one strategy was better than another and promoted choice based on improving educational outcomes of the students. Bauwens et al. (1989) added that their proposed strategies were not to be viewed as mutually exclusive but could be used simultaneously while Dynak et al. (1997) viewed the strategies as a palette of options that did not exist in a hierarchy. Friend and Cook (1996) emphasized using a variety of strategies to keep the co-teaching relationship and the instruction fresh, as well as combining strategies as needed to meet student needs (Friend & Cook, 2010) which was also supported by Murawski and Dieker (2013).

As discussed previously, the various names for the common co-teaching strategies mask their similarities, and this inconsistency creates confusion. The main categories of

strategies will be discussed in the sections that follow with reference to the various names used in the literature to describe each idea.

One Teach, One Support

The first common co-teaching strategy involved one teacher taking the primary responsibility for in-class instruction while the other teacher supported the lead teacher and/or the students by either observing or assisting in various ways. The lead teacher would typically be the one in front of the class who was engaging the students in instruction (Murawski & Dieker, 2013), but this strategy could also be employed during student activities with the lead teacher introducing the activity while also explaining the objectives, individual roles, and how the activity would be assessed (Villa et al., 2004).

When observing, the support teacher would be obtaining specific information related to instruction and would record data to share with the lead teacher (Friend & Cook, 1996) but would not be watching instruction without a purpose (Murawski & Dieker, 2013). Observation could focus on determining students' prior knowledge or misconceptions (Villa et al., 2004), when and if mastery of a concept was achieved (Hughes & Murawski, 2001), common student mistakes (Murawski & Dieker, 2013), or students in need of differentiated instruction (Hughes & Murawski, 2001). Observation could also focus on student behaviors related to IEP goals (Murawski & Dieker, 2013), to support referral for gifted and talented services (Hughes & Murawski, 2001), or to inform future planning regarding potentially useful strategies and support (Chapman & Hyatt, 2011). Group activities could also provide an opportunity for using observation to inform practice by recording which students take which roles in the groups, their level of participation in the group, and which social skills are demonstrated by various individuals

as well as proposing future groupings and modifications (Villa et al., 2004). In addition to observing students, the support teacher could focus observations on the lead teacher by recording which students answer questions or participate in discussions (Beninghof, 2012) or what level of questions are posed by the teacher (Hughes & Murawski, 2001).

In the assisting role, the support teacher would circulate, or drift, around the room assisting students (Hughes & Murawski, 2001) or in other ways do something to complement, support, or enhance the lesson for the benefit of all students (Villa et al., 2004). The support teacher could assist with administrative tasks such as passing out or collecting papers, taking attendance, or stamping homework (Murawski & Dieker, 2013) or could disseminate guidelines for individual projects or differentiated activities (Hughes & Murawski, 2001). Assisting should be related to the present instruction of the lead teacher and not future instruction, and thus the support teacher should not be grading papers, making photocopies, or checking e-mail (Murawski, 2009). However, Fattig and Taylor (2008) include assessing, grading, and planning, in their version of this co-teaching strategy.

During direct instruction, the support teacher could assist by rephrasing a definition that appeared to have caused confusion (Beninghof, 2012), asking the lead teacher clarifying questions to reiterate or reinforce key concepts (Fattig & Taylor, 2008), or including extra examples (Villa et al., 2004). The support teacher could also model the use of visual supports such as graphic organizers (Murawski & Dieker, 2013), how to outline the lecture (Hughes & Murawski, 2001), or note-taking (Beninghof, 2012). Assistance with classroom management by providing proximity control (Murawski & Dieker, 2013; Thousand, 2013), redirecting disruptive students (Murawski, 2009), or

handling negative student behaviors (Hughes & Murawski, 2001) could be another possible support role both during direct instruction and during small group or individual work time.

In addition, during individual work time or small group activities, the support teacher could monitor students as they work and step in with assistance as needed, prompt students to use particular learning strategies, or provide specific feedback to students on the use of social skills (Villa et al., 2004). In addition, support could include providing quiet accommodations to individual students (Murawski, 2009), working with individual students who are accelerated (Hughes & Murawski, 2001), or pre-teaching vocabulary as needed (Murawski & Dieker, 2013). Some have suggested that it would also be appropriate for the support teacher to prepare for upcoming activities by setting up materials (Murawski, 2009; Murawski & Dieker, 2013).

Variations exist in how planning would occur for this co-teaching strategy. Some advocate for the lead teacher also being in charge of the planning (Friend & Cook, 1996; Murawski, 2009; Villa et al., 2004) while others include both teachers in establishing learning goals and planning instruction (Chapman & Hyatt, 2011).

Co-teaching strategies included. Specific co-teaching strategies that are included in this One Teach, One Support co-teaching category include One teach, One assist (Friend et al., 1993); One Teaching, One Assisting (Cook & Friend, 1995); One Teaching, One Supporting (Friend & Cook, 1996); One Teach, One Support (MidValley Consortium, 2000; Murawski, 2009); Lead and Support (Hughes & Murawski, 2001); Supportive Teaching (Villa et al., 2004); Complementary Models (Chapman & Hyatt, 2011); and One Teach-One Support (Murawski & Dieker, 2013). One Teach, One

Support was chosen as an overall title for this category of strategies to differentiate the general support included in these strategies from the more specific One Teach, One Observe and One Teach, One Assist strategies that will be discussed in the next sections.

In addition, two of Beninghof's (2012) nine strategies are slight variations of the One Teach, One Support strategy. Her Lead and Support strategy involved one teacher, usually the general education teacher, carrying the primary responsibility for advanced planning with the other teacher, typically the special education teacher, offering suggestions for modifying or adapting the original lessons for specific learners. Both teachers would then be involved in instruction and assessment, but the support teacher would largely assist the lead teacher as well as the students. In the Speak and Add model, one teacher again would be responsible for leading instruction but the other would be more active in instruction by verbally adding comments as explanations, clarifications, or examples or with visual additions such as graphics.

One of the co-teaching strategies that emerged in Murphy and Beggs' (2006) research on co-teaching in teacher preparation also most closely aligns with this One Teach, One Support co-teaching strategy. Many of the cooperating teacher and teacher candidate pairs, who were not trained in any specific co-teaching strategies, commonly demonstrated the teacher candidate in the lead during instruction under the guidance of the cooperating teacher. In this case, the supportive role was aimed at assisting the teacher candidate rather than the students.

Recommendations. A recurrent suggestion for implementing the One Teach, One Support strategy focused on the need to frequently switch which teacher was in the lead, both in co-teaching for inclusion (Friend & Cook, 1996; Murawski, 2009) and in co-

teaching in teacher preparation (MidValley Consortium, 2000), so that both teachers are seen as having equal responsibility and authority (Friend & Cook, 1996; MidValley Consortium, 2000). Murawski and Dieker (2013) extended the idea of switching roles to include during a given class period or lesson with the co-teachers moving from the in-front to the support position multiple times.

Benefits. The cooperating teachers involved in the initial two years of the MidValley Consortium's (2000) application of co-teaching to student teaching identified many benefits of using the One Teach, One Support co-teaching strategy. The cooperating teacher often served as the lead teacher initially which allowed her/him to model both instructional and classroom management strategies for the student teacher. At the same time, the student teacher could determine what worked and what did not as well as ascertain the strengths, weaknesses, and behaviors of the students. Observing and assisting during the first few days in the classroom was perceived to help prepare the student teacher for when he/she took the lead role. When the student teacher was in the lead, the cooperating teacher was able to observe both the students and the student teacher at the same time and thus could provide valuable feedback to the student teacher on instruction, classroom management, and student engagement. Use of this strategy also allowed the student teacher to be actively involved in the classroom from the first day and provided time for him/her to build rapport with the students.

The MidValley Consortium (2000) cooperating teachers also identified benefits for the students. The support teacher was able to help identify students with both academic and behavioral problems so these problems could be addressed. Assistance could be provided to help students immediately so they would not get lost and to offer

timely feedback. Having two teachers in the classroom during group and individual work time allowed teachers to answer more individual student questions and to provide support to students who might not ask questions in front of the whole class. Two teachers could also give more individual attention to students who needed it.

The MidValley Consortium (2000) cooperating teachers identified additional benefits related to classroom management. An extra set of eyes could help keep students more focused and on-task, and proximity could be used to re-direct students without interrupting instruction. The student teacher and cooperating teacher working together to enact the classroom management plan allowed the student teacher to gradually take over more responsibility for managing student behavior.

Authors involved in researching co-teaching for inclusion have noted several additional theoretical benefits of using the One Teach, One Support co-teaching strategy. Less time would be required for planning (Cook & Friend, 1995; Murawski, 2009) along with less coordination among the co-teachers (Thousand, Villa, & Nevin, 2006). Using this strategy required less trust and knowledge of each other initially (Friend & Cook, 1996) but provided time for trust and the partnership to develop (Chapman & Hyatt, 2011).

Limitations. The MidValley Consortium (2000) cooperating teachers also identified limitations to the use of the One Teach, One Support co-teaching strategy during student teaching. When the student teacher was in the support role, she/he could be seen as an aide or lesser teacher rather than an equal, which could inhibit the student teacher's authority. Having the cooperating teacher in the support role also could prevent the student teacher from taking full responsibility for the class, developing his/her own

classroom management skills, or developing her/his own teaching autonomy. Students may also become distracted by the support teacher or come to rely on the extra support rather than tackling problems independently.

In addition, Murawski & Dieker (2013) noted that this co-teaching strategy has been overused in inclusive classrooms, and Murawski (2009) therefore recommended limiting the use of this strategy to not more than twenty percent of instructional time. She also suggested that use of this strategy might lead to the co-teachers taking turns rather than truly collaborating (Murawski, 2009). Chapman & Hyatt (2011) raised the issue of proper implementation of the observation component of this strategy by noting that if the observation data were not shared with the lead teacher and used to make changes in instruction, time in observation would be wasted.

One Teach, One Observe

Friend and Cook (2000) divided the One Teach, One Support co-teaching strategy into two separate strategies based on the two support roles, observing and assisting, that were included in the original strategy. They defined the One Teach, One Observe co-teaching strategy as:

> one teacher has primary responsibility for designing and delivering specific instruction to the entire group, whether that is a large-group lesson, individual assignments that the teacher is monitoring, or any other teaching/learning arrangement. The second educator has as a goal observing a single student, a small group of students, or the entire class for behaviors the professionals have previously agreed should be noted. (p. 54)

Cook (2004) added that the co-teachers should decide in advance what types of observational data should be collected specifically as well as what system will be used to collect the data. In addition, following observation and data collection, the teachers should analyze the data together.

Co-teaching strategies included. This strategy has been called One Teaching, One Observing (Friend & Cook, 2000), One Teach, One Observe (Bacharach et al., 2010; Cook, 2004; Darragh et al., 2011; Friend, 2015; Heck & Bacharach, 2015; Ingraham & Karsted, n.d.), or One Leading as the Other Observes (Murphy & Beggs, 2006). The St. Cloud State model of co-teaching during student teaching included this strategy (Bacharach et al., 2010), and the co-teaching pairs in Murphy and Beggs' (2006) study of co-teaching in teacher preparation commonly used this strategy even though they were not provided any training on co-teaching strategies or how to work together.

Recommendations: The roles of the lead teacher and the observer are the same as those described under the observation component of the One Teach, One Support co-teaching strategy presented previously, and the recommendation to frequently switch roles applies to this strategy as well (Friend & Cook, 2000). Cook (2004) advised using this strategy when concerns arise regarding specific students which require additional investigation and data collection as well as to check student progress.

Henning et al. (2015) recommended the use of the One Teach, One Observe co-teaching strategy in early field experience at the first developmental level, *Exploring*, with the cooperating teacher serving as lead and the teacher candidate participating in focused observations on a variety of topics. They also recommended its use during the final student teaching experience at the highest developmental level, *Emerging*, with the teacher candidate taking the lead with the cooperating teacher observing.

Benefits and limitations. The benefits of One Teach, One Observe include little need for co-planning, no requirement for well-developed relationships, and time for the observer to learn the classroom routines and curriculum (Friend & Cook, 2000) as well as

the production of useful data on both individual students and instructional practices gathered during observations (Cook, 2004). A major limitation was that overuse of this strategy, particularly, could lead to one teacher being viewed as an aide rather than a real teacher (Friend & Cook, 2000).

In addition, Yopp et al. (2014) surveyed both teacher candidates and cooperating teachers involved in co-teaching during a year-long student teaching experience about their perceptions of their success in implementing each of seven co-teaching strategies as well as which strategies were their favorites and least favorites. Twenty secondary mathematics teacher candidates and 10 cooperating teachers completed the survey. Both teacher candidates (90%) and cooperating teachers (100%) felt successful in implementing the One Teach, One Observe co-teaching strategy. However, whereas only 10% of the cooperating teachers rated One Teach, One Observe as one of their two least liked strategies, approximately 26% of the teacher candidates rated it as least liked, and both sets of teachers commented that they felt like a teacher was being wasted when using this strategy. At the same time, approximately 18% of teacher candidates and 20% of cooperating teachers rated One Teach, One Observe as one of their two most liked strategies.

One Teach, One Assist

The second sub-division of the One Teach, One Support co-teaching strategy proposed by Friend and Cook (2000) was defined as “one teacher maintains the primary role for managing the classroom and leading instruction while the other walks around the room to assist students who need support or who have questions” (p. 55). Cook (2004) added that the assistance should be unobtrusive while Friend and Cook (2010) specified

that the assistant should support the instructional process. Bacharach et al. (2010) expanded the definition for application to teacher preparation to state:

> one teacher has primary instructional responsibility while the other assists students with their work, monitors behaviors, or corrects assignments, often lending a voice to students or groups who hesitate to participate or add comments (p. 7).

Ingraham and Karsted (n.d.) further specified that the cooperating teacher would be in the lead role while the teacher candidate would "work the room, actively engaging with students, responding to questions, facilitating classroom communication, and assisting learners" (p. 12) but included the provision that the roles should be exchanged when the teacher candidate was ready.

Co-teaching strategies included. Friend and Cook (2000) originally used the term One Teaching, One Drifting which Cook (2004) changed to One Teach, One Drift, and the pair further modified to One Teaching, One Assisting (Friend & Cook, 2010). Vaughn et al. (1997) had previously called this concept Grazing while Murphy and Beggs (2006) labeled it "one leading with the other acting as 'assistant'" (p. 7). Bacharach et al. (2010), Friend (2015), Heck and Bacharach (2015), Henning et al. (2015), Ingraham and Karsted (n.d.), and Yopp et al. (2014) all used One Teach, One Assist.

Recommendations. Lead and assistant roles would be the same as stated under the assistive component of the One Teach, One Support co-teaching strategy and similar recommendations, such as limiting the use of this strategy and switching roles, would pertain (Friend & Cook, 2000). Cook (2004) added recommendations for the appropriate use of the One Teach, One Assist co-teaching strategy including when the lesson requires delivery by one teacher and when the lesson involves learning a process where student work needs to be closely monitored. Henning et al. (2015) promotes use of this strategy

during the first developmental level of clinical experience, the Exploring level, with the cooperating teacher serving as the lead and the teacher candidate assisting. In the final developmental level of clinical experience, during student teaching, the roles should be reversed with the teacher candidate taking the lead.

Benefits and limitations. The benefits and limitations stated in the assistive component of the One Teach, One Support co-teaching strategy apply here (Friend & Cook, 2000). Additional limitations of this strategy include its frequent use when co-planning time is not available which can deny one teacher an active role, the assistant becoming a distraction to students, and the tendency to encourage dependence in learners when help is too readily available or attention desired (Friend & Cook, 2000).

Yopp et al. (2014) found the One Teach, One Assist strategy to be very popular with many of the co-teachers with 40% of cooperating teachers and approximately 36% of teacher candidates rating this strategy in their top two most liked. All of the cooperating teachers and teacher candidates also felt they were able to successfully implement this strategy. However, both teacher candidates and cooperating teachers commented that they felt like a teacher was being wasted when using this strategy; 20% of cooperating teachers and approximately 26% of teacher candidates rated this strategy in their top two least liked.

Complementary Skills Instruction

Various authors have identified a co-teaching strategy that involved one teacher assuming primary responsibility for the specific content area instruction while the other teacher assumed primary responsibility for teaching academic skills, learning strategies, or behavioral skills in order to help students learn the content and function effectively in

the school and post-school environments (Bauwens & Hourcade, 1995; Bauwens et al., 1989; Beninghof, 2012; Dynak et al., 1997; Villa et al., 2004). The teacher tasked with teaching the complementary skills could do so as a warm-up or closure activity, as a short mini-lesson during the content lesson, or embedded directly within content instruction (Beninghof, 2012).

Academic skills could include identifying main ideas in reading passages, lectures, or discussions along with summarizing and focusing attention on the presenter (Bauwens & Hourcade, 1991; Bauwens et al., 1989). Learning strategies related to academic skills such as note-taking strategies, creating concept maps, strategies for activating prior knowledge, and memory strategies have also been suggested (Dynak et al., 1997). For example, one teacher could be conducting a lecture while the other might model how students should follow along and complete a study guide (Villa et al., 2004) or graphic organizer (Villa, Thousand, & Nevin, 2013).

Social or behavioral skills instruction could include both appropriate behavior in the large group as well as small group settings along with general skills such as organization or effective use of resources (Bauwens & Hourcade, 1991). Social skills such as working cooperatively, responding appropriately to criticism, and providing appropriate feedback to others may need to be taught if students commonly work in cooperative groups (Bauwens & Hourcade, 1991, 1995). For example, prior to initiating work in cooperative groups, the appropriate social skills needed for productive group work could be explained or demonstrated by the co-teachers, and once the groups began, the content-focused teacher could concentrate on making sure the appropriate content

was achieved while the skill-focused teacher could concentrate on making sure the groups were working together appropriately (Villa et al., 2004).

Co-teaching strategies included. Co-teaching strategies under this general umbrella include Complementary Instruction (Bauwens & Hourcade, 1991, 1995; Bauwens et al., 1989), Complementary Teaching (Dynak et al., 1997; Thousand et al., 2006; Villa et al, 2004; Villa et al., 2013), and Complementary Skills (Beninghof, 2012).

Recommendations. In order for the co-teachers to coordinate instruction, it has been recommended that they plan for instruction together (Bauwens et al., 1989). In inclusive classrooms, the special service provider often takes the role of skill-provider (Beninghof, 2012), but it has been recommended that teachers switch roles occasionally (Villa et al., 2013).

In teacher preparation, Dynak et al. (1997) identified the importance of co-planning in order to review the content to be presented and to determine what skills will complement the content learning. Often the cooperating teacher can initially suggest ways for the teacher candidate to teach the required skills while the cooperating teacher maintains responsibility for content instruction, but with experience, these roles should be able to be reversed.

Benefits. Co-planning involving a cooperating teacher and teacher candidate can provide an opportunity for the cooperating teacher to model her/his planning process and thoughts regarding the specific skills needed by students to complete the content-driven tasks (Dynak et al., 1997). Likewise, this co-teaching strategy can allow the cooperating teacher to observe the teacher candidate when she/he takes the lead and can provide both teachers the opportunity to be actively engaged in the lesson (Dynak et al., 1997).

In both co-teaching for inclusion and in teacher preparation, the Complementary Skills Instruction strategy can present the students with effective models of communication, equity, parity, and shared authority (Villa et al., 2004). Both teachers can have a positive influence on student learning even if they are not both equally strong in content knowledge (Villa et al., 2013). Skill instruction can also provide struggling students and students identified with special needs with the access to skills that they may lack (Beninghof, 2012).

Limitations. On the flip side, use of this co-teaching strategy can require more time and coordination between the co-teachers as well as both knowledge of and trust in the other's skills than other co-teaching strategies (Thousand et al., 2006). Teachers may also become too comfortable in their usual roles and not develop additional knowledge or skills (Villa et al., 2013). With two teachers contributing to direct instruction, use of this strategy may limit student engagement (Villa et al., 2013) or may slow down the pacing of the class (Beninghof, 2012).

Station Teaching

The Station Teaching co-teaching strategy was originally defined by Friend et al. (1993) to involve teachers dividing the instructional content into segments with each co-teacher taking responsibility for part of the whole, students would then rotate to different areas of the room to engage in instruction by each of the co-teachers, and the strategy allowed students to work independently at one or more additional stations. Friend and Cook have not significantly modified this original definition over the years (e.g. 1996, 2000, 2003, 2010, 2013), and many other authors have also included Station Teaching as one of their co-teaching strategies (Bacharach et al., 2010; Dynak et al., 1997; Heck &

Bacharach, 2015; Henning et al., 2015; Ingraham & Karsted, n.d.; MidValley Consortium, 2000; Murawski, 2009; Murawski & Dieker, 2013; Yopp et al., 2014).

Hughes and Murawski (2001) presented a Rotation Teaching strategy, instead of a Station Teaching strategy, in their application of co-teaching to teaching those identified as gifted and talented. The only difference in their definition compared to the Friend et al. (1993) definition of Station Teaching was that Hughes and Murawski (2001) allowed for the teachers to differentiate questions and activities at each station to better meet the needs of the students.

Vaughn et al.'s (1997) Plan D co-teaching strategy most closely aligned with traditional Station Teaching. These authors proposed their Plan D for use with multiple groups when two teachers were involved directly in instruction and included multiple activities arranged throughout the classroom with students rotating through the activities. A key difference between Plan D and traditional Station Teaching was that the students were not required to rotate through all of the activities, rather they could choose the activities that most focused on their specific needs.

Recommendations. Station Teaching can be appropriate for any grade level (Cook & Friend, 1995) and can be especially useful when the content to be learned is not hierarchical and therefore students do not need to attend the stations in a particular order (Cook, 2004). Differentiation can be provided at some of the stations as needed (Murawski & Dieker, 2013), but groups should not be formed only based on ability, and the composition of the groups should be varied regularly (Murawski, 2009). Each co-teacher can facilitate a station as can other adults who may be available such as paraprofessionals or parent volunteers (MidValley Consortium, 2000). Students may also

work independently or in pairs at another station that might involve working on assignments or participating in peer tutoring (Friend & Cook, 1996) or watching a brief video, reading from a textbook or other source along with answering questions, or working on collaborative projects (Murawski, 2009). Students do not need to complete all the stations in a single class period or day (Cook & Friend, 1995), and stations can include review activities, enrichment activities, or activities to reinforce concepts (Murawski & Dieker, 2013) as well as laboratory experiments or activities that use limited resources (Cook & Friend, 1995).

Stations need to be well-planned and paced appropriately (MidValley Consortium, 2000). Co-teachers will need to plan how to divide the content as well as what activities to include in teacher-led and independent stations (Dynak et al., 1997). Friend and Cook (2010) recommended that teachers develop some sort of signals or use a timer to help monitor the time at each station and communicate completion of activities. A slight alteration in Station Teaching would be to have the teachers rotate among the groups rather than having the groups rotate among the stations (Friend & Cook, 2000).

The cooperating teachers participating in the MidValley Consortium (2000) recommended the Station Teaching co-teaching strategy as a good strategy to use early in student teaching. Henning et al. (2015) also recommended using Station Teaching in the earliest clinical practica where a teacher candidate can facilitate a single station to assist small groups of students in completing a specific task while the cooperating teacher retains the lead role in the classroom and may supervise several stations. As teacher candidates gain experience, they can take over responsibility for multiple stations (Dynak et al., 1997).

Benefits. The cooperating teachers involved in the MidValley Consortium (2000) research identified several benefits of using the Station Teaching co-teaching strategy during student teaching. From an academic standpoint, Station Teaching provided an opportunity to present content in a variety of ways including encouraging active and hands-on learning stations, allowing for a variety of learning styles to be included, and reinforcing concepts in multiple ways. Stations also allowed for some mobility within the class period, provided an opportunity for independent or accelerated work, and minimized behavioral issues when students were actively engaged in learning. Logistically, stations were seen to break up block periods to make better use of time and provided students access to limited equipment and supplies. From the teacher's standpoint, both teachers could share ownership in the lesson; such sharing could utilize the strengths of both teachers and allowed teacher candidates to work with a subset of the entire class at a time. Heck and Bacharach (2010) also identified benefits of using Station Teaching in student teaching including allowing the teacher candidates to become actively involved in the class immediately, to develop and teach a portion of the larger lesson, to teach the same portion multiple times which provided the opportunity to work on pacing and refining the lesson, and to work with a smaller group to develop their classroom management skills.

In the Yopp et al. (2014) study of the perceptions of both cooperating teachers and teacher candidates, teacher candidates appeared to like the Station Teaching co-teaching strategy more than the cooperating teachers. Eighty percent of teacher candidates felt successful in implementing Station Teaching with approximately 36% of them rating Station Teaching as one of their two most liked strategies and no one rating it

as one of their two least liked strategies. However, only 50% of cooperating teachers felt successful in implementing Station Teaching with 20% rating it as one of their two least liked and 20% rating it as one of their two most liked co-teaching strategies.

In addition, others have included theoretical benefits of utilizing the Station Teaching co-teaching strategy. Along with the other grouping co-teaching strategies, Station Teaching reduces the student-to-teacher ratio (Cook & Friend, 1995) which may be perceived as providing a safer environment for some students to promote their engagement in discussions or participation in activities (Murawski, 2009). Co-planning time is required but only to divide the content and discuss the approach each co-teacher will take; additional planning for and delivery of the station activities can be done independently (Cook & Friend, 1995). This division of labor and independence in planning and delivery of instruction can work well if the co-teachers have significantly different teaching styles (Friend & Cook, 2000). Setting up and monitoring multiple stations can also be overwhelming for an individual teacher working alone so co-teaching can make this instructional strategy more feasible (Dynak et al., 1997).

Limitations. The MidValley Consortium (2000) cooperating teachers also identified several limitations of Station Teaching. Logistically, lack of space can limit the use of multiple stations, only content that is not hierarchical can be presented at stations, activities need to be paced so all require the same amount of time, and it can be difficult for students to make up the activities if absent. The need for co-planning can also be problematic. Behaviorally, noise can be a concern as well as ensuring smooth transitions between stations. In addition, Yopp et al. (2014) stated that it may be difficult to monitor multiple stations effectively to ensure appropriate student engagement, and Murawski

(2009) suggested that the segmentation of information presented at stations may not be easily generalized or synthesized into a coherent whole.

Parallel Teaching

Various authors have defined a Parallel Teaching co-teaching strategy in different ways. Cook and Friend (1995) defined it as when "the teachers plan the instruction jointly, but each delivers it to a heterogeneous group consisting of half the class" (p. 7) and further specified that all students should receive essentially the same instruction (Friend & Cook, 1996) on the same content simultaneously (Cook, 2004). Heterogeneous grouping that maximized diversity within each group was a key component to their definition (Friend & Cook, 1996). Bacharach et al. (2010) and Beninghof (2012) adopted similar definitions of Parallel Teaching that included dividing the class and teaching the same content in the same way at the same time while Beninghof (2012) also emphasized the heterogeneity of the groups. Vaughn et al. (1997) also presented a co-teaching strategy corresponding to this form of Parallel Teaching but called their version Plan B.

Cook and Friend (1995), however, also proposed extensions for the use of this strategy beyond teaching the same content in the same way at the same time. They suggested that Parallel Teaching could also be used to allow the two groups to look at an issue from different perspectives, such as taking a position for or against a controversial issue, and then conducting a whole class discussion or debate about the issue. They also proposed using parallel instruction in a tiered or differentiated manner but focusing on the same core concepts (Friend, 2015; Friend & Cook, 2010). The MidValley Consortium (2000) also allowed for differentiation during Parallel Teaching based on student need, including providing enrichment or reinforcing activities. Bacharach et al. (2010), on the

contrary, proposed a unique co-teaching strategy, Differentiated Teaching, to encompass these types of activities.

Villa et al. (2004) and Murawski (2009) proposed an alternative version of co-teaching that they also called Parallel Teaching but which was a broad category of grouping strategies that were further delineated into more specific strategies. This form of Parallel Teaching will be discussed later in the section entitled General Grouping.

Recommendations. Cook and Friend (1995) suggested using Parallel Teaching anytime when students needed to respond aloud such as during discussions, to engage in hands-on activities or projects that might require close teacher supervision, or to interact with each other. This strategy could also be useful for drill and practice or when reviewing for tests (Friend & Cook, 1996). It has also been recommended that teachers use outlines, study guides, or notes to make sure both teachers cover the same concepts (Friend & Cook, 2000) and to pull the groups back together following the group work in order to discuss any items that may have come up in only one of the groups (Vaughn et al., 1997). Henning et al. (2015) recommended using Parallel Teaching during the intermediate stages of teacher preparation with the cooperating teacher assuming the lead role in planning.

Benefits. One of the main benefits to Parallel Teaching was a decrease in the student-to-teacher ratio (Cook & Friend, 1995; Dynak et al., 1997; Yopp et al., 2014) which, in turn, produced many additional benefits. Students have more opportunity to participate actively in a lesson and to interact both with the teacher and with each other (Dynak et al., 1997), especially students who are shy who may be more likely to speak up in a smaller group (Friend & Cook, 2000). Smaller groups also can provide teachers a

better opportunity to connect with students and may reduce the number of students who are able to disengage without being noticed (Beninghof, 2012). Teachers may be better able to closely supervise students (Cook, 2004) and can separate disruptive students (MidValley Consortium, 2000).

Parallel Teaching also allowed both teachers to be seen as equals, helped teacher candidates to develop behavior management skills, and permitted the cooperating teacher to remain active in instruction (MidValley Consortium, 2000). The teachers can also prepare a single lesson together (Yopp et al., 2014) which can serve as a valuable learning experience for teacher candidates, especially if the co-teachers reflect on the lesson together following instruction (Dynak et al., 1997).

Yopp et al.'s (2014) survey on the perceptions of cooperating teachers and teacher candidates produced mixed results for the Parallel Teaching co-teaching strategy. A larger percentage of cooperating teachers (70%) felt successful implementing Parallel Teaching than teacher candidates (40%). Cooperating teachers also were evenly split on their rating of Parallel Teaching as a most liked or disliked strategy with 30% of cooperating teachers indicating each response. Approximately 8% of teacher candidates, however, rated Parallel Teaching as one of their most liked strategies, which was the lowest of all the co-teaching strategies studied, and approximately 36% rated it as one of their two least liked strategies, which was the highest for any of the co-teaching strategies.

Limitations. The MidValley Consortium (2000) cooperating teachers identified several limitations of Parallel Teaching. Parallel taught classes have potential to become noisy and disruptive and are difficult to facilitate successfully in limited space. Pacing

can be difficult and the need to cover the same amount of content in the same period of time might prevent teachers from taking advantage of teachable moments or being flexible during the lesson. It may also be difficult to assure that all students receive the same level of instruction or can lead to competition among both students and teachers. Friend and Cook (2000) suggested difficulty in fairly assessing students if they receive different instruction.

The MidValley Consortium (2000) cooperating teachers also identified some limitations specific to co-teaching in teacher preparation. Observation of the other teacher cannot occur during Parallel Teaching. Different philosophies or ideas can also make planning a single lesson difficult. Finally, if Parallel Teaching was overused, the teacher candidate might get the impression that teaching is easier than it really is.

Alternative Teaching

Friend et al. (1993) originally defined Alternative Teaching as "one teacher works with a small group of students to pre-teach, re-teach, supplement, or enrich while the other teacher instructs the large group" (p. 10). They added that the content or activity of the large group needed to be something that the small group could afford to miss (Friend & Cook, 1996) as well as the small group could complete either an alternative lesson or the same basic lesson taught at a different level or for a different purpose (Cook, 2004). Friend (2015) included assessment as a possible activity for the small group. Many authors have also included an Alternative Teaching co-teaching strategy in their versions of co-teaching (Henning et al., 2015; MidValley Consortium, 2000; Murawski, 2009; Murawski & Dieker, 2013).

Co-teaching strategies included. Other researchers included the concept of Alternative Teaching, as previously defined, in their versions of co-teaching but have not used the term Alternative Teaching. Bacharach et al. (2010) used the term Supplemental Teaching instead with its corresponding definition "supplemental teaching allows one teacher to work with students at their expected grade level while the other teacher works with those students who need the information or materials extended or remediated" (p. 7). Vaughn et al.'s (1997) Plan C co-teaching strategy divided the class into two groups based on knowledge or skills related to the specific topic to be learned with one teacher re-teaching the information while the other teaches alternative information.

Beninghof (2012) specified two co-teaching strategies that both fit the original definition of Alternative Teaching: Skills Groups in which the co-teachers divide a class into homogeneous ability-based groups for targeted instruction and Station Teaching which allowed for one teacher to pull a small group of students who needed support or enrichment aside to provide direct, intense instruction while the rest of the class worked on independent or small group work. Beninghof's (2012) Station Teaching was, therefore, not aligned to the more traditional definition of Station Teaching.

Hughes and Murawski (2001) also included two co-teaching strategies similar to Alternative Teaching in their adaption of co-teaching for teaching students identified as talented and gifted. Simultaneous Instruction included dividing the class into two groups, not necessarily a larger and smaller group, with one teacher assuming responsibility for each group. Groups were often based on ability in order to allow gifted students to extend their learning through independent projects, research, or in-depth activities. Tiered Instruction maintained the large group and small group traditionally included in

Alternative Teaching but the small group was used mainly for acceleration or compacting of instruction for students identified as talented and gifted.

Recommendations. In order for Alternative Teaching to be successful, group membership should be varied often with all students being included in the small group periodically (Cook & Friend, 1995). Small groups can be formed based on remediation needs, academic ability, or social maturity (MidValley Consortium, 2000). It has also been recommended that both groups be provided with engaging instruction (Beninghof, 2012).

When used in inclusive classrooms, teachers should rotate who instructs each group so the special service provider is not always in charge of the small group (Friend & Cook, 2000). This recommendation applied to teacher preparation as well since the teacher candidate could learn a lot from working with the small group as well as managing the larger group (MidValley Consortium, 2000). Henning et al. (2015) also recommended Alternative Teaching for earlier field experience practica, especially during the intermediate level, with the mentor retaining the lead role and during student teaching when the teacher candidate should take over the lead for planning and preparation.

Appropriate activities for the large group, that the smaller group can afford to miss, might include warm-up activities, watching a video, working independently, or doing a closing activity (Murawski & Dieker, 2013) as well as reviewing material or participating in a large group extension activity (Murawski, 2009). The small group may be pulled aside for pre-teaching of vocabulary, to make up work from an absence, or to extend learning or enrichment (Cook & Friend, 1995). The small group might also be

used to address social skills by including both students who display the desired skill and those who need to develop it in the small group (Cook & Friend, 1995) or including a few students with behavioral disorders along with some positive role models in a small group to allow the large group to learn with fewer disruptions (Friend & Cook, 2000).

Alternative assessment might also occur in the small group with all students taking turns participating in the assessment in the small group at various times while those not being assessed work on projects (Cook, 2004; Friend & Cook, 2000). Alternative Teaching also can be useful when all students are expected to achieve extremely high levels of mastery or when there is significant variation in students' levels of performance or knowledge initially (Cook, 2004).

Benefits. Differentiation has been a recent focus both in teacher education and in education in general (Yopp et al., 2014), but differentiation can be a challenge for a teacher working independently whereas it can be more easily accomplished with two teachers (Beninghof, 2012). The Alternative Teaching co-teaching strategy can allow teachers to identify specific skills needed by students and provide an avenue for students to develop those skills (Murawski, 2009). It can also aid students in making up work missed from an absence, those who need extra time to master a concept, or those who need extra reinforcement in a particular area (MidValley Consortium, 2000). At the other end of the student spectrum, extension activities can benefit those students who achieve mastery of a concept quickly and are ready for additional applications (Murawski, 2009). Co-teaching can provide opportunities for these types of differentiated activities within the general education classroom instead of through pull-out programs (Friend & Cook, 2000).

As discussed previously with both the Station Teaching and Parallel Teaching co-teaching strategies, the Alternative Teaching strategy also provides a lower student-to-teacher ratio (Murawski, 2009) along with more individual attention from both teachers for all levels of students (MidValley Consortium, 2000). Similarly, Alternative Teaching allowed both teachers to be actively involved in instruction (MidValley Consortium, 2000) and allowed teachers to divide both planning and instructional responsibilities (Murawski, 2009). In addition, the use of the Alternative Teaching strategy allowed teacher candidates to design and implement both enrichment and support activities and to monitor student learning from these activities (Dynak et al., 1997).

