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SECONDARY CO-TEACHERS' PERCEPTIONS OF THEIR COMPETENCE IN
CO-TEACHING AND UTILIZING INTEGRATIVE TECHNOLOGY

by

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Dedication

To my daughter, Zara. Who will always remain my life's greatest work. I love you.

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ABSTRACT

SECONDARY CO-TEACHERS' PERCEPTIONS OF THEIR COMPETENCE IN CO-TEACHING AND UTILIZING INTEGRATIVE TECHNOLOGY

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When ensuring the least restrictive environment for students eligible and receiving special education services a delivery option frequently considered is providing a second teacher in the general education classroom. This second teacher is often a specialist in special education instruction which allows for an increase in opportunities for differentiation and specially designed instruction through the instructional model known as co-teaching. Related, instruction is increasingly being presented through integrative technology. The purpose of this study was to explore secondary educators' perceptions of their competence in co-teaching and utilizing integrative technology, and the relationship it has with educators' perceived practices. The findings from this study illustrated the illusion of beliefs and knowledge and emphasized the disconnect between knowledge and

classroom practice. Several misconceptions of co-teaching and integrative technology are presented within this study's findings.

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CHAPTER I: INTRODUCTION

In 1975, the passing of the Education for All Handicapped Children's Act (EAHCA) allowed students with disabilities to receive a free and appropriate education in the least restrictive environment (LRE; EAHCA, 1975). Although this law has undergone changes over the decades, the same foundational concepts are present and require public schools receiving federal funding to provide equal access to education to children with disabilities. As a result of these legal guidelines, public schools were required to make significant efforts to provide students with an educational experience with consideration of LRE. To ensure LRE, many schools across the country transitioned from pulling students out of the general education classroom to using a push-in approach (Cook & Friend, 1995). This concept stipulates that students with special learning needs not only have access to the general education classroom, but also receive supplemental supports, services, and accommodations within natural environments (Cook & Friend, 1995).

One common service approach for students with disabilities is to provide support using the instructional model known as co-teaching. This model is employed to deliver support to students in the LRE of the general education classroom (Cook & Friend, 1995). Co-teaching is the practice of pairing two credentialed teachers together to allow sharing of duties such as planning, instructing, and assessing all students. Both professionals should be equally vested in the responsibilities of the classroom. Most often when two co-teachers are assigned to this instructional model, the pairing is a general education and a special education teacher. The hallmark of this model is it interdependently involves two teachers in the classroom and allows them to potentially benefit all students in the learning environment by combining different perspectives, teaching strategies, and skill sets (Cook & Friend, 1995).

In the 30 years since the co-teaching model was introduced and refined by Cook and Friend (1995), clarification regarding fidelity of implementation has been provided both in the literature and through the model designers. There are six recognized instructional approaches (often referred to as models) for implementation within the co-teach classroom: (a) one teach/one observe, (b) station teaching, (c) parallel teaching, (d) alternative teaching, (e) team teaching, and (f) one teach/one assist (Cook & Friend, 1995). When using a co-teaching approach, both teachers have a defined role that is either meeting the diverse learning needs of students in the classroom, collecting data to drive instructional outcomes, or participating in the delivery of instructional content (Cook & Friend, 1995).

Just as co-teaching has changed the dynamic of some classroom learning experiences, integrative technology has dramatically reformed instructional methods in a relatively short period of time (Davis, 2018). Instructional content presented through technology is an everyday occurrence in today's classrooms (Okojie, 2011). Education in general has been directly impacted by the increase of technology in learning environments; more specifically, technology has profoundly changed the learning experience for students with disabilities (Okojie, 2011). When technology is used purposefully to enhance student learning, its integration can have a dramatic effect on the instructional outcomes of all students (Davis, 2018).

Numerous studies have examined how technology has impacted educational and student learning experiences in the classroom (Davis, 2018; Hicks, 2011; Okojie, 2011; Rafool, Sullivan, & Al-Bataineh, 2012). However, after an exhaustive review of the existing literature, there has not been a significant amount of attention given to integrative technology in co-teaching environments (Bryant Davis, Dieker, Pearl, & Kirkpatrick, 2012). Specifically, this study sought to add to the gap in the literature

associated with secondary co-teacher knowledge and beliefs of co-teaching and integrative technology and actual classroom practices.

Research Problem

Cook and Friend (1995) noted that the teaching profession has a history of preparing teachers to work in isolation. However, to ensure students are educated in the LRE, pairing special education and general education teachers allow them to work in constructive and coordinated ways in the classroom. Co-teaching emerged as a means of providing students with disabilities access to the general education curriculum alongside their non-disabled peers. Therefore, co-teaching is widely recognized in the teaching profession as a means of helping students with disabilities in the LRE of general education settings (Cook & Friend, 1995).

Given the potential benefits of having two teachers in one classroom, co-teaching should aim to increase student achievement. However, existing literature showcases similarities in terms of how instruction in the co- and solo- taught classes are being delivered (McDuffie, Scruggs, & Mastropieri, 2007). Co-teach classrooms should use research-based teaching strategies comparable to solo- teaching environments. Furthermore, co-teach classrooms may have greater impact when using research-based teaching strategies such as small-group instruction or differentiation of instructional content, processes, products and environmental elements (Subban, 2006). Unfortunately, many barriers are often present that limit co-teaching's impact. The research outlines common barriers that professionals experience when implementing co-teach instruction, including (a) lack of preparation, (b) administrative support, (c) compatibility, and (d) planning time. Additional barriers presented include (e) negative views regarding inclusion, (f) equal status, and (g) lack of content expertise (McDuffie et al., 2007). As a result, co-teach classrooms often fail to implement the co-teach model with fidelity and

continue to rely primarily on whole group instruction utilizing primarily only the co-teaching approach one teach, one assist (McDuffie et al., 2007). Even though there are two teachers (general and special education) in the classroom, the literature seems to suggest that general education teachers generally lead instruction while special education teachers assist rather than co-teach. However, research supports the notion that co-teaching practices are not being implemented in a manner that provides students with special learning needs access to high-quality instruction through the use of co-teach approaches (models). Additionally, co-teachers are failing to implement specialized instructional techniques to ensure student success in a rigorous learning environment (McDuffie et al., 2007). True co-teaching allows for teachers to optimize the varied co-teach approaches to align with content demands and student learning needs (McDuffie et al., 2007).

In the current context of teaching and learning, technology plays a significant role in the delivery of instructional content in the classroom (Davis, 2018). With an increase in co-teach implementation as an instructional arrangement and student learning in technology rich environments, this study explored secondary educators' perceptions of their competence in co-teaching and utilizing integrative technology, and the relationship it has with educators' perceived practices. Ultimately, findings from this research could inform co-teach practices involving integrative technology considerations.

Significance of the Study

Co-teaching is multi-faceted and complex. Thirty years of research has established that while highly beneficial for impacting positive outcomes for diverse learners, it is more challenging than perceived to implement with fidelity (Friend, 2008; Mastropieri et al., 2005; McDuffie et al., 2007; Rice & Zigmond, 2000). Furthermore, research focused on Universal Design for Learning has served to inform ways that

technology can be integrated to enhance quality teaching and learning (Meyer, Rose, & Gordon, 2014). Based on Davis (2018), McDuffie et al. (2007), and Cook and Friend (2008), there appear to be significant discrepancies between secondary co-teacher knowledge and beliefs of co-teaching and integrative technology and actual practice. Coincidentally, Kaymakamoglu (2018) emphasized the gap in teacher beliefs, perceived practices, and actual classroom practice. Educators have maintained strong beliefs about recommended instructional practices; however, their actual classroom practice illustrates conflicting methods being utilized in co-teach classrooms. Ultimately, these inconsistencies necessitate exploring these areas as a means of adding to the existing literature to allow an increase in the implementation of recommended practices in co-teach classrooms. If school districts aim to effectively utilize co-teaching in the content of technology rich schools, an understanding of the relationship between perceived competence and practices can inform continuous improvements and thereby improve outcomes for students.

Research Purpose and Questions

The purpose of this study was to explore secondary educators' perceptions of their competence in co-teaching and utilizing integrative technology, and the relationship it has with educators' perceived practices. This study examined the following questions:

Quantitative:

1. What are the differences in perceptions of co-teachers (general education vs. special education) on co-teaching practices?
2. What are the differences in perceptions of co-teachers (general education vs. special education) ability to integrate technology in the classroom?
3. What is the relationship between perceptions of co-teaching and perceptions of technology integration proficiency and use?

Qualitative:

4. What perceptions do secondary co-teachers have about co-teaching practices and integrative technology in co-teach classrooms?

Definition of Key Terms

Assistive technology – is defined as “assistive, adaptive, rehabilitative, and instructional technology used for people with disabilities to fully be part of society and classrooms...without inconveniencing or disrupting the learning processes of both students with disabilities and the typically learning students” (Kalonde, 2019, p. 273).

Co-instructing – is defined as two professionals assigned to the same classroom or class period, but the general education teacher plans and leads all the lessons. While the special education teacher does not have an active role in planning and delivering instructional content (Cook & Friend, 1995).

Collaborative teaching – is defined as a means of providing students with diverse needs access to the general education classroom. This is provided by having two teachers in one classroom with one being a special education teacher and the other a general education teacher (Austin, 2000).

Competence – is defined as the set of knowledge, skills, and attitudes that must be maintained, experienced, mastered, and realized by the teacher when performing professional duties and displayed in work performance (Maba, Perdata, Astawa, & Mantra, 2018).

Co-teachers – is defined as the pairing of a general and a special education teacher who are teamed together to provide instruction to a heterogeneous class for one or more periods of instruction per day (Austin, 2000).

Co-teaching – is defined as “two or more professionals delivering substantive instruction to a diverse, or blended, group of students in a single physical space” (Cook &

Friend, 1995). However, co-teaching should not be confused with co-instructing or collaborative teaching (Cook & Friend, 1995).

General education teacher – is defined as any teacher professionally certified and endorsed to provide instruction in an elementary level classroom or secondary level subject area (Austin, 2000).

Instructional technology – is defined as “the use of technology in the instructional processes that enhances both teaching and learning by infusing instructional design and development with tools that eliminate learning in abstract” (Kalonde, 2019, p. 273).

Integrative technology – is defined as the “use of technology to enhance and support the educational environment, teacher instruction, and student learning” (Van Allen, 2020, p. 3).

Educational technology – is defined by Cheung and Slavin (2013) as “a variety of electronic tools and applications that help deliver learning content and support the learning process.”

Learning management system – This study follows the definition of Hornby (2015) for learning management system and defines it as a software system designed to deliver learning content. Learning management systems may be marketed with additional features, such as course management, presentation and communication tools, assessment capabilities, and grading tools. The learning management system can provide benefits to teachers by providing online tracking capabilities that track educational activities, user mastery, completion status, and student performance. Such software is often used in traditional, online courses, and blended learning environments.

Special education teacher – is defined as any teacher certified to provide instruction to any student in grades K-12 who is classified as having one or more

disabilities and for which the educator holds a professional certification specially in Special Education (Austin, 2000).

Universal Design for Learning – is defined as a framework that encourages and inspires educators to design learning experiences and accessible curricula for a wide range of student by reducing the number of learning barriers in the instructional planning processes (Rose & Meyer, 2002).

Conclusion

The passage of the Education for All Handicapped Children Act started revolutionary changes for students with disabilities (EAHCA, 1975). Aligned with the ensuing reauthorizations of IDEA, many schools have implemented the co-teaching instructional model as a means of educating students with disabilities in the LRE within the general education classroom. Such a service delivery option serves to ensure students with disabilities have access to the general education curriculum in a rigorous learning environment alongside their neurotypical peers with the support of special education supplementary supports and services.

As co-teaching has changed the dynamic of some classroom learning experiences, instructional technology has dramatically reformed instructional methods in a relatively short period of time (Davis, 2018). Moreover, technology plays a significant role in the delivery of instructional content in the classroom. Meanwhile, and according to the research, co-teaching practices are not being implemented in a manner that provides students with special learning needs access to high quality instruction though the use of co-teach approaches (models) and specialized instructional techniques designed to ensure success in a rigorous learning environment (Scruggs et al., 2007). With an increase of both co-teach implementation as an instructional arrangement and students learning in technology rich environments, this study explored secondary educators' perceptions of

their competence in co-teaching and utilizing integrative technology, and the relationship it has on educators' perceived practices. This chapter identified the need to examine significant gaps between secondary co-teacher knowledge and beliefs of co-teaching and integrative technology and actual practice. The research problem is supported by the significance of this study and was reviewed and aligned to the presented research questions. In the next chapter, the literature explains and analyzes co-teaching practices and integrative technology within the context of existing research focused on educator perceptions and practices will be presented.

CHAPTER II: LITERATURE REVIEW

The purpose of this study was to explore secondary educators' perceptions of their competence in co-teaching and utilizing integrative technology, and the relationship it has with educators' perceived practices. This literature review explores (a) the background of co-teaching, (b) co-teaching, (c) physical arrangements of classrooms, and (d) role of technology in the classroom. It also explores (e) technology barriers, (f) technology in co-teaching environments, (g) teacher efficacy regarding technology, and the overall (h) theoretical framework. This chapter presents a representative review of literature associated with the constructs of this study.

Background of Co-Teaching

The movement to end segregation of students receiving special education services from regular education programming began in the late 1960s (Peery, 2017a). This inclusive movement, initially led by parents, allowed for the eventual establishment of the Individuals with Disabilities Act (IDEA) in 1975. IDEA updated Public Law 94-142 and upheld two fundamental rights of students: a free appropriate public education (FAPE); and the least restrictive environment (LRE; Dang, 2010; Katsiyannis, Yell, & Bradley, 2001; Peery, 2017a).

Since being enacted into law, IDEA has been revised and expanded multiple times (Dang, 2010; Katsiyannis et al., 2001; Peery, 2017a). Historically, provisions for meeting the needs of students receiving special education services was accomplished through mainstreaming and self-contained environments. According to Peery (2017a), mainstreaming is the effort of mixing special needs students previously being in separate classrooms back into the general education setting. In doing so, these students would be able to find academic success once they were mainstreamed. However, without

specialized assistance within the general education classroom, many students receiving special education services struggled (Garvar & Papania, 1982; Peery, 2017b).

Following mainstreaming, an emphasis on inclusive practices ignited the next wave of special education reform in the 1990s with the reauthorization and retitling of IDEA (Yell, Rogers, Rogers, 1998). Through these reforms, an emphasis on person-centered education and supports allowed for co-teaching practices to evolve within the teaching profession (Peery, 2017a). An inclusive belief system requires schools to provide the resources necessary to ensure all students have access to meaningful learning environments but does not require a particular set of skills or abilities as a prerequisite to participate (Villa, Thousand, Nevin, & Liston, 2005). In complying with IDEA, decisions regarding access to (a) the general curriculum, (b) delivery of supplemental aids and services, and (c) subsequently which placement is best suited for a student are based on student data to ensure the individual needs of the student are the primary consideration in all special education programming decisions (Villa et al., 2005).

As a result of both the inclusion movement and federal law supporting LRE, students with special learning needs were included in general education classrooms (Yell et al., 1998). Unlike previous mainstreaming efforts, inclusive practices allowed for students receiving special education services to be supported by a special education teaching specialist in the general education classroom (Yell et al., 1998). As inclusive practices evolved, the term “co-teaching” was coined by Friend and Cook (1996), as it highlights the dual instructional model between the general education and special education teacher that needs to be present for students to benefit (Cook & Friend, 1995). Van Garderen, Stormont, and Goel (2012) reviewed 19 studies on the impact of collaboration between general and special education teachers on the academic, social, and behavior outcomes of students with disabilities. Their study findings revealed that

providing a special education teacher in a general education classroom to support the unique learning needs of students with disabilities is continuing to grow in popularity as a service option. This increase of popularity is not only because federal legislation supports students being in the LRE, but also because most students, regardless of disability, will show academic and behavioral improvements as a result of co-teaching arrangements when the instructional arrangement is implemented with fidelity (Van Garderen et al., 2012).

Rise of Co-Teach Practices

According to Friend (2008), co-teaching takes place when two or more professionals jointly deliver substantive instruction to a diverse, blended group of students primarily in a single physical space. According to the U.S. Department of Education, National Center for Education Statistics (2019), nearly 82% of students receiving special education services in the United States are served in the general education classroom for more than 40% of their school day. Therefore, since a majority of students eligible for special education are being educated in the general education classroom, it is imperative that instructional practices support the needs of all students (McLeskey, Landers, Hoppey, & Williamson, 2011). Co-teaching supports students' individual learning preferences and needs by providing additional instructional support, increased involvement, and enrichment opportunities for all students in the general education co-teach classroom (Mastropieri et al., 2005). In the following sections, a deeper analysis of the elements of co-teaching as explored in the literature is presented.

Co-Teaching

Friend and Cook (2013) defined co-teaching as two credentialed teaching professionals. This partnership often consists of a general education and a special education teacher with equivalent credentials and employment status. This pairing can be

considered as an equal partnership and a powerful approach to providing instruction because both professionals are able to demonstrate their unique expertise and experience to enhance instructional practices, ultimately benefiting all students in the co-teach classroom (Friend & Cook, 2013).

Villa et al. (2005) explained that the intent of co-teaching is not for one professional to teach while the other grades, sits, stands, tutors, or observes the instruction without a clear function or assignment. Special education teachers have the expertise required to support diverse students in the area of differentiation, progress monitoring, and teaching for mastery. Conversely, general education teachers have the unique skill set needed to enhance the learning environment, including specific expertise in curricula, classroom management, overall knowledge of general education students, and approaches of pacing instruction (Cook & Friend, 2010). Therefore, co-teaching enables two certified teachers to design a rigorous learning experience customized to the unique needs of diverse learners through co-planning, co-instructing, and co-assessing (Cook & Friend, 2010). The next section focuses on the co-teaching model and related approaches, the role of joint delivery of instruction, and variables impacting co-teaching experiences.

Joint Delivery of Instruction

Educators may loosely classify their teaching arrangement as co-teaching because two professionals are present in the classroom at the same time (Friend & Cook, 2013). In many situations, the general education teacher conducts instruction as if they were alone in the classroom, while the special education teacher waits for the direct instruction to conclude and then begins working around the room to help students, manage behavior problems, or work in small groups to provide supplemental instruction. Arrangements such as these are common yet, according to Friend and Cook (2013), should not be

regarded to as co-teaching. Instead, such practices should be viewed as an underuse of qualified teaching professionals (Friend & Cook, 2013). To truly achieve a positive outcome in a co-teach classroom, both educators need to be actively involved in planning, delivery of instructional content, and assessment (Friend & Cook, 2013). In a similar line of thinking, Scruggs et al. (2007) conducted a qualitative meta-synthesis of the literature and investigated 32 studies and concluded that teachers generally support co-teaching but identified the dominant co-teaching approach to be the one teach, one assist even though it is not highly recommended within the literature. The following section will outline the co-teach approaches.

Co-Teach Approaches

For co-teaching to be an effective instructional delivery option, co-teachers need to design, assess, and deliver instructional content in ways that best meet the needs of their diverse students (Friend & Cook, 2013; Murawski & Lochner, 2011; Strogilos, Stefanidis, & Tragoulia, 2016). Strogilos et al. (2016) surveyed and interviewed 400 co-teachers to investigate teachers' attitudes toward co-teaching practices in Greek schools. The researchers followed up with ten participants using semi-structured interviews to gain insight to the instructional planning process of co-teaching. Teachers reported that the limited time co-teachers have to co-plan has a negative impact on the quality of co-teaching. Their findings highlight the need for co-planning and present implications that emphasize the need for co-teachers to develop lesson plans specific to their classrooms to address these three components (i.e., designing, assessing, and delivering instructional content).

When teachers first establish their co-teaching relationship, it is common to start with approaches that involve less coordination. As co-teachers become more experienced and build relationships with each other, they will begin to integrate more co-teach

approaches into their instructional practice based on student and instructional needs. A successful partnership that implements a variety of the co-teach approaches (i.e., models) requires time to establish coordination and trust (Cook & Friend, 2010). This is evident in Keefe and Moore (2004), who conducted semi-structured interviews to collect data from three general and four special education co-teachers. One theme that emerged from the qualitative data was collaboration, which highlights the importance of compatibility between co-teachers. Their overall findings emphasize the importance of thoughtful consideration of co-teaching assignments, relationships between co-teachers, and supporting the development of co-teach teams over a period of time (Keefe & Moore, 2004).

When incorporating co-teaching approaches within lesson plans, professionals often emphasize content, levels of learning, and student needs to achieve desired outcomes and enhance instructional impact (Friend & Cook, 2013). As co-teachers determine the needs and abilities of their students along with instructional learning objectives for each lesson, they must decide the best way to structure teaching and learning (Cook & Friend, 2010). Since students have unique learning needs, co-teaching may vary from classroom to classroom and lesson to lesson (Cook & Friend, 2010). In a similar line of thinking, Reeves (2011) noted the importance of addressing individual student needs through well designed instructional plans that generate, support, and assess student learning. Conversely, Friend (2015) emphasized that studies focused on instruction in secondary co-taught classrooms continue to highlight the failure to provide specially designed instruction to students eligible for special education services that allows them to access and progress within the general education curriculum. For instance, Magiera and Zigmond (2005) conducted 84 observations in 11 classrooms and compared instructional experiences of middle school students in the general education classroom

with those of students with disabilities in solo teaching assignments, finding that teacher interactions, student groupings, whole group instruction, and student participation did not differ between classrooms. The overall literature provides insight into the role of co-teaching instructional approaches and the importance of instructional design in the co-teach classroom. In particular, the literature recognizes six co-teach approaches that are used most frequently in co-teach learning environments I (see Table 1 below; Friend & Cook, 2013). The following subsections will describe each approach and provide barriers, advantages, and recommendations for practice.

Table 1

Co-Teaching Approaches, Descriptions, and Purposes

Approach	Description	Intended purpose	Barriers	Frequency Recommendations
One Teach, one Observe	One teacher is leading instruction, while the other teacher is collecting data.	Purposeful data collection to guide instruction or track student progress.	Often the teacher collecting data is regarded as a subordinate role.	Frequent use, short periods of duration.
Station Teaching	Stations are set up around the room that utilizes both teachers at an assigned station that allows all students to work with both teachers at some point.	Decrease student teacher ratio, present targeted instruction through small group.	The noise levels of this approach can be high, student lead stations require an activity that allows for independent practice and requires a lot of preparation and planning.	Frequent use.
Parallel Teaching	Jointly planned instructional content that is presented by both teachers in two equal heterogenous groups.	Allows for increased student participation and academic conversations.	Requires equity in content expertise from both teachers, equal pacing, flexible workspace, and noise levels must be controlled.	Frequent use.

(Continued)

Approach	Description	Intended purpose	Barriers	Frequency Recommendations
Alternative Teaching	Based on previous assessments, both teachers will decide what students are at risk. One Teacher works with the at-risk group while the other continues to provide instruction.	Reteach the at-risk students while providing accelerated content to the remaining students.	Groupings must vary to avoid stigmatizations; teachers should equally work with at risk students to avoid creating a subordinate role and requires adequate space.	Occasional use to avoid risks if used too frequently.
Teaming	While team teaching, co-teachers should act as one	Share the role of leading instruction and providing student support.	Requires both teachers to blend teaching styles.	Occasional use.
One Teach, One Assist	As one teacher leads the whole class, the other teacher provides support, answers questions, monitors student behavior, etc.	Deliver instruction and monitor student progress.	Typically, the special education teacher's role is diminished to a subordinate role and lowers equity in the classroom.	Seldom or less use.

Note. Co-teaching approach One Teach, One Observe adapted from *Including Students with Special Needs: A Practical Guide for Classroom Teachers* (5th ed., p. 92), by M. Friend and W. D. Bursuck, 2009, Columbus, OH: Merrill. Copyright 2009 by Allyn & Bacon. Adapted with permission.

One teach, one observe. In this co-teach instructional approach, one teacher is responsible for designing and delivering instructional content, while the other has the goal of collecting data on a single, small group of students or the entire class (i.e., when professionals have previously agreed to observe prior to the delivery of instructional content; Friend & Cook, 2013). Usually, the teacher who delivers the instructional content is most familiar with the subject matter being taught—within the literature, this has historically been the general education teacher (Scruggs et al., 2007). One advantage of this model is that when used purposefully, it can help gather valuable data for special education programming decisions, functional behavior analysis, or to check student understanding during the lesson and drive future instruction (Friend, 2014). If this model is used frequently or exclusively, the second educator—typically the special education teacher—may be regarded as an assistant (Friend & Cook, 2013). To prevent this situation from occurring, co-teachers can alternate roles periodically to allow the students to develop an understanding that their class is led by two teachers with equivalent responsibility and authority (Friend & Cook, 2013). Overall, this model should be used purposefully, frequently, and for short durations as a means of collecting student data to drive instructional outcomes (Friend, 2014).

Station teaching. In station teaching, both teachers take an active role in instruction, enabling them to establish a clear role in the co-teaching process by dividing instructional content and take on the dual responsibility of planning and teaching (Friend & Cook, 2013). When station teaching occurs in the classroom, students will move from one station to another according to a prearranged rotation schedule. At some point in the rotation process, all students will have instructional content delivered to them by both teachers (Friend & Cook, 2013). This approach may be beneficial because it allows the teachers to work with student in small groups and respond to their individual needs

(Friend, 2014). Like the benefits of small group instruction, students benefit from this instructional approach because of the low teacher to student ratio (Friend, 2014). Because of the instructional benefits, this model can be used frequently in co-teach classrooms (Friend & Cook, 2013). Some drawbacks associated with station teaching are as follows (a) it requires significant preplanning, (b) it may lead to elevated noise levels in the classroom, (c) stations need to be paced so teaching ends at the same time, and (d) one or more of the groups will work independently of the co-teachers (Friend & Cook, 1996).

Parallel teaching. In this approach, teachers jointly plan instructional content, divide the class into two heterogeneous groups, and do not exchange students (Friend & Cook, 2013). This instructional arrangement requires both teachers to coordinate their instruction to ensure students receive equitable exposure to instructional content (Friend & Cook, 2013). This model is beneficial in that it allows for increased instructional conversations and provides reluctant students the ability to participate with a smaller audience. Research has indicated that both teachers need to be knowledgeable of the instructional content in order to provide equitable content exposure for the student groups. Additionally, the pacing of the lesson must be similar to allow both teachers to conclude at the same time. In order to properly implement this model, co-teach classrooms need to have flexible spacing to accommodate two instructional groupings. In addition, teachers will have to manage the noise level to prevent the two groups from distracting each other. If these aspects are not considered, the effectiveness of this approach may be compromised. However, because of its many benefits, co-teachers can use this model frequently as an instructional approach in the classroom (Friend, 2014).