Both the cooperating teachers and the teacher candidates surveyed by Yopp et al. (2014) seemed to like and find success in using this strategy. Seventy percent of cooperating teachers and 60% of teacher candidates felt successful implementing the supplemental (alternative) co-teaching strategy. Approximately 28% of teacher candidates and 30% of cooperating teachers rated supplemental teaching as one of their two most liked while only approximately 18% of teacher candidates and 10% of cooperating teachers rated it as least liked.

Limitations. Logistically, as mentioned regarding the other grouping strategies previously discussed, noise can be a problem (MidValley Consortium, 2000; Murawski, 2009), space can limit use or additional space may be required (MidValley Consortium, 2000), and pacing can be challenging (Murawski, 2009). Planning separate activities for two groups without presenting new information can be time-consuming and arduous (Cook, 2004; MidValley Consortium, 2000; Murawski, 2009). Students also miss out on experiencing the differing perspectives of the two teachers (Beninghof, 2012).

Alternative Teaching has been misused frequently in inclusive classrooms by continually forming groups solely based on ability (Murawski, 2009). This practice can lead to stigmatization of the students with special needs (Cook & Friend, 1995) as well as embarrassment and isolation for these students (Beninghof, 2012). Use of homogenous groups can also limit the breadth and depth of discussions, modeling of appropriate behaviors, and sharing of insight from different perspectives (Beninghof, 2012).

During student teaching, any of the grouping co-teaching strategies did not allow the teacher candidate to get the full experience of working with the whole class independently (MidValley Consortium, 2000). Grouping strategies may, therefore, be more useful during earlier practica than during student teaching or should be used in student teaching along with significant opportunities for solo teaching (MidValley Consortium, 2000).

General Grouping

Several groups of authors presented a general grouping co-teaching strategy that included sub-divisions similar to the Station Teaching, Parallel Teaching, and Alternative Teaching co-teaching strategies discussed previously and also included additional variations (Chapman & Hyatt, 2011; Fattig & Taylor, 2008; Murawski, 2009; Murawski & Dieker, 2013; Villa et al., 2004). Villa et al. (2004) defined their version of general grouping as involving dividing the class into groups of varying sizes and instructing the groups separately while teaching either the same or different content and with the possibility of teachers rotating among groups. Murawski and Dieker (2013) focused on the various purposes of the grouping: to reduce the student-to-teacher ratio, to enable both teachers to engage with groups of students, or to provide additional opportunities

such as more interaction, a different teaching style, or differentiation. Fattig and Taylor (2008) provided a very general definition involving teachers teaching small groups formed by various means while Chapman and Hyatt (2011) focused on the active involvement of both teachers in both planning and instruction when grouping students into smaller segments.

Co-teaching strategies included. Villa et al. (2004), Murawski (2009), and Murawski and Dieker (2013) all used the term Parallel Teaching for this general grouping co-teaching strategy. Fattig and Taylor (2008) did not provide a label for their version of this strategy, and Chapman and Hyatt (2011) called it Side-by-Side teaching.

Sub-divisions. Villa et al. (2004) divided their general grouping co-teaching strategy into seven different options. Station Teaching involved students rotating among stations facilitated by the co-teachers as well as by a support person if available and included an independent station; this strategy is similar to the traditional Station Teaching co-teaching strategy discussed previously. Split Class teaching involved each co-teacher taking responsibility for a group of students and monitoring their understanding of the lesson, providing guided instruction, or re-teaching the group. Co-teachers Rotate was similar to Station Teaching except the teachers rotate among the groups instead of the students rotating. In Cooperative Group Monitoring, each co-teacher had responsibility for monitoring and providing feedback to selected cooperative groups of students, and similarly, in Experiment or Lab Monitoring, the co-teachers also divided the responsibility for supervising and assisting a given portion of the student lab groups. Learning Style Focus presented instruction focused on using specific learning styles, such as primarily visual strategies or primarily kinesthetic strategies, to groups of students.

And lastly, Supplementary Instruction was similar to Alternative Teaching in that one teacher worked with the majority of the class on a concept, assignment, skill, or learning strategy while the other worked with a smaller group of students identified as needing extra assistance with the concept or who were ready for enrichment activities.

Murawski (2009) included three options in her general grouping co-teaching strategy: teaching the same content in the same way, teaching the same content in different ways, or teaching different content. Her model of co-teaching also included Station Teaching and Alternative Teaching, as defined previously.

Fattig and Taylor (2008) did not name their sub-divisions just as they did not name their co-teaching strategies but included three options. First, teachers could divide the class in half with one teacher instructing each group and then, after a set amount of time, the groups could switch. Another option involved multiple centers through which students would rotate. Both of these are similar to Station Teaching. Lastly, each teacher could teach the same concept but at a different level to ability-based groups, similar to Alternative Teaching.

And Chapman and Hyatt (2011) also delineated three options for their general grouping co-teaching strategy that resemble Alternative Teaching, Parallel Teaching, and Station Teaching. First, one teacher instructed the large group while the other pre-taught, re-taught, or offered enrichment to a smaller group which was formed based on readiness, learning style, student interest, or the assigned task. Second, the class was divided into relatively equal groups with the teachers presenting the same or similar content but in different ways. Third, students could rotate through teacher-led or independent stations.

Benefits and limitations. The benefits and limitations identified for these general grouping co-teaching strategies are similar to those already presented for the other grouping strategies. See the previous sections for details.

Differentiated Teaching

Bacharach et al. (2010) defined Alterative (Differentiated) Teaching as a co-teaching strategy that "provides two approaches to teaching the same information. The learning outcome is the same for all students; however, the avenue for getting there is different" (p. 7). Beninghof (2012) also delineated a differentiation-focused co-teaching strategy which she termed Learning Style and defined as using instructional and assessment activities that address a wide range of learning modalities. The focus of these co-teaching strategies appears to be differentiation of instruction, and therefore, the term Differentiated Teaching will be used to refer to it since Alternative Teaching had a previously established and different meaning within the co-teaching literature. As previously discussed, other authors have included differentiation as an option within other co-teaching strategies: Parallel Teaching (Cook & Friend, 1995; Friend & Cook, 2010; MidValley Consortium, 2000), general grouping (Chapman & Hyatt, 2011; Murawski, 2009; Murawski & Dieker, 2013; Villa et al., 2004), or Alternative Teaching (Ingraham & Karsted, n.d.).

Beninghof (2012) suggested teaching students specifically about learning styles and determining students' individual learning style strengths and weaknesses prior to introducing activities that incorporate different learning styles. She recommended using either an assessment or inventory instrument or observation to determine student learning styles.

Benefits and limitations. Yopp et al. (2014) presented mixed perceptions of Differentiated Teaching from the teacher candidates and cooperating teachers in their study. Approximately 28% of teacher candidates rated it as one of their two most liked strategies whereas only approximately 9% of them rated it as one of their least liked strategies. However, 20% of cooperating teachers rated Differentiated Teaching as one of their most liked and 20% rated it as one of their least liked co-teaching strategies. Only 30% of the cooperating teachers and of the teacher candidates felt successful in implementing this co-teaching strategy.

Beninghof (2012) identified additional benefits and limitations of Differentiated Teaching. She stated that students benefit from instruction that uses multiple learning styles and teachers are able to sustain student attention for longer periods of time with multiple approaches. However, including differentiated activities within a lesson can slow down the pace of the class or could result in behavioral issues. If not focused specifically on learning goals, additional activities could also distract students from the content to be learned.

Team Teaching

The term *team teaching* has been widely used in the education literature to connote very different ideas. Team teaching was used to describe a school reform movement in the 1960s and 1970s that involved flexible scheduling and grouping of students in order to make more efficient use of both human resources and emerging technology (Shaplin, 1964). It was also used in place of, or as a synonym for, co-teaching in the early literature on inclusion (Garvar & Papania, 1982; Armbruster & Howe, 1985; Friend et al., 1993). Some have used team teaching to describe teachers taking turns

teaching content to the same group of students (Darragh et al., 2011) or two or more teachers collaborating over the design or implementation of the same course (Easterby-Smith & Olve, 1984). Additionally, the term *teams* has been used in general to describe various types of working groups of teachers and other professionals with a school (Friend & Cook, 1992) including collaborative teams (Thousand & Villa, 1990), departmental teams (Bauwens & Hourcade, 1995), grade-level teams (Friend & Cook, 1992), interdisciplinary teams (MacIver, 1990), multidisciplinary teams (Friend & Cook, 2000), special education teams (Friend & Cook, 2000), teacher assistance teams (Bauwens & Hourcade, 1995), transdisciplinary teams (Friend & Cook, 2000), or simply teaching teams (Thousand & Villa, 1990), among others. All of these team structures share some similarities with as well as involve many differences from the co-teaching strategy called Team Teaching.

In addition, among the co-teaching strategies that are called Team Teaching, variations also exist. Bauwens et al. (1989) originally defined it as "the general and special educators jointly plan and teach academic subject content to all students" (p. 19) and allowed the two teachers to assume primary responsibility for specific portions of instruction. Friend and Cook (1992) did not specifically use the term Team Teaching but defined a co-teaching strategy that involved both teachers teaching the whole group at the same time, which might take the form of one modeling a skill while the other described it, sharing a presentation, or role playing. Friend et al. (1993) provided examples: "they may take turns leading a discussion, demonstrate concepts or learning strategies, and model appropriate question-asking or conflict behavior" (p. 10). Cook (2004) defined Team Teaching as "both teachers are delivering the same instruction at the same time" (p.

15) and emphasized that instruction was more of a conversation with both teachers speaking freely during large-group instruction and moving among the students in the class rather than two teachers taking turns in presenting content. These early definitions were fairly general, allowing for turn-taking and assisting, and not notably different than the overall definitions of co-teaching.

Hughes and Murawski's (2001) definition of Team Teaching was "both teachers share the planning, instruction, and assessment of the students and copresent information and activities" (p. 199) while Murawski and Dieker (2013) described it as teachers sharing the stage with both teachers in front of the class, responding to each other, conducting role-plays or debates, or modeling communication or skills. Likewise, Villa et al. (2004) described two teachers planning, teaching, assessing, and assuming the responsibility and leadership of all the students in the classroom; essentially two teachers doing what the traditional teacher previously did alone. Bacharach et al. (2010) envisioned "an invisible flow of instruction with no prescribed division of authority" (p. 7) while Beninghof (2012) emphasized the incorporation of the teachers' skills and experiences to provide an integrated approach to instruction, and Chapman and Hyatt (2011) noted the interchangeability of the roles and responsibilities of both teachers. Friend (2015) focused on the need for both co-teachers to integrate their unique contributions throughout the lesson delivered to the class as a whole. All of these authors specified the need for the teachers to work together in all aspects of teaching, beginning with planning and progressing through assessment, and focused on joint participation in instruction rather than turn-taking.

Co-teaching strategies included. Team Teaching has been the most common term used for this co-teaching strategy (e.g. Bacharach et al., 2010; Bauwens et al., 1989; Friend et al., 1993; Heck & Bacharach, 2015; Hughes & Murawski, 2001; Villa et al., 2004). In addition, Shared Teaching (Dynak et al., 1997), Plan E (Vaughn et al., 1997), Equal Teaching Roles (Murphy & Beggs, 2006), Walking the Talk (Chapman & Hyatt, 2011), the Duet Model (Beninghof, 2012), and Teaming (Friend, 2015) have also been used.

Recommendations. Several authors have made recommendations towards the successful implementation of Team Teaching. Yopp et al., (2014) emphasized the importance of the relationship between co-teachers, and co-planning has been considered essential (MidValley Consortium, 2000). Cook (2004) called Team Teaching "the most interpersonally complex co-teaching approach" (p. 21) and noted its dependence on the individual teaching styles of the co-teachers. In addition, teachers must be willing to tolerate differences of opinion and to be able to compromise (MidValley Consortium, 2000).

Many possible uses for the Team Teaching co-teaching strategy have also been suggested. Cook (2004) recommended its use whenever the goal of instruction was to demonstrate some type of interaction to students. This could include modeling how adults can disagree without fighting (Murawski, 2009) or could take the form of a simulated conflict (Friend & Cook, 2000). It might involve providing different viewpoints on the same topic or modeling multiple correct responses (Murawski, 2009). Additionally, teacher could take on the roles of characters in a story and act out a scene (Friend &

Cook, 2000) or participate in a role-play or debate (Friend & Cook, 1996; Murawski, 2009).

Alternatively, according to Friend and Cook (2000), both teachers can monitor and assist all the students in the class as they work independently or in groups. Both teachers can circulate around the room to ask questions to stimulate small group discussion or can make sure student groups are on-task as they work on shared projects.

Henning et al. (2015) suggested that Team Teaching during student teaching was often unsuccessful unless the cooperating teacher and teacher candidate had developed a good rapport and were very familiar with each other's teaching styles. The MidValley Consortium (2000) cooperating teachers, in contrast, recommended using Team Teaching early in student teaching after successful implementation of One Teach, One Support. The differences in these two recommendations may be due to the two types of Team Teaching activities described previously. While co-presenting using Team Teaching may require building solid relationships and communication, jointly offering students assistance during student-centered activities would likely be easily implemented early in student teaching.

Benefits. One of the main benefits of Team Teaching was that it led to the students viewing both teachers as equals (Friend & Cook, 2000; MidValley Consortium, 2000). It also kept both teachers actively involved in all phases of teaching (MidValley Consortium, 2000) and provided both teachers with more ownership of the classroom (Murawski, 2009).

Students seemed to benefit from Team Teaching as well. Students were seen as more attentive and engaged (Chapman & Hyatt, 2011; Yopp et al., 2014) and seemed to

enjoy hearing (Yopp et al., 2014) and learned from (MidValley Consortium, 2000) multiple explanations of a concept. In addition, students benefitted from seeing adults model effective communication and professional interactions (MidValley Consortium, 2000) and had to wait less time for assistance during independent or small group work (Murawski, 2009).

Teachers felt encouraged to take risks and try new or innovative techniques that they would be unlikely to attempt on their own (Friend & Cook, 2000; MidValley Consortium, 2000). Teachers could also take advantage of their individual strengths, particularly if the co-teachers had different teaching styles (MidValley Consortium, 2000). A variety of instructional techniques can also be done by two teachers fairly easily that are impossible for a lone teacher (Murawski, 2009). Teacher professional growth often accompanied use of Team Teaching (Beninghof, 2012).

Both the cooperating teachers and the teacher candidates surveyed by Yopp et al. (2014) had positive views of Team Teaching. Seventy percent of the cooperating teachers and 50% of the teacher candidates felt successful in implementing Team Teaching. The number of both cooperating teachers and teacher candidates rating Team Teaching as one of their favorite two co-teaching strategies put this strategy at the top of each groups' list with 40% of cooperating teachers and approximately 45% of teacher candidates identifying it. Only approximately 18% of teacher candidates rated Team Teaching as one of their least liked strategies while 30% of cooperating teachers disliked it. Friend and Cook (1996) also reported that some teachers found Team Teaching to be the most rewarding form of co-teaching.

Limitations. Cooperating teachers involved in co-teaching during student teaching noted it was difficult to team teach if the two teachers had different instructional philosophies (MidValley Consortium, 2000). Likewise, both cooperating teachers and teacher candidates involved in Team Teaching found it difficult not to step on each other's toes or did not know when to interject (Yopp et al., 2014). Murawski (2009) also noted that taking turns talking, in and of itself, did not really use both teachers effectively. Team Teaching was also seen to require very high levels of mutual trust, respect, and commitment (Cook & Friend, 1995; Hughes & Murawski, 2001).

Team Teaching also does not easily allow for differentiation and may lengthen the lesson with two teachers talking (Murawski, 2009). The MidValley Consortium (2000) cooperating teachers also found it more difficult to teach to state standards when using conversations rather than lectures. Extensive planning time was also required (Cook, 2004), and teachers had to be willing both to give up some control and to be open to different types of instruction (Murawski, 2009). Students may be confused by two opinions (Murawski, 2009) and will be affected if the teachers are struggling to implement Team Teaching (Friend & Cook, 2000).

For use in student teaching, cooperating teachers suggested that the success of implementing Team Teaching depended on the teacher candidate's knowledge, skills, and abilities (MidValley Consortium, 2000). Some of these teachers were also concerned that extensive use of Team Teaching could lead teacher candidates to view teaching as easy and emphasized the need for teacher candidates to teach independently as well.

Supportive Learning Activities

Bauwens et al. (1989) defined Supportive Learning Activities during co-teaching for inclusion as when:

> the general education teacher maintains responsibility for delivering the essential content of the instruction, while the special education teacher is responsible for developing and implementing supplementary and supportive learning activities (p. 20).

The teachers are both to be involved in deciding what activities to include and both participate in monitoring content instruction and activities. Bauwens and Hourcade (1995) further specified that activities to reinforce, enrich, or augment student learning could be included. Similarly, Vaughn et al. (1997) explained their Plan A as one teacher was primarily responsible for teaching the whole class while the other teacher, often the special education teacher, would give brief mini-lessons to individuals or small groups of students during the main presentation in order to reinforce or extend the concepts being taught.

Additional supplemental activities have been proposed. Bauwens and Hourcade (1991) included debates, cross-age or peer tutoring, and review games or tournaments. Bauwens and Hourcade (1995) added small group team discussions, partner work, group investigation projects, simulations, stations, use of manipulatives, organized games in cooperative learning groups, and reciprocal teaching. They emphasized that any activity that promotes substantive conversations within the classroom can be included.

Benefits and limitations. No benefits or limitations of this co-teaching strategy have been documented.

Adapting

Beninghof (2012) identified one unique co-teaching strategy which she called Adapting. This strategy was proposed for co-teaching for inclusion and allowed the special service provider to make accommodations and modification, either on the spot or in advance, for students to help them be successful in the general education classroom. Specifically assigning the responsibility for meeting the IEP obligations to the special education teacher should assure that student needs are recognized and adaptations are provided.

Benefits and limitations. One benefit of this co-teaching strategy was that little time would be needed for co-planning since the special education teacher was solely responsible for making accommodations and could do so from a copy of the general education teacher's lesson plan. The special education teacher could also focus on individualizing instruction. However, the lack of co-planning could lead to weak or ineffective interventions if the special education teacher did not fully understand the content of the lesson or if adaptation were developed on the spot. This strategy also underutilized the second teacher.

Reflection on Co-Teaching

Importance

Cook and Friend (1995) recommended regular evaluation of the effectiveness of the co-teaching process, and Villa et al. (2004) emphasized this process of reflection during co-teaching as important for educators to learn to be reflective practitioners who continuously gather data on the effectiveness of their instruction and solicit feedback on instructional performance. Cramer et al. (2010) recommended expanding the definition of

the reflective practitioner beyond self-reflection to include team reflection. Murphy and Beggs (2006) go so far as to claim that time spent in reflection is as important as time spent actually teaching.

Logistics

Murawski (2012) recommended scheduling time, before co-teaching even begins, for ongoing, periodic co-reflection on the co-teaching process in the same way that time is scheduled for co-planning. Thousand (2013) echoed this need when cooperating teachers are co-teaching with teacher candidates. Planning for reflection should also include discussion of how feedback will be provided (Murawski, 2009) as well as how ongoing communication will occur (Villa et al., 2004). As discussed previously related to co-planning, co-reflection may also incorporate the use of technology such as e-mail, phone calls, text, or instant messaging in addition to or instead of in-person conversation (Murawski, 2009). Time for reflection can be scheduled in conjunction with co-planning time (Friend & Cook, 2010) or as separate events (Murawski, 2009). Murawski (2009) also emphasized that effective co-reflection early in the partnership is vital to building a productive working relationship.

Reflection time during co-teaching should focus on both the details of what is happening with specific lessons and the overall process of co-teaching (Dieker, 2001). When reflecting on specific lessons, both co-teachers need to share their viewpoints (Murawski, 2009). Teachers need to monitor student and teacher performance and compare with objectives and goals (Villa et al., 2004). The focus of discussing specific lessons should be to use experience to design and implement more effective lesson in the future (Villa & Thousand, 1994). It is also important to discuss the quality of the

interactions between the co-teachers regularly (Bauwens & Hourcade, 1995) and to evaluate the co-teachers' ability to work together and coordinate actions to improve instruction (Villa & Thousand, 1994).

Murawski (2009) emphasized a proper attitude is needed toward co-reflection in order for it to be productive. Both co-teachers need to view co-reflection as a way to improve the partnership as well as to improve teaching. It is helpful to be open to suggestions, feedback, and constructive criticism and also to be honest with oneself and with each other. Beninghof (2012) added that authenticity, respect, and flexibility are necessary for productive co-reflection. Case (1992) recommended that feedback be accurate, specific, and non-evaluative.

Cogenerative Dialoguing

Roth et al. (2002) included a specific form of co-reflection, called cogenerative dialoguing, as a focal point of their model of co-teaching for teacher preparation. Cogenerative dialoguing involved discussions among all participants in the classroom, including students and university personnel; focus on understanding what has happened in the classroom; identifying and generalizing problems; and framing options for improving teaching and learning. Key characteristics of such group reflection include rapport, the inclusion of all stakeholders, respect for different forms of experience, and equitable participation. Tobin and Roth (2005) explained that cogenerative dialoguing should focus on a recent lesson, often videotaped to allow for in-depth examination and discussion. The group collectively evaluates the lesson from all perspectives and accepts shared responsibility for making changes to improve learning in future lessons (Tobin & Roth, 2005).

Although Roth, Tobin, and colleagues do not specify any co-teaching strategies (e.g. Roth & Tobin, 2002; Roth & Tobin, 2004; Roth et al., 2002; Tobin & Roth, 2005; Tobin et al., 1999), they explicitly state different ways individuals may participate in cogenerative dialoguing including listening attentively, speaking freely, initiating dialogue, posing critical questions, providing evidence, clarifying or elaborating on ideas, evaluating ideas or practices, suggesting alternatives for actions, and coordinating discussion (Roth & Tobin, 2002). They also specify potential topics for discussion such as learning to teach, co-teaching, effectively teaching students similar to those participating in the group, quality of the learning environment, and the transformative potential of activities (Roth & Tobin, 2002).

Cogenerative dialoguing has been frequently included as a component of co-teaching (Arshavskaya, 2014; El Kadri & Roth, 2015; Goodnough et al., 2009; Siry, 2011; Siry & Lang, 2010). Teacher candidates, cooperating teachers, and university supervisors who participated in cogenerative dialoguing as part of a 2-year co-teaching practicum all described the process as positive (El Kadri & Roth, 2015).

Research on Co-Teaching in Student Teaching

Purpose

Co-teaching has been applied to student teaching in order to strengthen teacher preparation, overcome the challenges of placing teacher candidates in schools, and to maximize the human resources in the classroom (Bacharach & Heck, 2012). In addition, co-teaching during student teaching provides an avenue for teacher candidates to learn crucial collaborative skills that they will need in their future teaching endeavors (Darragh et al., 2011; Dynak et al., 1997).

Differences from Traditional Student Teaching

Bacharach et al. (2010) highlighted several key differences between their co-teaching model for student teaching and traditional student teaching. First, traditionally, neither the teacher candidate nor the cooperating teacher received any training or preparation for the experience. Alternatively, in the co-teaching model, both the cooperating teacher and the teacher candidate are explicitly trained regarding roles, expectations, co-teaching instructional strategies, co-planning, relationship building, and communication. Traditionally, the teacher candidate would observe for a period of time at the beginning of the experience before they would become active in the class whereas in the co-teaching model, the teacher candidate is expected to participate actively in the classroom from the very first day. In traditional student teaching, only one teacher was typically active in the classroom at a time so if the cooperating teacher was leading instruction, the teacher candidate would be passive and vice versa. In co-teaching, both teachers are expected to be actively involved in the classroom most of the time. In co-teaching, the teacher candidate is able to develop and practice all aspects of teaching with the support and guidance of the cooperating teacher whereas in traditional student teaching, the teacher candidate would seldom work directly with the cooperating teacher but would rather initially observe and then take over the classroom. Thus traditionally, the teacher candidate was expected to possess the skills and knowledge needed to teach on their own whereas the teacher candidate in the co-teaching model is expected to develop such skills and knowledge throughout the student teaching semester. Co-teaching also specifically set aside time for co-planning throughout the semester which allows the two teachers to discuss ideas and to learn from each other whereas traditional student

teaching traditionally did not include any joint planning. Finally, one additional minor adjustment these authors have suggested is to refer to the university student as a teacher candidate rather than a student teacher so that the first word the registers with students or other staff is the word teacher rather than the word student.

Effectiveness

Student achievement. Only one study has objectively looked at the effect on student achievement of co-teaching during the student teaching experience (Bacharach et al., 2010). Others have asked teacher candidates (Darragh et al., 2011) along with cooperating teachers (Thousand, 2013) about their perceptions of the effects of co-teaching in student teaching on student achievement or have used classroom observations, student work samples, or student perceptions to gauge the effects on student achievement (Merk et al., 2014).

Bacharach et al.'s (2010) study was conducted in elementary schools in one large school district but did not use any form of randomization. Cooperating teacher-teacher candidate pairs who volunteered to participate in the study were the treatment group and were compared to a control group composed of classrooms identified by school principals as being similar to the treatment classrooms in terms of grade level, student demographics, and teacher experience. Two independent standardized measures of math and reading achievement were used: the state administered exam (the Minnesota Comprehensive Assessment) and the Woodcock-Johnshon III research edition test. Exam scores from the annual administration of the state test were used for the grade levels that were tested. The Woodcock-Johnson test was administered in both September and May to a subset of the study sample selected using stratified random sampling based on grade

level and class-level socioeconomic status. Students in classrooms with co-teaching pairs showed significantly higher gains in reading scores on the Woodcock-Johnson test in all four years of the study than did students in classrooms with either a traditional student teacher with a licensed teacher or a licensed teacher alone. Co-taught students also had significantly higher gains in math scores on the Woodcock-Johnson than students in the other two groups but only for two of the four years. On the state administered exam, a higher percentage of co-taught students were proficient in both reading and math for all four years than students in either traditional student teaching classrooms or classrooms without a student teacher. The finding that students scored higher on both reading and math after being co-taught by a cooperating teacher and teacher candidate than in classrooms with just a licensed teacher is impressive. However, the lack of randomization to treatment and control groups in this study requires that the results be interpreted with caution. It is possible that the best teachers in this school district volunteered to co-teach with a student teacher so that their students would have been high achievers even if the teacher candidate had not be present. In addition, this research was confined to elementary schools and spanned the entire school year rather than the semester when the student teacher was present.

Teacher candidate performance. Bacharach and Heck (2012) also reported results of teacher candidate performance from both traditional student teaching and co-taught student teaching. A summative assessment based on INTASC standards which also included ratings for professional dispositions was completed by university supervisors at the end of student teaching. No data were provided on establishing inter-rater reliability among the university supervisors. Co-teaching teacher candidates

received approximately equal ratings as traditional student teachers for all 10 INTASC standards; however, the co-teaching student teachers were rated higher, but not quite at a statistically significant level (p = .08), on both the reflection/professional development and the partnership standards. Co-teaching student teachers were rated significantly higher than traditional student teachers on the professional disposition portion of the assessment. Without establishing inter-rater reliability, these results too must be interpreted with caution.

Teacher Perceptions

Benefits. Benefits of co-teaching during student teaching have been identified from both the perspectives of cooperating teachers and teacher candidates. Cooperating teacher perceptions of co-teaching with a teacher candidate during student teaching have been reported for data collected from surveys (Bacharach & Heck, 2012; Hartigan, 2014; Heck, et al., 2008; MidValley Consortium, 2000), focus groups (Bacharach & Heck, 2012) and interviews (Scantlebury et al., 2008; Yopp et al., 2014). Cooperating teachers felt co-teaching for student teaching was a good learning opportunity for teacher candidates (Bacharach & Heck, 2012) and an effective and realistic model for student teaching (Yopp et al., 2014). Cooperating teachers appreciated the opportunity to host a teacher candidate without giving up their classroom (Bacharach et al., 2012) and felt co-teaching enhanced the teacher candidates' ability to work with other colleagues in the future (Yopp et al., 2014). Cooperating teachers felt they were able to communicate more effectively with their teacher candidates and built stronger relationships with them (Bacharach et al., 2012). Additionally, more emphasis on reflection, a deeper

understanding of the curriculum, and enhanced leadership were identified as benefits (Heck et al., 2008).

Additional benefits were related to instruction. The MidValley Consortium (2000) cooperating teachers felt they could spend more time on planning and preparation of lessons since they could share the teaching load with their teacher candidate. Enriched opportunities for students to learn (Yopp et al., 2014); the ability for students to complete projects more successfully (Bacharach & Heck, 2012); and the ability to better differentiate instruction (MidValley Consortium, 2000) were all noted. Teachers felt better able to give students the assistance they needed with two teachers in the classroom (MidValley Consortium, 2000), particularly high needs students (Bacharach & Heck, 2012). In addition, teachers felt they could better manage the classroom (Heck et al., 2008; MidValley Consortium, 2000) so that class time was more productive (Bacharach & Heck, 2012).

Cooperating teachers also felt they were able to grow professionally as they co-taught with a teacher candidate: through co-planning (Bacharach & Heck, 2012), through learning the co-teaching strategies (Hartigan, 2014), and from learning recent content knowledge and technology uses from their teacher candidates (Scantlebury et al., 2008). Some cooperating teachers also felt re-energized for teaching from working with a teacher candidate (Bacharach & Heck, 2012).

In addition to the benefits already identified by the cooperating teachers, the teacher candidates' responses from surveys (Bacharach & Heck, 2012; Darragh et al., 2011; Hartigan, 2014; Heck et al., 2008), focus groups (Bacharach & Heck, 2012), and interviews (Yopp et al., 2014) indicated that they felt co-teaching eased the transition into

student teaching, allowed them to see various instructional strategies modeled (Darragh et al., 2011), and improved their classroom management skills (Bacharach & Heck, 2012; Hartigan, 2014). Teacher candidates also felt co-teaching allowed them ample opportunities to ask questions and to reflect on teaching, to discuss ideas and strategies for teaching, and to learn to manage other adults in the classroom (Bacharach & Heck, 2012). Yopp et al. (2014) were able to follow some of their teacher candidates into their first year of teaching; practicing teachers who had co-taught during student teaching felt the co-teaching experience gave them an edge in the job interviews and had adequately prepared them for their first year of teaching. Teacher candidates gained confidence (Heck et al., 2008) and were proud that students saw them as a real teacher (Bacharach & Heck, 2012).

Limitations. Teacher candidates and cooperating teachers involved in co-teaching during student teaching have also reported limitations. First, some teacher candidates expressed concern they would not have the opportunity to co-teach in their future teaching positions (Darragh et al., 2011; Yopp et al., 2014). Although teaching is still primarily an individual pursuit, collaboration with special service providers (e.g. Beninghof, 2012; Murawski, 2006; Murawski & Bernhardt, 2015), grade-level or discipline-specific teams (e.g. Chapman & Hyatt, 2011; Cook, 2004; Darragh et al., 2011; Mandel & Eiserman, 2015), and paraeducators (e.g. Beninghof, 2012; Darragh et al., 2011; Villa et al., 2004) is common. Second, both teacher candidates (Darragh et al., 2011) and students (Bacharach & Heck, 2012) felt co-teaching could confuse students; confusion can be abated through clear communication and a unified approach to instruction. Cooperating teachers noted the need for additional planning and reflection

time was a potential barrier for co-teaching and that parity was not possible between the cooperating teacher and the teacher candidate due to the short duration of the partnership and the unequal status of the two individuals (Maddas, 2014; Thousand, 2013). Parity is difficult to achieve during a single semester of co-teaching during student teaching just as it is often elusive in co-teaching partnerships between general educators and special educators (Friend et al., 1993; Pugach & Winn, 2011). The need for additional planning time is significant as well in any form of co-teaching.

Finally, some teacher candidates felt unprepared to teach solo following co-teaching during student teaching (Darragh et al., 2011), and some cooperating teachers felt their teacher candidates relied too heavily on them during co-teaching (Maddas, 2014). The idea that teacher candidates will be less prepared to teach on their own following co-teaching during student teaching is partially due to the misconception that solo teaching is not allowed during co-teaching. Bacharach et al. (2010) allow for solo teaching as a component of co-teaching during student teaching in their model, but the timing and duration are different than in traditional student teaching. Traditionally, a student teacher began teaching alone, with very little guidance from anyone, a few weeks after the semester began and continued alone for much of the semester. This practice often resulted in ineffective instruction and a very overwhelmed teacher candidate. In the St. Cloud State model of co-teaching in student teaching, solo teaching is delayed but not eliminated. Teacher candidates are given the opportunity to teach on their own once they have developed the skills necessary to do so relatively effectively. The cooperating teacher may still be consulted regarding lesson planning, classroom management, or other issues prior to independently taught lessons. After several weeks of following the

lead of the cooperating teacher and several weeks of taking the lead in co-teaching with the cooperating teacher, a teacher candidate should be more prepared to teach independently than if he/she had been required to do so without any coaching or assistance. Individual teacher candidates may require more or less assistance in preparing for solo teaching, and the personalities and teaching philosophies of both teachers will affect the collaborative process. However, co-teaching when done well has the potential to produce teacher candidates who are more prepared to teach on their own than teacher candidates experiencing traditional student teaching.

Justification for Proposed Study

This literature review has identified several gaps in the research to date on co-teaching in field experience practica as well as the impact of teacher candidates on secondary student achievement. Co-teaching in field experience practica prior to student teaching has not been studied. Co-teaching in student teaching has shown potential for positive impacts on the teacher candidates, cooperating teachers, and students, although the research is incomplete. The impact of teacher candidates on student achievement has not been determined for any level of field experience practica. Therefore, this study will endeavor to contribute to the field of teacher preparation by determining the effect of professional development on co-teaching on secondary student academic achievement, teacher candidates' level of activity in their practicum classrooms, and practicing teachers' perceptions of field experience practica prior to student teaching. It will also investigate the impact of teacher candidates on secondary students' academic achievement during field experience practica prior to student teaching.

CHAPTER III

METHODOLOGY

Design

Institutional Review Board approval was obtained prior to conducting this study (see Appendix A). A mixed methods group-randomized experiment was conducted to answer five research questions:

Q1 Do secondary students benefit academically from having a teacher candidate in their classroom in addition to their assigned classroom teacher compared to only having their assigned teacher present?

Q2 Do secondary students benefit academically from having their assigned classroom teacher attend professional development on co-teaching with a teacher candidate as compared to students in classrooms where their assigned classroom teacher receives no professional development on co-teaching?

Q3 Does the effect on student achievement of having a teacher candidate present differ between classrooms where the assigned classroom teacher attended professional development on co-teaching with a teacher candidate and classrooms where the assigned classroom teacher did not attend professional development on co-teaching?

Q4 Are teacher candidates more active in their field experience practica, prior to student teaching, if their cooperating teachers have attended professional development on co-teaching with a teacher candidate than if they work with a cooperating teacher who has not attended professional development on co-teaching with a teacher candidate and is there a difference across the different levels of field experience?

Q5 Do classroom teachers perceive benefits from attending professional development on co-teaching with a teacher candidate, prior to student teaching, compared to working with a teacher candidate without attending professional development on co-teaching?

According to Creswell (2012), mixed methods designs take advantage of the strengths of both quantitative and qualitative research methodologies and help overcome the weaknesses of each type of research. Combining the two methodologies allows the research problem to be addressed more comprehensively.

An embedded mixed methods design (Creswell, 2012) was used to collect both quantitative and qualitative data. Quantitative data on student achievement were collected to answer the first three research questions, and additional quantitative data on teacher candidate activities were collected to answer the fourth research questions. Qualitative data were collected on cooperating teacher perceptions to answer the final research question as well as for monitoring the implementation of the co-teaching model in the secondary classrooms. This mixed methods design was appropriate because the primary interest was in the quantitative data, but qualitative data were collected throughout the study to augment the quantitative data and to produce a more complete understanding of the use of the co-teaching model during field experience practica prior to student teaching (Creswell, 2012).

Group-randomized trials (Murray, 1997), also called cluster randomized (Raudenbush, 1997) or place-randomized (Boruch et al., 2004) trials, are experiments in that they involve random assignment to two or more treatment conditions, but the randomization occurs at a group level rather than at an individual level (Murnane & Willett, 2011; Murray, 1997; Raudenbush, 1997). Intact groups that are commonly randomized in educational research include schools or classes since treatment of individual students within a classroom is logistically difficult (Murnane & Willett, 2011; Raudenbush, 1997). In this study, partner schools that agreed to participate were

randomized to either receive professional development on co-teaching techniques for working with teacher candidates or to the control condition, which did not involve any professional development for working with teacher candidates. The teachers within these schools who volunteered to work with a secondary teacher candidate in a field experience practica prior to student teaching as well as the teacher candidates themselves were the units of interest. Student achievement was used as a measure of the effectiveness of classroom teachers working alone or with a teacher candidate so although students did not participants in this study, student-level data were collected and analyzed.

Randomization of intact schools or classrooms is common in educational research for many reasons (Murnane & Willett, 2011; Raudenbush, 1997). It raises fewer ethical concerns with parents and school leaders than individual randomization of students to an intervention (Murnane & Willett, 2011; Raudenbush, 1997). In addition, policy decisions, at both the state and local level, made using educational research in schools focus on teacher, school, or district level changes so educational research focused on classroom, school, or district level interventions is also more natural and informative (Murnane & Willett, 2011; Raudenbush, 1997). Although intact groups are randomly assigned to treatment or control groups, data on the individual members of those groups, such as students or teachers, are collected and are of interest in group-randomized trials (Murray, 1997).

Causation

This research design determined the causal impact of providing professional development for cooperating teachers on co-teaching techniques for working with teacher candidates on three outcomes: the student achievement of the students in the cooperating

teachers' classrooms; the types of activities teacher candidates engaged in during field experiences; and the cooperating teachers' perceptions of working with a teacher candidate. In addition, the effect on student achievement of having a teacher candidate present in the classroom was also investigated. The purpose of causal research is to determine how a treatment affects the individuals receiving the treatment in comparison to what their outcomes would have been in the absence of the treatment (Murnane & Willett, 2011). In other words, this research was interested in determining if providing professional development for cooperating teachers on co-teaching techniques had an effect that would not have occurred if they had not participated in the professional development.

According to Agresti and Finlay (2009), three criteria must be met in order to show causation. First, there must be an association between the variables in that as one factor changes, the other must also change in some way. Second, the factor considered to be the cause must occur in time prior to the factor considered to be the effect. And third, all alternative explanations or other possible causal factors must be eliminated. Evidence that calls into question, or ultimately disproves, any of these three criteria invalidates a causal claim whereas evidence supporting each of these criteria, in the absence of alternative evidence, supports the causal impact.

According to Murnane and Willett (2011), experiments that involve random assignment of individuals to an intervention are the strongest research design for determining causation. An experiment is designed to determine if an intervention causes a change in outcome that would not have occurred in the absence of the intervention. However, it is impossible to expose subjects to an intervention and at the same time

determine what would have happened if those same individuals had not had the intervention, which is of ultimate interest and is called the counterfactual. Therefore, experiments attempt to determine cause and effect by dividing a subset of all the possible subjects of interest into two groups randomly and exposing one group to an intervention while allowing the other group to proceed unaffected. Randomization assures that the subjects in the two groups are similar on all characteristics, on average, prior to the intervention so that the control group can serve as the counterfactual for the treatment group that receives the intervention. Because individual subjects have a multitude of different characteristics, both those that can be measured and those that cannot, randomized groups will likely still contain some variation in both observable and unobservable characteristics, but this variation should be small and falls within the random error accounted for by statistical techniques. The two groups, therefore, are said to be *equal in expectation* prior to the intervention which allows the control group to be used as a counterfactual for the treatment group.

Group-randomized trials, however, do not randomize individuals into treatment and control groups, but randomize intact groups, such as schools, into treatment and control so it cannot be assumed that the individuals within each school are equal in expectation (Murnane & Willett, 2011). Teachers within a school as well as the students in that school typically share similar characteristics and have similar experiences that differ from teachers and students in other schools (Murnane & Willett, 2011). The nesting of teachers within schools and students within classes introduces a source of bias that is not present in experiments involving randomization of individuals since the students and teachers within a school are more homogenous than are teachers and

students in the general population (Murray, 1997). Various differences between the intact groups, therefore, introduce other possible explanations for any potential difference between the outcomes of the treatment and control groups in group-randomized trials (Murray, 1997) which makes it difficult to meet Agresti and Finlay's (2009) third criteria for determining causation, eliminating alternative explanations. Statistical techniques, however, can be used to adjust for these differences between randomization of individuals and of intact groups, and thus, quasi-experimental designs, such as group-randomized trials, can be used to determine causality (Murnane & Willett, 2011).

Validity

Validity in educational research refers to the accuracy, or correctness, of any inferences made based on results obtained (Creswell, 2012). Two of the main types of validity that are important in educational research are external validity and internal validity (Murnane & Willett, 2011). External validity refers to the ability to generalize results from the sample studied to the larger population of interest (Murnane & Willett, 2011) and is determined by the sampling procedure chosen and the overall research process. The classroom teachers and teacher candidates involved in this study are a subset of the entire population of classroom teachers in local schools and teacher candidates in the secondary teacher preparation program at the university.

The sample of cooperating teachers studied was a subset of those who volunteered to work with a secondary teacher candidate from the university for a field experience practica other than student teaching in either the Fall 2015 or Spring 2016 semesters. Due to the voluntary nature of serving as cooperating teachers, the classroom teachers in this study are likely different from the general population of classroom teachers in the local

secondary schools but should be representative of the larger population of classroom teachers who volunteer to serve as cooperating teachers at any time. However, not all of the partner schools who hosted the university's teacher candidates during these two semesters chose to participate in this study and not all of the cooperating teachers who volunteered to work with a teacher candidate in the participating schools agreed to participate in this study.

Therefore, in this study, two checks were undertaken to determine if non-participation of schools threatened the external validity of the study based on the recommendations of Huck (2012). First, the schools where teacher candidates were placed that did not participate in the study were compared to the schools that chose to participate on the basis of the demographic profile (school size, free/reduced lunch status, racial/ethnic composition, and gender composition) of each school. Second, the staffing patterns (number of teachers, number of full-time equivalents, turnover rate, average salary, gender composition, and racial/ethnic composition) in the participating and non-participating school districts were compared.

An additional external validity check was performed to determine if the cooperating teachers who consented to participate in the study were similar to the cooperating teachers who did not consent to participate in the study. Licensure information, grade level taught, and frequency of hosting teacher candidates were compared.

The teacher candidates enrolled in a secondary field experience course during the two semesters of this study were a sample of the larger population of interest that encompasses all secondary teacher candidates at this university across time. This is

considered an abstract population rather than a tangible population because it extends into the future so each member of the population does not have an equal probability of being chosen for participation (Huck, 2012). Although the sample of teacher candidates enrolled in field experience courses during the two semesters of the study were not chosen randomly, they should be representative of the larger abstract population of secondary teacher candidates at this university. Therefore, the results obtained should be generalizable to the larger population of secondary teacher candidates. However, not all of the teacher candidates in a secondary field experience chose to participate in the study during these two semesters. The characteristics (content area, course level, and gender) of the teacher candidates who consented to participate in the study were compared to the same characteristics of the non-participating teacher candidates to determine any potential impact on external validity.

The individual cooperating teachers working with teacher candidates vary over time. This study spanned two semesters in order to include a larger number of cooperating teachers than would have been available in a single semester study. In addition, some partner schools did not host teacher candidates both semesters so the longer study time frame allowed for more schools to be included. The partner schools that most commonly host the university's teacher candidates are those located geographically nearest to the university and were invited to participate in the study. The more distant partner schools that host fewer teacher candidates on a sporadic basis were not included in this study. Therefore, results are most applicable to the partner schools included in the study and may be less applicable to the more distant partner schools that

traditionally host fewer teacher candidates. Care has been taken in generalizing results to the overall population of potential cooperating teachers in all the partner schools.

The effect of having a teacher candidate present in the classroom on student achievement was also measured in this study. The Phase 3 teacher candidates were present in the classroom for a fraction of the class sections taught by a cooperating teacher. The teacher candidates arranged their time in the classrooms based on their individual university course schedule. Teacher candidates could not be randomized to particular class sections because of their college course schedule, but their presence at the school was also not purposively chosen. Teacher candidates participating in this study were present in schools throughout the school days; therefore, the teacher candidates' schedules should not have adversely affected the ability to generalize the results of this study.

Internal validity. Internal validity relates to the appropriateness of causal conclusions (Trochim, 2006). As previously stated, group-randomized trials can be used to determine causation (Murnane & Willett, 2011), but additional care must be taken to minimize specific threats to internal validity (Murray, 1997). Selection bias, or differences in the individuals making up the groups prior to intervention, may occur in group-randomized trials since intact groups are randomized to treatment and control groups (Murray, 1997), as previously discussed.

Several checks were performed to ensure that the co-teaching treatment and control groups were similar. The characteristics (content area, grade level taught, years of teaching experience, and frequency of hosting teacher candidates) of the cooperating teachers from the two experimental groups were compared. All teacher candidates

working with cooperating teachers in the treatment and control groups were also compared in terms of content area, course taken, and gender.

Two additional related potential threats to internal validity due to the randomization of intact groups in this study are due to different histories and different rates of maturation (Murray, 1997). History threats involve any event that occurs during a study that the treatment and control group experience differently (Trochim, 2006). Maturation threats involve different rates of typical growth within the treatment and control group during the study (Trochim, 2006). The randomization of intact schools to the treatment and control groups increased the probability of other events occurring in the some of the participating schools that would only affect members of the control group or members of the treatment group and thus may have affected the study outcomes (Raudenbush, 1997). The teachers and students within a school have similar experiences throughout the semester and those experiences differ from school to school. This is an inherent limitation of group-randomized trials which will be attenuated by including district level fixed effects in the statistical analysis of the student achievement data, which will be discussed in more detail in the Data Analysis section of this paper.

Additional threats to internal validity are common across any treatment-control group study using a pretest/posttest design. An instrumentation threat occurs when changes are made to a pretest before it is used as a posttest in only one of the groups (Trochim, 2006). In this study, each teacher used the same test as the pretest and the posttest, thus nullifying this threat.

Testing threat is due to differential effects between the groups on the posttest due to taking the pretest (Trochim, 2006). Teachers providing student achievement data used

the same procedure for administering pretests across all sections of their classes; however, different teachers used different procedures for administering their pretest. Testing threat therefore should not be a problem for determining the effect of having a teacher candidate in the classroom since this was determined based on student test scores from different sections of the same course. However, for the experimental intervention, a potential testing threat exists. Comparison of pretest scores across the treatment and control was used to determine if teachers in the two groups appeared to place different emphasis on the pretest.

Mortality threat involves differential attrition from the groups during a study (Trochim, 2006). The percentage of cooperating teachers or teacher candidates who discontinued participation in the study during the semester was determined at the conclusion of the study for both the treatment and control groups. The percentage of students in classrooms who are not present for either the pretest or posttest was also determined at the conclusion of the study and compared across class sections and between experimental groups to estimate the presence of a mortality threat. The demographic characteristics of the cooperating teachers and/or teacher candidates who did not complete the study were compared to the characteristics of the participants who remained to assess this threat.

Finally, regression threat involves differential rates of regression to the mean of the two groups often due to more extreme pretest scores in one group (Trochim, 2006). The test scores of all members of a given class were used to jointly determine the effect of the cooperating teacher with or without a teacher candidate on student achievement so no single extreme pretest score had a large effect on a class's overall student

achievement. This was true across both the treatment and control group. In addition, all test scores were normalized so they could be compared across teachers which should also have diminished the effect of outliers. Normalized pretest scores were examined to determine if a regression threat exists.

Trustworthiness. As a mixed method study, the trustworthiness of this study in qualitative research terms is also important. Trustworthiness, according to Merriam (2009), includes attention to credibility, consistency, transferability, and ethics. Credibility, akin to internal validity in quantitative research, involves the degree to which the findings of a study adequately represent the experience of the participants (Merriam, 2009). This study used triangulation of cooperating teacher survey data with classroom observation data to increase the credibility of this study.

Consistency, akin to reliability in quantitative research, involves determining if the findings match the data that is collected (Merriam, 2009). Triangulation of multiple data types and sources as well as keeping an audit trail in the form of a research log were used to increase the consistency in this study.

Transferability, akin to external validity in quantitative research, refers to the degree to which readers of a research report are able to apply the findings to their own situation (Merriam, 2009). Providing a thick description of the participants and the setting were used in this dissertation to increase the transferability. Readers should be able to determine the applicability of this research to their unique situation since details are provided about the participants and setting.

Finally, the ethical standards of a researcher relate to the trustworthiness of any study undertaken. Many ethical considerations common to qualitative research can be

decided in advance such as how to protect participants from harm and how to protect their privacy. Other ethical situations arise during the research process and have to be dealt with without much time or consideration. According to Merriam (2009), the ethical integrity of any research study is directly related to the ethical integrity of the researcher. As a novice researcher, I have begun to build my personal research integrity during this study by properly obtain informed consent, protecting my participants by handling their data securely, and by reporting findings in a way that my participants remain anonymous.

Participants

Teacher Candidates

This study was conducted at a single teacher preparatory university in the western United States. Teacher candidates pursuing secondary licensure enrolled in one of the four field experience courses that precede student teaching during the Fall 2015 and/or Spring 2016 semesters were recruited to participate in the study. A total of 89 teacher candidates out of 184, or 48%, consented to participate in the study in one or both semesters. However, only 30 of these teacher candidates are actual participants in the study as they contributed useable data. The characteristics of the participants in the two experimental groups are shown in Table 1.

Cooperating Teachers

The cooperating teachers who volunteered to work with a secondary teacher candidate during the Fall 2015 and/or Spring 2016 semesters at the 13 participating schools were also solicited to participate in the study. Table 2 shows the characteristics of the 18 co-teaching cooperating teacher participants who completed the co-teaching professional development with their teacher candidates and the characteristics of the 25

control group cooperating teacher participants who contributed data for this study. The co-teaching cooperating teachers were employed by six schools as were the control group cooperating teachers; one additional co-teaching school did not have any cooperating teachers contribute data to the study.

Table 1

Characteristics of Teacher Candidates by Experimental Group

Characteristic	Co-Teach (*n*=13)	Control (*n*=17)
Content area:		
English language arts	1	1
Mathematics	2	6
Science	2	3
Social studies	6	4
Theater	1	3
World languages	1	0
Course level:		
Phase 1	4	6
Phase 2	4	7
Phase 3	5	4
Gender: Female	10	11

Table 2

Characteristics of Cooperating Teachers by Experimental Group

Characteristics	Co-Teach (*n*=18)	Control (*n*=25)
Content area:		
English language arts	2 (11%)	4 (16%)
Mathematics	3 (17%)	8 (32%)
Science	3 (17%)	5 (20%)
Social studies	8 (44%)	6 (24%)
Theater	1 (6%)	3 (12%)
World languages	2 (11%)	1 (4%)
Grade level:		
High school	13* (72%)	11* (44%)
Middle school	5* (28%)	15* (60%)
Years teaching experience:		
1 to 3	2 (11%)	4 (16%)
4 to 6	6 (33%)	4 (16%)
7 to 10	2 (11%)	4 (16%)
11 to 15	3 (17%)	4 (16%)
16 to 20	1 (6%)	3 (12%)
More than 20	4 (22%)	4 (16%)
Prior teacher candidates:		
None	2 (11%)	6 (24%)
1 to 5	11 (61%)	8 (32%)
6 to 10	2 (11%)	3 (12%)
11 to 15	1 (6%)	2 (8%)
More than 15	2 (11%)	6 (24%)

* $p < .05$.

Placement

Placement of teacher candidates in local partner schools was facilitated by university personnel in coordination with each school principal. Placement requests were made by the university based on teacher candidate preference and/or program recommendation. Principals then placed teacher candidates with practicing teachers based on university requests, teachers' willingness to host a teacher candidate, and their own discretion. University personnel requesting placements were not aware of which schools had been randomized into the co-teaching and control groups so placements were made independent of this study.

Secondary Students

Secondary-aged students were not participants in this study. De-identified student achievement data from curriculum-based pretests and posttests that were regular components of class curriculum were requested from the participating cooperating teachers who hosted a teacher candidate in the final field experience course prior to student teaching as a measure of the teacher and teacher candidate performance.

Instrumentation

Curriculum-based Semester Exams

Curriculum-based semester exams developed by the individual districts, schools, or teachers were used as a measure of student achievement to determine the impact on student learning of having a teacher candidate present in the classroom and of providing professional development for cooperating teachers on co-teaching techniques. These data were used to answer the first three research questions. Practicing teachers often give a curriculum-based semester exam at the conclusion of each semester. The test scores of

students within each class section on these semester exams serve as the posttest for this study.

In addition, some practicing teachers also gave the same curriculum-based semester exam as a pretest at the beginning of the semester in order to calculate student growth. State teacher evaluation legislation requires 50% of teacher evaluation to be based on student achievement data which may include data from both state administered tests and locally-developed assessments (Concerning Ensuring Quality Instruction, 2010). State administered tests are not given in every subject every year so other measures of student achievement are needed. Participating cooperating teachers who had not routinely given the curriculum-based semester exam as a pretest were asked to do so. These exams serve as the pretest for the study.

The cooperating teachers involved in this study taught different courses at varying grade levels so each curriculum-based semester exam was unique. Some districts used common district-wide curriculum-based assessments which should be of high quality since they were jointly developed by a group of subject-specific teachers rather than a single classroom teacher.

Different tests also resulted in different scoring systems. Reported test scores were therefore normalized by conversion to z-scores so that they could be compared on a consistent scale of standard deviation units (Johnson, Lipscomb, Gill, Booker, & Bruch, 2012).

Documented use. State administered standardized tests have commonly been used as an important measure of student achievement to evaluate teachers, but alternative measures of student achievement that can be applied to a wider variety of subject areas

and grade levels have also been proposed (Gill, Bruch, & Booker, 2013). State administered standardized tests are not applicable for this study since they are given once a year or less often while teacher candidates are only present for a single semester.

Gill et al. (2013) identified three types of alternative measures that have been used to evaluate teacher effectiveness: (a) alternative exams such as commercially available tests like the Stanford Achievement Test or end-of-course exams developed and administered either by the state or at the local level; (b) non-test outcomes such as attendance, course completions, graduation rates, or dropout rates; or (c) student learning objectives (SLOs) which require classroom teachers to develop specific learning targets for their courses based on a curriculum-based pre-assessments, to have those learning targets approved by their principal, and then to post-assess students to determine their progress on meeting the learning targets. In theory, the student learning objectives system is a very attractive alternative for educational research such as this study, but this system has not been adopted by the local school districts so is not feasible. The pretest and posttest aspect of the specific learning objectives system however can be used in conjunction with locally developed curriculum-based exams. Non-test measures such as attendance are not thought to be specific enough to differentiate the impact of the co-teaching professional development or the presence of a teacher candidate in this study. Some of the partner schools may administer a commercially available assessment in addition to the required state exams for some subject areas or grade levels, but this practice does not appear to be consistent across local districts. In addition, most commercially available tests are administered at most once a year so are not appropriate for measuring a semester-long intervention. Therefore, locally developed curriculum-

based assessments are the most feasible option for measuring student growth to determine teacher effectiveness in this study.

Gill et al. (2013) stated that curriculum-based local assessment have been used as part of teacher evaluation systems in several large school districts including Charlotte-Mecklenburg Schools in North Carolina, Dallas Independent School District in Texas, Hillsborough County Public Schools in Florida, Milwaukee Public Schools in Wisconsin, and Pittsburgh Public Schools in Pennsylvania. However, additional information on the exams in use is only available for the Pittsburgh Public School system where curriculum-bases assessments have been developed for a variety of courses in the core content areas (English, math, social studies, and science) for grades 6 to 12 as well as for grade 9 and 10 world language courses (Johnson et al., 2012; Lipscomb, Gill, Booker, & Johnson, 2010; Rotz, Johnson, & Gill, 2014).

Johnson et al. (2012) stated that their locally developed assessments have not been "subjected to intensive psychometric scrutiny" (p. 6) but that they were designed to reflect the content of the specific courses. Gill et al. (2013) identified several difficulties in validating any measure of teacher performance including the error inherent in observations, the limitations of any assessment in capturing everything that students were expected to learn, and the lack of randomization of students to classrooms and teachers. In absence of a definitive standard of teacher performance, state administered standardized tests are often used as a comparison for validating alternative measures of teacher performance (Gill et al., 2013). Rotz et al. (2014) compared the teacher effectiveness ratings computed using the Pittsburgh Schools model, which included curriculum-based assessments results along with state standardized tests and

commercially available assessments, to the state teacher effectiveness ratings for Pittsburgh teachers based solely on the state administered standardized tests and found they were similar. However, they did not directly compare their curriculum-based assessments to either the state standardized tests nor the commercially available tests that were administered (Johnson et al., 2012; Lipscomb et al., 2010; Rotz et al., 2013).

Curriculum-based exams for a single course have also been used by others as a measure of student achievement at the secondary level related to various classroom-based or school-wide interventions. Day (2010) used a pretest-posttest language arts exam while Bechtel (2012) used a pretest-posttest chemistry course final exam. Fitzpatrick (2012), Edge (2011), and Sugg (2012) all used end-of-course exams in a ninth grade English course, an Integrated Math course, and a geometry course, respectively. Jang (2006) used both midterm and final exams in an eighth grade math class while Shirvani (2009) used a comprehensive exam for a 6-week term. Two of these authors mentioned the content validity of their exams based on alignment to textbook content (Day, 2010) or to course objectives (Jang, 2006), but no specifics are reported. Additionally, Sugg (2012) compared student results on his geometry final exam to the ninth grade state standardized math exam scores of the same students and showed a positive correlation in the form of a scatterplot comparing scores on the two tests. No correlation coefficient was reported.

Only one research group, Babendure et al. (2011), has reported using curriculum-based test scores from different courses within one school district to evaluate an intervention. In this case, the intervention was a multi-district professional development program for science teachers, which was evaluated using one district's test scores from

participating teachers' science classes. As with the majority of the single course exams, the validity of these assessments was not addressed.

Proposed curriculum-based semester exams. The use of locally-developed curriculum-based assessments as a measurement of student achievement has therefore been documented. As measures of school or course-level interventions, these test scores have only been compared within a single course. Babendure et al. (2011) have included multiple courses but within the same content area to evaluate a multiple-district intervention. In addition, the Pittsburgh School District has used scores from across content and grade levels to determine teacher effectiveness on a routine basis in the absence of a specific intervention (Johnson et al., 2012; Lipscomb et al., 2010; Rotz et al., 2014). The use of curriculum-based exam scores across courses in different content areas and across districts to evaluate specific interventions in this study appears to be a first.

Ideally, the validity and reliability of these tests would be determined, but no appropriate standard for comparison exists. State administered standardized tests are not available for all content-areas in all grade levels. Commercially available content tests are not widely used in local districts and would be too costly to administer in all the classrooms involved in this study. Further, the other researchers using these types of exams have either not addressed their validity or have not used a consistent method of validation. Therefore, the course semester exams already in use in the participating cooperating teachers' classrooms were used as a measure of student achievement without attempt to validate the measures.

Teacher Candidate Log Sheets

Teacher candidates in all field experience courses at this university were required to log the hours they spent in the classroom because each course required a specific number of hours to be completed and documented. These log sheets were used as a source of data on the types of activities that the teacher candidates participated in during their field experience practica to answer the fourth research question. The basic format of the log sheet that was used is included in Appendix B and was developed by the researcher prior to the Spring 2015 semester. This form of the log sheet was used in three of the field experience courses during the Spring 2015 semester. Prior log sheets for these courses had a similar format but contained a single column in the table for the teacher candidates to list the activities in which they engaged each day rather than the multiple columns of specific types of activities included on this form. The study log sheet required the cooperating teacher to initial that the teacher candidate was present for the amount of time specified for each day. In addition, both the teacher candidate and the cooperating teacher signed the bottom of the form prior to submission of the form to verify total hours completed. Teacher candidates in most content areas during the two semesters of this study were required to submit a signed log sheet at the midpoint of the semester; all teacher candidates were required to submit a signed log sheet at the end of the semester.

Documented use. Self-reported teacher candidate time logs have been used in previous research. Bullough et al. (2002) used such logs in a study investigating an alternative model of field experience prior to student teaching in an elementary teacher preparation program. Their intervention involved randomly placing teacher candidates either individually with a cooperating teacher, the control condition, or in pairs with a single cooperating teacher, the treatment condition. Self-reported time logs were

completed by the teacher candidates in order to determine the roles of the teacher candidate in the two groups. The log sheet used for this study was divided into "nine categories of how time was spent during the day: team planning, small group instruction, whole group instruction, team teaching, supportive interaction (assisting individual pupils), performing routines, dealing with challenging pupil behavior, individual lesson preparation and associated activities (correcting papers, gathering materials), and tutoring" (p. 71). Instructions given to the teacher candidates for completing the form were to mark on the log sheet what they were doing at half-hour intervals through the day and also to record the amount of time spent on each activity. These teacher candidates were in elementary classrooms for two days a week for 13 weeks and were asked to complete the log sheet throughout the experience. Raw data collected on the log sheets were used to determine the average number of hours spent within each of the nine categories for the two groups, treatment and control, and the average hours were compared between groups. Bullough et al. (2002) also conducted two interviews with the teacher candidates, once early in the semester and once near the end of the semester, to collect additional data on roles of teacher candidates and cooperating teachers as well as relationships among the participants within a classroom. Two planning sessions were also audio-taped and then transcribed. No indication was given that these alternate forms of data were used to validate the self-reported log sheet data collected.

Brunson (1968) reported the use of self-reported teacher candidate logs, also in an elementary field experience prior to student teaching, in order to ascertain the types of activities in which the teacher candidates were participating. Originally, teacher candidates were simply asked to record what they were doing at the placement schools

without any structure provided. The data collected from the initial unstructured logs from two semesters were used to create a structured log sheet containing four categories as well as additional sub-categories. The four categories were clerical tasks, supervisory tasks, teaching, and observation. Clerical tasks were sub-divided into three sub-categories: (a) filing, copying, stapling, answering telephones, etc.; (b) correcting papers, workbooks, or tests; and (c) other clerical tasks. Supervisory tasks sub-categories included: (a) assisting individual pupils with an assignment; (b) assisting small groups with an assignment or seat work; (c) supervising in room, gym, library, etc.; and (d) other supervisory activities. The three sub-categories of teaching were: (a) teaching a lesson to an individual child, (b) teaching a lesson to a small group, and (c) teaching a lesson to an entire class. The observation category was not further sub-divided but was defined by the author as only when the teacher candidate sat passively in the classroom watching either pupils or teaching. Brunson (1968) required that logs were signed by the school personnel before they were turned in to the course instructor but not to confirm the hours or activities engaged in but to confirm that the school knew what information the teacher candidate was providing the university. No additional data were collected to validate the self-reported log sheet data.

Fink (1976) had social studies student teachers submit a weekly summary log sheet to record the activities they engaged in each week during the 10 weeks of their student teaching experience. This log sheet was in the form of a list of questions to be answered. The first question asked student teachers to list and describe three categories of activities: working with pupils which including teaching and small group engagement, observations, and conferences with the cooperating teacher. The second question asked

for details about any other experiences that the student teachers felt were helpful in learning about becoming a teacher. Additional data in the form of classroom observations and student teacher questionnaires were collected, but no information was provided on using the data to validate the weekly logs.

Finally, Appelgate (2012), in her dissertation investigating math student teachers' use of specific teaching strategies, had student teachers complete a log every day for two non-consecutive weeks of the strategies they were implementing in the classroom. The log sheet largely contained a list of specific teaching strategies that could be checked to indicate use but also contained a small section for student teachers to record the types of classroom structures that were included in the lesson: whole group, small group, pairs, or roles and responsibilities within small groups. Appelgate (2012) also used observations to validate the self-reported logs by observing 11 different student teachers during the period logged; however, she found that the self-reported logs were not a reliable source of information regarding the teaching strategies used by student teachers with only five of the eleven observations matching the activities recorded on the student teacher logs. However, these log sheets were focused on types of teaching strategies used rather than overall types of activities engaged in.

Proposed log sheet. The log sheet used in this study (see Appendix B) to collect data to answer the fourth research question included columns for five types of activities: observation, assisting individuals or groups of students, assisting with instruction (in front of the class), assisting the cooperating teacher with non-instructional tasks, and co-planning or talking with the cooperating teacher about instruction. The categories chosen encompass the types of activities delineated by Bullough et al. (2002), Brunson (1968),

Fink (1976), and Appelgate (2012) but are more consolidated. Bullough et al.'s (2002) nine categories and Brunson's (1968) 11 different sub-categories seem to be too specific for practical use by teacher candidates in the field. Five categories should be sufficient to collect the required data without being confusing or cumbersome. Data collected using this log sheet during the Spring 2015 semester included time in all five categories.

The five types of activities also correspond to the activities of interest in this study. The co-teaching model emphasizes co-planning between the teacher candidate and cooperating teacher on a regular basis (Bacharach et al., 2010). The column dedicated to co-planning and similar conversations allowed this component of co-teaching to be monitored. Likewise, many of the co-teaching instructional strategies encourage the cooperating teacher and teacher candidate to work together instructing and assisting students (Bacharach et al., 2010). Two additional columns on the log sheet focused on these types of activities. Non-instructional tasks such as grading papers or preparing materials for future lessons are common teacher duties but are distinct from instructional activities so a separate column was included for such tasks.

Although one co-teaching strategy (One Teach, One Observe) includes focused observation by either teacher (Bacharach et al., 2010), the other six co-teaching strategies emphasize more active engagement of the teacher candidate in classroom activities. Data from the Spring 2015 field experience course logs indicated time was commonly spent in observations. Whereas focused observations may be useful on a limited basis, the overuse of observation in co-teaching has been discouraged (Murawski, 2009), and both teacher candidates and cooperating teachers stated it was a waste of a resource (Yopp et al., 2014). A single observation column was included on the log sheet; teacher candidates

were not asked to differentiate between the focused observation of One Teach, One Observe and merely passively observing in the classroom. This decision was made to make the form simpler for the teacher candidates to use and to discourage overuse of the One Teach, One Observe co-teaching strategy. In future research, a separate column could be included to differentiate between focused and passive observation.

Teacher candidates were instructed on how to complete the log sheet at the conclusion of their co-teaching session. Each category of activity was explained including examples of the types of activities to be included in each. The importance of accurately recording time spent on each activity and consistently completing the log sheet was also be emphasized.

Validation. Classroom observations were conducted in order to validate the activity log sheet in a similar manner as that used by Appelgate (2012). Data were collected during observation of 13 of the 30 participant teacher candidates, or 43%, in this study and used to compare the types of activities logged by the teacher candidates with the actual activities engaged in on that day. The researcher performed all of the observations and tallied which of the five types of activities the teacher candidate was involved in at 5-minute increments for the entire time period that the teacher candidate was at the school on that day.

Cooperating Teacher Perceptions Survey

All cooperating teachers from the control group who had signed informed consent and all participating co-teaching cooperating teachers were e-mailed an appropriate electronic copy of the survey included in Appendix C near the end of the semester. The survey in Appendix C shows the questions sent to the co-teaching group. The version of

the survey sent to the control group did not include the three questions marked as *CO-TEACHING ONLY*. The words CO-TEACHING ONLY were not included on the co-teaching survey that was sent to the co-teaching cooperating teachers. Cooperating teachers were asked to complete the survey electronically and return it to the researcher via e-mail. Cooperating teachers were also given the option of printing out a copy of the survey, completing it manually, and contacting the researcher to have the paper copy picked up. All cooperating teachers who completed the survey completed it electronically and return it via e-mail.

This instrument was used to collect data on the perceived benefits and limitations of hosting a teacher candidate as well as suggestions for program change. The cooperating teachers in the co-teaching group were also asked about their perceptions of the professional development provided on the co-teaching model. All teachers were also asked about any previous experience with co-teaching in order to identify possible confounding variables. All questions were open-ended to allow teachers to answer in any way they chose.

The surveys were not anonymous. Three of the questions collected basic demographic data (frequency of hosting a teacher candidate, licensure area, and number of years of secondary teaching experience) that were used to determine if the cooperating teachers in the co-teaching and control groups were similar.

Procedure

Recruiting Partner Schools

The partner schools that teacher candidates had requested for their placements during the Fall 2015 semester were contacted prior to the start of the school year to

explain the study and solicit participation. Twelve schools agreed to be randomized to either the co-teaching treatment or control group for the fall semester, and eight schools declined participation for the fall. Teacher candidates were only placed at 10 of the 12 participating schools and at three of the eight schools that had declined participation. Teacher candidates were also placed at seven other schools that had not been recruited for the study.

Two of the schools that had declined participation for the fall and had been requested by several teacher candidates for the spring semester were contacted again during the fall semester to solicit participation for the spring semester. Both schools agreed to participate in the spring. Time did not allow for the other schools that had been requested by teacher candidates to be recruited prior to the spring semester. Teacher candidates were placed at 13 of the 14 participating schools for the spring semester, two of the six schools that had declined participation, and 12 other schools that had not been recruited.

Randomization for Co-Teaching Intervention

The partner schools that agreed to participate in the study were randomized to either the treatment or control group using a stratified process. Klar and Donner (1997) recommended using a stratification process based on baseline risk factors for random assignment of intact groups in group-randomized trials, particularly with a small number of groups, in order to reduce the probability of the treatment and control groups being imbalanced. Stratification was based on school level (middle school, high school, or multi-level schools) and socio-economic status based on the percentage of students within a school qualifying for free or reduced meals. Schools were classified by level

based on the level reported to the state department of education for free or reduced meal status and then into two groups by percent of students qualifying for free or reduced meals (less than or greater than 50%) using the most recent information available (Colorado Department of Education, 2015). Once the schools were divided into strata, half of the schools in each strata were chosen using the random numbers generation function of Microsoft Excel® to be included in the treatment group. If there was an odd number of schools in a strata, an extra school was assigned to the treatment group. The remaining schools served as the control group. Randomization was performed before all the schools had made a decision on participation because some of the participating schools started their school year three weeks before other area schools. One of the schools joining the study in the spring semester had not previously been randomized so was randomized using simple random assignment. Eight participating schools ended up in the co-teaching group with the remaining six schools in the control group.

This study used a delayed treatment design for the control schools so the six schools that were randomized to the control group will be offered the co-teaching professional development during the Fall 2016 semester after the completion of this study.

Co-Teaching Professional Development

Initial cooperating teacher session. Each school randomized into the treatment group was contacted to schedule an initial co-teaching professional development session. The intent was to schedule this initial session at each of the treatment schools sometime during the already scheduled teacher professional development time prior to the start of the Fall 2015 semester or early in the semester and to include all teachers in this session.

Only one of the treatment schools was able to schedule the session with most of its teachers prior to the start of the school year. Two additional schools scheduled the initial session with most of the teachers approximately a month after school had started. Three of the remaining treatment schools were only able to schedule time with the teachers who were serving as cooperating teachers in the fall semester, but these sessions did not take place until near the midpoint of the semester. Two schools were able to schedule an initial session late in the fall for the cooperating teachers who were assigned for the spring semester. Cooperating teachers for the spring semester who had not attended a previous initial session met with the researcher one-on-one instead of as a group due to constraints in schedule group sessions.

The purpose of this initial session was to establish a common understanding of and a common language for discussing the co-teaching model for teacher preparation as recommended by Bacharach et al. (2010), Dynak et al. (1997), and Thousand (2013). As such, this session focused on introducing the co-teaching instructional strategies as recommended by Cook and Friend (1995), Darragh et al. (2011), Murawski (2005), and Thousand (2013).