Alternative teaching. In alternative teaching, co-teachers provide intensive instruction within the general education classroom setting (Friend & Cook, 2013). When using this approach, a co-teacher selects a small group of students to receive instruction

and provide opportunities to improve generalization of skills. This can occur in the form of pre-teaching or reteaching instructional content. The greatest risk of this approach is that students who are frequently invited to partake in the alternate grouping may become stigmatized because of negative perceptions (Friend & Cook, 2013). To prevent stigmas from forming, teachers need to take note of which students they are inviting to participate in the alternative instructional grouping to ensure all students participate at some point. Additionally, teachers can alternate leading the small group instruction, allowing both professionals to establish equal instructional roles in the classroom (Friend & Cook, 2013). Given these considerations, co-teachers should only use this co-teach model occasionally to avoid the downfalls of stigmatization that could otherwise arise (Friend, 2014).

Team teaching. In the team teaching approach, co-teachers simultaneously participate in delivering instructional content of the lesson, which may appear as a trading of ideas between teachers (Friend & Cook, 2013). An example of this approach is when each teacher takes on the role of a character in a play as a scene is being read. In addition, one teacher could explain the details of a lesson, while the other demonstrates a science experiment or model's note taking. A notable barrier for this approach is that it requires both teachers to blend their teaching styles in a complimentary way. Overall, this approach can enhance student participation and compel professionals to try out new instructional techniques (Friend & Cook, 2013). However, even with both teachers being fully engaged in delivering instructional content, it should only be used occasionally (Friend & Cook, 2013). Furthermore, when both teachers are leading whole group instruction, there may be decreased teacher to student interactions and individualized support (Friend, Burrello, & Burrello, 2005).

One teach, one assist. The final instructional approach in co-teaching occurs when one co-teacher is teaching and the other is moving around the room offering support to students or redirecting behavior (Friend & Cook, 2013). Friend and Cook (2013) recommended infrequent use of this instructional model, as the general education teacher often assumes the lead role of delivering instructional content. As a result, the other educator, typically the special education co-teacher, takes on an assistant role (Friend & Cook, 2013). One main drawback of this approach is that students may regard one professional as the teacher, and the other as the teacher's aide (Friend & Cook, 2013). In other instances, students have noted that a teacher moving around the room during instruction is distracting, while others expect immediate one-on-one assistance instead of varied approaches (Friend & Cook, 1996). To avoid these disadvantages, this approach should be utilized when no other approach meets the instructional needs of the lesson. Moreover, co-teachers can take turns presenting instructional content to the entire group while the other assists (Friend & Cook, 1996).

Overall, these six co-teaching approaches provide unique ways to meet the instructional needs of diverse students. However, co-teachers should consider each approach's purpose and value and align it with the instructional needs of the classroom prior to delivering instructional content. Accordingly, the following section will present variables that impact and hinder the implementation of co-teaching.

Variables that Impact Co-Teaching

The research outlines common barriers that professionals experience when implementing co-teach instruction, including (a) lack of preparation, (b) administrative support, (c) compatibility, and (d) planning time. Additional barriers presented include (e) negative views regarding inclusion, (f) equal status, and (g) lack of content expertise. These barriers will be outlined and discussed in the sections that follow.

Lack of preparation. Many professionals in co-teach partnerships have reported that they are not prepared professionally to co-teach (Avramidis & Norwich, 2002; Scruggs & Mastropieri, 1996; Scruggs et al., 2007). Avramidis and Norwich (2002), Scruggs and Mastropieri (1996), and Scruggs et al. (2007) each conducted meta-synthesis to examine the extant literature on co-teaching. Their research highlights a common finding among several studies that when teachers are provided appropriate training, they are more prepared and less likely to resist implementing inclusive practices in co-teach classrooms. Additionally, the authors noted concerns and requests from numerous co-teachers to be effective in the classroom, including (a) professional preparation to support flexible thinking; (b) implementation of teaching strategies and exposure to the co-teach approaches; (c) use of technology and information on various disabilities; (d) as well as collaborative, interpersonal, and communication skills (Avramidis & Norwich, 2002; Scruggs & Mastropieri, 1996; Scruggs et al., 2007).

In a meta-synthesis of over 50 articles on co-teaching, Welch, Brownell, and Sheridan (1999) highlighted that because co-teachers are not being provided adequate professional preparation, they may incorporate instructional practices that are not in line with co-teach recommendations. In particular, failure to implement co-teaching practices as recommended could significantly impact the efficacy and outcomes of special education students. Welch et al. further emphasized that it is incumbent for professional preparation programs to include co-teaching in their coursework and field experiences to provide co-teachers them with the skills needed to work effectively in the classroom (Welch et al., 1999).

In a similar line of thinking, Cook and Friend (2010) affirmed a critical need for stakeholders involved in co-teaching to be prepared for classroom application. However, co-teachers must demonstrate an awareness of how their knowledge and skill sets enable

learning in a co-teach instructional arrangement. Additionally, co-teachers need to have collaboration skills to establish roles and responsibilities that enhance the instructional support provided to students with disabilities. Without these essential skills, co-teachers are less likely to form an equal instructional partnership. These findings are evident in a yearlong mixed methods study of eight co-teaching pairs by Guise and Thiessen (2016), who highlighted the need for professional preparation prior to a teaching candidate's first year of teaching. The literature seems to support the notion that the special education co-teacher is often more prepared to work in co-teach environments than the general education co-teacher, as special education programs offer co-teach preparation as part of their teacher preparation coursework (Cook & Friend, 2010).

Teacher preparation programs. As co-teaching becomes commonplace in special education teacher preparation programs, it is critical that general education teachers are being adequately prepared (Cook & Friend, 2010). There is debate among researchers as to which route creates better teachers (Feng & Sass, 2013; Kee, 2012; Zientek, 2007). Lincove, Osborne, Mills, and Bellows (2015) examined the effectiveness of universities and alternative certification programs in Texas, noting two primary pathways into the teaching profession: the traditional path of a college or university undergraduate program or an alternative certification program. The study collected student performance data in the areas of math and reading from all Texas public schools during the 2010-2011 school year from the Texas Education Agency. The sample included approximately 500,000 students who were taught by 12,500 teachers. Overall, the study's findings revealed small differences of program types on student performance. The major difference between these pathways is the timing of professional preparation. In traditional options, preparation transpires during undergraduate coursework; in alternative avenues, it occurs

during the first year of teaching. Teacher preparation varies greatly in pedagogical knowledge and teaching experience requirements (Boe, Shin, & Cook, 2007).

Traditional preparation. Brownell, Ross, Colón, and McCallum (2005) reviewed 15 traditional teacher preparation programs to identify common features. Based on their findings, traditional programs often require intensive field and practicum experiences as well as a semester or yearlong student teaching placement. Moreover, programs varied in terms of integration of coursework requirements and field experiences. Additionally, co-teaching coursework was generally offered within more up-to-date preparation programs. Lastly, Brownell et al. highlighted that program philosophies varied significantly for special education teachers when compared to those of general education teachers. This finding confirms the conclusions of Goldhaber and Cowan (2014) and Darling-Hammond (2010), who each noted that teacher preparation programs vary greatly in their beliefs of teaching as well as how they organize coursework and clinical experiences around that vision. Ultimately, these variables will lead to differences in the effectiveness of their graduates.

Alternative programs. Educators generally agree that professional teaching standards ought to be the underlying framework of a preparation program (Darling-Hammond, 2010; Obiakor, Bakken, & Rotatori, 2010). Teacher preparation programs should be the entity that instills professional standards, ensuring teaching candidates understand those standards and develop a skill set to translate their understanding into practical practice (Obiakor et al., 2010). Notable examples of primary standards that inform teacher preparation include the National Board for Professional Teaching Standards or the Council for Exceptional Children (Darling-Hammond, 2010).

It is common for teacher preparation programs to provide pedagogical coursework focusing on methods of assessment, principles of classroom management, and curriculum

development (Obiakor et al., 2010). A general consensus exists among educators that there is considerable value in practical experience in the field. However, there seems to be a disagreement as to how practical experiences should appear when preparing teaching candidates (Obiakor et al., 2010). Darling-Hammond (2010) provided an insightful perspective, offering the belief that a student's program of study should equip them with the skills needed to teach powerfully. She also noted that preparing teachers for practical practice is an impossible task at times when preparation programs have modeled precisely the opposite: "No amount of coursework can, by itself, counteract the powerful experiential lessons that shape what teachers actually do" (Darling-Hammond, 2010, p. 42). Therefore, it is imperative that experiences with co-teaching be incorporated in teacher preparation.

Sindelar et al. (2012) interviewed 33 teacher preparation program directors and inquired about the instructional content that their program presented teacher candidates and the number of instructional hours candidates completed before program participants began serving in a teacher capacity. Their study's findings reveal that on average, teachers participating in face to face alternative preparation routes received about nine hours of preparation before entering the classroom. While those that participated in online preparation programs only receive 6.3 hours of preparation (Sindelar et al., 2012). When the researchers examined the distribution of instructional hours across specific content areas, special education coursework was the lowest proportion of the professional training in comparison to other coursework (Sindelar et al., 2012). Of the surveyed preparation programs, none offered or required specific coursework preparing teacher candidates for co-teaching. These studies reveal the problems in teacher preparation programs and the highlights the vast number of teachers not being prepared to work in co-teach classrooms and with students in special education.

Given the previously discussed literature and the inconsistency in program implementation, it is not surprising that teachers feel inexperienced when working in a co-teach setting with students with disabilities (Avramidis & Norwich, 2002; Boe et al., 2007; Hudson & Glomb, 1997; Scruggs & Mastropieri, 1996; Scruggs et al., 2007; Welch et al., 1999). Darling-Hammond (2010) asserted that “[w]e need to raise our expectations for the teacher education enterprise as a whole, requiring in every program a common vision that informs a tightly integrated program of high-quality clinical work married to a supportive learning-focused curriculum” (p. 43). This declaration further confirms the need for professional preparation for all teachers, so they have the skills and information to succeed in co-teach environments.

Conversely, Cook and Friend (2010) highlighted that the issue of teacher preparation extends beyond initial preparation program. If the teaching profession fails to adequately prepare co-teachers for co-teach roles, there is a critical need for high-quality professional development related to co-teaching (Cook & Friend, 2010). According to Cook and Friend (2010), teachers are not the only group of professionals that are required to have a clear understanding of co-teaching—administrators need to have a clear understanding of the key concepts of co-teaching as well. However, if they do not have a clear understanding, the question arises as to how administrators partner teachers, arrange schedules, establish a common planning time, and resolve problems (Cook & Friend, 2010).

Administrative support. To support the needs of co-teaching, administrators need to have a clear understanding of the critical components that are essential to its success (Cook & Friend, 2010). Pugach and Winn (2011), Murawski and Lee Swanson (2001), and Walther-Thomas (1997, 2000) all stressed the importance of having a campus-wide philosophy in place to create a culture of shared responsibility and

collaboration. Walther-Thomas (1997, 2000) conducted a study of 23 schools participating in the researcher's investigation of co-teaching. The participants noted how the campus-wide philosophy allowed for both teachers and administrators to be more informed of co-teaching practices; as a result, the campus embraced and expanded inclusive practices. When this type of philosophy is present, teachers are more likely to embrace co-teaching concepts, teaching arrangements, inclusive practices, and instructional roles that go beyond the classroom (Cobb Morocco & Mata Aguilar, 2002). However, collaborative practices connected to co-teaching are not limited to the classroom itself and require organizational support (Cobb Morocco & Mata Aguilar, 2002). More specifically, for co-teaching to yield its intended benefits, the organization needs to have visible administrative support (Brendle, Lock, & Piazza, 2017; Manset & Semmel, 1997; Scruggs et al., 2007).

Walsh (2012) uncovered that school districts that have structures in place that are supportive of co-teaching and inclusive practices—not only embedded in the campus' culture, but within the district's culture as well. Walsh examined programming changes and the outcomes of when a school district provided students with disabilities access to the general education classroom through co-teaching. The author emphasized that significant gains in student achievement are possible when both teachers and administrators are provided professional development and the tools needed implement an inclusive culture supportive of co-teaching. The findings further reveal that academic gains can be seen in the annual improvement process at both the district and campus levels. As a result, the school system showed dramatic accelerated achievement outcomes from students with disabilities when intense co-teach professional development and administrative coaching support was provided (Walsh, 2012).

Murawski and Lochner (2011) revealed that administrators often do not receive adequate training on what constitutes evidence of effective instructional practices in a co-teach classroom as. Based on the meta-synthesis of 29 studies, Murawski and Lochner extended guidance and recommendations to administrators as a means of improving co-teaching. Administrators need to participate in development opportunities related to co-teach practices to identify key elements when assessing co-teachers and their instructional practices (Murawski & Lochner, 2011). Such examples include finding creative ways to provide co-teachers with a common planning time and ongoing co-teach professional development opportunities (Murawski & Lochner, 2011).

Additional aspects administrators can consider include the class size of the co-teach classroom, specifically that there should not be a disproportionate number of students receiving special education services and supports (Friend, 2014). During the new teacher hiring process, administrators can gain insight into a teacher's beliefs on inclusion and determine their willingness to work in inclusive environments. It is also critical that administrators allow teachers to volunteer for co-teaching, as it will establish a campus wide culture where co-teaching is more likely to be successful by allowing teachers to consider important aspects such as compatibility (Friend, 2014).

Compatibility. Co-teaching is often likened to a professional marriage, requiring the components of a traditional union to be successful (Rice & Zigmond, 2000). Co-teachers' professional and personal characteristics play a vital role in compatibility between professionals and co-teaching success (Scruggs et al., 2007). This confirms the research of Rice and Zigmond (2000), who conducted interviews and observations with a total of 17 co-teachers (nine from Pennsylvania and eight from Queensland, Australia). Despite the social and cultural differences, similar themes were present in the data sets. Many participants concluded that compatibility was a significant predictor of co-teaching

success. Elements of compatibility reported by teachers include: (a) shared views regarding academics and behavioral expectations, (b) a willingness and ability to communicate and receive feedback objectively, (d) equivalence in knowledge and ability, and (e) an openness to take instructional risks (Rice & Zigmond, 2000).

Mastropieri et al. (2005) stressed that the relationship between co-teachers has the potential to influence the success or the failure of instructional outcomes for students with disabilities. When co-teachers work well with each other, all students, including those with disabilities, are more likely to experience success and have positive, inclusive experiences in co-teach classrooms. On the contrary, when co-teachers experience conflict, positive student outcomes become increasingly unlikely (Mastropieri et al., 2005). This contextual difference can partially be linked to the fact that historically teacher preparation prepares educators to be practitioners who are individually responsible for the outcomes in their classroom (Rice & Zigmond, 2000). Therefore, this further confirms that some teachers may not be adequately prepared to work in collaborative partnerships such co-teaching (Rice & Zigmond, 2000).

Planning time. There are several benefits of writing a lesson plan, the first being that it produces more unified lessons (Jensen, 2000). Planning provides teachers the opportunity to purposefully outline the (a) lesson objective; (b) materials needed; (c) grouping of students; and (d) relevant activities including their proper sequence and anticipated time for each activity. Teachers should use this time to reflect on the progression from one activity to the next, as well as the relationship between the current lesson and past or future lessons. When teachers take the time to consider multiple aspects of a lesson, they are able to make meaningful connections with students (Jensen, 2000). When co-planning takes place, the co-teaching partnership can identify a clear understanding of the instructional goal and the appropriate co-teach instructional

approach that will allow meaningful learning to occur (Brendle et al., 2017). However, a frequently noted issue in the literature is the lack of planning time between co-teachers (Brendle et al., 2017; Manset & Semmel, 1997; Scruggs et al., 2007).

Effective planning is a critical element of student success (Konrad, Helf, & Joseph, 2011). Proper time should be allocated both before and after each lesson to allow for reflective planning for instruction (Gunter, Estes, & Mintz, 2007). Reflective planning is an important aspect of designing an effective lesson and delivering instructional content. While planning time is scarce, effective co-teachers should allocate at least 45 minutes of joint planning time per week (Bos & Vaughn, 2006; Kohler-Evans, 2006). However, if co-teachers are not provided time or are not expected to plan together, then a varied implementation of the co-teach instructional approaches will not occur (Scruggs et al., 2007). In a meta-synthesis of qualitative research representing a generalization of co-teach practices, Scruggs et al. (2007) found that collaboration between two co-teachers focused on curriculum needs, specialized instruction, and reflection of student needs has largely not been implemented in co-teach relationships (Scruggs et al., 2007). To support co-planning, administrators need to provide a common planning time and require co-teachers to document co-planning using lesson plans (Murawski & Lochner, 2011). In particular, the lesson plan should document the role of both teachers, provide reflective differentiation, and delineate scaffolded instruction using one of the six aforementioned co-teach instructional approaches (Murawski & Lochner, 2011).

Negative views regarding inclusion. Rice and Zigmond (2000) suggested that secondary teachers maintain negative views toward inclusive practices because working with an instructional specialist was seen as a form of professional incompetence. In their qualitative study of 17 secondary co-teachers, many teacher participants did not want to receive suggestions on how they or their students could benefit from inclusion and

instead wanted professional autonomy. Furthermore, the authors found that teachers with less experience and those who taught classes in the social sciences tended to be more receptive to inclusion practices and less territorial than colleagues with more experience and in other content areas. All teachers interviewed in the study expressed the importance of a shared vision of inclusion—not only among co-teachers, but also between all teachers and administrators in the school—as a means of shaping belief systems and school wide practices (Rice & Zigmond, 2000).

Similar findings are further supported by Boyle, Topping, Jindal-Snape, and Norwich (2012), who investigated the attitudes of secondary teachers regarding inclusion. They found that novice teachers were more inclined to have positive views toward inclusion than established teachers. Moreover, Boyle et al. (2012) investigated changes in teachers' perceptions after the first year of teaching through in-depth interviews with 43 study participants. Their findings revealed that teachers' beliefs about inclusion are significantly influenced by the initial year of practical practice and exposure to inclusion beliefs of their colleagues. Negative connotations about inclusion and co-teaching have been reported in numerous studies (Cook, Semmel, & Gerber, 1999; Daane, Beirne-Smith, & Latham, 2000; Scruggs & Mastropieri, 1996). Scruggs and Mastropieri (1996) summarized the findings of 32 studies on co-teaching, reporting that teachers generally maintain positive attitude toward inclusive practices. In addition, recent research continues to confirm these findings (Hellmich, Löper, & Görel, 2019; Heyder, Südkamp, & Steinmayr, 2020; Olsson, Sand, & Stenberg, 2019).

Equal status. Another significant theme present in the literature is that special education teachers are seldom given equal status in co-teach partnerships and often take on a subordinate role in the classroom (Rice & Zigmond, 2000). Rice and Zigmond (2000) conducted observations of secondary co-teacher study participants, noting special

education teachers frequently took on the role of paraprofessional during instruction. Furthermore, the special education teacher circulated around the classroom in a subordinate helper role and encouraged struggling students, redirected off-task behaviors, or served as an extra set of hands during a lab activity. However, special education teachers were rarely observed actively leading whole group or small group instruction (Rice & Zigmond, 2000). Even when special education teachers were seen in an instructional role, it was typically subordinate in nature in comparison to the general education teacher (Sweigart & Landrum, 2015; Vannest & Hagan-Burke, 2010).

Instructional inequity in the co-teach classroom may be attributed to the fact that the special education teacher often lacks content knowledge, especially at the secondary level where coursework is specialized (Scruggs et al., 2007). This makes it increasingly challenging for special education teachers to maintain an equal role during instruction (Scruggs et al., 2007). However, according to Cook and Friend (1995), co-teachers are more than two educators present in the same classroom—co-teaching involves shared ownership in the instruction of all students.

Lack of content expertise. As mentioned previously, evidence exists within the literature that the general education teacher may be more inclined to take the lead role presenting while the special educator assists (e.g., Cook & Friend, 2010; Rice & Zigmond, 2000; Scruggs et al., 2007). Imbalance in instruction could be attributed to the perceived lack of content expertise by the special education teacher (Cook & Friend, 2010). It is a common assumption that the general education teacher maintains the content area credentials, while the special education teacher has the qualifications to teach students with disabilities (Scruggs & Mastropieri, 2017). A means of addressing the systematic perception of special education co-teachers having a lack of content expertise would be to require special education teachers to be highly qualified in both the content

and in special education (Scruggs & Mastropieri, 2017). At the secondary level content area credentials are often course specific, therefore making it more likely that the special education teacher cannot co-deliver instructional content (Scruggs & Mastropieri, 2017).

The case study conducted by Mastropieri et al. (2005) followed four co-teach partnerships and the findings revealed that course content and teacher knowledge have a significant impact on the implementation of co-teaching. When instructional content was well known, simple content, or quickly understood by the special education teacher, co-teachers would operate under a more equal basis. However, if the instructional content, for example history or chemistry, was not completely mastered by the special education teacher, they were more likely to assume a subordinate role in the classroom. In many of the study's examples the special education teacher would help with classroom management and offer individual student assistance but would not be an equal partner in delivering instructional content (Mastropieri et al., 2005).

Zigmond and Matta (2004) and Weiss and Lloyd (2002) also reported the special education teacher taking on a subordinate role in secondary classrooms because their lack of content knowledge. However, Zigmond and Matta reported that the role of special education teachers varied across content areas with the lowest level of instructional equity taking place in high school mathematics classes. The authors further suggested that if the special education co-teacher was highly knowledgeable in secondary math, they would have yielded different findings. (Zigmond & Matta, 2004). Therefore, if content knowledge is disproportional between co-teachers, the teacher with the most knowledge will assume the more dominant instructional role in the partnership (Mastropieri et al., 2005). As previously stated, these presented practices would not be in line with the industry accepted definition of co-teaching which requires a shared ownership between co-teachers of the instruction of all students (Cook & Friend, 1995).

Role sharing. A central theme has been presented in this literature review that instead of sharing instructional planning, instructional delivery, and assessment, general education teachers prefer to take the lead role in the classroom (Scruggs et al., 2007). Meanwhile special education teachers settle on a subordinate role (Scruggs et al., 2007). A fundamental challenge in co-teaching is the underutilization of personnel in the classroom, which may undermine the potential of co-teaching (Friend, 2008).

Notably, Friend (2008) provided three solutions to promote greater role sharing in the co-teach classroom. First, professionals should make effective use of the six co-teaching approaches as a method of implementing frameworks grounded in research-based instructional practices such as small group instruction. Second, professionals must implement purposeful co-planning and creates an instructional plan that allows for both teachers to have impactful teaching responsibilities. Lastly, role sharing enables co-teachers to debrief on instructional practices, roles, and responsibilities. Moreover, this suggestion allows co-teachers to continually refine not only their craft, but also the learning outcomes for all students as co-teachers (Friend, 2008). King-Sears and Strogilos (2020) recently confirmed this after examining a secondary co-teach partnership from the perspectives of the teachers and their students. In particular, students and co-teachers agreed that one teach, one observe was used most frequently with the general education teacher leading instruction.

Despite the benefits and advantages of co-teaching, the research outlines common barriers that teachers experience when implementing co-teach instruction into the classroom. Each of the aforementioned barriers are critical components to co-teaching success. Accordingly, the following section will present variables of the physical arrangement of classrooms and how they promote a positive learning environment.

Physical Arrangement of Classrooms

Since student learning is diminished when they feel uncomfortable, unsafe, or at-risk, it is imperative that classrooms are set up for academic success (Causton & Kluth, 2016; Chen, 2007; Ripski & Gregory, 2009). A well-designed classroom considers the needs of the students, teachers, and classroom activities by defining in which meaningful instruction can occur (Rohrer & Samson, 2014). Establishing and defining areas in the classroom helps students anticipate the activity that will be held in each area, ultimately managing behavior and increasing participation. While there is no one ideal classroom physical design to accommodate all academic activities (Lei, 2010), an organized classroom with well-defined areas promotes a positive learning environment that encourages teamwork, student learning, and active participation (Niemeyer, 2003; Rohrer & Samson, 2014). Physical settings can motivate or discourage room occupants; hence, the physical arrangement of the classroom should be carefully considered to offset potential barriers (Lackney, 1999; Niemeyer, 2003). The following review of the literature analyzes key features associated with the physical arrangement of classrooms: (a) the organization of the class as a home base for both teachers and students; (b) allotted space for varied instructional formats such as small group instruction; (c) designated workspaces for teachers to plan for instruction; and (d) physical designs to meet the technology needs of 21st century schools.

Home Base

In a textbook for undergraduate students, Rohrer and Samson (2014) stated that in a well-designed classroom, specific areas are dedicated to certain types of activities. Students depend on the physical classroom environment to determine what instructional activities will occur by establishing appropriate expectations for each particular space. In some parts of the classroom, it is important to set the expectation that students are

expected to work quietly, while in other parts collaboration during an activity is appropriate. Within the classroom, students need their own desk or home base to do work independently, prepare for transitions between activities, or sit during a class lesson. In most cases, students have a desk and a chair in which they can consider their home base (Rohrer & Samson, 2014).

Yang, Becerik-Gerber, and Mino (2013) surveyed 255 students who were enrolled in six preselected classrooms to rate their perception of various classroom factors and the impact of those areas on their individual performance. The study revealed that students' perceptions of their learning environment were highly correlated with spatial attributes of the classroom (i.e., furniture and room layout). Students reported that the furniture's level of comfort was of greater importance than any other condition surveyed. Conversely, students reported low levels of concern with the amount of available furniture and seating arrangements. The findings of Yang et al. (2013) suggest that students are impacted by the functionality and comfort of classroom furniture than the amount of furniture available.

Small Group Instruction

Small group instruction allows for teachers to work closely with students. This type of instruction provides teachers the opportunity to assess student learning, locate gaps, and then customize lessons to address specific learning objectives based on student need (Rohrer & Samson, 2014). Because of its instructional benefits, a designated area should be established for small group instruction within the classroom (Rohrer & Samson, 2014). Since small group instruction is teacher driven, having a dedicated area helps set behavioral expectations for students. For instance, students who are in this space understand they may share ideas or comment on the activity without needing to raise their

hand. Additionally, a separate area creates greater awareness and defines expectations between other areas in the classroom (Rohrer & Samson, 2014).

Yang and colleagues (2013) also surveyed information about classroom layout. Their findings showed a linear regression of students' perceptions with the following three conditions: (a) layout for interactions and collaboration with others; (b) sufficiency of workspace for course tasks; and (c) sufficiency of space for moving around the classroom. These findings imply that classroom layout has an impact on students' perceptions of their learning environment and illustrate the value of providing a learning environment that allows for interacting and collaboration to occur (Yang et al., 2013). In a similar line of thinking, Friend (2008) recommends setting up the layout of the co-teach classroom in a manner that allows for the implementation of the recommended instructional approaches. The ideas presented by Yang et al. (2013) and Friend (2008) provide a great deal of insight into the role of establishing a classroom layout that supports research-based instructional practices.