The initial professional development sessions varied in length from 15 minutes for individual sessions to about 45 minutes for group sessions. Cross and Villa (1992) delineated three levels of training: awareness, awareness with knowledge acquisition, and awareness with knowledge and skill acquisition. The awareness level involved exposing participants to terminology and concepts in a general manner and required one to three hours to achieve. The goal of the initial training session was to make the potential cooperating teachers in each school aware of the co-teaching model for working with

teacher candidates. Friend and Cook (2010) cautioned that adult learners have many time commitments and demands on their time; the difficulty in accessing the teachers in the treatment schools to provide this professional development was evidence of this point. The original intent was to provide the minimum amount of time recommended by Cross and Villa (1992), one hour, for the initial session at each school; however, this was not possible. Each session did start and end on time, as recommended by Friend and Cook (1996), in order to honor the teachers' time.

Friend and Cook (2010) described various types of professional development formats including individually guided, coaching, group improvement, and group training/workshop approaches. The initial co-teaching sessions provided to groups of teachers in the treatment schools used the group training/workshop approach which was defined as a large group activity with the primary objective to promote awareness and provide initial information along with changing attitudes (Friend & Cook, 2010). As previously stated, the purpose of this initial session was to promote awareness of the co-teaching model for working with teacher candidates which aligns with the group training/workshop focus and an activity-based approach was desired. The initial sessions for individual teachers would be classified as the individually guided format since the researcher met with these teachers individually and guided them through the information and discussed any questions that arose.

Friend and Cook (1996) described several effective practices for facilitating professional development involving teachers that were incorporated into these initial sessions. First, they noted that adults learn better when they perceive that the session will meet their needs or solve their problems. Therefore, this initial session was introduced as

a way to assist teachers in utilizing a teacher candidate in order to better meet the needs of their own students. Second, Friend and Cook (1996) recommended acknowledging the extensive experience and prior knowledge of the teachers and creating learning opportunities for teachers to participate in which will allow them to integrate new ideas into their existing concepts and practices. They also recommended providing a balance of control between the facilitator and the participants, as adults tend to resist authority and desire to be self-directed. The format of this initial session centered on a small group activity where the teachers worked together with their peers to elicit their prior knowledge and experiences as they applied new concepts to their personal classroom situations.

Friend and Cook (1996) also recommended providing teachers with specific tools on a single-concept and allowing time for application. Appendix D contains the handout that was provided to the teachers during the initial session and that guided the small group activity. The handout defined each of Bacharach et al.'s (2010) seven co-teaching strategies and allowed space for teachers to brainstorm ideas for how to use them in their classroom to work with a teacher candidate. Each initial session began with a brief introduction of the researcher and statement of the purpose of the session. The teachers were then provided with the handout (see Appendix D), asked to read the definition of the first two strategies (One Teach, One Observe and One Teach, One Assist), and asked to work together with their table group to answer the two questions that followed each definition. The groups were allowed some time to complete the stated tasks, and then volunteers were asked to share some of their ideas with the whole group. This process was repeated for station and parallel teaching and for supplemental, differentiated

teaching, and team teaching. The amount of time allowed for each section depended on the total time provided for the session. Every group session included approximately equal time for each set of co-teaching strategies. Each session was concluded with a brief description of the five university field experience courses (Phase 1 to Phase 5) and the expectations for each of the four experiences prior to student teaching (Phase 1 to Phase 4). Time was also allowed for questions.

Each cooperating teacher that was assigned to work with a teacher candidate at the treatment schools was contacted by e-mail following the initial group professional development session to set up a meeting to solicit participation in the study and obtain informed consent. These meetings were set up at the convenience of the cooperating teacher and lasted approximately five minutes. Most cooperating teachers met with the researcher individually though some chose to meet in pairs.

The initial sessions that were conducted individually occurred when informed consent was obtained from the cooperating teachers who had not previously attended an initial professional development session but had agreed to work with a teacher candidate. These meetings used the same handout (see Appendix D) as the initial group sessions but involved the cooperating teacher and the researcher talking through the definitions and brainstorming together how the cooperating teacher might use each. The purpose was stated at the beginning, and the meeting was concluded with a summary of expectations for the specific field experience course of the assigned teacher candidate. Time was allowed for questions.

Bacharach et al.'s (2010) co-teaching model was chosen for use in this study for several reasons. First, St. Cloud State University (2015) has established The Academy for

Co-Teaching and Collaboration which provides training on their model of co-teaching in student teaching, which the researcher attended in May of 2014 along with more than 100 other teacher educators. The availability of such training opportunities for teacher educators has facilitated the widespread use of the St. Cloud State model of co-teaching in student teaching across the United States (e.g. Belanger, 2015; Darragh et al., 2011; Hartigan, 2014; Ingraham & Karsted, n.d.; Merk et al., 2014; Tracy, 2015; Wagner et al., 2015; Yopp et al., 2014). It is also the model that was used at this university for a pilot study of co-teaching in student teaching during the Fall 2014 semester. In addition, the St. Cloud State model is based on the Cook and Friend (1995) model for co-teaching for inclusion that has also been widely used as evidenced by being cited by more than 500 other authors, according to Google Scholar. Teacher candidates in all content areas may be expected to co-teach with a special education teacher during their teaching career and will likely encounter the Cook and Friend (1995) co-teaching model then as well.

The other popular model for co-teaching in teacher preparation is the model of Roth and Tobin (2002). However, their model did not provide specific co-teaching instructional strategies, and no professional development was provided on co-teaching. This model would be difficult to implement in this study.

Initial teacher candidate session. Teacher candidates enrolled in the secondary field experience courses prior to student teaching received the same initial session on the co-teaching model at the beginning of each semester. Most of the teacher candidates in the final undergraduate field experience course had already received some information on co-teaching in previous field experience courses as had some of the teacher candidates in the middle undergraduate field experience course. It was, therefore, not possible to only

provide co-teaching information to those teacher candidates working at one of the treatment schools. Therefore, information on co-teaching was provided to all of the teacher candidates as a constant in this study.

The initial co-teaching sessions for teacher candidates were each approximately an hour in length and were held during one of their scheduled on-campus class sessions, as recommended by Darragh et al. (2011) and Kamens (2007), at the beginning of each semester. The format was similar to the cooperating teacher initial session in that the sessions focused on increasing awareness of the co-teaching model, allowed for teacher candidate participation in small groups, and emphasized Bacharach et al.'s (2010) seven co-teaching instructional strategies. A similar handout to the cooperating teacher handout (see Appendix D) was used except instead of the questions asking about *your classroom*, they asked about *working with your cooperating teacher*. The introduction included an overview of the co-teaching model in general including its use in special education. The small group activity based on the handout (see Appendix D) comprised most of the session. The summary and conclusion provided information on how to complete the log sheet and about this study as well as time to obtain informed consent from the teacher candidates who were interested in participating. Information on co-teaching had been a regular part of most of these courses in previous semesters so the only difference this year was that the researcher facilitated the sessions as a guest to the classes to make the information consistent across the secondary program.

Pairs sessions. In order to be considered as participants in this study, cooperating teachers and their teacher candidates had to attend additional sessions together on communication and co-planning. Attending these sessions together is the treatment for

this study. The original intent was to offer one 2-hour session which would include both topics, communication and co-planning, at each treatment school for all the teachers and teacher candidates at that school. However, because it was such a challenge to schedule the initial professional development session for large groups at each school, the pairs sessions were scheduled with individual cooperating teachers and their teacher candidates at a time that was convenient for both. There were three teachers at one school who had a common plan time and all three of their teacher candidates were also available to meet at this time, but individual sessions were provided for all the other pairs. Most pairs only had 45 minutes available to meet on a given day as most meetings occurred during the cooperating teacher's planning period. Therefore, the communication activity and the co-planning activity were done on different days, usually two weeks apart. There was one pair who had begun working together prior to the first pairs session; this pair had already built their relationship and established good communication patterns and therefore met only once with the researcher to focus on co-planning. There were also three pairs who entered the study a couple weeks into the semester; these groups met only once and completed both the communication and co-planning activities in an abbreviated time.

The purpose of the communication session was to provide time for the cooperating teacher and teacher candidate to get to know each other and to establish a foundation for working together throughout the semester (Chapman & Hyatt, 2011; Heck & Bacharach, 2010). This session involved the cooperating teacher and teacher candidate participating in an activity together, guided by the set of questions shown in Appendix E. The researcher was available during the session to make sure the pair progressed through the questions and to answer any questions that arose.

Relationship building as a component of initial co-teaching preparation has been widely recommended (e.g. Cramer et al., 2010; Cook & Friend, 1995; Darragh et al., 2011; Fattig & Taylor, 2008; Heck & Bacharach, 2010; Murawski & Dieker, 2004; Thousand, 2013). Co-teachers need time to get to know each other both personally and professionally (Darragh et al., 2011) and to identify and understand differences in personalities (Villa et al., 2004) and ways of working (Heck & Bacharach, 2010). The initial pairs session for most of the cooperating teachers and teacher candidates was the first time the two teachers met. The session began with a brief introduction by the researcher explaining the purpose of the session and allowing time for the teachers to introduce themselves.

The main focus of the session focused on communication. Again, many authors have emphasized the need to provide training in communication skills and time to establish positive communication patterns during co-teaching training (e.g. Cook & Friend, 1995; Darragh et al., 2011; Gately & Gately, 2001; Heck & Bacharach, 2010; Villa et al., 2004). The communication activity involved the co-teaching partners in answering a series of questions together about what their partnership would look like in the semester ahead using a handout included in Appendix E. The time required by different sets of teachers to complete this activity varied. The first question focused on expectations in general and logistics so that the co-teachers could discuss what each envisioned the semester would look like. Heck and Bacharach (2010) recommended that the teacher candidate be informed of specific classroom and school information such as policies and procedures. In addition, the teacher candidate and cooperating teacher needed to decide their schedule for working together in the classroom.

Second, the co-teachers determined what means they would use to communicate with each other throughout the semester. This set the stage for the final pairs session involving co-planning and also helped to make explicit the expectations of each partner regarding ongoing communications.

Several authors have recommended discussing each co-teacher's pet peeves early in the partnership (Beninghof, 2012; Chapman & Hyatt, 2011; Cook & Friend, 1995; Murawski, 2002). The cooperating teachers, especially those who had worked with teacher candidates previously, more often had identifiable pet peeves than the teacher candidates, but it was important for the teacher candidates to know what classroom behaviors or practices irritated their cooperating teacher. Some common identified pet peeves from the co-teaching literature included interruptions during instruction, failure to return or replace borrowed materials (Friend & Cook, 1996), procedures for grading assignments, or the arrangement of the classroom or materials (Friend & Cook, 2010).

The literature also has recommended that co-teachers discuss the roles they expect to play during the partnership early in the partnership (Dieker, 2001) with both the cooperating teachers and the teacher candidates expressing their specific expectations about what responsibilities each will have (Darragh et al., 2011). Chapman and Hyatt (2011) recommended addressing what roles each co-teacher assumes she/he will fill as well as what roles each assumes his/her partner will fill; this could be facilitated through making a list of classroom responsibilities or tasks that would need to be done and dividing up who would do each task or be responsible for each item.

The need to communicate preferences for giving and receiving feedback has also been widely recognized (Beninghof, 2012; Cook & Friend, 1995; Heck & Bacharach,

2010; Murawski, 2009). Issues include the preferred method of communication which could include e-mail, text messages, telephone conversations, in-person, or using other internet platforms (Beninghof, 2012) as well as the timing of the feedback which could include immediately after class, at the end of the day, or at the end of the week (Heck & Bacharach, 2010). The timing and method of communication needed to be coordinated as well. The fifth question in the communication activity addressed these topics.

The final pairs session focused on co-planning as recommended by Cole and McLeskey (1997); Cook and Friend (1995); Heck, Bacharach, and Dahlberg (2008); and Villa et al. (2008). Co-teachers were provided with the co-planning handout (see Appendix F) and provided time to work through the questions, to make decisions about how they would co-plan, and to begin planning for their semester together. All of the co-teaching pairs had been working together for at least a week prior to completing this activity. Most had established their schedules, and the teacher candidates had enough experience in the classrooms to identify how they might assist.

Cook (2004) and Murawski and Dieker (2008) recommended beginning co-planning by determining where, when, and how co-planning would occur as well as discussing barriers that could interfere with co-planning. Providing the teacher candidate with an overview of the course and curriculum has also been recommended (Heck & Bacharach, 2010; MidValley Consortium, 2000). Additional recommendations for initial co-planning have included a focus on the specific needs of the students in each class, (Villa et al., 2004), the typical instructional strategies that are used by the teacher (Villa et al., 2008), and the lesson planning format to be used (Beninghof, 2012). Time was also spent reviewing the seven co-teaching instructional strategies (Bacharach et al., 2010)

and making plans to implement them in the pair's particular context as recommended by Heck and Bacharach (2010) and Villa et al. (2008).

Follow-up session. An additional follow-up pairs session was originally planned that would occur mid-semester. This session would allow the cooperating teacher, teacher candidate, and researcher to re-connect and discuss any questions or concerns that had arisen during the first half of the semester. Ongoing staff development and support throughout a co-teaching implementation has been recommended by Murawski (2006). Each co-teaching pair was instead observed by the researcher some time after the two professional development activities had been completed. This observation allowed the researcher to see first-hand how the two teachers were interacting in the classroom, to re-connect with the pair, and to discuss how the semester was progressing.

The communication and co-planning pairs sessions along with the classroom observation that replaced the planned follow-up session were intended to move the co-teachers beyond the awareness level to the knowledge level which Cross and Villa (1992) suggested required a minimum of half a day to accomplish. The communication and co-planning sessions were each approximately 45 minutes in duration, all observations were at least 45 minutes in length and many were longer, and the initial co-teaching informational sessions were also 45 minutes. Some pairs spent less time in some of the sessions and some spent more time. All accomplished the same objectives for each session. Most pairs spent close to the four hours recommended by Cross and Villa (1992) with the researcher to establish a solid knowledge of co-teaching.

Recruiting Cooperating Teachers in Control Group

Cooperating teachers in the control schools were contacted individually to solicit participation in this study. The study was explained, their schools' status as a control school identified, and informed consent obtained if they choose to participate.

Data Collection

Student achievement data. Cooperating teachers in both treatment and control schools working with a teacher candidate enrolled in either of the last two field experience courses were asked to provide pretest and posttest data from their curriculum-based semester exam. Data were requested for both the students in the class sections that the teacher candidate directly worked with as well as for the students in other sections of those courses that were taught solely by the cooperating teacher. The data were used to answer the first three research questions:

Q1 Do secondary students benefit academically from having a teacher candidate in their classroom in addition to their assigned classroom teacher compared to only having their assigned teacher present?

Q2 Do secondary students benefit academically from having their assigned classroom teacher attend professional development on co-teaching with a teacher candidate as compared to students in classrooms where their assigned classroom teacher receives no professional development on co-teaching?

Q3 Does the effect on student achievement of having a teacher candidate present differ between classrooms where the assigned classroom teacher attended professional development on co-teaching with a teacher candidate and classrooms where the assigned classroom teacher did not attend professional development on co-teaching?

The first research question addresses the impact of having a teacher candidate present in the classroom. To answer this question, the difference between the normalized posttest scores and the normalized pretest scores of the students in the class sections

served by the teacher candidate were compared to the difference between the normalized posttest scores and the normalized pretest scores for the students in the cooperating teacher's other sections of the same course. The control group for this portion of the study was the cooperating teachers working alone with their individual performance measured by their students' growth between the pretest and the semester exam. The treatment group for this portion of the study was the cooperating teachers working with the teacher candidates in all of the participating schools, not just the co-teaching schools, whose performance was measured using the students' growth between the pretest and the semester exam.

The second research question addressed the impact of the cooperating teachers attending professional development on co-teaching with a teacher candidate, independent of the presence of a teacher candidate. The control group for this portion of the study was all the cooperating teachers who work in the control schools who did not receive professional development on co-teaching with a teacher candidate. The treatment group was all the cooperating teachers who attended professional development on co-teaching with a teacher candidate. All the differences between semester exam scores and pretests of the students available for each cooperating teacher were used to determine the performance of each teacher, regardless of if the teacher candidate worked with the students or not.

The third research question investigated the interaction between the two interventions: having a teacher candidate present and attending professional development on co-teaching with a teacher candidate. The difference in the impact of having a teacher

candidate present, based on student growth scores, was compared between the co-teaching cooperating teachers and the non-co-teaching cooperating teachers.

Teacher candidate activity. Teacher candidates are required to log the time they spend in the placement classrooms for their field experience courses, and therefore, this will occur throughout each semester. Log sheets were collected at midterm of each semester as well as at the conclusion of the semester and used to answer the fourth research question:

> Q4 Are teacher candidates more active in their field experience practica, prior to student teaching, if their cooperating teachers have attended professional development on co-teaching with a teacher candidate than if they work with a cooperating teacher who has not attended professional development on co-teaching with a teacher candidate and is there a difference across the different levels of field experience?

Classroom observations. The researcher conducted in-person observations in classrooms throughout both semesters. The purpose of the observations was two-fold. First, they were used to record the activities teacher candidates participated in as a means of validating the self-reported activities on their log sheets. The researcher was present for the entire time the teacher candidate was at the placement school on the day of the observation and tallied, at 5-minute increments, the types of activities in which the teacher candidate was engaged. Second, observations were used to gather qualitative data to answer the final research question, as explained in the next section. Finally, observations were used to determine whether or not co-teaching was occurring. The researcher was not always able to be present for the entire time that the teacher candidate was present at the school. In these cases, only the second and third purposes of the observation were achieved.

Cooperating teacher perceptions. Qualitative data were collected both semesters from several sources to answer the final research question:

> Q5 Do classroom teachers perceive benefits from attending professional development on co-teaching with a teacher candidate, prior to student teaching, compared to working with a teacher candidate without attending professional development on co-teaching?

Throughout both semesters, field notes were taken during and after each classroom observation to provide data on cooperating teacher perceptions as well as general information on the degree to which pairs were implementing co-teaching in their classrooms. E-mail correspondence with cooperating teachers was also included in the data set when it related to their perceptions of working with their teacher candidate, to co-planning, or to co-teaching.

The cooperating teacher perception survey (see Appendix C) was another data source for this final research question. The survey was e-mailed to cooperating teachers near the end of the semester, after they had finished working with their teacher candidates but before their semester was finished. Cooperating teachers were sent a Microsoft Word® version of the survey and asked to complete it. They were also asked to return it via e-mail to the researcher prior to the end of their semester or as soon as feasible.

Data Analysis

Student Achievement Data

Three-level multilevel mixed effects model. A multilevel, or hierarchical, model was intended to be used to answer the first three research questions. Insufficient data were collected in this study to allow for these questions to be answered, but the data analysis plan is still included here for thoroughness. A multilevel model would have been appropriate for these data as they would have contained students nested within classes

which were nested within schools since students and teachers within a school tend to be more similar to each other than students and teachers in different schools (Agresti & Finlay, 2009). A multilevel model could account for the lack of independence among student-level and class-level residuals that could not be accounted for in standard multiple regression models (Murnane & Willett, 2011). The model used would have been a three-level model with the first stage equation:

$$Y_{2ijk} - Y_{1ijk} = \beta_{0jk} + \beta_{1jk}(TC)_{ijk} + e_{ijk}$$

where Y_{2ijk} was the normalized score, or z-score, of student i on the posttest in teacher j's classroom in school k; Y_{1ijk} was the normalized score of student i on the pretest in teacher j's classroom in school k; β_{0jk} was the intercept of the regression equation for teacher j's classroom in school k; β_{1jk} was the regression coefficient for the categorical variable, $(TC)_{ijk}$, indicating if the teacher candidate worked in the class section of student i; and e_{ijk} was the random component for student i in teacher j's classroom in school k. The presence of a teacher candidate would be treated as a random effect (Murnane & Willett, 2011). The first stage would have produced separate regression equations for each teacher's class sections where the teacher candidate was present and each teacher's class sections that did not work with a teacher candidate (Pedhazur, 1997).

The outcome variable used in this study would have been a difference score, also called a change score or gain score (Willett, 1988), which would have been obtained by subtracting a pretest score from a posttest score for each student (Rogosa, Brandt, & Zimowski, 1982). A difference score has been considered the simplest measure of academic growth (Anderman, Gimbert, O'Connell, & Riegel, 2015), and although more limited than growth measures based on data collected at more than two time points, the

difference score could provide more information than a single test score (Rogosa et al., 1982). In education research overall and in this study specifically, ultimate interest was in the amount of change in a measure caused by an intervention (Gall, Borg, & Gall, 1996) rather than the final score itself. It was not thought possible to collect data on more than two occasions in this study so a more complex model of growth was not considered. Any test score, or observed score, includes the true score as well as a degree of measurement error, but the observed score is considered the only lens available for discerning the true status of the individual (Willett, 1988). Difference scores are an unbiased estimate of the difference in true scores even in the presence of measurement error and can provide an accurate and useful measure of individual change (Rogosa et al., 1982).

Both the pretest and posttest scores would have been normalized, or standardized, by conversion to z-scores prior to calculating the difference score (Kenny, 1975). Normalization would have been necessary as the test scores from the various classes would not have been on the same scale so raw scores from the various classes would not be comparable (Johnson et al., 2012). Z-scores would have been calculated by subtracting the average class test score from each individual test score and then dividing the result by the standard deviation of the class test scores which would have converted all raw values to units of standard deviation (Johnson et al., 2012; Lipscomb et al., 2010). The Pittsburgh Public Schools used this normalization procedure for their curriculum-based assessments from various content areas in their value-added models of teacher effectiveness (Johnson et al., 2012; Lipscomb et al., 2010).

The second stage of the three-level model would have included two equations that treated the regression intercept, β_{0jk}, and the regression coefficient for the presence of a

teacher candidate, β_{1jk}, from the level 1 equation as dependent variables in order to investigate the sources of variability in their estimates from stage 1 within schools (Pedhazur, 1997):

$$\beta_{0jk} = \gamma_{00k} + u_{0jk} \text{ and}$$

$$\beta_{1jk} = \gamma_{10k} + u_{1jk.}$$

The first equation would have estimated the regression intercept, β_{0jk}, based on the school where the teacher was employed with γ_{00k} as the intercept and u_{0jk} as the random variation within the school. The second equation would have estimated the regression coefficient for the dummy variable for the presence of a teacher candidate based on the school where the teacher candidate was placed with γ_{10k} as the intercept and u_{1jk} as the random variation within the school.

The third level of the multilevel model would have accounted for variations in student difference scores in the estimated regression intercept, γ_{00k}, for the effect of teachers, β_{0jk} , and the regression intercept, γ_{10k} , for the presence of a teacher candidate, β_{1jk} , among the schools taking into account whether the school was randomized to the co-teaching intervention, $(\text{Co-teach})_k$, and including a fixed-effect (α_m) for each school district:

$$\gamma_{00k} = \alpha_m + \delta_{01} (\text{Co-teach})_k \text{ and}$$

$$\gamma_{10k} = \alpha_m + \delta_{11} (\text{Co-teach})_{k.}$$

The effect of the school in both of the level 2 equations was not of interest so was not included in the level 3 equations.

Q1. The effect of having a teacher candidate in the classroom was a variable of interest so its regression coefficient from the level 1 equation was included in the second

and third stages of the model to account for difference in the effect of the teacher candidate across classrooms, across schools, and in combination with the co-teaching intervention. The effect of having a teacher candidate present, regardless of whether the teacher candidate was working with a teacher who attended professional development on co-teaching, would have been determined by the significance of the regression coefficient, β_{1jk} , for the teacher candidate dummy variable in the level-1 equation. This would not account for the clustering of students within classrooms or within schools. Teacher candidates were present for some of the cooperating teachers' class sections and not for others. The students in the various class sections of a given cooperating teacher would have taken the exact same pretest and posttest and would be very similar to each other. Therefore, determining the effect of the teacher candidate at this level of the model would have been most appropriate.

Q2. The effect of the co-teaching intervention independent of the teacher candidate effect would have been determined by the significance of the regression coefficient for the co-teaching dummy variable, δ_{01}, related to the regression intercept from the level 1 equation. This would have compared the difference scores of all the students of the teachers who attended professional development on co-teaching to the difference scores of all the students whose teachers did not attend professional development on co-teaching, regardless of if a teacher candidate was present in their classroom, accounting for the clustering of students in classrooms and teachers within schools.

Q3. The effect of having a teacher candidate in co-teaching treatment schools verses control schools was also of interest in this study and would have been determined

by the significance of the regression coefficient, δ_{11}, for the co-teaching categorical variable in the level 3 equation related to the teacher candidate categorical variable. This estimate would have accounted for the clustering of students within classes and within schools as well as differences among students in different school districts.

Justification of model. One of the drawbacks to a group randomized trial is the loss of statistical power, or the ability to detect a difference between treatment and control groups, that occurs when intact groups are randomized rather than individuals (Murnane & Willett, 2011). Individual students within a class tend to be more alike than students in different classes or different schools (Murnane & Willett, 2011) so the within-school variance can often be less than the between-school variance, and it can be more difficult to detect between-school differences (Murray, 1997).

Murray (1997) suggested including covariates in group randomized models in order to account for additional variation and thus protect power. Many individual-level factors have been shown to be correlated with student achievement and have been commonly used in evaluating teacher effectiveness including gender, race/ethnicity, free and reduced meal status, special education identification, gifted identification, and English language learner status (Lipscomb et al., 2010). Murnane and Willett (2011), however, suggested the inclusion of group-level covariates rather than individual-level covariates in group randomized trials to protect power along with including fixed-effects at a different level than the level where the intervention was applied. Therefore, in this study a district-level fixed-effect would have been included in the between-school equation. If there had been differences in the class-level demographic data among class

sections taught by a teacher, the class-level demographic data would have been added as covariates in the model.

A power analysis was performed, prior to undertaking this study, using Optimal Design Plus software (Raudenbush, 2011) to determine the probable effect size that could be achieved for this 3-level group randomized trial with 15 schools, 12 teachers on average per school over the course of two semesters, and 50 students per teacher. Additional parameters used included a Type I error of .05, an intraclass correlation for both levels of .10, and the district level fixed-effect accounting for between 10 and 30% of variation in difference scores, as explained below. The design would provide a power level of .8 with an effect size of approximately .45.

According to Murnane & Willett (2011), intraclass correlation is the percentage of the total variation due to difference among groups, and for a 3-level nested model, there would be an intraclass correlation at the within-school level and the between-school level. A low within-school intraclass correlation would indicate that most of the variation was among the students rather than among the classes so students' scores would be largely independent of each other which would be desirable for maximizing power and detecting differences. A low between-school intraclass correlation would indicate that most of the variation was within the schools rather than between the schools so that classes could be treated as largely independent of each other. According to Murnane and Willett (2011), in educational research, an intraclass correction of .01 is considered small, of .09 is considered medium, and of .25 is considered large. A medium intraclass correction was chosen for both levels in this power analysis.

District level fixed-effects were chosen for inclusion in the model because they would account for both observable and unobservable variation among the school districts whereas including school demographic information such as race/ethnicity and free and reduced meal status would only have accounted for observable variation (Murnane & Willett, 2011). In essence, district-level fixed-effects would allow for the calculation of a unique intercept for each school district (Murnane & Willett, 2011). School-level fixed-effects could not be used since the co-teaching intervention was applied at the school level, and school-level fixed-effects would have absorbed the variation due to the intervention (Murnane & Willett, 2011). In addition, there were only four school districts included in this study, but those districts have very different student demographics and leadership. No previous data on the amount of variation explained by district level fixed-effects could be found so two conservative percentages (10% and 30%) were included in the power analysis.

A power level of .8 and type I error of .05 are standard for educational research (Spybrook et al., 2011). An effect size of .45 would be considered moderate (Urban, 2010). In order to maximize power in this study, as many schools were included as possible.

Assumptions. Prior to the estimation of the parameters for the three-level model specified, the assumptions underlying a multiple regression model would have been checked. Agresti and Finlay (2009) delineated five assumptions for regression analyses. The first was randomization in selecting the sample which would be based on the study design. This study used randomization of schools rather than individuals, but the three-level model used would have taken into account the nested nature of the data so this

assumption could have been relaxed. The second assumption was linearity which would indicate that any continuous explanatory variable would need to be linearly related to the outcome variable. No continuous predictor variables were used. The third assumption was normality which would mean that the distribution of the outcome variable at each level of the explanatory variable was normally distributed which would have been checked by examining a normal probability plot as well as by performing a Shapiro-Wilks test. The fourth assumption was homogenous variation which would mean that spread of outcome values at each level of the explanatory variable was consistent and would have been checked using the Breusch-Pagan or White's test. The final assumption was multicollinearity which would mean that the explanatory variables were not related to each other. The variance inflation factor would have been checked to determine if multicollinearity was present.

Parameter estimation. The three-level model would have been estimated using SAS statistical software.

Alternate analysis. Limited data were obtained from participating cooperating teachers, and therefore, the originally planned multi-level regression analysis could not be performed. Instead, a simple linear regression model was used to determine if the presence of a teacher candidate or the experimental group affected the difference between normalized posttest scores and normalized pretest scores of secondary students in the participating classrooms. The assumptions for multiple regression were still checked as originally planned.

Validation of Teacher Candidate Log Sheets

Percent difference between the observed time for each type of activity and the logged time was determined for each observation by subtracting the logged time from the observed time for that activity and then dividing by the total time observed. Descriptive statistics (mean, median, mode, standard deviation, and range) were used to summarize this data and to determine the relative degree to which the log sheets accurately measured the activities undertaken by the teacher candidates.

Teacher Candidate Activity

Multiple regression. Multiple regression was used to answer the fourth research question. The outcome variable was the percentage of total time. The raw data in hours and minutes spent at the placement school from each log sheet were used as the total time. The amount of time logged for each activity was divided by the total time to determine the percentage of time each teacher candidate spent participating in each type of activity over the course of the semester. The first set of three categorical explanatory variables indicated the type of activity that the teacher candidate was involved in for each percentage of time and delineated four of the five categories of activities from the log sheet: observation, assist individuals or groups of students, assist with instruction, and co-plan or talk with teacher about instruction. The fifth category of activity, assist with non-instructional tasks, was eliminated as its value could be determined from the values of the other four activities which would produce collinearity if included in the model. The second set of categorical explanatory variables indicated the level of field experience course in which the teacher candidate was enrolled; there were three classes so there were two categorical variables used. The final categorical explanatory variable indicated

whether or not the teacher candidate participated in professional development on co-teaching with their cooperating teacher. All categorical variables were coded using effect coding (Pedhazur, 1997). The general model was:

$$Y_{ijkm} = \mu + \alpha_i + \beta_j + \gamma_k + (\alpha\beta\gamma)_{ijk} + (\alpha\beta)_{ij} + (\alpha\gamma)_{ik} + (\beta\gamma)_{jk} + \varepsilon_{ijkm}$$

where Y_{ijkm} was the percentage of time spent by individual m on activity i in the field experience course j and in the experimental group k; μ was the grand mean; α_i was the treatment effect for the type of activity; β_j was the treatment effect for the field experience course level; γ_k was the treatment effect for the co-teaching intervention; and ε_{ijkm} was the random error term. Interaction terms were included in the model to determine the three-way interaction among all of the explanatory variables as well as pairwise interaction terms for each pair of explanatory variables.

Assumptions. The same five assumptions of regression analyses discussed previously were checked for this dataset. Independence of responses was determined by examining the placement procedures. Since no two participants were placed with the same cooperating teacher, all participant responses are independent. All explanatory variables were categorical so linearity was assumed. The dataset was determined to violate the normality assumption based on the Kolmogorov-Smirnov test of normality ($D = 0.095$, $p < .01$) and the normal probability plot. The constant variance assumption was also violated based on White's Test [$W(9) = 31.5$, $p < .001$] and the Breusch-Pagan test [$bp(6) = 23.6$, $p < .001$]. The histogram of the outcome variable was positively skewed with more than 40% of values less than 0.15. Therefore, an alternate parameter estimation procedure, beta regression, was used. Beta regression is appropriate for situations where the outcome variable is restricted to the interval of 0 to 1 (Ferrari & Cribari-Neto, 2004)

and does not require normal distribution or constant variance (Espinheira, Ferrari, & Cribari-Neto, 2008). Multicollinearity was not expected since one activity category was not included in the analysis and the other categorical explanatory variables are unique.

Interpretation. The beta regression analysis was conducted using SAS statistical software. The three-way interactions were included initially followed by all pairwise interactions. The significance of the *F* values was used to determine significance of the various explanatory variables. The overall model type I error was .05.

Validity

Logistic regression. The internal and external validity checks described previously were performed using logistic regression. Logistic regression allowed for a group of characteristics to be compared across two different sample groups. For all of the external validity checks, participation or non-participation in the study was the categorical outcome variable and the characteristics available for the schools, districts, teachers, or teacher candidates served as explanatory variables. For internal validity checks comparing the two experimental groups, the categorical outcome variable was experimental group assignment and the characteristics of the teachers or teacher candidates served as explanatory variables. For internal validity checks related to mortality, the categorical outcome variable was continued participation versus dropping out and the explanatory variables were the characteristics of the teachers or teacher candidates.

Interpretation. A non-significant outcome indicated that the two samples, participants and non-participants or co-teaching and control groups, were drawn from the same population so results can be generalized to the larger population.

Assumptions. Agresti and Finlay (2009) delineated two assumptions for logistical regression. First, randomization, or independence of responses, is assumed. The characteristics of the school districts, schools, teachers, and teacher candidates are independent. Second, the outcome variable must have a binomial distribution, or two distinct responses are present. Participants were compared to non-participants or co-teachers to non-co-teachers so both responses were represented.

Qualitative Data

The data analysis approach used for analyzing the qualitative data was modeled after the constant comparative approach described in Chapter 8 of Merriam (2009). The general characteristics of this approach include starting data analysis during data collection and continually comparing new data obtained to the data already collected.

Data analysis began after the first classroom observation when thoughts and reflections on the observation were added to the notes taken during the observation, as recommended by Merriam (2009). After each subsequent observation, in addition to recording thoughts and reflections on that observation, notes were taken on how that observation compared to previous observations. This process was continued for all observations.

Approximately weekly throughout the semester, data from field notes were transferred to a Microsoft Excel® spreadsheet and cataloged according to the data source, experimental group, grade level taught, content area taught, and field experience course level of the teacher candidate. According to Merriam (2009), the process of coding in qualitative research involves assigning shorthand designations to small segments of the data in order to categorize the data and facilitate easy retrieval. Each data element, or row

within the spreadsheet, also included a column for a code and sub-code. Each data element was assigned a code based on its subject matter. Initial codes were based on previous research on teacher candidate perceptions of benefits of co-teaching during student teaching including classroom management, instruction, planning, professional growth, relationships, and student assistance and engagement (Bacharach & Heck, 2012). However, new unique codes were included as they emerged from the data. E-mail correspondence with cooperating teachers was also included in the database and coded appropriately using a similar procedure.

A list of codes used along with a brief definition of each was kept as a separate worksheet in the Excel® spreadsheet to facilitate the use of the same codes for subsequent field notes and to allow for combining and changing code labels more easily. Periodically throughout the semester, the codes themselves were examined to determine if any overlap existed among the codes or if a code needed to be subdivided into multiple codes.

As cooperating teacher surveys were received at the end of each semester, they were included in a separate spreadsheet of the Excel® file and coded in a similar fashion. Survey responses were categorized by date received, experimental group, number of prior teacher candidates served, years of teaching experience at the secondary level, grade level taught, licensure area, field experience course of teacher candidate, and question number.

Finally, the data elements present in each code were examined in search for answers to the final research question as well as to determining to what degree co-teaching was implemented in the secondary classrooms. Larger themes were developed that fit the data and captured the perceptions of the cooperating teachers.