Teacher Work Area

Within the classroom, teachers need a place to do conduct administrative duties throughout the school day (Rohrer & Samson, 2014). It is critical to note that classrooms are limited in terms of space and the majority of the room should be dedicated to students' needs and learning activities. Therefore, a teacher's work area should be relatively small; typically, this would include a desk, chair, and bookshelf or cabinet as sufficient fixtures. While in the work area, the teacher should be able to scan the entire classroom when sitting in their space. Therefore, reflective placement is critical. Establishing a well-defined teacher work area enables students to honor and respect boundaries by learning that certain parts of the classroom are restricted (Rohrer & Samson, 2014).

Schneider (2003) obtained qualitative data from a large sample of teachers in Chicago and Washington, D.C. seeking their perceptions of working conditions in their schools and the relationship it has on job performance and teaching effectiveness in the classroom. Teachers were asked to rate their working conditions and a significant number of teachers reported being dissatisfied. More than 40% of the study participants reported that classroom size did not meet their needs, and 25% reported having to teach in non-classroom spaces, such as hallways and even closets. Moreover, teachers-maintained perceptions that the school's poor facilities failed to lend itself to effective instruction and high levels of student learning. These poor conditions caused participating teachers to consider changing schools or leave the teaching profession entirely. Poor facility conditions make it difficult for teachers to deliver instruction (Schneider, 2003). These findings highlight school facilities and poor working conditions have a direct impact on teachers and increase the likelihood that teachers will leave schools or the teaching profession.

Conversely, other studies have highlighted schools moving away from teacher work areas and toward office-based workspaces within the school to establish a more professional image of teaching (Gordon, 2010). Research has shown that shared workspaces foster professional communities and promote networking and collaboration among teachers (Lieberman, 1996). Regardless if teacher workspaces are in the classroom or in shared spaces within the school, the workspace should be regarded as a critical element of successful preparation for academic success in the classroom (Gordon, 2010).

Teacher workspaces in co-teach classrooms. When setting up a classroom, special consideration needs to be given to the configuration, organization, and arrangement (Friend, 2008). In addition to the elements of a traditional classroom, as

outlined in previous sections of this literature review, co-teach classrooms require reflective set up to establish equal status between the teachers. If this is done correctly, students should not be able to differentiate between the general education or special education teacher. Additionally, Friend (2008) suggested co-teachers should decide if they will set up a shared workspace outside of the classroom or a distinct workspace within the classroom. Creating equity within the classroom will help avoid the common subordinate role special education teachers take on in the co-teach classroom (Friend, 2008). Furthermore, Rytivaara, Pulkkinen, and de Bruin (2019) examined the experiences of co-teaching partnerships by developing narratives two-teacher teams to illustrate the sharing of a professional setting. Rytivaara et al.'s findings suggest that negotiation, commitment, and engagement are key elements in establishing a shared environment. Co-teachers expressed the critical need for both teachers to be given space within the classroom as a means of establishing equity.

In summary the ideas presented by Friend (2008) and Rytivaara et al. provide significant insight into establishing equitable teacher workspaces within the co-teach classroom as a means of deflecting role imbalance between educators. When the classroom has been set up to reflect equal status, teachers can create and model a collaborative learning environment. Related instructionally, technology has the potential to improve classroom conditions for teachers and students. Accordingly, the following section presents the role of technology in the classroom and the variables that impact and hinder instruction.

Role of Technology in the Classroom

Papert (1993) realized the potential of technology in education and focused his research on two major themes: (a) that students can learn to use technology in masterful ways, and (b) that technology can change the way students learn. The scholar believed

technology has the potential to improve classroom conditions for teachers and increase their ability to work directly with students (Papert, 1997). The school setting has been dramatically reformed in a relatively short period of time because changes in technology in society and within the classroom to enhance the learning experiences of all students (Davis, 2018). The Texas Administrative Code ([TAC], 2018) frames technology standards and technology application based on to the five strands outlined by the International Society for Technology in Education (ISTE). According to the ISTE (2020), teachers are expected to incorporate technology into their lesson plans to create innovative digital learning environments that engage and support learning.

It is both well cited and evident that instructional content presented through technology is an everyday occurrence in today's classroom (Davis, 2018; Hicks, 2011; Okojie, 2011; Rafool et al., 2012). Rafool et al. (2012) explored whether the implementation of technology in the classroom increased student engagement, motivation, and satisfaction by collecting survey data from approximately 40 students. The findings emphasized the important role of integrative technology and how it is used to present curricula in today's classroom. Rafool et al.'s (2012) study results corroborated the practice recommendations of Roschelle (2000) and Lengel and Lengel (2006), which noted that effective use of technology leads to increased student engagement in the learning process. When asked about their learning preferences, students noted that they prefer instructional approaches employing technology instead of traditional pencil and paper methods (Rafool et al., 2012). Educators and other professionals are constantly searching for meaningful ways to integrate technology into the classroom, particularly to enhance teaching and student learning outcomes (Davis, 2018).

As new technology continues to evolve, it inherently requires changes in pedagogical practices and requires teachers to take on different roles and responsibilities

in the classroom (Okojie, 2011). Relatedly, national and state long range planning and technology initiatives continue to increase the expectation that teachers not only know how to use technology, but also understand how to connect it to instructional content and devise creative uses to meet the needs of diverse learners (Okojie, 2011). When used purposefully, technology integration can have a profound impact on the quality of the teacher's instruction (Chen, Star, Dede, & Tutwiler, 2018). Furthermore, increases in student achievement have been linked to purposeful technology integration in the classroom (Cobb, 2016; Lei & Zhao, 2007).

Having access to technology does not ensure teachers will utilize it to promote meaningful learning experiences for students (Bauer & Kenton, 2005; Chen et al., 2018; Glazer, Hannafin, & Song, 2005). The original intent of most available technology was not for educational purposes and requires teachers to make connections to the content and how technology can support learning (Bauer & Kenton, 2005; Chen et al., 2018). When used effectively, technology can motivate students, enhance instruction, increase work productivity, and allow for students and teachers to stay current with societal demands of technology (Chen et al., 2018; Rafool et al., 2012; Roblyer & Doering, 2013).

Technology Integration

Since its introduction in the classroom, technology integration has been operationalized and defined in a variety of ways. Ertmer (2005) utilized a productivity approach and defines technology integration as a process by which technology adds value to the curriculum by allowing teachers and students to do more activities in a shorter duration as a means of increasing goal attainment. On the other hand, other definitions of technology integration embrace a larger picture. This section will present two common frameworks for technology integration: (a) technological pedagogical and content knowledge (TPACK; Mishra & Koehler, 2006), which combines knowledge of

instructional content with pedagogy and technology; and (b) the substitution, augmentation, modification, redefinition (SAMR) model, which identifies a variety of transformational uses of technology regarding enhance student learning in meaningful ways (Puentedura, 2014). Related, these frameworks will lend a connection to the framework of Universal Design of Learning (UDL), because it also focuses on improving and enhancing teaching and learning by using scientific insights of the learning process as its foundation (Lieberman, 1996; Rose, 2000).

TPACK Framework. Dr. Punya Mishra and Dr. Matthew Koehler established the TPACK (formally known as TPCK) framework and describe it as “the basis of effective teaching with technology” (Mishra & Koehler, 2006, p. 66). The framework was built upon the foundation of Shulman’s (1986, 1987) work emphasizing the core of good teaching as content knowledge and pedagogy. Content knowledge pertains to expertise, while pedagogical knowledge entails a deep understanding of teaching methods, instructional practices, and processes as they are related to instruction and student learning (Shulman, 1986, 1987). Pedagogical content knowledge is the understanding that an educator has of pedagogy that is applicable to the teaching of instructional content. It is important that an educator have both skills because they transform their knowledge of the subject matter into a variety of ways to represent it and adapt instructional materials to allow for alternative pathways to understanding and connection to a student’s background knowledge (Mishra & Koehler, 2006).

Mishra and Koehler (2006) developed this framework to introduce technology into teaching. This framework is important because many educators view technology as the solution to the challenges that they face in the classroom. It is often assumed that the presence of digital tools alone will improve education; this misconception is precisely why the TPACK framework is vital, as it outlines the relationship between technology,

content, and pedagogy (Mishra & Koehler, 2006). In addition to the foundational descriptions of Shulman’s (1986, 1987) pedagogical content knowledge, Mishra and Koehler’s (2006) framework (see Figure 1), presents three primary aspects of teacher knowledge: (a) content (CK), (b) pedagogy (PK), and (c) technology (TK). Equivalently meaningful to the framework are the intersections between the concepts. These intersections are represented as (d) pedagogical content knowledge (PCK), (e) technological content knowledge (TCK), (f) technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPACK). The following subsections will expand upon the individual aspects of the framework.

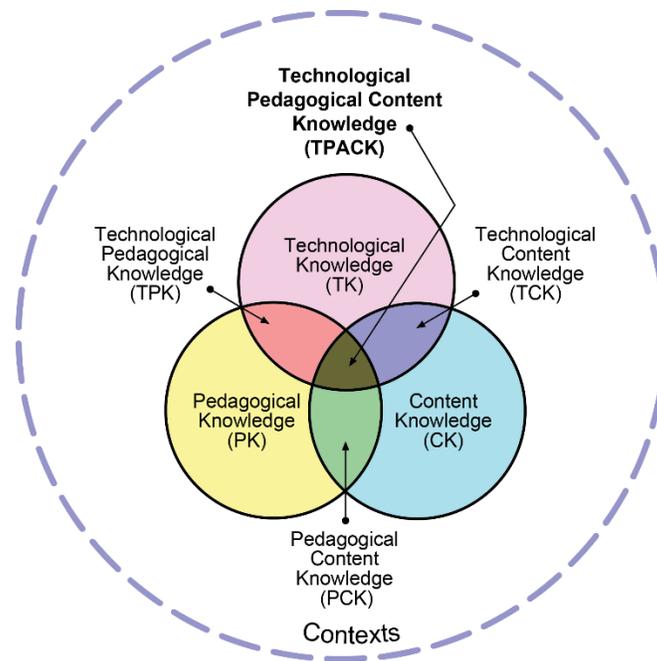


Figure 1. TPACK framework and its knowledge components.
 From “TPACK Framework” by P. Mishra and M. J. Koehler, 2012 (<http://tpack.org>).
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Content knowledge. Koehler and Mishra (2009) note that “content knowledge is the teachers’ knowledge of the subject matter to be learned or taught.” (p. 63). Content

that is covered in academic area is not the same content that will be covered in another. For teachers to be able to teach instructional content it is critical that they have a deep understanding of their subject matter. The impact of not having an in depth understanding of content knowledge can have a negative impact on students, because they are more inclined to receive incorrect information or develop misconceptions of the subject matter (Koehler & Mishra, 2009).

Fielding-Barnsley's (2010) study collected data from 162 preservice teachers supporting low levels of content knowledge of phonemic awareness, phonics, and the principles of the alphabet. Relatedly, Mahar and Richdale (2008) revealed that 69 preservice teachers, who had completed two of the four required reading methods courses illustrated low levels of knowledge of the structures of the English language. These studies reveal that possessing skills of personal literacy does not presume that an individual has the skillset needed to teach students to read. In other words, having a surface level understanding of the subject matter is not enough for teachers to be able to teach the instructional content within a course (Fielding-Barnsley, 2010). Without a deep understanding of the instructional content teachers are likely to hinder student academic achievement (Darling-Hammond, 2010). These findings emphasize the critical need of having content knowledge to support effective teaching. Related, the following section will highlight the importance of pedagogical knowledge in teaching and learning.

Pedagogical knowledge. According to Koehler and Mishra (2009), “pedagogical knowledge is a teachers’ deep knowledge about the processes and practices or methods of teaching and learning.” This form of knowledge understands how students learn, classroom management skills, instructional planning, and methods of student assessment. Teachers who have this understanding are knowledgeable of instructional techniques or teaching strategies that should be employed into the classroom. They are also able to

understand how students make connections to the instructional content and create opportunities for them to establish positive beliefs towards learning (Koehler & Mishra, 2009). Doherty, Hilberg, Pinal, and Tharp (2003) examined the influence of effective pedagogy on student achievement gains by collecting data from 15 teachers and 266 students at the elementary level. The first phase of the study revealed that teachers that had a more in-depth understanding and implementation of common pedagogy practices into the classroom reliably predicted student achievement gains for English Language Learners in the areas of reading comprehension, basic reading skills, spelling, and vocabulary. Findings in the second phase of the study revealed that achievement in the aforementioned areas were the greatest for teachers who had transformed their instructional practices by creating diversified learning experiences. These findings emphasize the critical need for improving the learning outcomes of all students, especially those at risk of academic failure. Accordingly, the following section will present the implications of pedagogical content knowledge.

Pedagogical content knowledge. Pedagogical content knowledge follows the Shulman's (1986) interpretation that occurs when the teacher has a deep understanding of the subject matter and can find multiple meaningful ways to make connections with the prior knowledge base of students. This form of knowledge is essential to teaching because it creates conditions that support learning (Koehler & Mishra, 2009). Shulman (1986) and Koehler and Mishra (2009) emphasize the connection content knowledge and pedagogy has on effective teaching.

Johnson and Larsen's (2012) study collected data from three university math professors over a two-year period to gain insight how the educators responded students' mathematical struggles in a college algebra class. The analysis of the findings suggest that knowledge of content is a critical component that allows educators to not only

identify common misconceptions, but to also foresee the likely consequences of their fallacies. In other words, knowledge of content goes beyond understanding the subject matter because having an understanding of pedagogical knowledge is a critical component of anticipating and responding to student misconceptions (Johnson & Larsen, 2012). Related, the following section will present aspects of technological knowledge.

Technological knowledge. Mishra and Koehler (2006) cautioned the application of a definition to this domain because of the ever-changing nature of technology and the danger of the term becoming outdated. However, the model closely follows the definition of the Information Technology Literacy of National Research Council ([NRC], 1999), which maintains that fluency of information technology goes beyond traditional notions of computer literacy and requires individuals to have the ability or understanding to understand technology broadly enough to have the ability to apply it productively at work and within their everyday lives. Additionally, it requires the recognition that technology can assist or impede learning objectives. Thus, emphasizing the prerequisite of continual adaptation to needed environmental changes in regard to changing technologies (Mishra & Koehler, 2006). Technology knowledge requires a deeper understanding that goes beyond computer literacy, it is the knowledge of technology, how to use it for communication and problem solving (Mishra & Koehler, 2006). Understanding technology knowledge from this standpoint requires the understanding that there is no ending point, but rather presents the notion that technology knowledge is forever evolving, developing and therefore requires continual growth to keep up with the changing demands (Mishra & Koehler, 2006).

López-Vargas, Duarte-Suárez, and Ibáñez-Ibáñez (2017) surveyed 208 public school teachers in Colombia seeking information on teacher computer self-efficacy and its relationship with cognitive style and TPACK. The researchers revealed that older

teachers feel less self-efficacious in the use of technology in the classroom, presenting that the knowledge of technology was at the basic level. The research of López-Vargas et al. (2017) continues to confirm the research of Prensky (2001) and Korumaz and Karabiyik (2013), who reported that older teachers have a greater insecurity and fear with using technology in the classroom because they feel at a disadvantage with their students who are digital natives.

Technological content knowledge. Technological content knowledge is an understanding of how technology and instructional content interact with each other to inhibit or impact one another (Mishra & Koehler, 2006). Digital tools can enhance or transform how the instructional content is delivered to students or how students can interact with it. Therefore, teachers need to be more than knowledgeable of the content matter in which they teach, they must also have a keen understanding of what technology is available that best meets the needs of their learning objective, how the subject matter can be enhanced by technology, and how the instructional content changes technology (Mishra & Koehler, 2006). According to Abbitt (2011) technological content knowledge described the relationship between technology and the subject matter and how a specific technology can be integrated into teaching. Teachers have to be knowledgeable of the content matter and what form of technology will be most effective in allowing students master learning outcomes (Mishra & Koehler, 2006).

Technological pedagogical knowledge. Technological pedagogical knowledge is the understanding of how teaching and learning can change the way we use technology. This is particularly important to the needs of the classroom because often technology is not designed for educational purposes, but instead for business environments, entertainment, communication, or social networking (Mishra & Koehler, 2006). Teachers must be prepared to reject common uses for technology and adapt them for pedagogical

purposes. Therefore, according to Mishra and Koehler (2006), technological pedagogical knowledge requires “forward-thinking, creative, and open-minded seeking of technology use, not for its own sake but for the sake of advanced student learning and understanding” (p. 66). Overall, this framework accounts for the different types of knowledge needed and how educators need to cultivate this knowledge to be successful in the classroom by understanding that instructional practices are best shaped by content driven, pedagogically-sound, and technologically-forward thinking practices (Mishra & Koehler, 2006).

Figg and Jaipal (2009) sought information from pre-service teacher's technology practices in four elementary classrooms across various content areas focused on technological pedagogical knowledge. Their findings elaborated the TPACK model by recognizing specific characteristics needed for successful teaching with technology. Their findings indicate that technological pedagogical knowledge characteristics plays the most significant role in planning and implementation in the classroom. The findings also indicate that if teachers lack the fundamental concepts (modeling, classroom management, preparation, differentiation, sequencing, and activity choices), there would be negative impacts on lesson implementation (Figg & Jaipal, 2009).

The TPACK framework is deep awareness that goes beyond comprehension three foundational components (content, pedagogy, and technology) individually (Koehler & Mishra, 2009). The TPACK framework suggests that content, pedagogy, technology, and teaching have paramount roles, both individually and collectively intertwined among each other. This framework overall promotes teachers the possibilities technology has to enhance and create meaningful learning experiences. Similarly, the SAMR Model encourages teachers to use technology in meaningful ways. Accordingly, the following section will present this model and its connection to student learning.

SAMR Model. The SAMR Model uses hierarchical levels of technology adaptation allowing educators the opportunity to reflect and evaluate how they are integrating technology use into the classroom (Puentedura, 2014). Created by Dr. Ruben Puentedura, the model encourages teachers to move beyond the substitution level of recreating existing educational activities to allow for the creation of new learning experiences that were previously impossible (Puentedura, 2014). When integrative technology is used as a substitute, it fails to create a meaningful learning experience for students. When integrative technology provides students a learning experience that would not exist without integrative technology, its value and impact in a lesson is increased (Puentedura, 2014). To help the reader better understand the four levels, brief descriptions are provided in the subsections that follow. This model is designed to help educators immerse technology into teaching and learning. The model supports and enables teachers to design, develop, and introduce digital learning experiences that use technology into the classroom.

Substitution. At the substitution level, technology does not generate a functional change and is instead a direct replacement to a traditional task (Puentedura, 2014). At this low level of the model changes take place in the learning environment in the way tasks are completed but is not considered an approach that enhances student learning. Overall, the level of technology integration is considered low and teachers are substituting technology for things that could be done without it.

Evans (2008) conducted a study in which final exam reviews were replaced with podcast lectures prior to an exam. In this study's sample, podcasts were used as a replacement for traditional review methods that would have taken place in class. The research revealed that podcasts were an effective review tool in the classroom. Within the study students noted preferring alternative methods over traditional reviews because they

were able to review in any location outside of the classroom. About 25% of participants reported listening to the reviews (podcasts) when traveling. Students indicated that the podcast alternative to a traditional review was more engaging than they would experience with a textbook or class lecture (Evans, 2008). These findings are further confirmed by Gromik (2012), who conducted research using cell phone video cameras to create videos in class. The study revealed that students enjoyed using alternative methods (e.g., cell phones) because it allowed them to complete their assignment anytime and anywhere. While these presented assignments could have been completed with more traditional methods, the increase in convenience made it preferable over traditional methods but fails to add functional improvement.

Augmentation. Augmentation is the next level up on the model (Puentedura, 2014). At the augmentation level technology is used as a direct tool replacement it does provide a functional improvement for a task. An example of this in the classroom would be using a word processor to type an essay. This integration of technology allows the learning process to be more efficient and engaging. In this example, images could be added, text could have hyperlinks, and changes to the text can be made quickly. In this and the previous phase technology provides an enhancement to an existing method of doing working. Technology itself is not required to complete the learning objective, but instead provides a medium for learning to occur, which does not necessarily enhance learning in the classroom environment.

Chuang and Tsao (2013) conducted a study with nursing students using text messages to help them memorize information about medications. The participants were split up into two groups, one group received text messages twice a day, while the other group did not. The messages that were received included information about specific medications and presented materials from the classroom lecture. This example of

augmentation adds functional improvement only providing a lecture or having students create their own flashcards. Chuang and Tsao (2013) determined that students who received the text messages had higher test scores than the other group of students.

Modification. Modification is the third level of the SAMR model. In this level, technology has significantly redesigned the task. Therefore, the learning activity is enhanced and as a result it has been significantly transformed (Puentedura, 2014). An example of this in the classroom would be to require students to set up a blog online for a worldwide audience. This activity alone will mean students are more accountable for the work they are presenting; therefore, they are more likely to put higher quality written assignments out to their audience. Hockly (2013) claimed that levels modification and redefinition are where true technology capability and learning is fully realized and transformed. Wang, Yu, and Wu (2013) designed an online course for a speech and debate course that allowed students to collaborate with each other to complete assignments and learning objectives. Student reported perceptions about the course being online that illustrated not only their preference, but students perceived the use of technology allowed them to complete tasks that traditional methods in the classroom did not.

Redefinition. The final and highest domain of the SAMR model is redefinition (Puentedura, 2014). In this level, technology is used to create innovative tasks. This level requires teachers to think about their learning activities that would be impossible without technology. For example, instead of assigning an essay a teacher can assign an assignment for students to create and present their positions through individually created videos. This innovative assignment would be impossible without technology. Fonseca, Martí, Redondo, Navarro, and Sánchez (2014) conducted a study with 57 engineering students who were divided into groups based on their personal cell phone's capabilities.

The students who had cell phones capable of using augmented reality, used their device to visualize simple models and manage design projects with high levels of detail and volume. The group of students perceived the ability of using technology over traditional methods because it allowed them to do things that were not possible without technology.

Overall, the intent of the SAMR model (Puentedura, 2014) is to encourage educators to significantly enhance the quality of education provided through technology. When teachers create learning activities that fall within the substitution and augmentation criteria, they can enhance student learning outcomes, while learning activities that fall within the modification and redefinition criteria allow them to transform student learning outcomes (Puentedura, 2014). When learning experiences fall higher within the SAMR framework learning is more personalized and accessible, which is ultimately supportive of the Universal Design for Learning framework (Rose, 2000).

Universal design for learning

Universal design for learning (UDL) is a framework that improves and enhances teaching and learning using scientific insights of the learning process as its foundation (Lieberman, 1996; Rose, 2000). This framework was inspired by the Universal Design principles of Rose and Meyer (2002) and evolved into an instructional strategy that allows teachers to foresee student learning barriers. The goal of UDL is for teachers to use a variety of methods to eliminate barriers to learning and provide all students with equal learning opportunities (Rose, 2000). UDL acknowledges that learning is a unique process and emphasizes curricula design techniques to minimize the significance of learner differences (Courey, Tappe, Siker, & LePage, 2012).

The UDL framework provides teachers guidance on how to develop lessons and assessments based on three key principles: (a) representation, (b) action & expression, and (c) engagement (Gargiulo, Metcalf, & Metcalf, 2017). First, representation pertains

to offering information in a variety of formats, allowing all students to access the material based on their unique learning needs. Examples of this principle may include a reading passage (text), audio, video, and a hands-on learning activity. Second, the principle of action & expression suggests providing students with more than one way to interact with the material to show understanding is essential. This can be accomplished by providing students with a menu of choices for completing an assignment, which will allow them to take ownership of their learning by creating a product that feels authentic to them. Lastly, the third principle is engagement. This critical aspect of learning can be challenging because all learners differ in the ways they can be engaged or motivated to learn. Therefore, there is not one means of engagement that is optimal for all learners in all context. However, if students are able to make meaningful connections between the learning objective and their personal lives and interests, they are more likely to be engaged and take ownership of their own learning (Gargiulo et al., 2017). Overall, the UDL framework encourages teachers to seek a variety of ways to motivate students and combined with other inclusive practices, provide support to all students. Ultimately UDL makes learning more accessible by presenting information in ways that adapt to different learners instead of requiring learners to adapt to the information (Gargiulo et al., 2017; Rose, 2000; Rose & Meyer, 2002).

Technology Use

As stated in preceding sections of this literature review, technology plays a prominent role in modern day teaching and has many benefits for both students and teachers with its ability to positively impact teaching and student learning (Carbonilla Gorra & Bhati, 2016; Khamprem & Boonmoh, 2019). For instance, technology can enhance classroom learning activities, promote communication, improve teaching outcomes, provide variation in course content, and increase student and teacher

interactions. Technology not only improves the ways in which students learn, but also leads to increased motivation, provides access to instructional content, and promotes individualized learning (Ahmadi, 2018).

Flipped Learning

Increased consumption of technology outside of the classroom makes it even more vital for teachers to expand their technology use to promote an active learning environment. (Nicol, Owens, Le Coze, MacIntyre, & Eastwood, 2018). Based on a study of a high school student sample, Nicol and colleagues (2018) found that students in technology active learning classrooms outperformed traditional classrooms and students enjoyed the classroom more than traditional setting. To keep pace with this demand, teachers are digitally transforming their classrooms as a means of enhancing their instructional practices (Leneway, 2018). Some teachers are “flipping the classroom,” which is an instructional strategy using a blended learning model that delivers instructional content—often online—outside of the classroom. When students are in class, teachers use that time to help them with their assignments (Leneway, 2018).

Digital Story Telling

Other instructional methods used in the classroom include digital storytelling and infographics. According to Leneway (2018), digital storying telling “is a highly personal and densely pack exploration of a topic through story” (p. 12). Storytellers use software, voiceovers, and images to help tell the story as a powerful means of connecting to the audience. Infographics, on the other hand, are visual representations of vast amounts of information, which can be more powerful than words to convey the same message.

As technology continues to proliferate, Leneway (2018) noted that educators will look to expand instructional practices using personal learning environments and game-based learning. Personal learning environments have shifted most recently in education as

educators incorporate smartphones and tablets into their classrooms. Moreover, game-based learning is a concept enabling teachers to integrating curriculum content in an engaging and creative manner, fostering collaboration, creativity, and critical thinking (Leneway, 2018).