CHAPTER IV

ANALYSIS

Evidence of Co-Teaching

Observations were performed in 36 different classrooms: 18 control group classrooms and 18 treatment group classrooms. Co-teaching was evident in all 18 treatment classrooms as well as 13 of the control classrooms. Co-teaching was not used exclusively in the classrooms where it was observed; solo teaching was also commonly seen. The criteria used to determine if co-teaching was occurring was based on whether what the two teachers were doing was contributing to student learning in a way that would not have been possible for either teacher working alone. If the activities of the two teachers were enhancing student learning, it was considered to be co-teaching. If what one of the teachers was doing did not enhance student learning in any way, it was not considered co-teaching.

The most commonly observed co-teaching strategies were One Teach, One Assist; Station Teaching; and Team Teaching. Only one example of Differentiated Teaching and one example of Supplemental Teaching were observed; both were seen in treatment group classrooms. There was no evidence of the use of the One Teach, One Observe or the Parallel Teaching co-teaching strategies.

One Teach, One Assist

Various forms of the One Teach, One Assist co-teaching strategy were observed in 16 treatment classrooms and six control classrooms. Both the cooperating teacher and the teacher candidate were observed in the lead role. Assistance was provided by both teachers with routine classroom procedures such as taking attendance, handing out and collecting papers or other supplies, and managing the flow of students in and out of the classroom. Both teachers also provided assistance with managing student behavior and by assisting individual students. Teacher candidates from all three field experience courses were involved in leading instruction as well as assisting their cooperating teacher.

When the cooperating teacher took the lead role in instruction, the teacher candidates assisted in various ways. Most commonly, the teacher candidate contributed by taking care of routine classroom tasks such as taking attendance, passing out papers that would be used in the lesson, or collecting assignments. Although these tasks are not instructional, per say, they were directly related to the instruction for that day so were considered to be assisting in student learning, and thus co-teaching. The cooperating teacher was able to attend to instructional tasks for more of the class period when the teacher candidate performed these other routine tasks. One teacher candidate assisted by setting up the audio-visual equipment needed for the lesson while the cooperating teacher began the lesson. Another teacher candidate was able to talk with a school staff member who came to the classroom door so as not to disturb the cooperating teacher who was leading a discussion with the class. Several teacher candidates also assisted with behavior management either by using proximity or by redirecting students verbally. The teacher candidates in all of these situations contributed to student learning by allowing their

cooperating teachers to have more uninterrupted time to work with the students. This form of One Teach, One Assist was observed in nine of the treatment classrooms and four of the control classrooms; teacher candidates in all three field experience courses were involved in assisting in the treatment classrooms whereas only teacher candidates in the last two field experience courses were involved in this type of assistance in the control classrooms.

Teacher candidates also contributed more directly to student learning when the cooperating teacher was in the lead. While one cooperating teacher was demonstrating how to get to a website that would be used in an independent station, the teacher candidate listed the required steps on the white board as the cooperating teacher performed them so the students would have the step-by-step directions when they reached that station. Another teacher candidate modeled note-taking for the students as the cooperating teacher lectured. Two teacher candidates directly assisted individual students during cooperating teacher led instruction. Near the end of a class session mostly led by one teacher candidate, the cooperating teacher took over the lead so that the teacher candidate could look through the assignments that students were handing in from that class period. The teacher candidate was able to return some of the assignments that were incomplete to the students so they could finish them before leaving for the day. Students benefited from getting immediate feedback and being able to complete the assignment while it was still fresh in their minds. These types of instructional assistance were observed in three treatment and two control classrooms and involved teacher candidates in the final two field experience courses.

The One Teach, One Assist co-teaching strategy was also used in both treatment and control classrooms when the teacher candidate was in the lead. Many of the cooperating teachers assisted by performing the same types of routine tasks that the teacher candidates had done while the cooperating teacher was in the lead: taking attendance, handling audio-visual equipment, and handing out papers. Cooperating teachers also assisted by facilitating the movement of students in and out of the classroom when they arrived late or needed to leave the room. One cooperating teacher left the rooms to make copies when the projection system malfunctioned; the teacher candidate continued leading instruction in her absence and the lesson was able to progress once the copies were obtained. Cooperating teachers also assisted with behavioral management both verbally and using proximity, in the same way as the teacher candidates had assisted. This form of One Teach, One Assist allowed the teacher candidate to focus on instruction by assisting with non-instructional, but essential, tasks and was observed in six treatment classrooms and two control classrooms. In the control classrooms, only teacher candidates in the final field experience course were assisted in these ways whereas teacher candidates in all three field experience courses in the treatment classrooms used this form of One Teach, One Assist.

Cooperating teachers also assisted the lead teacher candidates in several ways that were more directly related to instruction. One cooperating teacher assisted an individual student while another aided students in following along with the lesson by pointing to items on the projected slide, similar to the assistance provided by the teacher candidates. However, the cooperating teachers also provided unique assistance. Several cooperating teachers provided clarification during teacher candidate led instruction by interjecting

into the presentation. The input of the cooperating teachers appeared to be welcome by the teacher candidates rather than being an interruption. One treatment group cooperating teacher working with a teacher candidate in the first field experience course assisted by calling on students who had not yet been heard from, indicating when class was almost over so the teacher candidate could begin the closing activity, and adjusting the homework assignment written on the board based on class progress with the lesson. Only one control group cooperating teacher of a final field experience teacher candidate assisted in these ways whereas six treatment group cooperating teachers with teacher candidates in all field experience courses did.

Teacher candidates commonly took the lead in facilitated student-centered activities while the cooperating teachers assisted with various non-instructional tasks. Teacher candidates, however, were not observed assisting their cooperating teachers in these ways when the cooperating teachers were facilitating student-centered activities. Cooperating teachers were able to deal with behavior management issues and redirected students in their vicinity, conversed with other staff members present in the room such as special education personnel, took attendance, and checked for homework or warm-up completion. Cooperating teachers also assisted students in obtaining make-up work from absences, answering student questions about grades or assignments, and getting a new student set up in the class. In one classroom where a lot of students had been absent the previous day, the cooperating teacher proctored a missed quiz, graded the quiz immediately, and returned it to the students to use for the in-class activity that the teacher candidate was facilitating. This situation was classified as co-teaching since the immediate grading of the quiz allowed the students to proceed with the current lesson

which they would not have been able to do otherwise. Other situations where one of the teachers was grading papers were not classified as co-teaching. Nine treatment classrooms spanning all three field experience courses and three control classrooms with teacher candidates in the first and final field experience course provided evidence of this form of One Teach, One Assist.

Team Teaching

The Team Teaching co-teaching strategy was also observed in 15 of the treatment and eight of the control classrooms. Team teaching took several different forms but was characterized by both teachers being involved in the same types of activities at the same time. It was seen in classrooms with teacher candidates in all three field experience courses.

The most common form of Team Teaching involved both the cooperating teacher and the teacher candidate in assisting students during student-centered activities, which was documented in 11 of the treatment classrooms and eight of the control classrooms. Teacher candidates in all three field experience courses were involved in joint assisting Team Teaching in both treatment and control classrooms. In order for this situation to be truly co-teaching, there have to be enough students in need of assistance to require both teachers; at least two treatment and two control classrooms fit this description. It was sometimes difficult to determine if one teacher would have been able to meet all the students' needs independently. However, the focus of co-teaching is on meeting student needs so if students are engaged in a student-centered activity and do not require the assistance of either teacher, it may not really matter what the two teachers are doing. Having two teachers available to assist students as needs arise is more likely to benefit

students than if one of the teachers is working on grading papers, checking e-mail, or performing other non-instructional tasks while the other is available to help students.

Another commonly observed form of Team Teaching involved both teachers in classroom management which was documented in eight treatment and three control classrooms. Teacher candidates in all field experience courses were involved in joint management Team Teaching in treatment classrooms, while only teacher candidates in the first and last field experience courses were involved in control classrooms. Both teachers were often involved in handing out papers, collecting papers, or managing classroom supplies. Occasionally, one of the teachers would be passing out papers or facilitating acquisition of supplies while the other took attendance, provided make-up work for students, or answered student questions. Both teachers were also observed checking for correct answers on in-class activities and jointly managing student behavior. Cooperatively performing these routine and management tasks reduced the amount of time spent on non-instructional tasks and freed up more time for engaging students in learning.

The final type of Team Teaching observed was the more traditional joint presentation form. Contrary to the other co-teaching strategies previously discussed, joint presentation Team Teaching was more commonly seen in control group classrooms, being documented in four control classrooms as compared to two treatment classrooms. It was exclusively documented with teacher candidates in the final field experience course in the control classrooms whereas a teacher candidate in each of the two latter field experience courses was involved in the two treatment classrooms. The key characteristics present in situations classified as joint presentation Team Teaching were that both

teachers were involved in leading instruction and both interjected frequently without creating any animosity. In one classroom, two sessions of the same class were observed, and the two teachers took on different, but equal, roles in the two classes. In another classroom, both teachers reminded students of appropriate test taking strategies prior to administering a test and both participated equally in discussing the students' reactions to the test when it was finished. The two teachers commonly presented two perspectives on a topic or re-stated instructions in two different ways. Joint presentation Team Teaching was not sustained throughout large portions of the class periods observed but was noted periodically.

Station Teaching

Station Teaching was evident in three high school treatment classrooms and four middle school control classrooms. Teacher candidates from all three field experience courses were involved in Station Teaching in the control classrooms while teacher candidates from the final two field experience courses were involved in the treatment classrooms.

Various numbers of stations were implemented with the role of the two teachers dependent on the number of stations. Two classrooms, one treatment and one control, each utilized two stations. In the treatment classroom, the teacher candidate and the cooperating teacher each facilitated one station. In the control classroom, the teacher led one station and kept an eye on the other independent station while the teacher candidate helped individual students at either station as needed. Two classrooms, one treatment and one control, used three stations; the teacher candidate led one of the stations in both classrooms. The cooperating teacher in both classrooms led one of the other stations and

also managed the students at the third independent station. The two additional control classrooms utilized four stations. In one of the classrooms, the teacher candidate facilitated one station while the cooperating teacher managed the other three independent stations. In the other classroom, both the teacher candidate and the cooperating teacher rotated among the four independent stations, assisting students as needed and also managing the activity. In the final treatment classroom, the teacher candidate and cooperating teacher both roamed among six stations, assisting students and managing the activity.

In all but one classroom, the cooperating teacher took the lead in facilitating the overall management of the station activities. The cooperating teachers gave instructions at the beginning of class for all of the station activities. They also determined when groups should rotate to the next station and announced how that transition should occur. One cooperating teacher also stepped in at the teacher candidate led station several times to interject into the activity. In one control classroom, the final field experience teacher candidate took on the lead role of managing the overall activity.

Differentiated Teaching

Differentiated Teaching was observed in one treatment theater arts classroom. Students were divided into two groups who were preparing two different scenes. The cooperating teacher worked with one of the groups and the teacher candidate worked with the other group. Each group also had a student director who was in charge of the rehearsals. The learning objectives for both groups of students were the same, but the route to achieving those objectives were somewhat different as the scenes were different. The One Teach, One Assist co-teaching strategy was also used by the teacher candidate

and student director during this class period with the student director often in the lead and the teacher candidate assisting as questions arose.

Supplemental Teaching

Only one treatment classroom utilized the Supplemental, or Alternative, Teaching co-teaching strategy. The cooperating teacher allowed students who desired more help on a student-centered activity to join her on the floor to work through the activity together. Meanwhile, the teacher candidate monitored the rest of the class and answered student questions as needed.

Student Achievement

Q1 Do secondary students benefit academically from having a teacher candidate in their classroom in addition to their assigned classroom teacher compared to only having their assigned teacher present?

Q2 Do secondary students benefit academically from having their assigned classroom teacher attend professional development on co-teaching with a teacher candidate as compared to students in classrooms where their assigned classroom teacher receives no professional development on co-teaching?

Q3 Does the effect on student achievement of having a teacher candidate present differ between classrooms where the assigned classroom teacher attended professional development on co-teaching with a teacher candidate and classrooms where the assigned classroom teacher did not attend professional development on co-teaching?

Pretest and posttest student achievement data from curriculum-based semester exams were only available from one control group cooperating teacher and one co-teaching cooperating teacher. There were 13 consented control group cooperating teachers and nine co-teaching cooperating teachers who worked with a Phase 3 teacher candidate during either semester of the study, and therefore, 22 sets of data were potentially available.

Pretest and posttest means scores with standard deviations as well as the mean differences from the classrooms contributing data are shown in Table 3. All pretest and posttest scores were normalized prior to analysis. The data did not violate the normality assumption based on a non-significant ($p > .05$) Kolmogorov-Smirnov test and visual analysis of the linear normal probability plot. The data also did not violate the equality of variances assumption based on non-significant ($p > .05$) Breusch-Pagan and White's Tests. Variance inflation factors for both explanatory variables were approximately 1, and therefore, multicollinearity was not present. Experimental group membership, co-teaching versus control, was not a statistically significant factor [t (1) = -0.00, $p > .05$]. The presence of a teacher candidate in the classroom also did not have a statistically significant effect [t (1) = 0.00, $p > .05$].

Table 3

Student Achievement Data Summary

	Pretest ($M \pm SD$)	Posttest ($M \pm SD$)	Difference ($M \pm SD$)
Control classroom			
Teacher candidate (n = 12)[a]	93 ± 28	144 ± 26	51 ± 16
No teacher candidate (n = 11)[a]	88 ± 25	146 ± 27	57 ± 22
Treatment classroom			
Teacher candidate (n = 27)	58 ± 19%	67 ± 18%	8 ± 22%
No teacher candidate (n = 27)	59 ± 18%	73 ± 19%	13 ± 17%

[a]Score = words read – mistakes, for a fluency test.

Based on this very limited dataset, it does not appear that the Phase 3 teacher candidates had a statistically significant effect on the academic achievement of the

students in the class sections they worked with when compared to the other sections of the same classes taught by the same teachers. There also does not appear to be a difference between the co-teaching and control classrooms. However, this data set is extremely small so further research is needed to determine the effect of teacher candidates and/or co-teaching on student achievement.

Teacher Candidate Activity

Q4 Are teacher candidates more active in their field experience practica, prior to student teaching, if their cooperating teachers have attended professional development on co-teaching with a teacher candidate than if they work with a cooperating teacher who has not attended professional development on co-teaching with a teacher candidate and is there a difference across the different levels of field experience?

Validation of Log Sheets

Thirteen sets of comparable data were available to validate the teacher candidate activity log sheets. These 13 sets of observation and logged data represent 43% of the 30 teacher candidates who submitted usable log sheets. Data from teacher candidates in all three field experience courses (n = 4, 6, and 3, respectively) as well as from both the co-teaching (n = 5) and control (n = 8) groups were included. A summary of the results is shown in Table 4. For all five activity categories, the variability was high as shown by the wide ranges of percent difference values and the high standard deviations. However, the measures of central tendency were all relatively close to zero. Only three teacher candidates, or 23% of participants contributing validation data, had percent difference values of more than 20%.

Table 4

Comparison of Reported vs. Observed Activities

	Percent Difference (n = 13)			
Activity	$M \pm SD$	Median	Mode	Range
Observation	1 ± 23	-4	None	-36 – 58
Assists individuals or groups of students	-5 ± 10	-2	0	-24 – 9
Assist with instruction (in front of class)	-3 ± 14	0	0	-42 – 12
Assist teacher with non-instructional tasks	6 ± 10	4	0	-12 – 27
Co-plan or talk with teacher about instruction, etc.	0 ± 9	0	0	-15 – 19

Note. Data used to compute these values were calculated using the formula: percent difference = [(observed time in minutes – log sheet time in minutes)/total observed time in minutes] x 100.

The largest discrepancies were for the observation category. Teacher candidates under-reported and over-reported time spent observing. The teacher candidates who over-reported time in observations most commonly did not recognize the amount of time they spent assisting with non-instructional tasks. Only one teacher candidate misreported substantive time spent co-planning as time observing. Teacher candidates who under-reported time for observation most commonly misclassified the time as assisting individual students or groups. One teacher candidate included time spent observing as assisting with instruction. All three teacher candidates who had percent differences of more than 20% misrepresented their observation time by more than 20%.

There were fewer extreme percent difference values for the other activity categories, and these values were largely compensation for the misrepresented observation times. Assisting individuals or groups, assisting with instruction, and

assisting with non-instructional tasks each had one percent difference of more than 20%. Each of these large percent differences was parallel to one of the three extreme percent difference values for observation.

Therefore, the log sheets appear to be a reasonable representation of the activities in which the teacher candidates were involved in the classrooms. Care should be exercised in interpreting the data from the teacher candidate log sheets.

Effect of Co-Teaching

Complete log sheets were obtained from 30 teacher candidates out of 52 consented teacher candidates placed at schools involved in the study, which constitutes 58% return. The average percentages of time spent in the five activities for teacher candidates in the three field experience courses in the co-teaching and control classrooms are shown in Table 5. The co-teaching intervention did not affect the time spent in the various activities of the three field experience courses as the co-teaching main effect and all interaction terms involving co-teaching in the beta regression analysis were not statistically significant ($p > .05$).

The only two statistically significant interactions involved the Phase 1 and Phase 3 field experience courses and the activities. The mean percentages of time spent by Phase 1 and Phase 3 teacher candidates varied significantly across the activities of observation, assisting with instruction, assisting with non-instructional tasks, and co-planning. Differences in time spent in the various activities across these field experience courses are expected as the requirements of the final field experience course are quite different from the requirements of the first course.

Table 5

Teacher Candidate Activity Data Summary

Activity by field experience course	Percentage of time			
	Co-Teaching		Control	
Observation	*n*	*M* ± *SD*	*n*	*M* ± *SD*
Phase 1	4	51 ± 28	6	63 ± 22
Phase 2	4	26 ± 20	7	46 ± 29
Phase 3	5	33 ± 17	4	22 ± 24
Assists individuals or groups of students				
Phase 1	4	25 ± 34	6	24 ± 21
Phase 2	4	35 ± 21	7	24 ± 18
Phase 3	5	24 ± 12	4	19 ± 13
Assist with instruction (in front of class)				
Phase 1	4	5 ± 6	6	2 ± 2
Phase 2	4	5 ± 5	7	10 ± 12
Phase 3	5	18 ± 7	4	28 ± 19
Assist teacher with non-instructional tasks				
Phase 1	4	5 ± 5	6	8 ± 9
Phase 2	4	18 ± 5	7	11 ± 14
Phase 3	5	8 ± 9	4	13 ± 6
Co-plan or talk with teacher about instruction, etc.				
Phase 1	4	14 ± 9	6	3 ± 5
Phase 2	4	10 ± 10	7	9 ± 10
Phase 3	5	17 ± 6	4	16 ± 10

Although not statistically significant, there were some positive patterns of activity reported by the co-teaching teacher candidates compared to the control teacher candidates, as evident from the summary data shown in Table 5 and Figure 1. Figure 1

represents the percentages of the total time recorded by all 30 teacher candidates that were spent in each type of activity for the two experimental groups.

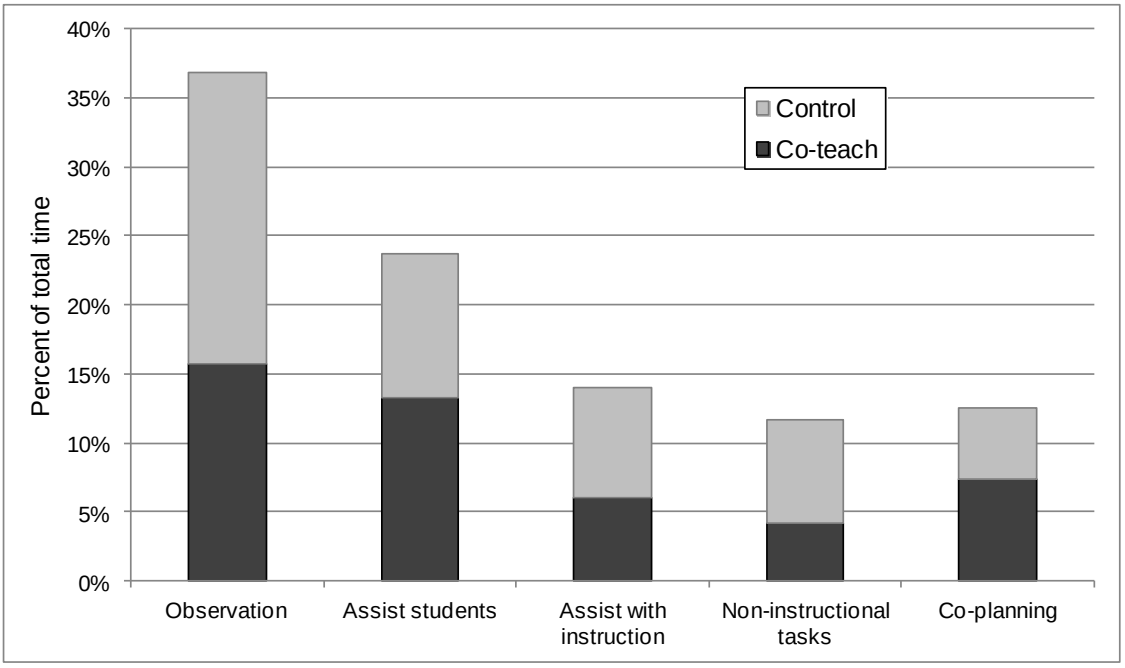

Figure 1. Percentage of Total Time Recorded for Activities

Observations

A total of 706 hours of observation were recorded by the 30 teacher candidates in this study. This accounts for the largest percentage of time spent on any of the five activities, 37% of the total hours logged, as shown in Figure 1. Of these 706 hours, 404 hours, or 57% of the observation hours, were recorded by teacher candidates in the control group.

Both Phase 1 and 2 teacher candidates in the co-teaching classrooms spent less of their time, on average, in observation than their peers in the control classrooms. There was a lot of variation in the percent of time spent in observations by both co-teaching and control Phase 1 and 2 teacher candidates, as evident by the relatively large standard deviations. One of the Phase 1 co-teaching teacher candidates only spent 20% of her time

in observations whereas another Phase 1 co-teaching teacher candidate spent 88% of her time in observations. Similarly, a Phase 1 control teacher candidate only spent 33% of her time in observations compared to a peer who spent 92% of her time in observations. Phase 2 co-teaching teacher candidates ranged from 11% to 55% of time in observations verses 0% to 88% for control teacher candidates. The researcher performed classroom observations in most of the classrooms with these extreme percentages of time spent on observation. The teacher candidates who spent less time in observation were working with cooperating teachers who often used student-centered instructional approaches; the teacher candidates who spent the majority of their time in Phase 1 and 2 observing were working with cooperating teachers who often implemented on teacher-centered instructional approaches.

Phase 3 teacher candidates in control classrooms spent less of their time, on average, observing than did their peers in co-teaching classrooms. The percentages of time spent in observation in both experimental groups varied widely: the range for the control group was 1% to 57% and for the co-teaching group was 17% to 52%. This wide range of percentages is unexpected for teacher candidates in the final field experience course; there appears to be extreme differences in the experiences of Phase 3 teacher candidates. The teacher candidates with the highest percentages of time in observation also had the lowest percentages of time in instruction. The Phase 3 control group teacher candidates, on average, spent less of their time in observations than either the Phase 1 or 2 control group teacher candidates. The Phase 3 co-teaching teacher candidates, on average, spent less of their time observing than the Phase 1 co-teaching teacher candidates but more of their time than the Phase 2 teacher candidates. It is expected that

the percentage of time spent in observation would decrease from Phase 1 to Phase 2 to Phase 3.

Instruction

All of the teacher candidates combine logged 268 hours of assisting with instruction, and 57% of this time was logged by teacher candidates in the control group. Only five teacher candidates out of 30 spent more than 20% of their time assisting with instruction. This included four Phase 3 teacher candidates, two each from the co-teaching and control groups, and one Phase 2 control group teacher candidate.

Not much time was spent by Phase 1 teacher candidates involved in assisting with instruction. Teacher candidates in the first field experience course typically have not been involved in leading instruction. However, two of the co-teaching teacher candidates logged approximately 10% of their time assisting with instruction. The other three co-teaching teacher candidates along with two of the control teacher candidates logged no time for assisting with instruction. The remaining control teacher candidates spent between 1% and 5% of their time assisting with instruction.

Researcher classroom observations also documented Phase 1 teacher candidates assisting with instruction, but the teacher candidates in the two experimental groups had different levels of involvement. One co-teaching teacher candidate was observed in the lead role for an entire class period, and a second co-teaching teacher candidate was intimately involved in assisting with instruction throughout the class period. On the other hand, two Phase 1 teacher candidates in the control group were observed assisting or leading instruction but to a lesser extent, and they were involved in instruction for only a small portion of the class periods.

Phase 2 teacher candidates in control classrooms, on average, spent larger percentages of their time assisting with instruction than did their peers in co-teaching classrooms. One of the control teacher candidates logged 34% of her time assisting with instruction. All other control and co-teaching teacher candidates logged less than 13% of their time assisting with instruction. The Phase 2 teacher candidates in control classrooms spent more of their time, on average, assisting with instruction than did their Phase 1 peers whereas in co-teaching classrooms, the average percentage of time spent by Phase 1 and 2 teacher candidates was very similar. Researcher classroom observations did not support these results. Phase 2 co-teaching teacher candidates were more often observed to be directly involved in assisting with or leading instruction than Phase 2 teacher candidates in control classrooms.

Phase 3 teacher candidates are required to teach five lessons over the course of the semester. Two of the teacher candidates in control classrooms assisted with or led instruction much more than required as they logged more than 40% of their time in their field experiences in this category. One of these teacher candidates worked at one of the middle schools implementing blended learning and was observed leading one of the station activities during the researcher observation. The other teacher candidate was working in a more traditional mathematics classroom which included teacher-led instruction followed by student work time but with a very organized and experienced cooperating teacher who shared her lesson plans with the teacher candidate electronically. This teacher candidate took the initiative to get involved with instruction regularly, and his cooperating teacher was flexible enough to allow his active participation. On the other hand, another teacher candidate in a control classroom only spent 7% of her time

assisting with instruction. She worked in a teacher-centered classroom but with a teacher hosting his first teacher candidate and who was not terribly organized. He did not provide many opportunities for his teacher candidate to get involved in the classroom.

The percentages of time spent on instruction by the co-teaching teachers, on average, were less than that of the control teacher candidates and were more moderate, ranging from 11% to 27%. Phase 3 teacher candidates spent more of their time on instruction than either Phase 1 or Phase 2 teacher candidates.

Assisting Students

A total of 454 hours were logged by participating teacher candidates for assisting individual and groups of students. This represents 24% of the total hours recorded which is the second highest number of hours behind observation as shown in Figure 1. Fifty-six percent of these hours were logged by co-teaching teacher candidates.

Teacher candidates in the first field experience course spent about the same amount of their time, on average, assisting individual students and groups of students regardless of whether they were in a co-teaching or control classroom. Again, the range of times spent on assisting was wide with co-teaching teacher candidates' percentages spanning from no time to 74% and control group teacher candidates' percentages ranging from no time to 60%. In general, teacher candidates who spent a lot of time in observations spent minimal time assisting students and worked in classrooms dominated by teacher-centered instruction whereas teacher candidates who spent little time observing, spent significant time assisting and worked in student-centered classrooms.

Phase 2 teacher candidates in the co-teaching classrooms spent a larger percentage of their time, on average, assisting individual students and groups of students

than did their peers in control classrooms. The ranges of times spanned from 16% to 63% for co-teaching teacher candidates and from 2% to 53% for control group teacher candidates. The Phase 2 teacher candidates in co-teaching classrooms spent more time assisting students than the Phase 1 co-teaching teacher candidates whereas the Phase 1 and 2 teacher candidates in control classrooms spent very similar amounts of their time assisting students.

The Phase 3 co-teaching teacher candidates spent a slightly larger percentage of their time, on average, assisting individual students and groups of student than did their control group peers. The ranges of percentages for the two groups were similar with the co-teaching group spanning from 10% to 41% and the control group spanning 0% to 30%. Phase 3 teacher candidates in both experimental groups logged less of their time, on average, assisting students than their Phase 1 or 2 peers, although the difference between the Phase 3 and Phase 1 co-teaching teacher candidates was small.

Researcher classroom observations also documented teacher candidates assisting students, mostly during student-centered activities or individual work time. Two teacher candidates working in control classrooms mentioned to the researcher during these classroom observations that they specifically helped certain groups of students who needed extra assistance. One teacher candidate targeted students who were English Language Learners and the other, students who struggled. Most of the teacher candidates, however, did not appear to target any specific groups of students but helped all students.

Co-Planning

Participating teacher candidates logged 239 hours in co-planning and conversing with their cooperating teachers in this study, which is 13% of the total logged hours. Co-

teaching teacher candidates logged more hours in co-planning, 141 hours or 59% of the total, than control group teacher candidates. Eight teacher candidates, all but one working in control group classrooms, logged less than an hour of time for conversing with their cooperating teachers over the course of the semester. All eight of these teacher candidates also spent their largest percentage of time observing.

Phase 1 co-teaching teacher candidates, on average, spent more of their time talking to their cooperating teacher or co-planning than their peers in control classrooms. All of the Phase 1 co-teaching teacher candidates spent at least 5% of their time co-planning whereas only one of the six teacher candidates in the control classrooms spent more than 5% of their time co-planning.

Co-planning consumed on average approximately 10% of Phase 2 teacher candidates' time. Both experimental groups had similar variance in the percentage of time spent co-planning with two co-teaching teacher candidates and three control teacher candidates spending less than 3% of their time in conversations with their cooperating teacher. One of the co-teaching teacher candidates who logged less than 3% of his time for co-planning also used e-mail communication with his cooperating teacher to co-plan between their class times working together, therefore, his logged co-planning time does not represent all of the time they spent co-planning. Two co-teaching teacher candidates and two control teacher candidates spent approximately 20% of their time co-planning while the two final control teacher candidates spent close to 10% of their time. The Phase 2 control group teacher candidates, on average, spent larger percentages of their time conversing with their cooperating teacher than their Phase 1 peers whereas Phase 2 co-teaching teacher candidates, on average, spent less of their time co-planning.

Lastly, the Phase 3 teacher candidates in the co-teaching classrooms spent slightly more of their time, on average, co-planning than did their peers in control classrooms. The range of times for the co-teaching teacher candidates was slightly narrower, 8% to 25%, than the control group teacher candidates, 5% to 29%. The control group teacher candidate who spent the majority of his time assisting with instruction also had the largest percentage of logged time for co-planning. Both experimental groups of Phase 3 teacher candidates spent larger percentages of their time, on average, co-planning than either the Phase 1 or 2 teacher candidates.

Non-Instructional Tasks

A total of 225 hours, or 12% of the total, was recorded by participating teacher candidates as assisting with non-instructional tasks. Teacher candidates in the control group were responsible for 64% of these hours.

Not much time was spent by Phase 1 teacher candidates assisting with non-instructional tasks. One of the control teacher candidates spent 25% of his time assisting with non-instructional tasks whereas one co-teaching teacher candidate spent 11% of her time in this category. The remaining control group teacher candidates spent less than 9% of their time in non-instructional assistance; the rest of the co-teaching teacher candidates spent less than 5% of their time helping with non-instructional tasks.

Non-instructional tasks accounted for close to 20% of Phase 2 teacher candidates' time in co-teaching classrooms. Control group teacher candidates' time spent on these tasks was much more variable with four teacher candidates only spending 2% or 3% of their time, two spending approximately 15% of their time, and one spending almost 40% of his time on non-instructional tasks. The teacher candidate who spent almost 40% of his

time in his control classroom assisting with non-instructional tasks also spent over four times the total amount of time required in his field experience practica, therefore, he spent 55 hours grading and distributing papers and helping with other tasks not directly related to instruction during the semester. Phase 2 teacher candidates in both experimental groups logged more of their time, on average, assisting with non-instructional tasks than their Phase 1 peers with the difference larger in co-teaching classrooms.

Phase 3 teacher candidates in the control classrooms, on average, spent more time assisting with non-instructional tasks than their co-teaching counterparts. The range of times for the co-teaching group was wider, from 1% to 22%, than the range for the control group, from 10% to 22%. Phase 3 control group teacher candidates spent more time, on average, on non-instructional tasks than the Phase 1 or 2 teacher candidates. The Phase 3 co-teaching teacher candidates spent more of their time, on average, contributing to non-instructional tasks than the Phase 1 teacher candidates but less of their time, on average, than the Phase 2 teacher candidates.

Classroom observations by the researcher also documented teacher candidates involved in non-instructional tasks in 20 of the 36 classrooms observed, 10 classrooms from each experimental group. Teacher candidates were involving in grading in five control classrooms and three co-teaching classrooms. They assisted with preparing, distributing, or collecting supplies in four classrooms from each experimental group. Passing back graded assignments or collecting assignments occurred in two control classrooms and four co-teaching classrooms, and taking attendance was seen in three control and two co-teaching classrooms.

Cooperating Teacher Perceptions

Q5 Do classroom teachers perceive benefits from attending professional development on co-teaching with a teacher candidate, prior to student teaching, compared to working with a teacher candidate without attending professional development on co-teaching?

The cooperating teachers' responses to the end-of-semester survey provided insight into broader concepts than proposed in Research Question 5. The questions included on the end-of-semester survey (see Appendix C) focused on the benefits and challenges of working with teacher candidates in field experience practica prior to student teaching as well as any suggestions for program change. Co-teaching cooperating teachers were also asked about their experiences with the professional development and how the current semester compared to previous work with teacher candidates. The answers to these survey questions provided insight into three broad concepts: expectations related to the practicum, the utility of teacher candidates during a practicum, and the overall outcomes of the practicum.

Expectations

Although there were no questions on the cooperating teacher end-of-semester survey that asked specifically about the expectations of the cooperating teachers, 20 out of the 33 cooperating teachers (61%) who completed the survey made comments related to expectations of the practicum. These comments came from 10 cooperating teachers from each experimental group, which represents 71% of the co-teaching respondents and 53% of the control group respondents. Cooperating teacher comments related to expectations can be divided into two categories: their own expectations for the practicum experience and the expectations of the teacher preparation program.

Cooperating teacher expectations. Cooperating teacher comments related to their own expectations for the practicum can be further categorized as either focusing on their own experience or on the experiences of others. Several cooperating teachers mentioned what they hoped to get out of the experience of working with a teacher candidate or why they chose to volunteer to host a teacher candidate. Another group of teachers emphasized the expectations they have for their teacher candidates or for their students.

Four cooperating teachers from the control group, or 21% of control group respondents, and three cooperating teachers from the co-teaching group, or 21% of co-teaching respondents, shared their own personal expectations for the practicum experience; most of the comments from the two groups were similar. Cooperating teachers from both groups expressed their enjoyment of meeting and getting to know teacher candidates. They also expressed their desire to share their own teaching experiences with teacher candidates and to show them what teaching looks like. One of the co-teaching cooperating teachers, Ms. Carlo, raised a unique aspect of her expectations for the practicum experience by stating that working with a teacher candidate encouraged her to focus on the positive aspects of teaching. Ms. Platero, a control group cooperating teacher, commented that she feels she has to be "on" whenever she has a teacher candidate in her room. Both Ms. Carlo and Ms. Platero suggest that cooperating teachers have different expectations for themselves when they work with a teacher candidate than when they simply teach their secondary students.

Thirteen of the cooperating teachers, or 39% of respondents, mentioned more altruistic expectations for the practicum. Six of these cooperating teachers were from the

co-teaching group, which represents 43% of co-teaching respondents, and seven were from the control group, which represents 37% of the control group respondents. Altruistic expectations were expressed for secondary students and for teacher candidates.

Three control group teachers concentrated mostly on expected benefits for their students when a teacher candidate was present in their classroom. Mr. Lambros stated, "I like for my students to see lifelong learners and people who are attending college to fulfill an ambition." Similarly, Ms. Tolson noted that her students have many questions to ask a college student. Ms. Nardone wrote extensively about the opportunity for students to learn to self-regulate their behavior and take responsibility for their own learning when a teacher candidate is present in the classroom. She even explicitly discusses this expectation with her students before a teacher candidate begins to work with them. None of the co-teaching cooperating teachers mentioned these types of student-focused expectations for the practicum.