Technology Barriers

The benefits of technology in the classroom have been presented in preceding sections of this literature review (Davis, 2018; Hicks, 2011; Okojie, 2011; Rafool et al., 2012). However, barriers also exist when incorporating technology into a classroom, including (a) lack of professional development, (b) technology support, (c) access to resources, and (d) time. The following subsections will address the barriers presented in the existing literature.

Professional Development

Professional development provides teachers new teaching strategies, district initiatives, new technology, and a variety of other topics (Hew & Brush, 2007). Ongoing professional development in technology is critical to support the fast-paced changes that are currently taking place. In the metasynthesis conducted by Hew and Brush (2007), the researchers looked at 94 studies; one finding indicated that professional development not only provides teachers with the knowledge and skills to employ technology into the classroom, but also influences their attitudes and belief systems toward technology. Consequently, for teachers to incorporate technology into their classroom, it is essential that they commit to creating meaningful learning experiences with integrative technology. (Hew & Brush, 2007).

Attitudes toward technology, whether positive or negative, influence its implementation in the classroom (Tondeur, Valcke, & Van Braak, 2008). As noted by Hicks (2011), teachers have reported that their overall low comfort levels with

technology hinders their use in the classroom. More specifically, Hicks (2011) asserted the predominant reason teachers feel that they cannot implement technology into the classroom is because they fear they will look inadequate in front of their technology savvy students because of their skill deficits. Therefore, providing teachers with professional development opportunities will allow them to maintain higher comfort levels which would result in increased technology integration within the classroom.

Hew and Brush (2007) presented three critical components of valuable technology professional development. Their findings about teacher development emphasize the following: (a) focus on content such as technology supported pedagogy, skills, and knowledge; (b) provide teachers with hands on learning experiences to practice skills; and (c) address teachers' immediate needs so they can apply taught concepts into their classrooms. Teachers need to have a transferable technology skillset that allows them to use skills in an infinite number of ways. These skills will increase their comfort level and allow them to create meaningful and relevant learning experiences (Hew & Brush, 2007). Makki, O'Neal, Cotton, and Rikard (2018) continue to highlight the significance and role of professional development regarding technology comfort and implementation.

Technical Support

Technology support goes beyond the traditional view of technical support, encompassing administration, peers, students, parents, school or district culture, and funding (Inan & Lowther, 2010). Levin and Wadmany's (2008) exploratory, longitudinal study examined six teacher's views on the factors that impacted technology integration. Their study revealed teachers are unlikely to use integrative technology if they themselves have not had rich learning experiences and support. This finding was also apparent in a study conducted by Miranda and Russell (2011), who collected data from university faculty and found that perceived obstacles and lack of support were the biggest

limitation that prevented the use of technology. These findings suggest that regardless of the amount of professional support provided to a teacher, if the teacher does not perceive they are being supported, they will allow their perceptions to create barriers that prevent technology integration. On the other hand, Bebel, Russell, and O'Dwyer (2004) collected quantitative data on 2,894 teachers in 22 Massachusetts school districts to examine the extent to which integrative technology is used inside and outside of the classroom. The researchers revealed that administrators' expectations and encouragement to use technology were strong predictors of teachers' computer use. In a more recent study, Petko, Prasse, and Cantieni (2018) surveyed 349 Swiss primary school teachers to determine if they were professionally prepared to integrate technology into classrooms. The findings presented that in order to foster technology integration amongst teachers, both teacher readiness and school readiness. In other words, teachers' skills and beliefs need to be supported from within their school (Petko et al., 2018). Their findings continue to confirm that providing professional development support increases comfort levels and reduce complexity with implementation.

Access to Resources

Today, nearly every school has access to the internet and technology resources in their classrooms (Inan & Lowther, 2010). However, having access to quality resources has also been considered an important element of technology integration efforts. Additionally, the types of digital resources available to teachers may influence their ability to integrate technology. Inan and Lowther (2010) examined the direct and indirect effects of teachers' individual characteristics and perceptions of environmental factors that influence integrative technology in the classroom by collecting survey data from 1,382 Tennessee public school teachers. The authors reported that technology made available to teachers increases the likelihood it will be used in the classroom. Their

findings indicate a strong relationship between the frequency of technology use and the technology resources available for use. Likewise, Palilonis and Watt (2019) collected data from teachers K-5 about their ability to effectively create, collaborate, and communicate in digital environments. The teachers within the study lacked resources that were needed to support their integrative technology efforts. As a result, limited learning opportunities using technology were created for students. These findings continue to confirm earlier findings supporting a need for teachers to have access to technology resources to support implementation efforts.

Lack of Time

Preparing lessons that integrate technology can be time consuming (Reigeluth, 2016). The barrier of having limited time inhibits teachers using technology to create rich and meaningful learning activities (Reigeluth, 2016). Reigeluth (2016), presents an instructional theory and how it relates to the paradigm of technology. The study reveals impactful way to support teachers in creating technology-enhanced, student-centered lessons is to provide time for hands on practice and planning. Similarly, Hicks (2011) investigated how technology has presently impacted education, hypothesizes the future of technology in the classroom, and presents guidelines for technology use for learning purposes. The researcher's findings present the notion that technology can save users a significant amount of time, it does require an upfront investment of providing the user opportunities to learn about various technology resources, ultimately supporting technology integration. These findings are further confirmed by Tondeur et al. (2019), who collected data on the perceptions of 284 Belgium teachers on preparation for technology integration. Their findings continue to support the literature base which reveals the importance of providing teachers with an opportunity to use knowledge and skills in new and authentic situations.

In sum, while there are many benefits of using technology in the classroom there are also many barriers that inhibit integration. Elements that frequently hinder implementation are a lack of (a) professional development, (b) technical support, (c) access to resources, and (d) time. Related, co-teach environments also experience challenges with technology integration. Accordingly, the following section will present variables that impact and hinder technology in co-teaching environments.

Technology in Co-Teaching Environments

In the mixed methods study by White and Robertson (2015), the researchers studied an elementary co-teach classroom through observations and teacher interviews over an 8-week period to document technology issues and success, teacher strategies, student progress, and student attitudes both with and without technology. Their study uncovered effective technology integration into the co-teach classroom allowed students to participate fully in the academic and social life of the general education classroom. During the weekly meeting with the researcher, the teachers discussed how they planned technology integration into their lessons and that when their students started show academic gains it encouraged them to continue with their implementation efforts. At the conclusion of the study both participating teachers indicated that they intend on implementing technology into their classroom and will continue to meet on a regular basis using the planning model introduced by the researcher (White & Robertson, 2015).

Bryant Davis et al. (2012) noted that reflective technology integration, modified assignments and assessments were seen in 17% of the joint co-teachers' lesson plans but questions the 83% of the plans that did not require academic modifications or accommodations. They found it hard to imagine that the lesson plans did not need reflective modifications or accommodations of some sort for students with disabilities to access the instructional content. Furthermore, they maintain that if lesson plans are not

reflecting written documentation of such modifications and accommodations then it is likely that the second teacher, the special educator, is most likely not contributing to instruction in the setting. Their research confirms the findings of Weiss and Brigham (2000) which highlights the lack of instructional change and importance of allocating time for planning (Scruggs et al., 2007).

Bryant Davis et al. (2012) charged that there should be further research investigation looking at little or no use of technology during instruction in inclusive classrooms. The amount of technology that is available in today's classrooms and a generation of students who have a vast understanding of technology require teachers to more effectively use these tools to arm students with disabilities with the tools needed to access the general education curriculum (Edyburn, Higgins, & Boone, 2005). Researchers Bryant Davis et al., (2012) are disappointed to learn that technology resources are not being tapped into as resources when writing lesson plans for co-teach classrooms. They conclude that according to their study and the literature, co-planning will continue to be a challenge for co-teachers regardless if it is the framework of effective co-teaching (Bryant Davis et al., 2012). Many studies have looked at how technology has impacted education and student learning experiences in the classroom. However, after an exhaustive review of the literature, there has not been a lot of attention given to implementing instructional technology in co-teaching environments. This study seeks to add research to this gap in the literature on co-teaching.

Technology Use with Students with Special Needs

Technology allows for students with learning disabilities to have access to the general education curriculum and can provide more equitable classroom environments for all learners (White & Robertson, 2015). It is critical that students with special learning needs be able to participate and access instructional resources in a way that does not

make them feel as an outsider. If a student with special needs is the only one using technology to access the instructional content, this may make them feel as if they are isolated from their peers. Technology should not make a student's disability more apparent or this may resemble a more restrictive environment for the student (White & Robertson, 2015).

To avoid this, it is recommended that teachers use technology learning resources with all students in the classroom to avoid isolation (Fakrudeen, Miraz, & Excell, 2017). By using this approach, technology can support the unique learning needs of all students and concurrently expand technology capabilities of every student in the classroom (Fakrudeen et al., 2017). According to White and Robertson (2015) when technology is used in the classroom, its assistive nature becomes "disguised as everyday learning, [and] this can potentially provide more inclusive and enabling [learning] environments." Technology innovations are available to help students with diverse learning needs gain access to the curriculum so that they can keep up with their non-disabled peers (White & Robertson, 2015).

Teacher Efficacy Regarding Technology

Teacher self-efficacy is based on Bandura's (1997) social cognitive theory which refers to the beliefs a teacher has regarding their ability to carry out instructional practices within a classroom that yields positive outcomes for students (Lemon & Garvis, 2016). Efficacy beliefs are thought to be linked as an influence on the teacher's overall effectiveness with students, outcomes in the classroom, student motivation, student attitudes toward teachers and school, student's own self-efficacy beliefs and strongly related to student achievement. Additionally, teacher's with higher self-efficacy beliefs have been linked to decreased burnout, commitment to teaching, increased levels of planning and organization, and the use of innovative teaching methods. Self-efficacy

beliefs influence thought patterns and empower action that allow individuals to pursue their goals, overcome setbacks, and take control of events that impact their lives (Bandura, 1986, 1993, 1997). Bandura (1997) highlights that people with higher self-efficacy seeks, commit to, and invest more effort in more challenging goals.

Conversely, Kaymakamoglu (2018) conducted semi-structured interviews and structured observations with 10 classroom teachers to explore their beliefs, perceived practice, and actual classroom practice in relation to traditional (Teacher-Centered) and constructivist (Learner-Centered) teaching. Findings of the study revealed discrepancies among teachers' beliefs, perceived practice, and actual classroom practice. The mismatch between teachers' stated beliefs and actual classroom practice appeared to be a result of perceived contextual constraints, including large class sizes, mixed ability levels, classroom culture, campus culture, and lack of access to campus supports. Ultimately, the findings of this study suggest that beliefs do not always translate into practice, as teachers' beliefs, perceived practice, and actual classroom practice might differ (Kaymakamoglu, 2018).

In sum, internal (e.g., beliefs) and external factors (e.g., time or resources) can be barriers when implementing technology into the classroom (Mama & Hennessy, 2013). However, Kim, Kim, Lee, Spector, and Demeester (2013) found a relationship between a teacher's self-efficacy and technology integration practices in the classroom. Knowledge about technology is a required prerequisite for technology use in the classroom, but teachers also need to feel confident in their ability level to incorporate technology into their teaching practices (Al-Awidi & Alghazo, 2012; Benson, & Ward, 2013; Ertmer & Ottenbreit-Leftwich, 2010; Hatlevik & Hatlevik, 2018). Therefore, in addition to general knowledge about technology, teachers' beliefs about their ability to use technology is instrumental to integrating technology into the classroom.

Theoretical Framework

The theoretical framework that guides the development of this study is rooted in Bandura's (1977) self-cognitive theory as a means of self-efficacy. Bandura defined self-efficacy as intellectual activity that develops one's belief about their ability to achieve an accomplishment. This theory emphasizes that an individual is their own change agent and it is their beliefs about their own abilities that not only determines the choice of activity, but also how much effort is allocated to specific activities (Skaalvik & Skaalvik, 2010). Research supports the theory because teachers that have a greater sense of self-efficacy are more likely to implement innovation teaching strategies (Sparks, 1988) and have a greater impact and level of effectiveness in the classroom during instruction (Pendergast, Garvis, & Keogh, 2011). A teacher's belief in their own ability has a direct connection to how a student performs on academic tasks (Pendergast et al., 2011).

In application with co-teaching practices and the implementation of integrative technology into the co-teach classroom, a teacher's use of technology for instructional purposes has been attributed to their perceived ability to do so (Paraskeva, Bouta, & Papagianni, 2008). For technology to be integrated into instructional practices, teachers must have a strong sense of technology efficacy (Kumar, Rose, & D'Silva, 2008), therefore making self-efficacy a prerequisite for the implementation of integrative technology (Teo, 2010) and innovative teaching practices (Sparks, 1988), such as co-teaching.

Conclusion

This review of the literature indicated that the rise of co-teaching is linked to federal law changes and societal inclusive practices movement. Co-teaching is a means of providing specially designed instruction and support to students eligible for special education in the least restrictive environment of the general education classroom. The

literature indicates that co-teaching should not be perceived as the mere presence of another individual in the classroom to help with various tasks, but it is the intentional pairing of two equally credentialed educators, one special education and the other general education certified, who are able to bring their individual unique experience and expertise their respective certifications to the instructional practices of the co-teach classroom. To truly be considered co-teaching, both teachers need to be actively involved in planning, delivery, and assessment of instructional content. Additionally, to support implementation the current literature recognizes six instructional approaches that can be used by co-teachers as a means of enhancing their joint instructional impact on students.