Three control group teachers (16%) and five co-teaching teachers (36%) focused on the mentoring aspects of the practicum experience. The comments from the teachers in the two experimental groups were very similar. Co-teacher Ms. Allbritton stated she likes to "give back to the program," whereas co-teacher Ms. Nicolas wrote she enjoys supporting teacher candidates. In the same manner, control group teacher Ms. Nardone responded, "any time I can help a teacher feel comfortable and enjoy the process, I feel like I am helping provide the gift of education to future generations in a far greater manner than just teaching in my own classroom." Two other control group teachers and one co-teaching teacher indicated that they expected to have conversations with their

teacher candidates about instruction and other topics which suggests they saw themselves as mentors.

Two of the co-teachers provided more detail on their expectations for mentoring their teacher candidates. Ms. Oliver focused on the individualized nature of mentoring:

> Each teacher candidate is unique and brings about a different experience. You can't predict how a teacher candidate and teacher will interact with the classroom of students until it happens. It isn't until you're into the experience that you realize the benefit or lack thereof for all involved.

Ms. Renate mentioned three different aspects of mentoring in her responses. First, she stated that she needed to explain her strategies and rationale to her teacher candidate. Second, she indicated that the professional development on co-teaching made her more conscientious of the need to provide her teacher candidate with a variety of experiences. And finally, she explained that she had focused on building up her teacher candidate's confidence in his ability to teach in order to prepare him for student teaching.

Five teachers, two from the co-teaching group and three from the control group, stated expectations related to teacher preparation in general. Co-teachers Mr. Macy and Ms. Renate both made comments that indicated that they expected teacher candidates in different field experience courses to be involved in the classroom in different ways. Both of these teachers were working with teacher candidates in the first field experience course. Mr. Macy did not make any other comments related to what types of activities he expected his teacher candidate to be involved in. On the other hand, the earlier referenced comments of Ms. Renate indicate that she expected her teacher candidate to be involved in a variety of activities including assisting with instruction. Co-teacher Ms. Nicolas, who worked with a teacher candidate in the final field experience course, stated, "A lot of instructional strategies are learned and acquired from practice," indicating that she

expected her teacher candidate to learn by doing. The two control group teachers who worked with teacher candidates in the first field experience course insinuated that they expected the teacher candidates to simply observe. Mr. Lambros wrote that it was a challenge to find time for this teacher candidate to "come in to observe my work." Similarly, Ms. Kenyon said a challenge was that her teacher candidate could only be present in her classroom once per week which meant that "there could be the possibility of observing only parts of a new lesson each time." It appears that the expectations for the types of activities early field experience teacher candidates should be involved in were different for the control group teachers than for the co-teaching group teachers. This concept will be discussed more in the later section on Utilizing a Teacher Candidate.

Co-teacher Ms. Renate also expressed interest in the expectations of her teacher candidate and adjusting her own expectations to meet the needs of her teacher candidate. This comment is unique among the responses related to the expectations of cooperating teachers for working with a teacher candidate in a field experience practicum.

Program expectations. The second category of responses related to expectations for the practica was related to the expectations of the teacher preparation program. Three teachers from the control group, and none of the co-teaching cooperating teachers, expressed their desire for better communication of the program expectations for the teacher candidates. Specifically, these cooperating teachers wanted to know the expected level of involvement for teacher candidates in the classroom, the required hours teacher candidates would need to fulfill, and the assignments that the teacher candidates would need to complete along with due dates.

In contrast, six of the co-teaching cooperating teachers listed the establishment of expectations for the semester as a benefit of the professional development on co-teaching with a teacher candidate. Three of these cooperating teachers also commented that it was helpful for the teacher candidates to also be present and be aware of the expectations for the semester. More specifically, Mr. Esteban stated that the professional development "put me in the mindset that I needed to share responsibility," and Ms. Gust mentioned that it was a "helpful reminder of what the process can look like." Ms. Oliver stated that the information on co-teaching was not new to her, but what was new was "the fact that the teacher candidate and I were to perform as a co-teaching pair." In addition, Ms. Allbritton, who graduated from this teacher preparation program recently, expressed appreciation that changes are being made to the program to make it more hands-on in the early field experience courses and that the changes were communicated.

The comments related to program expectations were not universally negative from the control group cooperating teachers or universally positive from the co-teaching teachers. Control teacher Mr. Lambros stated he likes to hear what teacher candidates are doing to become teachers and to learn about the coursework they are required to complete which implies that he had knowledge of some of the recent expectations of the program. Two other control group teachers offered general praise for the teacher preparation program: Ms. Kenyon stated that the university "takes a lot of variables into consideration before sending us the teacher candidates," and Ms. Oralee stated that the university is "doing a great job in preparing the teacher candidates and monitoring their progress." Three of the co-teaching teachers commented that they saw little or no benefit to the professional development sessions; further research will need to be conducted to

explore the reasons for these comments. One of these co-teaching teachers also made a comment that expressed that she had misunderstood the expectations related to co-teaching which will also need to be explored in more detail.

Finally, seven cooperating teachers from the control group (37%) and four from the co-teaching group (29%) offered suggestions for the teacher preparation program to adopt. Three of the co-teaching teachers and one of the control group teachers made suggestions relating to the logistics of scheduling the teacher candidates' time in the secondary classroom. Ms. Hilario, a co-teaching teacher, liked the flexibility of scheduling she had with her teacher candidate during the semester while control group teacher Ms. Raven recommended more flexibility in schedules and due dates. Co-teacher Mr. Lyndon recommended that all teacher candidates set up their schedules so they can work with a single class or two throughout the semester because the students benefit from such consistency. And Ms. Carlo expressed concern about having teacher candidates student teach in the fall semester since cooperating teachers haven't had time to get to know their students yet; the teacher candidate working with Ms. Carlo is scheduled to student teach during a fall semester which likely raised this concern.

Two of the control group teachers' suggestions focused on placement procedures. Mr. Vale would like to see more teacher candidates placed at his school and within his classroom whereas Ms. Tolson expressed concern that the relocation of their school farther from the university campus may inhibit their receipt of teacher candidates. Also on a logistical note, control group teacher Ms. Raven suggested that the teacher preparation program find a single evaluation form and format to use rather than changing it frequently.

Two control group teachers and one co-teaching teacher suggested activities that they think the teacher preparation program should require of teacher candidates. Ms. Herschel suggested having teacher candidates "develop a lesson they want to teach," which she did with her Phase 3 teacher candidate. Ms. Merkle, who worked with two Phase 2 teacher candidates, stated she would like to see them "bring their own ideas/mini lesson plans to the classroom," or design and implement a "focus lesson for a small group," so that the teacher candidates would "get a feel for the whole process." Co-teacher Ms. Renate, who worked with a Phase 1 teacher candidate, suggested providing teacher candidates with a basic template lesson design which could be used in "evaluating what the teacher does and observing different components of a lesson." Interestingly, both control group teachers suggest activities that will allow the teacher candidates to become more involved with classroom instruction whereas the co-teaching teacher suggested structured observation. However, most of Ms. Renate's other statements which have already been referenced indicate that she expected her teacher candidate to be involved in all aspects of the classroom rather than just observing.

These logistical suggestions of the cooperating teachers from the two experimental groups somewhat mirror their tone toward the communication of program expectations. Co-teaching cooperating teachers, for the most part, emphasized what worked for them in their practicum semester whereas control group cooperating teachers intimate lack of communication, fear, or frustration which could likely be alleviated with better communication between the university and the schools.

The final two control group cooperating teachers' suggestions are more substantive. Mr. Lambros recommended that the university faculty become more

involved in the practica experiences of the teacher candidates prior to student teaching. The co-teaching initiative addressed this need. Ms. Nardone raised concern about the characteristics of the teacher candidates she has worked with recently. She stated that most of the teacher candidates "are scared to step in, step up, ACT like they are motivated" and questioned if the program encourages teacher candidates to "sit back and wait to be invited." She emphasized the need for teacher candidates to show initiative and look for ways to get involved in the classroom; these are skills that they will need to succeed in teaching. The root of this suggestion seems to be the communication of expectations to the teacher candidates. I do not believe that university teacher educators are encouraging the teacher candidates to be passive in their fieldwork; however, there may not be enough communication as to what is expected from the teacher candidates.

Utility of Teacher Candidates

One of the primary purposes of the professional development on co-teaching with a teacher candidate intervention implemented in this study was to provide cooperating teachers with tools to more fully utilize the human resources available in the teacher candidates present in their classrooms. Teachers and their students often have needs that go unmet because the teacher simply cannot do everything on their own. At the same time, if cooperating teachers better utilize their teacher candidates, the teacher candidates may also benefit from becoming more involved in the teaching process, learning to teach by being involved in teaching, rather than passively observing. Better utilization appears to be a win-win situation for both the classroom teacher and the teacher candidate.

All of the cooperating teachers who returned the end-of-semester survey, except one teacher from the control group, discussed how they had utilized their teacher

candidate. All 32 of these teachers documented the types of activities their teacher candidates had been involved in that the teachers found beneficial, either for themselves or for their students. In addition, 25 respondent teachers, 13 (68%) from the control group and 12 (86%) from the co-teaching group, discussed factors that were important in determining the utility of the teacher candidates in the classroom.

According to the cooperating teachers, teacher candidates were involved in assisting students, assisting with instruction, assisting with classroom management, assisting with non-instruction tasks, planning, and reflecting and also brought a different perspective to the classroom. Although three teachers, two from the control group and one from the co-teaching group, mentioned *observation* in their expectations for the practicum, none of the participants listed observation as an activity that was beneficial to themselves or their students or as a way they had utilized their teacher candidate. One control group teacher did state that it was beneficial for the teacher candidate to "collect data for me," which implies the teacher candidate was observing, but this is the only reference to observation in the over 200 data elements coded as utilization of teacher candidates. So even though observation comprised 37% of the total time recorded by the 30 teacher candidates on their log sheets, representing the largest percentage of time spent on any activity, no cooperating teacher emphasized any beneficial effects of having the teacher candidates observe.

Assisting students. The most cited beneficial teacher candidate activity was assisting students. Fourteen control group teachers, representing 74% of control respondents, and nine co-teaching teachers, representing 64% of co-teaching respondents, indicated that assisting students was a benefit of having a teacher candidate present.

There were no major differences in the responses of the teachers from the two experimental groups with regard to how teacher candidates assisted students. Seven control group teachers and three co-teachers stated very generally that students benefited from extra help, extra support, more adult attention, active participation in their learning, or more teacher contact.

Four control group teachers and five co-teaching teachers were more specific about the types of instructional activities where extra help was beneficial. Instructional activities included writing conferences, projects or assignments, independent work time, or providing feedback. Students could get their questions answered more quickly and get individual help or instruction. Co-teacher Ms. Renate stated, “With two of us in the room we are able to talk to every student in the room, often multiple times, during one class period.” Co-teacher Mr. Esteban and his teacher candidate implemented a Flipped Classroom design in two of their class sections, and he stated that having an extra person was especially helpful when some students needed to complete the outside of class work while others were ready to move on with the planned lesson.

Three control group teachers and one co-teaching teacher specified the types of students who particularly received benefits by having extra help from teacher candidates. Struggling students or groups, advanced learners, and students who simply needed additional help were all identified. Control group teacher Mr. Cierra, on the other hand, stated that having a teacher candidate present “Gave me more freedom to work with struggling students,” a very insightful comment.

Only two control group teachers touched on the quality of the assistance provided by the teacher candidates. Ms. Raven stated she felt affirmed when the students got “to

hear the same information from additional sources." On the other hand, Ms. Merkle identified the challenge that arose when "students would sometimes get different answers from the candidate than from me when asking a question." The amount of time spent by the cooperating teacher-teacher candidate pair in conversations about upcoming lessons or the personal characteristics of the teacher candidates or cooperating teachers may explain the differences between the experiences of these two teachers.

Instruction. Seven control group teachers (37%) and eight co-teaching group teachers (57%) identified instruction-related benefits of having teacher candidates present in their classrooms. The most commonly cited benefit was that teacher candidates stimulated more varied instruction. One control group teacher and five co-teaching teachers cited this type of benefit. Control group teacher Ms. Raven and co-teaching teachers Ms. Hilario and Ms. Jonas all emphasized that their teacher candidates brought different teaching styles. Ms. Carlo stated, "It was also nice to see more contemporary ideas (music examples and technology) from my teacher candidate," which she found to really be engaging for the students. Ms. Raven also mentioned different forms of assessment as beneficial. Ms. Carlo emphasized the broader opportunity for students to learn that "what works for one teacher may not work for another" and to see "how another teacher can teach the same subject differently." Similarly, Ms. Raven noted that it was a benefit to her to see "different approaches to the same content or lessons." Ms. Nicolas added that her students were "excited to see a new, young face teaching them."

All of these cooperating teachers, except Ms. Hilario, were working with teacher candidates in their final field experience practica. Teacher candidates in the final field experience are required to teach five lessons, therefore, it is not surprising that all of these

teachers mentioned instructional benefits. Ms. Hilario worked with a Phase 2 teacher candidate, where leading instruction is not required. The other co-teaching teacher who commented on instructional variety, Ms. Deangelo, also worked with a Phase 2 teacher candidate and expressed a unique idea. She stated that the co-teaching professional development helped her to "plan lessons where I could use a candidate on the days she was coming," which was the main intension of the professional development on co-teaching.

Two control group teachers, Ms. Platero and Ms. Saad, and three co-teaching teachers emphasized the ability to use more small group instruction when a teacher candidate was present. All of these teachers worked with Phase 2 teacher candidates except Ms. Platero, who worked with a Phase 3 teacher candidate. Ms. Deangelo stated that she "enjoyed using an extra helper to properly work with smaller groups," while Ms. Oliver stated, "As a teaching team we were able to conduct small group instruction, which my students enjoy more than large group instruction." Ms. Saad emphasized the welcomed assistance with small groups which allowed her to better differentiate instruction. Ms. Platero and Mr. Lyndon both specifically utilized their teacher candidates to facilitate a small group as part of station teaching. Ms. Platero specified that having the teacher candidate allowed her to set up two teacher-guided stations, and Mr. Lyndon noted that his teacher candidate "'ran' a learning station on most days."

Two control group teachers, Ms. Kenyon and Ms. Benton, noted benefits related to teacher candidates assisting with whole-class instruction specifically. Ms. Kenyon stated that it was beneficial to have "The teacher candidate 'teaching' mini lessons of 5 to 10 minutes maximum," but qualified this statement by stating that this would depend on

the level of the teacher candidate. She was working with a Phase 2 teacher candidate. Similarly, Ms. Benton stated she encourages "teacher candidates to have to get in front of the classroom from the very beginning so it is not as difficult for them when they finally do."

Finally, two control group teachers and three co-teaching teachers mentioned challenges involved with having teacher candidates involved in instruction. The main area of concern involved the novice status of the teacher candidates. Control group teacher Ms. Platero described having the teacher candidate assist with instruction as "letting the teacher candidate 'practice' on your class," which she stated sometimes resulted in wasting instructional time that could not be recouped. Co-teacher Ms. Nicolas implied a similar idea but stated it in a more positive manner, "A lot of instructional strategies are learned and acquired from practice–a student teacher is still developing those skills, which can partially hinder the growth of students." Co-teacher Ms. Renate added, "Sometimes misunderstandings occur, and those get passed down to my students," and "you just have to make a conversation and learning opportunity out of it."

Another challenge related to the novice status of the teacher candidates focused on managing the classroom. Control group teacher Ms. Merkle noted that "students were sometimes able to get the teacher candidates in off-task conversations." The final two challenges related to logistics. Co-teacher Ms. Carlo allowed her Phase 3 teacher candidate to largely take over the lead in instruction for one of two sections of a course and noted that when the teacher candidate left at the end of the university semester, the two class sections were at different points in the curriculum. She qualified this comment by saying that this was not a major issue. Lastly, Ms. Platero stated, "It's always a

challenge when you plan something specific (like station work, small group work, etc.) and the teacher candidate is late or unprepared." All of these concerns are very valid.

Classroom management. Six of the co-teaching teachers, or 43% of co-teaching respondents, and none of the control group teachers stated that teacher candidates were helpful in managing the classroom environment. Two teachers emphasized the benefit of having "another set of eyes," and two were grateful for another body to assist with overall room management. Ms. Hilario specifically had her teacher candidate attend "during the largest and most difficult class to manage (because of numbers, neediness and curriculum combined)." These teachers were working with teacher candidates in all three field experience courses.

Non-instructional tasks. Seven control group teachers, which represent 37% of control respondents, and only one co-teaching teacher cited benefits related to utilizing teacher candidates to assist with non-instructional tasks. All seven control group teachers specifically stated that they utilized their teacher candidates to assist with grading. Additionally, Ms. Oralee expressed the benefit of also having her teacher candidate assist with entering grades, Ms. Platero appreciated assistance with paperwork and organizing, and Ms. Wilber mentioned assistance with small projects in the classroom. The only co-teaching teacher who mentioned assistance with non-instructional tasks simply stated, "Help with administrative tasks" as a benefit of hosting a teacher candidate.

Planning. Five control group teachers and one co-teaching group teacher, Mr. Macy, identified benefits related to planning. More specifically, Mr. Cierra stated his teacher candidate "gave great help in developing curriculum," whereas Ms. Herschel stated, "I don't normally have someone to collaborate with" and having a teacher

candidate provided a collaborator. Both of these teachers worked with Phase 3 teacher candidates. Both Ms. Wilber and Mr. Macy emphasized having someone to brainstorm or discuss new ideas for lessons with, and Ms. Benton stated, “it was nice to bounce ideas off of somebody who was new and excited about teaching.”

Reflection. Four teachers from each experimental group identified activities related to reflection on their end-of-semester surveys. There were no differences in the comments from the teachers in the two experimental groups. Three of these teachers, all who worked with Phase 3 teacher candidates, emphasized the benefit of joint reflection. Control group teacher Mr. Vale stated, “It was nice to review and analyze my instruction and lessons with another person.” Control group teacher Mr. Cierra stated that the teacher candidate was helpful in “providing feedback on pacing of the class and success of students.” Co-teacher Mr. Esteban indicated it was beneficial to “have a second opinion about how things are going and where students are, as far as understanding the materials.” Co-teacher Ms. Renate, who worked with a Phase 1 teacher candidate, emphasized her own personal reflection, “Having a co-teacher is always helpful in making me reflect on what I do that is working and what isn’t.”

Three teachers, two from the control group and one from the co-teaching group, brought up challenges related to reflecting with teacher candidates. All three mentioned that the time they spent having discussions with their teacher candidates took time away from other activities like planning, grading, paperwork, or simply having a bit of downtime. Ms. Wilber, however, qualified her statement by saying that the time spent talking with her teacher candidate was “absolutely worth the use of time!”

Different perspectives. Nine control teachers (47%) and seven co-teachers (50%) mentioned one of the benefits of working with a teacher candidate is that the teacher candidate brought a different perspective or different way of doing things. Two teachers from each group simply stated that the teacher candidates brought a different perspective. Three control group teachers and one co-teacher emphasized alternate ways of explaining concepts or of solving problems. Four co-teachers recognized their teacher candidates were sources of new ideas, and one control group teacher emphasized the relevant concepts contributed by his teacher candidate. One teacher from each group mentioned that their teacher candidates brought their own set of experiences and expertise. And two control teachers and one co-teacher stated their students enjoy having someone new or different in the classroom. None of these comments varied between the two groups of teachers. However, control group teacher Ms. Raven put a different spin on the topic of different perspective in stating that having a teacher candidate present "helps me observe my students from a different perspective."

Factors related to utility. Comments from 13 control group and 12 co-teaching group teachers emphasized various factors that affected the utility of their teacher candidates. These comments can be classified into four topics: logistics, personal characteristics, relationships, and strategies.

Nine control group teachers (47%) and eight co-teachers (57%) identified challenges of working with a teacher candidate that were related to logistics. The most common challenge mentioned related to time constraints of teaching and finding time for the teacher candidate. Five control group teachers and four co-teachers were challenged for time. Three of these co-teachers and two control teachers specified that they needed

more time to plan and coordinate lessons or that it took time to plan with their teacher candidates. One co-teacher and one control teacher noted that feedback and discussing questions took time. One teacher from each experimental group stated that working with the teacher candidate took time away from other tasks such as working with students or lesson planning or from their lunch or planning periods.

Coordinating the cooperating teachers' and teacher candidates' schedules was also a logistical area of concern for nine teachers. Four control group teachers and one co-teacher found it difficult to schedule times for the teacher candidate to be in the classroom or felt the teacher candidates could not be present often enough to be beneficial whereas co-teacher Ms. Hilario's teacher candidate wanted to be present too often. Control group teacher Ms. Tolson, who taught classes in two content areas, expressed frustration that her teacher candidate could not be present during the teacher candidate's major content area classes. Co-teacher Mr. Lyndon, on the other hand, was the only teacher who made a logistical comment that was not a challenge. He stated that his teacher candidate was able to be present for one class section every day of the semester and that this consistency was a benefit for his students as they trusted him, asked him questions, and accepted him as an authority when he led instruction at a station. All of these schedule-related comments came from teachers who were working with Phase 1 or 2 teacher candidates who were required to be in their placement classrooms about three hours per week.

Communication was somewhat problematic for one teacher from each group. Control group teacher Ms. Saad expressed frustration that her teacher candidate was absent often and did not always communicate if she would be attending or not; this made

it difficult for Ms. Saad to plan to utilize her teacher candidate or to schedule other activities. Co-teacher Mr. Esteban stated it was challenging “making sure we are on the same page and being sure the students are not playing one teacher against the other.”

The final logistical concerns were mentioned by only one teacher each. Control group teacher Ms. Benton stated it was sometimes difficult to find “something for them to do.” Co-teacher Ms. Jonas stated it was “Sometimes hard to make sure they were included effectively in class.” Both of these teachers were concerned with the activities their teacher candidates were involved in, but Ms. Benton seemed to mainly want to keep them busy whereas Ms. Jonas was concerned with the effectiveness of the teacher candidate’s activity. Control group teacher Mr. Durrant stated, “The challenges were giving the classes without the candidate teacher the same attention and relevant lessons.” Lastly, Ms. Raven stated, “The educational environment is a world of its own. Sometimes it’s challenging for a candidate to come into a classroom without the benefit of having the entire context of that environment.”

There were no distinct differences overall between the logistical comments of the two experimental groups of teachers. Co-teacher Mr. Lyndon was the only teacher who stated what had logistically worked well in his classroom. Yet, control teacher Mr. Durrant’s comment about struggling to give appropriate attention to his students in class sections without the teacher candidate also indicated that his classroom utilized co-teaching well. Co-teacher Ms. Jonas expressed concern about utilizing her teacher candidate effectively whereas control group teacher Ms. Benton was only concerned with keeping her teacher candidate busy. Logistical factors such as finding time to converse with the teacher candidate, coordinating schedules, communicating, and other related

concerns appear to affect how teachers are able to utilize their teacher candidates. Open communication appears to be a key factor in allowing teachers to effectively utilize their teacher candidates. The professional development sessions at the beginning of the semester included explicit discussions of logistics such as scheduling and methods of communication, but these sessions apparently did not alleviate all the logistical concerns of the teachers in the co-teaching group.

The effect of the teacher candidates' personalities and characteristics on teacher candidate utility was another factor mentioned by two control group teachers (11%) and five co-teaching teachers (36%). Teacher candidates were praised by their cooperating teachers for being prompt, well-organized, engaged, trustworthy, reliable, dependable, positive, passionate about teaching, and committed to being present in the classroom. These positive comments came from two teachers from each experimental group. One of these control group teachers also commented that when a teacher candidate was not passionate about teaching, students would lose respect for the teacher candidate which made the situation stressful. Co-teaching group teacher Ms. Hilario and her students struggled with the personality of their teacher candidate, and co-teacher Ms. Raven commented that other teacher candidates she had hosted had been "more mature and confident in themselves."

Other more specific characteristics were also mentioned. Teacher candidates were praised for being knowledgeable in their subject area, for working well with students, and for adapting well to the cooperating teacher's teaching style. In contrast, co-teacher Ms. Allbritton had a difficult semester noting that "a teacher candidate can also be a distraction if they are in need of constant management." The characteristics of the

cooperating teacher can also be a challenge as noted by Ms. Herschel who stated that she struggled to release control of the class to the teacher candidate.

Comments on how personal characteristics affected the utility of the teacher candidate were similar for teachers from both experimental groups. Two of the co-teaching cooperating teachers particularly struggled with the personalities or professional characteristics of their teacher candidates during the study semesters. These struggles appear to be independent of the co-teaching intervention. However, both teachers expressed their appreciation throughout the semester for my additional support in dealing with these challenging teacher candidates.

Four control group teachers commented on the relationships between the teacher candidates and the secondary students. Teachers perceived that their students enjoyed the attention of the teacher candidate, could relate to the teacher candidate, and were used to having teacher candidates present in the classroom. Ms. Kenyon enjoyed seeing her teacher candidate "develop a rapport with the students."

Four co-teaching teachers also mentioned relationships, but their comments focused on the relationships they had with the teacher candidates or with their own students rather than the relationships of the teacher candidates with the secondary students. Mr. Esteban credited the professional development sessions at the beginning of the semester with helping him to build a better working relationship with his teacher candidate than he had experienced with previous teacher candidates. The other teachers felt they benefited from the professional development by meeting and getting to know their teacher candidates as well as myself, creating open lines of communication between themselves and their teacher candidates, and putting a support system in place for the

semester. In addition, Mr. Esteban also stated that having a teacher candidate present in his classroom “allowed more time to build my own relationships with students.”

Finally, nine of the co-teachers, represented 64% of co-teaching respondents, stated that the professional development sessions provided strategies that helped them to better utilize their teacher candidates. The idea of co-teaching with a teacher candidate appeared to be new for four of the teachers. Ms. Hilario stated, “It gave us a ground work to start from, gave me ideas on what the teacher candidate could work on and gave us discussion points,” and “It helped introduce the idea of co-teaching.” Similarly, Ms. Nicolas stated, “I was more aware of different teaching strategies, and able to utilize more than I would have otherwise.” Mr. Macy also stated, “They caused me to be more intentional about how I was utilizing” my teacher candidate and “the information helped me to be more pro-active in terms of discovering ways that I could make use of my teacher candidate rather than simply having them observe.” The other five teachers intimated that the information wasn’t new to them but was a good reminder of how to incorporate the teacher candidates into their classrooms or gave them new ideas for utilizing their teacher candidate more effectively.

The professional development sessions appear to have assisted teachers in developing relationships with their teacher candidates and recognizing the benefits of those working relationships. None of the control group teachers mentioned their relationships with their teacher candidates, but many expressed logistical challenges that may have been alleviated by better relationships and better communication.

Logistical factors such as scheduling, finding time, and communication; personal characteristics; and relationships are all factors that affect how effectively teacher

candidates can be utilized in secondary classrooms. The co-teaching professional development appears to have offered teachers with, or reminded them of, strategies for utilizing their teacher candidates effectively. The co-teaching professional development did not alleviate all of these concerns.

Outcomes

The final category of comments on the cooperating teacher end-of-semester survey is outcomes of the practicum experience. Six control group teachers (32%) and 11 co-teaching teachers (79%) made comments related to the overall outcomes of the semester. Part of the difference in the number of responses from the teacher candidates in the two groups can be contributed to one of the additional questions on the co-teachers' survey which asked how the current semester compared to previous semesters working with a teacher candidate; two additional teachers answered this question who did not make other comments related to outcomes. In addition to comments on the differences from previous semesters, outcomes related to personal professional growth.

Personal professional growth. All six control group teachers who commented on outcomes saw the opportunity to become a better teacher as they worked with teacher candidates. Only three co-teaching group teachers commented on their personal professional growth, and two of these teachers' comments focused on different areas of growth as compared to the control group teachers. Control group teachers Ms. Adan, Mr. Durrant, and Ms. Tolson stated they learned new theories, new and relevant ways to teach the content, and new technology uses, respectively. Conversations about practice and students as well as reflecting on personal teaching practice were considered stimuli for improvement for three of the control group teachers. In addition, Ms. Wilber stated she

had adopted some of her teacher candidate's alternate ways of explaining certain concepts into her own practice. Ms. Merkle felt she "was able to learn how to be a better mentor," and similarly, co-teacher Ms. Allbritton stated she "gained conflict resolution skills and better ways to communicate," which are also related to mentoring. These seven teachers focused on learning new teaching strategies, being more reflective, or becoming better mentors.

On the other hand, two of the three co-teaching teachers felt their teacher candidates affected their attitudes, making them be more positive. Ms. Franklin said her teacher candidate "kept me going" and "encouraged me to teach my best every day." These co-teachers appeared to benefit from the teacher candidates' mere presence rather than by learning new strategies from them.

Difference from previous. Thirteen of the fourteen co-teaching teachers rated the study semester compared to previous semesters working with a teacher candidate. Six of these teachers felt the current semester was better in some way. Ms. Deangelo stated her teacher candidate was "much more useful and interactive." Mr. Esteban felt he and his teacher candidate had a better working relationship. Mr. Lyndon felt "it seemed to go smoother." Ms. Gust qualified her statement, "It was better since my teacher candidate was more committed to being here." And Ms. Franklin stated, "I really enjoyed this experience more than my previous one."

Two co-teachers had difficult semesters due to working with teacher candidates whose dispositions were not a good fit for teaching. Both Ms. Allbritton and Ms. Hilario rated their semester as worse than previous ones had been due to the characteristics of their teacher candidates.

The other five teachers' responses were neutral or not different. Mr. Bolen stated the semester was "average," whereas Ms. Jonas said, "I've had two good ones." Both Mr. Macy and Ms. Renate said it was difficult to compare the current semester with previous ones since they were working with teacher candidates in different field experience courses. Ms. Carlo and Ms. Oliver simply stated they had a great experience.

Validity

External Validity

Schools. Two checks were undertaken to determine the external validity of study results based on the characteristics of the schools that agreed to participate in the study versus the schools that hosted teacher candidates but were not involved in the study. The characteristics of the two groups of schools during fall and spring semesters are shown in Table 6. For the fall semester, teacher candidates were placed in 10 schools that had agreed to participate in the study, and teacher candidates were placed in 10 additional schools that had not agreed to participate in the study. The overall logistic regression model was not statistically significant [χ^2 (5) = 3.578, $p > .05$], and none of the characteristics were found to be statistically significant predictors of group membership ($p > .05$). This indicates that the group characteristics for the two types of schools did not vary in the fall semester.

For the spring semester, 16 schools hosting teacher candidates had agreed to participate in the study, and 11 schools served as placement sites for teacher candidates but were not involved in the study. The group of characteristics was not found to be statistically significant predictors of group membership based on logistic regression

analysis [χ^2 (7) = 5.5, $p > .05$], and none of the individual characteristics were found to be statistically significantly predictors either ($p > .05$).

Table 6

Demographic Composition of Schools

	Participants		Non-Participants	
Characteristic	*M* ± *SD*	Range	*M* ± *SD*	Range
			Fall	
No. of students	974 ± 514	440 – 1780	965 ± 358	280 – 1410
Female (%)	49 ± 2	47 – 52	49 ± 2	47 – 54
Free/reduced meals (%)	56 ± 29	15 – 88	42 ± 25	15 – 92
Race: Latino (%)	51 ± 25	18 – 83	36 ± 24	14 – 82
Race: White (%)	44 ± 26	13 – 79	60 ± 24	12 – 82
			Spring	
No. of students	980 ± 520	240 – 1780	710 ± 395	100 – 1370
Female (%)	49 ± 2	47 – 52	50 ± 3	47 – 55
Free/reduced meals (%)	55 ± 28	15 – 88	48 ± 20	19 – 92
Race: Latino (%)	50 ± 24	15 – 83	44 ± 20	14 – 82
Race: White (%)	45 ± 25	13 – 80	52 ± 21	12 – 82

Note. Data obtained from *2015-2016 Preschool (PK) Through 12th Grade Pupil Enrollment by School, Grade, Race/Ethnicity and Gender* and *2015-2016 Preschool (PK) Through 12th Grade Free and Reduced Lunch Eligibility by School* by Colorado Department of Education, retrieved from https://www.cde.state.co.us/cdereval/pupilcurrentschool.

Therefore, the schools involved in the study and those where teacher candidates were placed that were not involved in the study appear to be similar in composition overall. Results can therefore be generalized to the larger population of partner schools

serving as host sites for this university's teacher candidates. In addition, for the fall semester, 69% of the teacher candidates were placed at participating schools, and for the spring semester, 79% of the teacher candidates were placed at participating schools which increases the level of confidence in extrapolating the study results to the larger population of partner schools.

School districts. The second check on external validity compared the school district staffing characteristics of the participating and non-participating school districts. Data related to staffing patterns of the partner schools were only available at the school district level. Therefore, any district with at least one school participating in the study was considered as a participating district even though not all the potential schools in the district participated. The same four school districts were involved in the study both semesters. There were also five school districts that did not participate in the study but hosted teacher candidates in both the fall and spring semesters. The characteristics of the participating and non-participating school districts are shown in Table 7. The overall logistic regression model was not statistically significant [χ^2 (6) = 12.4, $p > .05$], and none of the individual explanatory variables was a statistically significant ($p > .05$) predictors of group membership. The two groups, therefore, have similar characteristics, and the results of the study can be generalized to the overall population of partner school districts. In addition, the participating districts hosted 91% of the teacher candidates in the fall semester and 93% of the teacher candidates in the spring which also confirms the ability to generalize results to the larger population.

Table 7

School District Staffing

	Participants (*n*=4)		Non-Participants (*n*=5)	
Characteristic	*M* ± *SD*	Range	*M* ± *SD*	Range
No. of teachers	454 ± 530	120 – 1240	602 ± 732	60 – 1750
Total teacher FTE	443 ± 518	120 – 1210	581 ± 710	60 – 1710
Average salary (thousand $)	47.1 ± 1.1	46.2 – 48.2	48.0 ± 4.9	39.9 – 52.9
Turnover rate (%)	12 ± 4	7 – 17	15 ± 6	7 – 23
Female (%)	77 ± 2	75 – 79	75 ± 3	71 – 79
Race: Latino (%)	6 ± 5	2 – 11	5 ± 3	1 – 10
Race: White (%)	92 ± 5	87 – 97	94 ± 3	90 – 99

Note. Data obtained from *2015-2016 Teacher FTE and Average Salary* and *2015-2016 Teachers by Ethnicity/Race and Gender* by Colorado Department of Education, retrieved from https://www.cde.state.co.us/cdereval/staffcurrent. FTE = full time equivalent.

Cooperating teachers. Another external validity check involved comparing the characteristics of the cooperating teachers who signed informed consent, thus agreeing to participate in the study, with the teachers who did not agree to participate in the study. Not all of the consented teachers contributed data to the study. Differential attrition of teachers from the two experimental groups will be discussed in the next section related to internal validity. Licensure information and the grade level taught are presented in Table 8 for the cooperating teachers. Logistic regression analysis revealed that holding an English language arts teaching license was a statistically significant predictor of group membership [Wald's χ^2 (1) = 5.986, $p < .05$] with English language arts licenses held by more non-participant teachers. None of the other characteristics were statistically significant predictors of group membership ($p > .05$). Care should be taken in

generalizing the results of this study to English language arts teachers, but all other licensure areas were well-represented in the study. The number of cooperating teachers holding professional teaching licenses, in comparison to initial teaching licenses, of the two groups was similar as was the number teaching at the high school verses the middle school level.

Table 8

Cooperating Teacher Characteristics: Consented vs. Non-Participants

Characteristic	Consented (*n*=58)	Non-Participants (*n*= 57)
Taught high school	29	32
Held a professional license	54	54
Licensure area:		
Drama theater arts or speech-drama	2	3
Elementary (K-6)	7	8
English language arts	7*	16*
Mathematics	7	11
Science	8	5
Social studies	19	10
Spanish or French	4	7

Note. Licensure data obtained from *Search for a License* by Colorado Department of Education, 2016 (June) at https://apps.colorado.gov/cde/licensing/Lookup/LicenseLookup.aspx.
* $p < .05$.

Another measure of comparison for these two groups of teachers was how often they have served as cooperating teachers for field experience practica prior to student teaching in the past. Data on placement of teacher candidates with cooperating teachers

were available for the past three years so the number of teacher candidates hosted in that time period was also included in the logistic regression model. The number of previous teacher candidates hosted in the past three years was not found to be a statistically significant predictor for group membership ($p > .05$), indicating that the groups were similar.

However, Figure 2 shows a difference in the patterns of hosting teacher candidates by the two groups of teachers that was not reflecting in the results of the logistic regression analysis. Figure 2 shows the number of consented and non-participant cooperating teachers who have hosted various numbers of teacher candidates over the past three years. A little over half of the non-participant cooperating teachers only hosted the one teacher candidate in the fall or spring semester of the study and did not host any other teacher candidates in the past three years. In comparison, only 10 of the consented cooperating teachers hosted a single study teacher candidate. The largest number of consented cooperating teachers, 24, hosted two teacher candidates in the past three years. The frequency of hosting teacher candidates for the non-participant cooperating teachers is split into two ranges: hosting less than four teacher candidates or hosting more than nine. Although not shown in Figure 2, two additional non-participant cooperating teachers hosted 20 and 24 teacher candidates, respectively, over the past three years. The distribution of teacher candidates among the consented cooperating teachers appears more balanced. Therefore, care should be taken in generalizing the results of this study to English language arts licensed teachers, novice cooperating teachers, and cooperating teachers with extensive experience hosting teacher candidates.

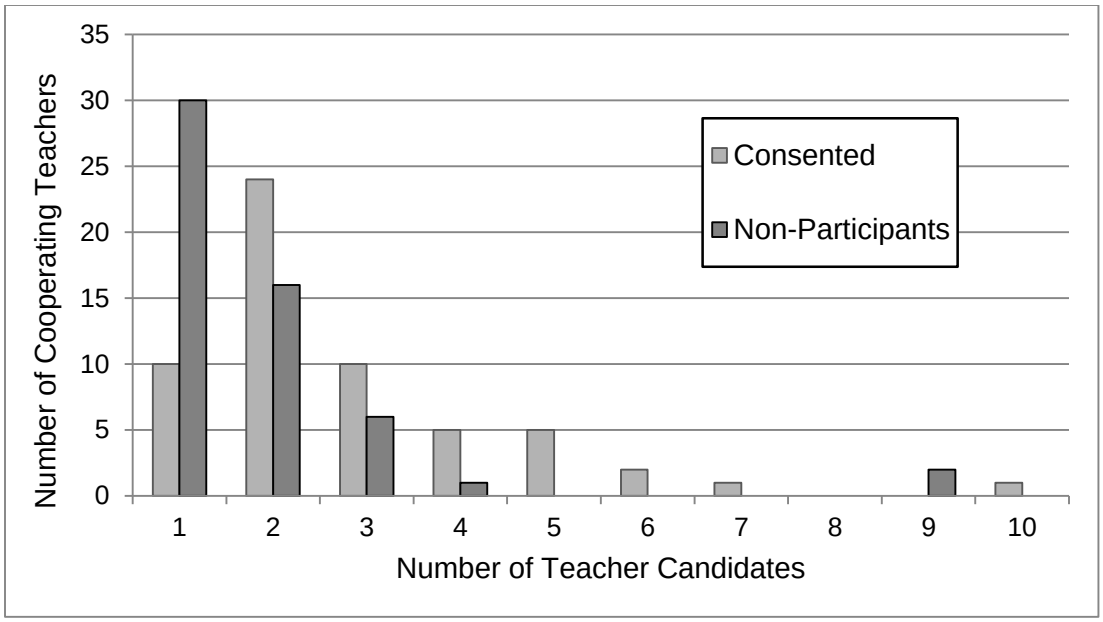

Figure 2. Frequency of Serving as a Cooperating Teacher in the Past 3 Years

Teacher candidates. Finally, the characteristics of the teacher candidates were compared between those who signed informed consent and those who did not, as shown in Table 9, as the final check for external validity. Data are presented for each semester of the study separately since several teacher candidates were enrolled in field experience courses both semesters, but not all of them signed consent forms during the fall semester. Logistic regression analysis revealed that the teacher candidates who consented to participate in the study in both semesters were different from the teacher candidates who chose not to participate. For the fall semester, a statistically significant larger percentage of science teacher candidates [Wald χ^2 (1) = 5.8, $p < .05$] chose to participate as did a larger percentage of the female teacher candidates [Wald χ^2 (1) = 3.9, $p < .05$] while a smaller percentage of the teacher candidates in the first field experience course chose to participate [Wald χ^2 (1) = 5.4, $p < .05$]. The teacher candidates who consented to participate in the spring were much more similar to the non-participant teacher candidates

except that a smaller percentage of English language arts teacher candidates [Wald χ^2 (1) = 5.4, $p < .05$] chose to participate. Results will be interpreted with care as they may not be as applicable to male teacher candidates, teacher candidates in the first field experience course, or English language arts teacher candidates.

Table 9

Teacher Candidate Characteristics: Consented vs. Non-Participants

	Fall		Spring	
Characteristic	Consented (*n*=52)	Non-Participants (*n*=59)	Consented (*n*=45)	Non-Participants (*n*=64)
Content area:				
English language arts	8 (15%)	15 (25%)	1* (2%)	26* (41%)
Mathematics	11 (21%)	11 (19%)	7 (16%)	10 (16%)
Science	14* (27%)	3* (5%)	8 (18%)	2 (3%)
Social studies	11 (21%)	19 (32%)	22 (49%)	12 (19%)
Theater	5 (10%)	5 (9%)	3 (7%)	8 (13%)
World languages	3 (6%)	6 (10%)	4 (9%)	6 (9%)
Course level:				
Phase 1	9* (17%)	27* (46%)	17 (38%)	32 (50%)
Phase 2	18 (35%)	16 (27%)	14 (31%)	22 (34%)
Phase 3	19 (37%)	15 (25%)	14 (31%)	10 (16%)
Combined phases 1-3	6 (12%)	1 (2%)	0	0
Gender: Female	36* (69%)	30* (51%)	28 (62%)	42 (65%)

*$p < .05$

Internal Validity

Cooperating teachers. A total of 58 cooperating teachers consented to participate in this study. However, data from either end-of-semester surveys or classroom observations were collected from 43 teachers, representing 75% participation. The characteristics of the participants in the two experimental groups were shown previously

in Table 2. The only statistically significant predictor of group membership was the grade level taught [Wald χ^2 (1) = 5.5, $p < .05$]; a larger percentage of the cooperating teachers in the control group taught middle school. Therefore, care should be taken in interpreting the results as the grade levels taught by the two experimental groups were different.

The characteristics of the teachers who completed the end-of-semester survey and those who did not for each experimental group are shown in Table 10. Experimental group was not a statistically significant predictor of survey completion [Wald χ^2 (1) = 0.002, $p > .05$], nor were any of the other available characteristics ($p > .05$). Therefore, the respondent and non-respondent teachers in the two experimental groups appear similar. Attrition from the study should not have affected the study results.

Teacher candidates. The characteristics of the teacher candidates in the two experimental groups were shown previously in Table 1. The overall logistic regression model was not statistically significant [χ^2 (8) = 5.7, $p > .05$], and none of explanatory variables was a statistically significant ($p > .05$) predictor of group membership. Selection bias of teacher candidates does not appear to be present in this study as they were similar based on available characteristics.

Table 10

Cooperating Teacher Characteristic: Survey Respondents vs. Non-Respondents

	Co-Teach		Control	
Characteristics	Respondents (*n* = 14)	Non-Respondents (*n* = 12)	Respondents (*n* = 19)	Non-Respondents (*n* = 13)
Held professional license	14 (100%)	11 (92%)	16 (84%)	13 (100%)
Taught high school	9 (64%)	8 (67%)	8 (42%)	4 (31%)
Licensure area:				
Drama theater arts or speech-drama	0 (0%)	0 (0%)	1 (5%)	1 (8%)
Elementary (K-6)	2 (14%)	2 (17%)	2 (11%)	1 (8%)
English language arts	3 (21%)	0 (0%)	3 (16%)	1 (8%)
Mathematics	2 (14%)	1 (8%)	3 (16%)	1 (8%)
Science	2 (14%)	1 (8%)	3 (16%)	2 (15%)
Social studies	5 (36%)	7 (58%)	3 (16%)	4 (31%)
French or Spanish	1 (7%)	1 (8%)	1 (5%)	1 (8%)
Teacher candidates hosted in past 3 years:				
1 to 3	12 (86%)	9 (75%)	16 (84%)	7 (54%)
4 to 6	2 (14%)	3 (25%)	2 (11%)	5 (38%)
7 or more	0 (0%)	0 (0%)	1 (5%)	1 (8%)

Note. Licensure data obtained from *Search for a License* by Colorado Department of Education, 2016 (June) at https://apps.colorado.gov/cde/licensing/Lookup/LicenseLookup.aspx

A total of 45 teacher candidates of the 97 consented teacher candidates, or 46%, submitted useable log sheets. However, 15 of these log sheets were not included in the data analysis for this study for various reasons. Five of these teacher candidates were

placed in schools that were not participating in the study. Nine of these teacher candidates were placed for the fall semester in the schools that had been randomized to the co-teaching intervention, but due to logistical difficulties, the initial cooperating teacher professional development sessions were scheduled too late in the semester in these schools to allow for the full intervention to be implemented. So although these teacher candidates were placed in schools that were randomized to receive the co-teaching professional development, they did not participate in the co-teaching pairs training sessions with their cooperating teachers and thus were not part of the treatment group. One teacher candidate was placed for the spring semester in a school randomized to the co-teaching intervention but worked with a cooperating teacher who chose not to participate in the study.

The characteristics of the 30 participating teacher candidates are shown in Table 11 along with the characteristics of the other 35 teacher candidates who were placed in schools that had agreed to participate in the study but who did not submit usable log sheets. The 17 teacher candidates in the control schools simply did not turn in their log sheets or their log sheets did not contain enough detail to use whereas only one of the teacher candidates who participated in the co-teaching intervention with her cooperating teacher did not turn in her log sheets. The other non-participants from the co-teaching schools did not have the opportunity to participate in the co-teaching intervention: 12 were placed in co-teaching schools in the fall semester and five worked with cooperating teachers in the spring semester who chose not to participate in the study.

Table 11

Teacher Candidate Characteristics: Participants vs. Non-Participants

Characteristic	Co-Teach School		Control School	
	Participant (n = 13)	Non-Participant (n = 18)	Participant (n = 17)	Non-Participant (n = 17)
Content area:				
English language arts	1	1	1	3
Mathematics	2	3	6	2
Science	2	4	3	2
Social studies	6	7	4	6
Theater	1	1	3	1
World languages	1	2	0	3
Course level:				
Phase 1	4	6	6	6
Phase 2	4	6	7	6
Phase 3	5	6	4	5
Combined phases 1-3	0	0	0	0
Gender: Female	10	12	11	10

The overall logistic regression model [χ^2 (9) = 6.4, p > .05] was not statistically significant, and the experimental group explanatory variable was also not statistically significant [Wald χ^2 (1) = 0.423, p > .05]. There were also no statistically significant differences (p < .05) in the other explanatory variables for the participant teacher candidates compared to the non-participants teacher candidates. Therefore, the teacher candidates who provided data for this study are similar based on the available

characteristics to the teacher candidates who did not submit useable log sheets. Mortality threat does not appear to be an issue for this study.

Trustworthiness

Data collected during classroom observations reinforced many of the cooperating teacher perceptions reported on the end-of-semester survey as well as the quantitative teacher candidate log sheet data. The qualitative data, therefore, enhanced and supplemented the quantitative data to create a more detailed description of the field experience practica prior to student teaching at one university. This triangulation of data from various sources lends credibility to this study.

Time limited the number of classroom observations that could be conducted as well as the length of time spent in each observation. However, this study involved more than 90 hours of classroom observation in more than 45 classrooms over two academic semesters along with additional time spent with cooperating teachers and teacher candidates in professional development sessions. The prominent conclusions of this study emerged from repeated observations of similar phenomena, thus supporting the consistency of the findings.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Effect of Co-Teaching

Co-Teaching Enacted

More evidence of cooperating teachers and teacher candidates co-teaching together was gathered in treatment classrooms than in control classrooms. The observed co-teaching in the treatment classrooms also involved more teacher candidates in the first two field experience courses in a variety of activities, whereas in the control classrooms, co-teaching occurred most often with teacher candidates in the final field experience course. Although co-teaching has been advocated for field experience practica prior to student teaching (Cardullo & Forsythe, 2013; Darragh et al., 2011; Ingraham & Karsted, n.d.; Kamens, 2007; Murphy & Beggs, 2006; Roth & Tobin, 2002), no previous research has presented evidence of the enactment of co-teaching in field experience practica prior to student teaching. Three main co-teaching strategies were utilized by cooperating teacher-teacher candidate pairs in this study: Station Teaching, Team Teaching, and One Teach, One Assist.

Station Teaching. Approximately equal numbers of treatment and control classrooms utilized Station Teaching. However, this does not indicate that the professional development intervention was unsuccessful. All of the middle schools in one of the participating school districts were implementing a blended learning initiative

during this academic year. The focus of this initiative was to include technology facilitated, individualized learning in the core subjects. However, none of the schools had enough digital devices to utilize with all of their students so many of the classrooms included the blended learning activities at one of several stations. All four of the control middle school classrooms where Station Teaching was observed were participating in this initiative. Observations were also conducted in two treatment and four additional control middle school classrooms within this school district where Station Teaching was not utilized during the observed class periods. The three treatment classrooms where Station Teaching was evident were all at high schools and were not part of the blended learning initiative. Therefore, it appears that the professional develop on co-teaching may have increased the use of the Station Teaching co-teaching strategy in the treatment schools as compared to the control classrooms.

Station Teaching was originally proposed for inclusive classrooms as a way for both teachers to present content and therefore been seen as equals (Friend et al., 1993). Later authors expanded the definition to include roles in monitoring student-centered activities as well (Murawski & Dieker, 2013; Vaughn et al., 1997). The Station Teaching observed in the study classrooms included both teacher-led stations and student-centered, or independent, stations. Teacher candidates and cooperating teachers facilitated instruction at stations, assisted individual students, and managed the overall activity.

Station Teaching has been advocated to be used early in student teaching (MidValley Consortium, 2000) as well as in early field experiences (Henning et al., 2015). Station Teaching allows the teacher candidates to teach a short lesson to a small group of students multiple times during a class period, allowing them to build confidence

and gain experience with all aspects of instruction (Heck & Bacharach, 2010, 2015; MidValley Consortium, 2000). Dynak et al. (1997) recommended a progression in responsibility for the teacher candidate from teaching one station to taking over multiple stations or managing the overall activity. In this study, teacher candidates in all three field experience courses were involved in station teaching. The Phase 1 teacher candidate assisted students at all the stations, teacher candidates in Phase 2 led a station or assisted students, and Phase 3 teacher candidates participated in all aspects of the station activity.

It is, therefore, recommended that Station Teaching be advocated for use with teacher candidates in all field experience courses. Station Teaching would be a good first co-teaching strategy to implement early on in a practicum, particularly in classrooms where student-centered instruction is already being utilized. Exploratory activities at the beginning of a unit of instruction and review activities at the end of a unit are easy time points for including station activities. Computer assisted activities also work well as one station.

Teacher candidates could begin by assisting students at a single independent station to get experience working with students individually and in a small group. They could progress to facilitating a student-centered station activity or providing direct instruction at a single station where they would have the opportunity to take on the lead role in instruction with a smaller group of students, repeat the instruction several times in succession, and develop classroom management skills with a small group. Finally, they could facilitate the overall activity including managing transitions between stations, facilitating several stations, or managing the classroom as a whole.

Teacher candidates in the first field experience course would benefit from assisting students at stations and facilitating a station. Co-planning for assisting could be limited to the cooperating teachers sharing their lesson plan so the teacher candidates were aware of the objectives to be met and content included. Co-planning for a teacher candidate led station should include discussion between the two teachers on how to facilitate the activity and should allow the teacher candidate time to prepare to participate. Teacher candidates in the second field experience course, after assisting students and facilitating a station in the first course, would be ready to facilitate multiple stations and the overall activity. Phase 2 teacher candidates would benefit from co-planning such Station Teaching lessons with their cooperating teacher. Teacher candidates in the final field experience course could then begin to design lessons using Station Teaching, assign the cooperating teacher or other staff roles during the lesson and communicate those roles, and facilitate the overall activity.

Team Teaching. The types of Team Teaching prevalently used by cooperating teachers and teacher candidates in this study involved both teachers assisting students as they engaged in student-centered activities or both teachers jointly managing the classroom. Joint assisting as a form of Team Teaching has been advocated previously (Chapman & Hyatt, 2011; Friend & Cook, 2000; Heck & Bacharach, 2015) as way to provide more help to students and reduce unproductive time (Murawski, 2009). Joint classroom management has not been previously cited as Team Teaching; non-instructional tasks (Murawski & Dieker, 2013; Villa et al., 2004) and behavior management (Murawski, 2009; Thousand, 2013) have more commonly been included as an assisting role in One Teach, One Assist. However, in this study, both teachers were

participating in these administrative or management tasks at the same time and neither teacher played a leading role; therefore, this type of co-teaching fits within the various definitions of Team Teaching.

There were only a few cases documented in this study where Team Teaching involved joint presentation. These situations were abbreviated interactions by the teachers but included both teachers speaking freely (Cook, 2004) and fluidly contributing to the instruction (Dynak et al., 1997). There was no evidence of the more common forms of Team Teaching advocated previously: role-plays, debate, simulated conflict, demonstrating an interaction, or acting out a scene from a story (Cook, 2004; Friend & Cook, 1996, 2000; Murawski, 2009).

Cooperating teacher-teacher candidate pairs were more commonly seen implementing Team Teaching in treatment classrooms than in control classrooms. Joint assisting Team Teaching and joint management Team Teaching were primarily used by treatment pairs. The more traditional form of joint presentation Team Teaching was more commonly used by cooperating teacher-teacher candidate pairs in control classrooms, though sustained use of this strategy was not documented. It appears that the co-teaching professional development allowed cooperating teachers to utilize the joint assisting and joint management forms of Team Teaching in working with their teacher candidates. It is not clear if the cooperating teachers in the treatment classrooms provided more opportunities for their teacher candidates to assist in these ways or if the teacher candidates in the treatment classrooms took more initiative to assist after attending the professional development sessions with their cooperating teachers.

Team Teaching was used in classrooms with teacher candidates in all three field experience courses. Heck and Bacharach (2015) and the MidValley Consortium (2000) recommended utilizing this co-teaching strategy early in student teaching so that the student teacher would be perceived as a real teacher. Based on the observed interactions of the teachers in this study, the joint assisting and joint management forms of Team Teaching appear to be very useful in all levels of field experience prior to student teaching as well. Teacher candidates gain valuable experience working one-on-one with students and small groups as they help assist students during student-centered activities. Cooperating teachers can also utilize teacher candidates to assist with managing student behaviors during student-centered activities as well as to assist with the routine tasks such as taking attendance and distributing materials in order to create a more efficient classroom. Team Teaching allows the teacher candidates to be actively involved throughout the class period to a greater extent than if they are the assistant when implementing the One Teach, One Assist co-teaching strategy.

The joint assisting form of Team Teaching is recommended as a useful co-teaching strategy for field experience practica prior to student teaching for teacher candidates at all levels. This strategy could be implemented with little advanced planning in a classroom where student-centered activities are utilized. Lesson plans could be shared by the cooperating teacher with the teacher candidate to allow the teacher candidate to prepare to assist with the planned activity. Teacher candidates, especially in the first field experience course, would also benefit from discussing the cooperating teachers' expectations for student engagement and work as well as for teacher candidate

assistance. Teacher candidates could progress to be included in co-planning for joint assisting Team Teaching and then to planning and facilitating these types of activities.

The joint management form of Team Teaching is also recommended for all field experience levels. Teacher candidates can easily assist in handing out or collecting papers or supplies for an upcoming activity, even on their first day in the classroom, which allows them to learn the procedures of the classroom. Passing back graded assignments or taking attendance allow the teacher candidates to get to know students by name. The class period can progress more smoothly with additional assistance for these procedural tasks, and when the cooperating teacher and teacher candidate jointly perform these types of tasks, they are seen as co-teachers to a greater extent than when these activities are relegated to the teacher candidate. Teacher candidate involvement should not be limited to assisting with non-instructional tasks.

One Teach, One Assist. The One Teach, One Assist co-teaching strategy was commonly used in treatment classrooms with all levels of field experience teacher candidates with both the cooperating teacher and the teacher candidate taking the lead role. This strategy was used less often in the control classrooms and primarily with students in the final two field experience courses. One Teach, One Assist has been previously recommended in early field experiences with the cooperating teacher in the lead role and in student teaching with the teacher candidate assuming the lead role (Henning et al., 2015). In contrast, this study has documented the use of One Teach, One Assist in all levels of field experience prior to student teaching with the teacher candidates not only assisting the cooperating teachers but also taking the lead role in both direct instruction and student-centered instruction. The cooperating teachers of the

MidValley Consortium (2000) felt student teachers benefited from engaging in the One Teach, One Assist strategy because it allowed them to get involved in the classroom immediately; the same logic applies to teacher candidates in the very first field experience courses.

One Teach, One Assist has been recommended for use with both direct instruction and student-centered activities (Thousand, 2013); both types of instruction were evident in this study. For inclusive settings, it has also been recommended that both teachers have the opportunity to take the lead (Friend & Cook, 2000) which was also observed here.

In this study, assistance was mostly provided with routine classroom tasks and with managing student behavior rather than for assisting individual students as has commonly been the focus in inclusive co-teaching settings (Friend et al., 1993; Villa et al., 2004) and co-teaching in student teaching (Bacharach et al., 2010). Administrative tasks (Murawski and Dieker, 2013) and behavior management (Fattig & Taylor, 2008; Hughes & Murawski, 2001; Murawski, 2009; Thousand, 2013) which assist by providing more time for instruction (Murawski, 2009) have been documented previously. Instructional assisting such as modeling note-taking (Beninghof, 2012; Chapman & Hyatt, 2011) and clarifying important information (Villa et al., 2004) have also been reported in inclusive settings.

One Teach, One Assist appears to be a very useful co-teaching strategy in field experience practica prior to student teaching and was implemented in the treatment classrooms with minimal professional development. Teacher candidates in their very first field experiences can get involved in the classroom very quickly through assisting with administrative tasks. They can also practice various classroom management techniques

and gain experience being in front of the class by modeling note-taking, listing procedural instructions, or assisting with instruction in other ways.

Teacher candidates can also take the lead role in instruction, even in their very first practicum, and benefit from the assistance of the experienced teacher who can assist with classroom management and administrative tasks so the teacher candidate can concentrate on instruction. Early field experience teacher candidates who are leading their first lessons may also really benefit from the types of assistance documented in this study by one cooperating teacher who helped choose students to call on, assisted with the pacing of the lesson, and made adjustments to homework. Caution should be exercised in not overusing this strategy as other co-teaching strategies more fully utilize both teachers, as has been suggested for co-teaching in inclusive settings as well (Murawski & Dieker, 2013).

Other co-teaching strategies. The remaining four co-teaching strategies were not utilized to any extent in this study. Two of these co-teaching strategies, Differentiated Teaching and Supplemental Teaching, were only utilized by one pair of teachers each. Both of these strategies were only used by teachers in the treatment group. Use of the One Teach, One Observe and Parallel Teaching strategies was not seen.

Differentiated Teaching was proposed as a co-teaching strategy by Bacharach et al. (2010), and this concept was only mentioned by Murawski (2009) for inclusive classrooms. Therefore, not as much prior research has discussed this co-teaching strategy. It is unlikely that the co-teaching professional development had an effect on the use of this strategy in the one treatment classroom out of 18 observed. It appears that Differentiated Teaching was utilized based on the content of the course rather than

specifically to utilize the teacher candidate. This co-teaching strategy appears to be a bit difficult to enact in field experience courses prior to student teaching since both teachers need to be experienced enough to provide instruction in different ways. Potentially, students might be allowed to choose from two different student-centered activities that relate to the same learning objective, and the teacher candidate could facilitate one of these activities. More often in practice, if two different activities are designed, students are allowed to participate in both at stations rather than choosing one.

Grouping students based on ability was only seen in one study classroom. This observation is contrary to previous research in inclusive settings where Alternative Teaching has often been overused or misused (Murawski, 2009). Henning et al. (2015) recommended this co-teaching strategy for middle level field experience with the cooperating teacher in charge of the larger group as well as in student teaching where the student teacher should assume responsibility for the larger group. The MidValley Consortium (2000) cooperating teachers, on the other hand, recommended that student teachers should be provided with significant amounts of time with leading both groups and also suggested that this strategy might work better in earlier field experiences than in student teaching since student teachers need to be responsible for entire class instruction. The teacher candidate in this study who participated in Supplemental Teaching was in the first field experience course and chose to facilitate the larger group.

It is unlikely that the professional development on co-teaching affected the use of the Alternative, or Differentiated, co-teaching strategy since it was only observed in one of 18 treatment classrooms. Several of the cooperating teachers in initial professional development session expressed negative opinions of grouping by ability due to the related

stigma. However, utilizing teacher candidates to provide assistance to students who have been absent appears to have potential to contribute to student learning. Teacher candidates in the earlier field experience courses may better be able to facilitate a student-centered activity with the large group while the cooperating teacher works with the smaller group of previously absent students. Early field experience teacher candidates are often not present in the classroom on a consistent enough basis to know what was missed by the absent students.

Although teacher candidates were commonly involved in observations, there was no evidence of the use of the One Teach, One Observe co-teaching strategy. The MidValley Consortium (2000) teachers identified several benefits of the One Teach, One Support co-teaching strategy where support was provided via observation during co-teaching in student teaching: student teachers can observe student behaviors and get to know their students and can observe the cooperating teacher's instruction and behavior management. Limitations were also noted including reinforcing student perceptions that the student teacher is not a real teacher and limiting the opportunities for the student teacher to get involved in the classroom (MidValley Consortium, 2000).

The use of One Teach, One Observe is not recommended for use during early field experience practica. Excessive time is already being spent in observations, and recommending the use of this strategy may only exacerbate this practice. Classroom instruction and students themselves might benefit from the collection of data related to instruction by either cooperating teachers or teacher candidates, but in order for this data to be useful, the teachers need time to discuss the data. Time for reflection and discussion is limited.

Parallel Teaching does not appear to present any benefits for use in field experience practica prior to student teaching. The joint assisting Team Teaching strategy could be modified to become Parallel Teaching if the two teachers divided the students in the classroom into two groups and each focused on assisting one group. The MidValley Consortium (2000) cooperating teachers identified this as a benefit of Parallel Teaching in student teaching. The classrooms involved in this study were often small and crowded which limited the use of other grouping co-teaching strategies and would also limit the use of Parallel Teaching. Previously reported limitations include noise level, lack of space, difficulty with pacing, and coordinating efforts (MidValley Consortium, 2000).

Student Achievement

Based on very limited data collected, it does not appear that teacher candidates had an effect on the academic achievement of the students in the class sections they worked with as compared to the students in the other sections of the same courses taught by the same teachers. It also does not appear that the professional development on co-teaching influenced the impact of the teacher candidates. Research utilizing student achievement data from more classrooms is needed to confirm or refute these preliminary conclusions.

Limitations. Obtaining the student achievement data needed to answer the first three research questions proved more difficult than anticipated. Many of the cooperating teachers did not give a pretest and were not willing to prepare and administer an additional test once the semester had begun. Several teacher candidates worked with all of the class sections of their cooperating teacher which prevented the desired analysis. The window of opportunity for obtaining the test scores from the cooperating teachers for

the spring semester was also very narrow as the final exams were not given until the last several days of schools and the teachers were busy with end-of-the-year tasks at this time.

Due to the extremely limited amount of student achievement data available, a simple linear regression model was used instead of the planned multi-level regression model. This more basic model did not allow statistical adjustments to be made to alleviate the bias caused by randomizing intact schools rather than individuals to the treatment and control groups. Teachers and students within a school are often more alike than teachers and student in different schools, but the model used to analyze the data did not take this into account. The limited data and model used, therefore, make it difficult to make any conclusions related to the effect of co-teaching and/or teacher candidates on student achievement.

Teacher Candidate Activity

Providing professional development on co-teaching with a teacher candidate to cooperating teachers and their teacher candidates did not significantly affect the types of activities in which teacher candidates were involved in their placement classrooms. The effect of the co-teaching professional development appears to have been overshadowed by the primary type of instruction utilized in the classrooms. Classrooms that were observed by the researcher to utilize student-centered instruction provided more opportunities for the teacher candidates to get involved with assisting students and assisting with instruction than classrooms observed to mainly enact teacher-centered instruction. Killian and McIntyre (1986) noted a similar conclusion when they compared elementary and secondary placement classrooms; elementary teacher candidates were involved in a larger variety of activities more consistently than secondary teacher

candidates. These authors attributed the difference to different types of instruction commonly utilized in elementary versus secondary classrooms; secondary classrooms more often utilized teacher-centered instructional strategies, and this provided less opportunities for teacher candidates to get involved in classrooms.

Good clinical experiences are thought to be associated with the development of effective teachers (AACTE, 2010). Teacher candidates need repeated opportunities to apply knowledge and skills in real classroom situations (Dunn et al., 2000; National Research Council, 2010). They need time to build relationships with students (Clift & Brady, 2005; Henning et al., 2015) and experience student diversity (Wasburn-Moses et al., 2012). They also need to explore the profession of teaching to determine if it is a good fit for them personally (Brunson, 1968; Dunn et al., 2000; Union University, 1975). All of these objectives for field experience practica prior to student teaching require teacher candidates to be actively involved in the classrooms rather than passive observers.

Therefore, one of the primary purposes of providing professional development on co-teaching with a teacher candidate in this study was to provide cooperating teachers with strategies for utilizing teacher candidates in their classrooms in order to increase the activity level of the teacher candidates. The hypothesized outcome for Research Question 4 was that teacher candidates working in co-teaching classrooms would spend less time in observation and more time in assisting students, assisting with instruction, and co-planning with their cooperating teachers than their control group counterparts. Although not statistically significant, teacher candidates in co-teaching classrooms as a group did spend less time in observation, less time assisting with non-instructional tasks, more time

co-planning, and more time assisting students but less time in assisting with instruction than the control group classrooms.

The full desired pattern of activity was evident in this study only in the teacher candidates in the first field experience course, on average, but did not occur for all of the teacher candidates. There was a wide range of experiences for the Phase 1 teacher candidates in both experimental groups. In partial fulfillment of the desired outcome, Phase 2 co-teaching teacher candidates observed less and assisted students more than their control group peers, on average, but were involved in instruction less often and co-planned at an equal rate. As with the Phase 1 teacher candidates, there was a lot of variability in the experiences of Phase 2 teacher candidates in both experimental groups. Co-teaching teacher candidates in the final field experience course also partially met the study expectation by spending more of their time assisting students and slightly more of their time co-planning, on average, than the teacher candidates in the control group, but they spent more time in observation and less assisting with instruction, on average.

It has been previously recommended that teacher candidates assume more responsibility in their field experience classrooms as they progress through a teacher preparation program (Darling-Hammond, 2006b; Trump & Baynham, 1963; Wasburn-Moses et al., 2012). Teacher candidates in the final field experience course, on average and in general, spent more of their time assisting with instruction than teacher candidates in the two earlier field experience courses. However, the Phase 3 teacher candidates did not spend as much of their time, on average or in general, assisting students as the teacher candidates in the earlier courses. One Phase 1 co-teaching teacher candidate and three Phase 2 teacher candidates, one co-teaching and two control group, spent larger

percentages of their time in the combined categories of assisting students and assisting with instructions than any of the Phase 3 teacher candidates. Whether or not an individual teacher candidate experiences a progression in their level of responsibility and activity as they move through this teacher preparation program appears to be largely left to chance as no consistency was seen in the activities associated with the three different field experience courses.

Observation. Excessive time in observation was documented in this study. Forty percent of participating teacher candidates spent more than half of their practicum time in observations, including two of the Phase 3 teacher candidates. Killian and McIntyre (1986) previously documented that the early field experiences of secondary teacher candidates were primarily passive observation. Observation of effective instructional and management techniques, behaviors of accomplished teachers, and children has been recommended for field experience practica (Darling-Hammond, 2006b). As previously stated, Henning et al.'s (2015) Developmental Curriculum for Clinical Experiences included only six observation-based activities of 113 activities recommended for field experience practica prior to student teaching, and three activities specified the collection data during observation.

There was no attempt in this study to have teacher candidates differentiate between passive observations and the focused observations of the One Teach, One Observe co-teaching strategy. However, no observational evidence of use of the One Teach, One Observe co-teaching strategy was documented in the 36 classroom observations undertaken in this study. Several teacher candidates were observed taking notes as they observed in the classrooms, but none of them were observed speaking to the

cooperating teacher prior to the start of class about what to observe, and none of them were observed shared their notes with the cooperating teacher at the conclusion of the lesson. It is possible that some of the cooperating teachers and teacher candidates had set up a system outside of their time together to discuss what the teacher candidates should observe or for the teacher candidate to share their findings, but no evidence of such systems was seen. Teacher candidates and cooperating teachers were observed prior to the start of class discussing what the upcoming lesson would entail and how the teacher candidate could be involved as well as discussing at the conclusion of class when the teacher candidate would return to the classroom next. It is, therefore, unlikely that the large percentages of observational time documented in this study were focused observations to collect data to share with the cooperating teachers.

The excessive amounts of time spent in passive observations in this study are an area of concern, particularly since similar results were reported 30 years ago (Killian & McIntyre, 1986). A total of 706 hours of observation for 30 teacher candidates is a lot of time merely sitting in a classroom. However, 57% of this time was recorded by teacher candidates in the control group. The co-teaching professional development, therefore, appears to have decreased the total amount of time spent in observations by the teacher candidates in the co-teaching classrooms. Killian and McIntyre (1986) found no differences in the percentage of class periods spent in observation for teacher candidates placed with untrained cooperating teachers versus cooperating teachers who had previously taken a graduate course on supervision. Selecting classrooms for placements that primarily utilize student-centered instructional strategies may also help to decrease the amount of time teacher candidates spend in observations. The cooperating teachers

observed in this study who were engaging in teacher-centered instruction largely left their teacher candidates to observe.

Although excessive time was spent in observations, no cooperating teacher identified any benefits of having teacher candidates observe. It appears that observation is a convenient activity for teacher candidates to engage in as it requires no advanced planning. It is somewhat of a default activity in field experience practica prior to student teaching. Many of the cooperating teachers likely spent large portions of their practica observing, and therefore, have not critically examined this practice. The co-teaching professional development sessions may have prompted cooperating teachers to consider other ways to utilize teacher candidates to benefit student learning and thus decreased the amount of time teacher candidates spent in observation in co-teaching classrooms.

Assisting with instruction. Assisting with instruction accounted for only 14% of the total time teacher candidates spent in their placement classrooms. This is higher than the 5% of hours reported by Al-Bataineh (2009). The percentage of time spent assisting with instruction increased for teacher candidates across the field experience courses. The university teacher preparation program used for this study does not require teacher candidates to teach a lesson until the final field experience course prior to student teaching. Other teacher preparation programs also emphasize developing and teaching lessons as part of their last semester of field experience prior to student teaching (Baldwin & Keating, 1996; Darling-Hammond, 2006b). However, Henning et al. (2015) included 15 activities involving instruction in their list of 113 total activities appropriate for teacher candidates prior to student teaching. Eight of these activities were included in the first two developmental levels of the curriculum and thus were recommended for

teacher candidates in the earliest field experience courses. These activities included facilitating small group discussions or activities, creating and implementing a small group lesson, reviewing assignments with the whole class, supervising students during group work times, and teaching a routine portion of a lesson to the whole class.

The co-teaching professional development intervention did not increase the amount of time teacher candidates spent assisting with instruction when compared to the control group; the teacher candidates in the control group were responsible for 57% of the total hours recorded for assisting with instruction and spent more of their time, on average, on instructional tasks than the co-teaching teacher candidates in the final two field experience courses. Killian and McIntyre (1986) found that the cooperating teachers in their study who had previously taken a graduate course in supervision provided more opportunities for their teacher candidates to be involved in whole-class and small group instruction, although these differences were not statistically significant. Teacher candidates participated in whole-group instruction as part of 32.0% of their classroom visits in the last half of the semester when working with one of these "trained" cooperating teachers as compared to 20.1% of their classroom visits when working with a cooperating teacher who had not taken such a course. Opportunities to participate in instruction were more prevalent in the first half of the semester as well with 20.9% of classroom visits involving instruction for teacher candidates working with trained cooperating teachers as compared to only 9.6% of classroom visits in the other classrooms. Teacher candidates working with trained cooperating teachers participated in small-group instruction during 21.6% of their classroom visits during the second half of

the semester compared to 11.6% of their visits when working with untrained cooperating teachers.

Co-teaching strategies such as Station Teaching, Team Teaching, and One Teach, One Assist should be useful in providing instructional experiences to teacher candidates in the earlier field experience courses to prepare them for taking the lead for an entire lesson. As previously stated, placement of teacher candidates in classrooms that primarily utilize student-centered instruction may also provide more opportunities for teacher candidates to get experience assisting with instruction. The cooperating teachers observed in this study who used teacher-centered instructional strategies seemed reluctant to share the stage with their teacher candidates.

Teacher candidates need the opportunity to practice the interactive work of teaching (Ball & Forzani, 2009), not just observe or talk about teaching. Opportunities to be in front of the class in the earliest field experience courses will help them discern if the teaching profession is a good fit for them personally (Dunn et al., 2000), which will not occur from mere observations. In addition, experience with instruction may help teacher candidates gain confidence in their ability to teach (Dunn et al., 2000) and manage a classroom (National Research Council, 2010). It can also provide a solid foundation for their student teaching experience (Union University, 1975).

Almost half of the cooperating teachers who returned end-of-semester surveys stated benefits of teacher candidates being involved in instruction. The co-teaching intervention appears to have assisted the treatment teachers in recognizing the instructional benefits of their teacher candidates as 57% of co-teacher respondents and 37% of control group respondents mentioned instructional benefits. Common benefits

included teacher candidates bringing new ideas to the classroom and the ability to implement more small group instruction with the aid of a teacher candidate. The challenges identified were in providing teacher candidates opportunities to be involved in instruction while not adversely affecting student learning due to the teacher candidates' inexperience. Co-planning between the cooperating teacher and teacher candidate could potentially alleviate some of this concern as cooperating teachers could preview lesson plans and discuss problematic concepts in order to implement a measure of quality control.

Assisting students. The co-teaching professional development appears to have increased the amount of time the teacher candidates spent assisting individual students and groups of students, on average, over the time spent by teacher candidates in the control group, though this difference is not statistically significant. Co-teaching teacher candidates in all three field experience courses spent larger percentages of their time assisting students than their peers in the control group. Killian and McIntyre (1986) did not record statistically significant differences in the percentage of visits involving assisting individual students in classrooms with a trained versus and untrained cooperating teacher.

Henning et al. (2015) included eight suggested activities that involve assisting students, and seven of these activities are at the first developmental level. Recommended activities included assisting students in making up work, in finding information or resources, and in using technology as well as clarifying directions for individual students and answering individual student questions. Assisting individual students or small groups of students allows the teacher candidate to build relationships with students (Clift &

Brady, 2005), gain confidence in their interactions with students (Dunn et al., 2000), and learn about student diversity and individuality firsthand (Wasburn-Moses, 2012). It also can assist teacher candidates in determining if a career in teaching fits them since an important component of teaching is interacting with students (Dunn et al., 2000).

Utilizing teacher candidates to assist individual students is also very beneficial to the schools and the cooperating teachers (Brunson, 1968). One of the main purposes of co-teaching for inclusion as it was first enacted was to provide more individualized attention to students, especially those with specific needs (Cook & Friend, 1995). Schools are more diverse than in the past which creates challenges for reaching all students (Darling-Hammond, 2006b). Teacher candidates are a valuable resource who can help give struggling or disengaged students extra attention as well as providing more personal attention to all the students in the class. Team Teaching was used by many of the cooperating teacher-teacher candidate pairs during student-centered activities to provide additional assistant to students with questions and provides a very effective strategy for allowing teacher candidates to gain the experience they need while at the same time meeting the needs of the students. Station Teaching was also utilized in this study to provide teacher candidates with opportunities to assist individual students or small groups of students.

Assisting students was the benefit most cited by cooperating teachers related to hosting a teacher candidate as it was mentioned by 74% of co-teaching respondents and 64% of control group respondents. Although a few cooperating teachers cited benefits for assisting students who were struggling, most identified the benefit for all students. Almost 50% of cooperating teachers from each experimental group also emphasized the

benefit of teacher candidates bringing a different perspective to the classroom. However, some of the cooperating teachers also mentioned challenges of having teacher candidates assist students such as providing different answers. So it appears that while cooperating teachers recognize the beneficial effect of teacher candidates bringing their varied experiences and knowledge to the classroom, they are also challenged by the differences. Communication between the cooperating teachers and teacher candidates could potentially diminish this tension between the benefits and challenges of differing perspectives.

It is recommended that assisting individuals and groups of students replace observation as the primary activity for teacher candidates in all field experience practica. Teacher candidates, cooperating teachers, and secondary students would likely all benefit if teacher candidates spent at least half of their time involved with assisting students or groups. Joint assisting Team Teaching and Station Teaching are both effective strategies for utilizing teacher candidates for assisting students. Selective placement of teacher candidates in classrooms commonly utilizing student-centered instructional strategies would help facilitate this change in activity.

Co-planning. More overall time was spent co-planning or in conversation with the cooperating teacher by teacher candidates in the co-teaching group than those in the control group. Slightly larger percentages of time were recorded by the co-teaching teacher candidates in all three field experience courses than those working in control classrooms as well. It appears that the co-teaching professional development encouraged cooperating teachers and teacher candidates to spend time conversing about instruction. Killian and McIntyre (1986) reported 16.1% of classroom visits in classrooms with

trained cooperating teachers compared to 6.0% of classroom visits in classrooms with untrained cooperating teachers involved preparation and planning during the first half of the semester, but these differences were not statistically significant. During the second half of the semester, 16.0% of classroom visits in classrooms with trained cooperating teachers involved preparation and planning compared to 9.2% of visits in classrooms with untrained cooperating teachers.

Teacher candidates need time to talk with their cooperating teachers about how they can contribute to the lesson as well as to reflect on the lesson upon its completion. In this study, 13% of the total recorded time spent in placement classrooms involved conversations with teachers. Al-Bataineh (2009) stated that almost 22% of the time spent in the field by teacher candidates at his institution was spent in planning. In this study, only four teacher candidates recorded 22% or more of their time spent in co-planning. One of the key roles for cooperating teachers is the role of mentor who can provide support, direction, and feedback to teacher candidates as they learn to teach (Chesley & Jordan, 2012). Cooperating teachers take on the role of teacher educators when they volunteer to work with pre-service teachers during field experience practica (Chastko, 1993; Zeichner, 2010).

Time for collaboration and to create materials together during early field experience practica has been recommended (Henning et al., 2015). Co-planning has repeatedly been recognized as a vital component for co-teaching (Garvar & Papania, 1982; Heck & Bacharach, 2015; Murphy & Beggs, 2006; Pugach & Winn, 2011). Classroom observations documented that some sort of co-planning occurred in 30 out of the 36 classrooms observed. Quick conversations when the teacher candidate arrived and

during the class sessions were common, most of which were related to the current day's lesson. Joint planning periods were also observed that included conversations related to adjustments needed for the next class period, upcoming lessons and schedules, and reflection on previous class sessions and students.

Communication is essential for any collaborative working relationship (Fattig & Taylor, 2008). In order for a teacher candidate and cooperating teacher to work together effectively in a classroom, they must set aside time to communicate by some means (Bacharach et al., 2010; Heck et al., 2008; MidValley Consortium, 2000; Thousand, 2013). The teacher candidate needs to know how they can assist in the classroom if they are going to be involved. Without any communication, they are left to observe.

More control group cooperating teachers, 26%, than co-teaching teachers, 7%, emphasized benefits of co-planning on the end-of-semester surveys. It is unclear the reason for this difference. Based on teacher candidate log sheets, cooperating teachers in the co-teaching group were involved in co-planning to a larger extent than control group cooperating teachers. However, the co-teaching cooperating teachers may not have considered this time to be beneficial. Approximately the same number of cooperating teachers from both experimental groups identified time as a challenge of hosting a teacher candidate.

Cooperating teachers commonly stated that their teacher candidates contributed new ideas to the classroom. They also commonly identified personal professional growth attributed to talking with their teacher candidates. However, finding time to have meaningful conversations was a challenge identified in this study. Cooperating teachers and teacher candidates would likely benefit from scheduling time to co-plan each week.

Teacher candidates as a group spent 13% of their time involved in co-planning or other types of conversations with their cooperating teachers. This percentage of time seems to be sufficient if all teaching pairs are able to set aside this time.

Reflection. Effective teachers are reflective (Darling-Hammond, 2006b). Teacher candidates need to see reflection modeled (Kain et al., 2012) and participate in reflection with their cooperating teacher (Fowler et al., 1991). Teacher candidates also benefit when their cooperating teacher can share their thought and decision-making processes to make these complex hidden processes visible (Feiman-Nemser, 1998). Finding time for these types of conversations has often been problematic (Henning et al., 2015; Maddas, 2014; Thousand, 2013).

Time spent on reflection was included in the co-planning and conversations category in this study and not as a separate activity. Therefore, the 13% of total time included time for reflection as well as for planning. Al-Bataineh (2009) stated teacher candidates in his program typically spend around 10% to 20% of their time on reflection in addition to the 22% of their time involved in planning. This represents a significant proportion of a teacher candidate's time. Killian and McIntyre (1986) sub-divided reflection time based on topic: general education, cooperating teacher's management of instruction, students, and teacher candidate performance. The only statistically significant difference between classrooms with a trained versus and untrained cooperating teacher was in the percentage of classroom visits involving discussion of teacher candidate performance during the second half of the semester with 29.2% of visits in classrooms with trained cooperating teachers and 15.0% of visits in classrooms with untrained cooperating teachers involving these types of discussions.

Reflection involving the participating teacher candidates and cooperating teachers was noted during classroom observations and focused on either individual students or on instruction. Time spent by teacher candidates reflecting with their cooperating teachers was included in the activity category with co-planning, and therefore, no distinct measure of the time for reflection is available. There was no difference in the cooperating teacher perceptions for reflection between the two experimental groups. Although it may be difficult for teaching pairs to find time to reflect, both teacher candidates and cooperating teachers may potentially benefit professionally from this joint practice.

Non-instructional tasks. The teacher candidates in the control group spent more total time assisting with non-instructional tasks than the teacher candidates in the co-teaching group. Killian and McIntyre (1986) recorded similar non-statistically significant results with teacher candidates working in classrooms with trained cooperating teachers documenting time spent on non-instructional tasks in 36.4% of classroom visits in the first half of the semester and 38.5% of classroom visits in the second half of the semester compared to more than 50% of classroom visits for teacher candidates in classrooms with untrained cooperating teachers. Al-Bataineh (2009) did not include any time typically spent on non-instructional tasks for teacher candidates in his program. Non-instructional tasks such as grading papers, taking attendance, and distributing and collecting papers or supplies are tasks common to the classroom environment. It is very appropriate for teacher candidates to be involved in these types of activities (Henning et al., 2015). However, teacher candidates also need to spend time assisting students, helping with instruction, and talking with their cooperating teacher so involvement in non-instructional tasks should not overshadow these other activities.

Teacher candidates observed in this study were mainly involved in grading papers, distributing and collecting assignments, taking attendance, and preparing, collecting, and distributing supplies. One teacher candidate served lunch duty with her cooperating teacher. Another volunteered to take tickets at the theater production that her cooperating teacher was directing. All but one of the teacher candidates observed seemed to be involved in an appropriate amount of non-instructional work.

One control group teacher candidate appeared to have been given sole responsibility for grading student work. Although this teacher candidate was only in the second field experience course, he spent more than four times the number of hours required in his practicum classroom. With all that extra time, it would be expected that he had the opportunity to be involved in assisting with instruction and helping students more than his peers. However, he spent almost 40% of this time involved with non-instructional tasks, according to his log sheet. He also had the most hours of observation and some of the smallest numbers of hours for co-planning, assisting students, and assisting with instruction of any of the participating teacher candidates, regardless of field experience course. During the class period observed by the researcher, he spent 45 minutes out of 55 minutes grading papers, recording grades, passing back papers he had graded, and providing students with make-up work. The teacher candidate made a comment during the observation about how much working grading is, which insinuates that the observed class period was typical. The amount of non-instructional responsibility placed on this teacher candidate is inappropriate.

The only non-instructional benefit identified in previous research on co-teaching during student teaching was that students felt they had their grades and assignments

returned more quickly (Bacharach et al., 2010). A larger percentage of respondent teachers from the control group (37%) than the co-teaching group (7%) identified benefits related to non-instructional tasks. The control group cooperating teachers almost exclusively identified benefits of assistance with grading whereas the co-teaching teacher identified the general benefit of assistance with non-instructional tasks. The total percentage of time spent by the teacher candidates in this study, 12%, is not excessive. However, there was a lot of variety in the amount of time spent by individual teacher candidates.

Two historical accounts of early field experience practica identified providing assistance to schools as a purpose for early field experiences (Brunson, 1968; Union University, 1975). Union University (1975) specified that teacher candidates could provide assistance with non-professional duties such as lunch supervision or selling tickets at extracurricular activities to relieve overburdened teachers. Brunson (1968) suggested the teacher candidates could be used to release teachers for more sophisticated professional activities.

More recently, other researchers have stated that field experience practica prior to student teaching should provide opportunities for teacher candidates to explore the different aspects of teaching (Darling-Hammond, 2006b; Dunn et al., 2000), which would include experience with the various non-instructional tasks involved in teaching. Henning et al. (2015) included non-instructional activities as appropriated activities for teacher candidates in the earliest field experience courses but only for the first developmental level. In the higher developmental levels, the only non-instructional task included was

communication with parents and assessment related tasks focused on developing assessments and using assessment results to guide instruction (Henning et al., 2015).

Teacher candidates involved in joint management Team Teaching on a regular basis would likely gain adequate exposure to non-instructional tasks. If teacher candidates can arrange their schedules to be present during their cooperating teacher's planning period, they would not only benefit from more time co-planning and reflecting with their cooperating teacher but would also be able to assist with non-instructional tasks such as grading, setting up activities, making copies, and other routine classroom non-instructional tasks. Caution should be taken not to overuse teacher candidates to assist with non-instructional tasks in the assistive role of One Teach, One Assist as this does not fully utilize the teacher candidate to contribute to student learning.

Classroom management. Forty-three percent of co-teaching cooperating teachers respondents identified benefits of teacher candidates being involved with classroom management whereas no control teachers identified such benefits. Joint management Team Teaching was more commonly observed in co-teaching classrooms than in control classrooms as well. It appears that the professional development on co-teaching caused cooperating teachers to recognize the utility of teacher candidates for assisting with behavior management in the classroom and to utilize their teacher candidates in this way. Killian and McIntyre (1986) did not report any substantial or statistically significant differences in teacher candidates' participation in classroom management in classrooms with a trained versus untrained cooperating teacher.

Previous research has included establishing and practicing classroom management skills as one of the purposes of field experience practica prior to student teaching (Dunn

et al., 2000; National Research Council, 2010), and Henning et al. (2015) included the use of appropriate classroom management as a recommended activity for the earliest field experience practica. Cooperating teachers surveyed in a previous study stated that teacher candidates lacked preparation in classroom management (Al-Bataineh, 2009).

Research on co-teaching in student teaching has also recognized the benefit of a teacher candidate in managing a classroom. Cooperating teachers felt co-teaching improved classroom management (Heck et al., 2008; Maddas, 2014). Fewer disruptions (Bacharach & Heck, 2012; Bacharach et al., 2010), more productive class time (Bacharach & Heck, 2012), and the ability to deal with behavior issues without interrupting instruction (Heck et al., 2008; MidValley Consortium, 2000) were all cited as reasons for improved classroom management. The beneficial effects of having a second adult in the classroom appear to apply to earlier field experiences as well as student teaching.

Expectations

Cooperating teachers as teacher educators. A change in focus from being a classroom teacher to also being a teacher educator who mentors and guides a teacher candidate has been recommended by Chastko (1993) and Zeichner (2010), and Darling-Hammond (2006a) identified training for cooperating teachers on mentoring as a characteristic of successful teacher preparation programs. It appears that the co-teaching professional development provided in this study may have helped cooperating teachers to recognize their role as mentors and teacher educators rather than just secondary teachers.

Communication of program expectations. It appears that the co-teaching professional development helped to communicate the program expectations to the

cooperating teachers, although this was not recognized by all the cooperating teachers who participated in the professional development. The need for communication of expectations was expressed by several of the control group cooperating teachers and has also been identified previously by cooperating teachers involved in field experience practica prior to student teaching from surveys (Applegate & Lasley, 1982) and in interviews (Henning et al., 2015). Darling-Hammond (2006b) emphasized the importance of communicating expectations to cooperating teachers during field experience practica while Henning et al. (2015) noted that cooperating teachers had the least understanding of the teacher preparation programs' expectations during the earlier field experiences.

Bacharach and Heck (2012) identified lack of communication of expectations, other than through the university supervisor, as a problem of traditional student teaching and thus included communication of expectations as a component of the initial co-teaching training for cooperating teachers (Heck & Bacharach, 2010). However, none of their group's research included communication of expectations as a benefit of co-teaching in student teaching (Bacharach & Heck, 2012; Bacharach, Heck, & Dahlberg., 2008, 2010; Heck & Bacharach, 2010; Heck et al., 2008), and no other authors who reported benefits of co-teaching in student teaching identified communication of expectations either (Darragh et al., 2011; Hartigan, 2014; Ingraham & Karsted, n.d.; Maddas, 2014; Merk et al., 2014; MidValley Consortium, 2000; Murphy & Beggs, 2006; Perl et al., 1999; Roth, Masciotra, & Boyd, 1999; Scantlebury et al., 2008; Thousand, 2013; Yopp et al., 2014). Darragh et al. (2011) surveyed teacher candidates about their experience co-teaching in student teaching and noted that many of the teacher candidate frustrations during the semester were due to confusion about expectations for the roles

each teacher was to assume, and therefore these authors recommended that expectations be communicated clearly, especially related to the roles of the co-teachers, by the program at the beginning of the semester.

Traditionally, a university supervisor has been a participant in student teaching along with the cooperating teacher and teacher candidate, and the involvement of someone from the university in this final phase of field experience practicum may have facilitated the communication of expectations to the cooperating teachers in at least some form. Therefore, communication of expectations during student teaching may have not been as problematic as in earlier field experiences so co-teaching has not affected this communication.

Traditionally in the field experience practica prior to student teaching at the university where this present study was undertaken, there has been very minimal involvement of university personnel. Two university faculty members are assigned to evaluate each teacher candidate as he/she teaches a lesson in the final practicum prior to student teaching, but this evaluation usually occurs at the very end of the practicum semester and is usually the only time university personnel are in placement classrooms during any semester. No one from the university is assigned to supervise the earlier field experience practica. Communication of expectations to the cooperating teachers occurs only through the teacher candidates, if at all. Therefore, the co-teaching intervention in this study which provided face-to-face contact between me, the cooperating teachers, and the teacher candidates at the beginning of the semesters, as well as throughout each semester, along with the inclusion of program expectations in the professional development sessions filled a gap in the traditional program.

The professional development sessions on co-teaching also appear to have provided cooperating teachers with strategies for utilizing their teacher candidates. More of the co-teaching teachers than the control group teachers utilized the various co-teaching strategies. Co-teaching cooperating teachers commonly identified benefits of becoming aware of co-teaching strategies and the expected use of these with their cooperating teachers on their end-of-semester surveys.

Differences from Previous Semesters

The co-teaching initiative was perceived in general as an improvement over previous practice. Six of the 13 co-teaching cooperating teacher respondents stated their semester of co-teaching with a teacher candidate was better than previous semesters working with a teacher candidate. Only two co-teaching respondents had a more difficult semester than in previous semesters, and these difficulties were related to the personalities and dispositions of the teacher candidates involved rather than due to the co-teaching initiative. Both cooperating teachers expressed their appreciation for the additional support during the study. The remaining five co-teaching respondents stated there was no difference between the co-teaching semester and previous semesters or that it was difficult to compare the semesters since their teacher candidates were in different field experience courses. This overall positive response to the co-teaching initiative indicates that it is a viable method for improving field experience practica prior to student teaching.

Suggestions for Future Research

Professional Development on Co-Teaching

The co-teaching professional development provided in this study was not sufficient to promote significant change in practice in the participating classrooms. The co-teaching initiative did not produce statistically significant change in teacher candidates' activities as recorded on their log sheets. It did not appear to affect student achievement, although insufficient data were available for a full analysis. The only effects were on the perceptions of cooperating teachers and the observational evidence of enacted co-teaching.

The amount of time and the format for the professional development sessions that had been planned for this study were unable to be implemented due to logistical constraints. Additional research is needed to determine if a more substantial professional development program on co-teaching with a teacher candidate has an effect on student achievement or teacher candidate activity. Qualitative data should also continue to be collected to monitor the implementation of co-teaching as well as cooperating teacher perceptions.

In future research, all professional development sessions are recommended to be delivered to individual cooperating teacher-teacher candidate pairs since scheduling larger groups of cooperating teachers for professional development was unattainable in this study. Cooperating teacher-teacher candidate pairs are also recommended to be individually randomized to the co-teaching or control group to simplify analysis and because professional development is recommended to be provided individually.

Providing professional development individually to teacher pairs will also allow for the intervention to be customized to each pair's particular situation.

If time is available prior to the start of the semester, cooperating teachers and teacher candidates are recommended to meet with the researcher to get to know each other and discuss logistics such as schedules, methods of communication, and expectations of the program. Specifications for completing teacher candidate log sheets should be included in the initial session so cooperating teachers will also be aware of this data source. The expectation that cooperating teachers will serve as mentors for their teacher candidate should also be emphasized both when they are recruited and in the initial professional development session. If possible, a second session discussing the co-teaching strategies and the program expectations related to co-teaching is also recommended to be held prior to the start of the semester. Teacher pairs should be asked to brainstorm ways they envision using each co-teaching strategy in their classroom. It is recommended adopting only the co-teaching strategies most used in this study: Station Teaching, Joint Assisting Team Teaching, Joint Management Team Teaching, and One Teach, One Assist. Supplemental Teaching and Joint Presentation Team Teaching may also be included since they have potential for assisting some teacher pairs. If placements are not available and/or teachers cannot be recruited before the semester begins, these initial sessions are recommended to occur as soon as possible after the start of the semester.

Professional development sessions are recommended to continue throughout the semester. Co-planning time should be strongly encouraged for all participants. The researcher should join the teacher pair for an early co-planning session to assist them in

establishing their co-planning routines. Classroom observations should be undertaken in all participating classrooms as early in the semester as possible to determine to what extent the pairs are implementing co-teaching. Each classroom observation should include a discussion with the two teachers to co-reflect on the observed lesson. Teacher candidate log sheets should also be reviewed during these reflection sessions to compare the teacher candidates' perceptions of the activities they participated in with the researcher's perceptions. Co-planning, instruction, and reflection could possibly all occur in one observation. Additional classroom observations should be scheduled throughout the semester to provide support for the co-teaching pair and should include co-planning, instruction, and reflection. It is recommended that qualitative data be collected during or after all professional development sessions.

The amount of time dedicated to professional development recommended is much more extensive than in the current study. For this reason, recruiting cooperating teachers to participate in the co-teaching intervention may be more difficult. However, the benefits for the cooperating teachers and their students of more fully utilizing the additional human resources available in the teacher candidates should be emphasized along with the personalized support provided by the researcher.

Instructional Type

Research specifically studying the involvement of teacher candidates in classrooms dominated by teacher-centered versus student-centered instruction is also needed.

Student Achievement

In all future research investigating the impact of co-teaching and/or teacher candidates on student achievement, a better mechanism for obtaining student achievement data is needed. It is recommended that cooperating teachers be asked to share unit pretest and posttest data as well as semester pretest and posttest data. Data could then be requested periodically throughout the semester as unit test data become available. Unit data would not only allow a more complete investigation of the effect of co-teaching and teacher candidates on student achievement but should also establish procedures for sharing data so that semester pretest and posttest data can be obtained.

Teacher Candidate Activity

The teacher candidate log sheets used in this study functioned reasonably well. Additional assistance for teacher candidates in completing the log sheets is recommended. In future research, changes could also be made to the categories of activities on the log sheets as needed to answer the research questions of interest.

Implications for Practice

Placements

Based on the results of this study, practicing teachers who commonly utilize student-centered activities should ideally be sought out to serve as cooperating teachers for teacher candidates in field experience practica prior to student teaching. Many of the cooperating teachers who primarily utilized teacher-centered instructional strategies appeared to be fairly effective in their instruction; their lectures were interesting and engaging, and they included visuals to supplement their presentation. However, there were few opportunities for teacher candidates to be involved in instruction or with

assisting students in teacher-centered classrooms. Experienced teachers who are dynamic lecturers are unlikely to share the stage with inexperienced teacher candidates who have not developed those skills. Student-centered instruction, on the other hand, appears to provide a variety of opportunities for teacher candidates to actively participate in the classroom. Further research is needed to confirm or refute the initial findings in this study.

Cooperating teacher and teacher candidate schedules also need to be coordinated to optimally allow for a common time for co-planning and reflection. Common challenges of many of the cooperating teachers in this study were the difficulty of coordinating schedules and lack of time for planning and reflection. These concerns affected the utility of the teacher candidates in the secondary classrooms and could be addressed through more intentional placement practices. Another factor affecting utility was the personal characteristics of both the teacher candidates and the cooperating teachers. Finding the right fit between cooperating teachers and teacher candidates is challenging but may be possible with more selective placements.

Communication of Expectations

Teacher preparation program expectations need to be communicated to cooperating teachers. Many of the cooperating teachers in the control group expressed frustration with being uninformed about the activities, assignments, and requirements of their teacher candidates. An initial meeting involving the cooperating teacher, teacher candidate, and someone from the university would provide a solid foundation for the semester.

Utilizing Teacher Candidates and Preparing Effective Teachers

Co-teaching appears to be a promising practice for assisting cooperating teachers and teacher candidates in working together effectively during secondary field experience practica prior to student teaching. Teacher candidates need opportunities to become actively involved in classrooms in order to develop into effective teachers, and practicing teachers and their students in student-centered classrooms can benefit from extra assistance. Teacher candidates bring new ideas and activities to the classrooms, can assist with classroom management and routine daily tasks in order to allow the classroom teacher more time for student interactions, and can provide additional assistance to students during student-centered activities. These types of active involvement in the classroom will provide teacher candidates with a realistic conception of the profession of teaching, allow them to learn to work with students, and contribute to creating effective learning environments. When teacher candidates are leading instruction, cooperating teachers can assist with classroom management and routine daily tasks to allow the teacher candidate to concentrate on facilitating learning, can assist in assuring that all students are participating, and can assist with the pacing, logistics, and differentiation of the lesson. These types of assistance from cooperating teachers should allow teacher candidates, even in the earliest field experience practica, to take the lead in the classroom, and thus to build their confidence and ability to teach effectively. Co-teaching in field experience practica is a win-win situation for teacher candidates, classroom teachers, and students.

The co-teaching strategies of Station Teaching, Joint Assistance Team Teaching, Joint Management Team Teaching, and One Teach, One Assist hold particular potential

for assisting cooperating teachers in more fully utilizing teacher candidates in their student-centered classrooms during field experience practica. These strategies allow the teacher candidates to add value to the classroom by assisting the cooperating teacher in promoting student learning to a greater extent than the classroom teacher could do alone. The basic ideas behind these co-teaching strategies are largely intuitive to practicing teachers, but many teachers have not thought of utilizing them when a teacher candidate is present in their classroom. Discussing these co-teaching strategies along with general expectations of the field experience practica during an initial meeting of the cooperating teacher, teacher candidate, and university faculty can set the stage for a productive semester of collaboration.

Teaching is a complex and challenging task. Watching someone else teach, no matter how effective that teacher may be, does not prepare a pre-service teacher to meet these challenges. Teacher candidates need to be involved in actual teaching under the guidance of effective teachers who can also explain their decision-making processes in order to learn the craft. Co-teaching provides a mechanism to assist cooperating teachers in utilizing teacher candidates in their classrooms in order to optimize student learning while providing the teacher candidates with the experience they need to develop into effective teachers.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL

UNIVERSITY of NORTHERN COLORADO

Institutional Review Board

DATE:	July 24, 2015
TO:	Stephanie Fanselow
FROM:	University of Northern Colorado (UNCO) IRB
PROJECT TITLE:	[772383-2] Co-Teaching in Secondary Field Experience Practica
SUBMISSION TYPE:	Amendment/Modification
ACTION:	APPROVAL/VERIFICATION OF EXEMPT STATUS
DECISION DATE:	July 24, 2015

Thank you for your submission of Amendment/Modification materials for this project. The University of Northern Colorado (UNCO) IRB approves this project and verifies its status as EXEMPT according to federal IRB regulations.

Hello Stephanie,

Thank you for your excellent modifications. Everything looks great and clear. Your application is approved. Good luck with this important research project.

Sincerely,

Nancy White, PhD, IRB Co-Chair

We will retain a copy of this correspondence within our records for a duration of 4 years.

If you have any questions, please contact Sherry May at 970-351-1910 or Sherry.May@unco.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Northern Colorado (UNCO) IRB's records.

APPENDIX B

TEACHER CANDIDATE LOG SHEET

Name: _____ Student #: _____

Host School: _____ Host Teacher: _____

Host Teacher Email: _____ Host Teacher Telephone: _____

Date	Time: from-to	Total hours & minutes	Types of Activities (number of hours and/or minutes for each)					Host Initials
			Observation	Assist individuals or groups of students	Assist with instruction (in front of class)	Assist teacher with non-instructional tasks	Co-plan or talk with teacher about instruction, etc.	
Example	9:30-10:45	1 hour 15 min.	30 min	45 min				SAF

(Expand table as needed)

Total: _____ hours _____ minutes (please do not use fractions or decimals)

I, _____ , certify that I have completed the field experience hours listed above.
Teacher Candidate Signature

I, _____ , certify that the above named teacher candidate completed the total field experience hours listed above.
Host Teacher Signature

APPENDIX C

COOPERATING TEACHER PERCEPTION SURVEY

Cooperating Teacher End-of-Semester Survey

Thank you for taking the time to complete this survey about your experience working with a teacher candidate this semester. To answer each question, please click and type where it says "Click here to enter text." Each box should expand to allow you to enter as much information as you would like. Your responses will be combined with those of other teachers, and you will not be personally identified when the results are presented.

1. Prior to this semester, approximately how many teacher candidates have you hosted?

   Click here to enter text.

2. Describe any previous professional development or coursework you have participated in related to co-teaching.

   Click here to enter text.

3. What do you feel were the benefits for your students, if any, of hosting a teacher candidate this semester?

   Click here to enter text.

4. What do you feel were the benefits for you, if any, of hosting a teacher candidate this semester?

   Click here to enter text.

5. What do you feel were the drawbacks or challenges of hosting a teacher candidate this semester?

   Click here to enter text.

6. CO-TEACHING ONLY: In what ways did the meeting(s) with your teacher candidate and the researcher at the beginning of the semester affect your experience working with your teacher candidate?

   Click here to enter text.

7. CO-TEACHING ONLY: In what ways did the information provided on co-teaching affect your experience with your teacher candidate?

   Click here to enter text.

8. CO-TEACHING ONLY: How did your experience hosting a teacher candidate this semester compare to any previous semesters hosting a teacher candidate?

   Click here to enter text.

9. What suggestions do you have for the University to make hosting a teacher candidate more beneficial to you and your students?

   Click here to enter text.

10. What area(s) are you licensed to teach?

    Click here to enter text.

12. How many years have you taught at the secondary level? (Include this year)

Click here to enter text.

Thank you so much for working with a teacher candidate this semester and for participating in this research study. You are vital to the preparation of the next generation of effective teachers. Please save this document and e-mail it to me at:

APPENDIX D

HANDOUT FOR INITIAL CO-TEACHING PROFESSIONAL DEVELOPMENT SESSION

Implementing the 7 Co-teaching Strategies with a Teacher Candidate

Co-teaching: 2 should be able to do more together than either 1 could do alone.

1. One Teach, One Observe: One teacher has primary instructional responsibility while the other gathers specific observational information on students or the (instructing) teacher.

    - What might be observed that would be helpful?

    - How might you use this strategy in your classroom?

2. One Teach, One Assist: One teacher has primary instructional responsibility while the other assists students' with their work, monitors behaviors, or assists with instruction.

    - In what ways could assisting improve student learning?

    - How might you use this strategy in your classroom?

3. Station Teaching: The co-teaching pair divides the instructional content into parts. Each teacher instructs one of the groups, groups then rotate or spend a designated amount of time at each station.

    - What are some topics or ways you envision using this strategy in your classroom?

4. Parallel Teaching: In this approach, each teacher instructs half the students. The two teachers are addressing the <u>same</u> instructional material using the <u>same</u> teaching strategies.

- What are some topics or ways you envision using this strategy in your classroom?

5. Supplemental Teaching: This strategy allows one teacher to work with students at their expected grade level, while the other teacher works with those students who need the information and/or materials extended or remediated.

    - What are some topics or ways you envision using this strategy in your classroom?

6. Differentiated Teaching: Differentiated teaching strategies provide two different approaches to teaching the same information. The learning outcome is the same for all students however the avenue for getting there is different.

    - What are some topics or ways you envision using this strategy in your classroom?

7. Team Teaching: Well planned, team taught lessons, exhibit an invisible flow of instruction with no prescribed division of authority. Both teachers are actively involved in the lesson. From a student's perspective, there is no clearly defined leader, as both teachers share the instruction, are free to interject information, and available to assist students and answer questions.

    - What would this look like in your classroom?

Adapted from Bacharach, N., Heck, T. W., & Dahlberg, K. (2010). Changing the face of student teaching through coteaching. *Action in Teacher Education, 32*(1), 3-14. doi:10.1080/01626620.2010.10463538

APPENDIX E

CO-TEACHING PAIRS COMMUNICATION ACTIVITY

Co-Teaching Pairs Communication Activity

1. Discuss your expectations for this semester. What will this semester look like for each of you? Include specifics of schedules, classroom and school policies, etc.

2. Decide how you will communicate throughout this semester? Will there be time to talk in person prior to the start of the school day, during a planning period, or after school? Can you use e-mail or other electronic tools to communicate lesson plans or specific expectations? How will you communicate a change in plans such as an unexpected absence?

3. What are your pet peeves related to teaching? What classroom practices really bother you? Is organization important to you? Is it alright for the other co-teacher to interject information while you are talking?

4. What roles do you expect to assume during the semester? You may want to make a list of the tasks that need to be completed and discuss who can take responsibility for each. How will you make the best use of having two adults in the classroom? What do each of you need from the other?

5. How do you prefer to receive feedback? Immediately or delayed? In person or through written communication? How can you each provide feedback to your partner based on her/his preferred style?

APPENDIX F

CO-TEACHING PAIRS CO-PLANNING ACTIVITY

Co-Teaching Pairs Co-Planning Activity

1. When, where, and how will you co-plan?

2. What must be done to make co-planning happen?

3. What is the basic content of this course, what standards will be addressed, and what curriculum will be used?

4. What are the specific needs of the students in this class?

5. What instructional strategies are commonly used in this class?

6. How can the specific co-teaching strategies be incorporated into this class to make use of the teacher candidate?

    - One Teach, One Observe
    - One Teach, One Assist
    - Station Teaching
    - Parallel Teaching
    - Supplemental Teaching
    - Differentiated Teaching
    - Team Teaching

7. What format will be used for lesson planning? How will lesson plans be shared?

8. Plan out a specific lesson for this week or next week.