The literature suggests that there are many benefits to implementing co-teaching as a method of supporting not just students receiving special education but all students. However, there are many barriers that co-teachers experience when implementing co-teach instruction. Unfortunately, because of the common barriers, the literature reveals that the intended model of co-teaching, by definition, is largely not taking place. A significant amount of the available research suggests most instruction is lead solely by the general education teacher, while the special education teacher's role is often diminished to an assistant. The most frequent reason teachers are not co-teaching, based on the available literature, is the lack of planning for dual instruction.

In considering the synthesis of the literature associated with co-teaching, this present study also integrates the component of technology in the co-teach classroom. As technology continues to evolve and change instructional methods, and the method students interact with instructional content, teachers are expected to implement lessons that create innovative learning environments. However, as presented in the literature review, teacher's background, personal interest, learning characteristics and belief systems have an impact on technology integration into classroom environments.

However, after an exhaustive review of the current available literature, it is evident there has been limited focus given to secondary teacher knowledge and beliefs of co-teaching and integrative technology and actual practice. The goal of this research study was to address the identified gap in the literature and present information which serve to inform and potentially be beneficial for co-teach implementation. In the next chapter, an overview of the research design is provided, which includes the operationalization of the theoretical constructs, research purpose, research questions, population and related sampling techniques, as well as instrumentation, data collection procedures, data analysis, and privacy and ethical considerations.

CHAPTER III: METHODOLOGY

The purpose of this study was to explore secondary educators' perceptions of their competence in co-teaching and utilizing integrative technology, and the relationship it has with educators' perceived practices. The researcher collected survey and interview data from a purposeful sample of secondary special and general education co-teachers. This chapter presents an overview of the research problem, operationalization of theoretical constructs, research purpose and questions, research design, population and sampling selection, instrumentation that was employed, data collection procedures, data analysis methods, along with privacy, ethical considerations, and the research design limitations for this study.

Overview of Research Problem

Cook and Friend (1995) noted that the teaching profession has a history of working in isolation; however, as an LRE service delivery option, special education and general education teachers are paired together to work in constructive and coordinated ways in the classroom. Co-teaching emerged as a means of providing students with disabilities access to the general education curriculum alongside their non-disabled peers. Accordingly, co-teaching is considered as a means of meeting the needs of special education students in general education settings (Cook & Friend, 1995).

Given the potential of having two teachers in one classroom, co-teaching should promote an increase in student achievement; however, a theme present in the existing literature presents similarities in the way that co- and solo- taught classes are being taught (Scruggs et al., 2007). Co-teachers can use research-based teaching strategies such as small-group or differentiation; however, co-teach classrooms often fail to do so and continue to rely primarily on whole group instruction (Scruggs et al., 2007). Even though

there are two teachers (general education and special education) in the classroom, general education teachers often lead co-teach instruction while special education teachers assist rather than truly co-teach (Scruggs et al., 2007).

Additionally, according to Davis (2018), education has been directly affected by the increase of technology in the classroom; more specifically, technology has changed the learning experience for students with disabilities. When used purposefully, technology integration can have a dramatic effect on instructional outcomes. Instructional content presented through technology is an everyday occurrence in today's classroom (Davis, 2018). This study explored educators' perceptions of the influence and role technology has on the implementation of co-teach models across secondary content areas. Ultimately, this information could contribute to an increase of recommended co-teaching practices taking place in the classroom.

Operationalization of Theoretical Constructs

This study consisted of three constructs: (a) teachers' perceptions of co-teach practices (b) teachers' perceptions of technology integration and (c) teachers' perceptions of comfort level with technology. The Perceptions of Co-Teaching Survey ([PCTS]; Austin, 2000) was used to operationalize teachers' perceptions of currently employed co-teach practices. This survey is composed of two parts: Part I consists of eight items designed to collect participants' information, while Part II comprises 23 items where participants respond to 5-point Likert-type items and were summed. Higher total scores indicate that teachers' perceptions and practices are in line with recommended co-teach practices according to the existing literature.

The Technology Comfort Scale (TCS; Kajs, Underwood, & Tanguma, 2002) was used to operationalize teacher comfort level with technology, frequency of technology use, and self-efficacy. The survey consists of six subsections totaling 31 items asking

participants to respond to 5-point Likert-type items and was summed within each specific subsection. The sums of each subsection report scores indicating teachers' perceptions of their ability and efficacy beliefs regarding technology integration in the classroom. The higher the score, the more confident in their technology integration abilities and the greater perceived level of self-efficacy integrating technology into the classroom by the study participant. The researcher omitted four demographic questions at the beginning of the survey because they were either repetitive from the PCTS or they did not collect data that would help the researcher answer the study's research questions.

Research Purpose and Questions

The purpose of this study was to explore secondary educators' perceptions of their competence in co-teaching and utilizing integrative technology, and the relationship it has with educators' perceived practices. This dissertation examined the following questions:

Quantitative:

1. What are the differences in perceptions of co-teachers (general education vs. special education) on co-teaching practices?
2. What are the differences in perceptions of co-teachers (general education vs. special education) proficiency and use of integrated technology?
3. What is the relationship between perceptions of co-teaching and perceptions of technology integration proficiency and use?

Qualitative:

4. What perceptions do secondary co-teachers have about co-teaching practices and integrative technology in co-teach classrooms?

Research Design

An explanatory sequential mixed methods design was used, which involved collecting quantitative data first and then followed by an explanation of the quantitative results with in-depth qualitative data. The first phase utilized the PCTS (Austin, 2000) and the five subsections of the TCS (Kajs et al., 2002) to collect quantitative data from co-teachers in Maroon Independent School District (ISD) about co-teachers' perceptions regarding co-teaching and comfort levels with integrative technology. The second phase was conducted as a follow-up to help explain the quantitative results. In the exploratory follow up, the plan was to explore co-teachers' perceptions of integrative technology in co-teach classrooms within Maroon ISD.

Population

According to the Texas Education Agency's Texas Academic Performance Report (2018), Maroon ISD is a public-school district located in Gulf Coast region of the United States that serves approximately 13,000 students and employs approximately 800 teachers. Of those teachers, 71% are assigned to general education programming and 12% are employed to support special education students. Of the 12% of special education teachers, 45% are employed at the secondary level with a co-teaching assignment.

Sample

A purposeful sample of participants was generated for this study consisting of adults (18 years and older) who held a valid teaching certificate and had a secondary general education or special education co-teaching assignment within Maroon ISD. All 120 secondary co-teachers (general education and special education) were invited to participate in the study. Of those invited, 69% were general education co-teachers and 31% were special education co-teachers. The researcher's target was to have at least 50%

of those who met the participation requirements to participate in the study. The target number was 18 special education and 41 general education co-teachers.

Participant Selection

A purposeful participant selection was conducted with the site's district administrator and researcher to ensure all invited participants were general education and special education teachers in a current secondary co-teaching assignment. After the purposeful selection took place, the teachers were sent an email by the district administrator through district email with a link that would direct them to an online survey. The last question on the survey was for the participants to leave their contact information if they were willing to participate in a one-on-one interview. Based on the survey results, the researcher selected a total of 11 participants, five special education and six general education teachers, to participate in the interviews. The selection process for the interviews were based on meeting eligibility requirements for participation and a potential participant's availability and willingness to participate.

Instrumentation

Perceptions of Co-Teaching Survey

The PCTS (see Appendix E) was developed by Austin (2000) in consultation with Fennick (1995), who was the author of the Collaborative Teaching Survey. The PCTS consists of two major parts totaling 31 items. Part I has eight items seeking demographic information from the participants, while Part II has 23 items seeking information in four domains relevant to teachers' perceptions of co-teaching. The four domains of Part II ask participants to respond based on a 5-point Likert-type scale in the following areas: (a) Co-Teacher Perceptions of Current Experience; (b) Recommended Collaborative Practices; (c) Teacher Preparation for Collaborative Teaching; and (d) School-Based Supports that Facilitate Collaborative Teaching.

The first domain, Co-Teacher Perceptions of Current Experience, consists of five items and asks participants to respond on a 5-point Likert-type scale as follows: strongly agree (1), agree neither (2), agree (3), disagree (4), and (5) strongly disagree (5). The scale was rated based on participants' perceptions of their current co-teaching experience. The scores range from 5-25, with lower scores indicating positive perceptions of their co-teaching experience. Coefficient alpha reliability was run using the researcher's pilot data set and $\alpha = .412$. A final optional item in this domain is a blank text box for participants to provide commentary regarding their answers as needed.

The second domain, Recommended Collaborative Practices, consists of five items and asks participants to respond on a 5-point Likert-type scale as follows: strongly agree (1), agree neither (2), agree (3), disagree (4), and strongly disagree (5). Participants were asked to rate each statement according to their belief in the value of practice in the column titled "Value" and whether they current employ the practice in the column titled "Employ." The scores range from 5-25, with the lower score indicating greater value and employment of co-teach practices. Coefficient alpha reliability was run using the researcher's pilot data set, $\alpha = .800$ in the Value column, and $\alpha = .903$ in the Employ section. A final optional item in this domain is a blank text box for participants to provide commentary regarding their answers as needed.

The third domain, Teacher Preparation for Collaborative Teaching, consists of seven items and asks participants to respond on a 5-point Likert-type scale as follows: very useful (1), somewhat useful (2), of limited use (3), not useful (4), and don't know (5). The scale was rated based on participants' beliefs as to what type of professional preparation would be beneficial to enhance the co-teaching experience. The scores range from 7-35, with the lower score indicating greater value of professional preparation. Coefficient alpha reliability was run using the researcher's pilot data set and $\alpha = .913$. A

final optional item in this domain is a blank text box for participants to provide commentary regarding their answers as needed.

The fourth and final domain in the survey, School-Based Supports that Facilitate Collaborative Teaching, consists of seven items and asks participants to respond on a 5-point Likert-type scale as follows: very useful (1), somewhat useful (2), of limited use (3), not useful (4), and don't know (5). Participants were asked to rate each statement according to their belief in the value of practice (see Appendix E) and whether they currently had access to school-based support. The scale is rated based on participants' beliefs as to what type of school-based supports would be beneficial to enhance the co-teaching experience and their access to those support. In Column a, scores range from 6-30, with the lower score indicating greater value for school-based supports. In Column b, scores range from 6-30, with the lower score indicating less access to common school-based supports needed for co-teach instruction to occur. Coefficient alpha reliability was run using the researcher's pilot data set, in the section titled "Value" $\alpha = .321$, and in the section titled "Access" $\alpha = .889$. A final optional item in this domain was a blank text box for the participant to provide commentary regarding their answers as needed.

Each of the participants' responses to the items in the four domains was subjected to a test of internal reliability using Cronbach's alpha. The means and standard deviations were calculated for each subdomain. The analysis of the research data is presented in Chapter IV using these means and standard deviations.

Technology Comfort Scale

Kajs et al.'s (2002) TCS was designed to assess perceived confidence levels of educators regarding their ability to implement technology into classroom lessons and activities as a means of promoting student success through technology use (see Appendix F). The TCS is a 31-item survey with Likert-type responses. Participants responded to

statements ranging on a scale of 1 to 5, with 1 = very uncomfortable and 5 = very comfortable.

The first subsection of the survey consists of four items asking participants to respond on a 5-point Likert-type scale as follows: not competent (1), somewhat competent (2), uncertain (3), competent (4), and very competent (5). The scale collected beliefs about participants' perceptions of their ability to facilitate and inspire student learning and creativity. The higher the score, the higher the self-efficacy in this domain.

The second subsection of the survey consists of four items asking participants to respond on a 5-point Likert-type scale as follows: not competent (1), somewhat competent (2), uncertain (3), competent (4), and very competent (5). The scale collected beliefs about participants' perceptions of their ability to design and develop digital age learning experiences and assessments. The higher the score, the higher the self-efficacy in this domain.

The third subsection of the survey consists of four items asking participants to respond on a 5-point Likert-type scale as follows: not competent (1), somewhat competent (2), uncertain (3), competent (4), and very competent (5). The scale collected beliefs about participants' perceptions of their ability to model digital age work and learning. The higher the score, the higher the self-efficacy in this domain.

The fourth subsection of the survey consists of four items asking participants to respond on a 5-point Likert-type scale as follows: not competent (1), somewhat competent (2), uncertain (3), competent (4), and very competent (5). The scale collected beliefs about participants' perceptions of their ability to promote and model digital citizenship and responsibility. The higher the score, the higher the self-efficacy in this domain.

The fifth subsection of the survey consists of four items asking participants to respond on a 5-point Likert-type scale as follows: not competent (1), somewhat competent (2), uncertain (3), competent (4), and very competent (5). The scale collected beliefs about participants' perceptions of their ability to engage in professional growth and leadership. The higher the score, the higher the self-efficacy in this domain.

The sums of each subsection report scores indicating teachers' perceptions of their ability and efficacy beliefs regarding technology integration in the classroom. The higher the score, the more confident in their technology integration abilities and the greater perceived level of self-efficacy integrating technology into the classroom. The researcher omitted four demographic questions at the beginning of the survey because they were a repetition of the PCTS or did not collect data that would help the researcher answer this study's research questions. Cronbach's alpha for this locally developed instrument was .91.

Data Collection Procedures

Quantitative

After the researcher's dissertation committee approved the proposal, the researcher requested permission from the University of Houston-Clear Lake (UHCL) Committee for the Protection of Human Subjects as well as written consent from the school district being studied. The researcher worked with a Maroon ISD administrator to compile a purposeful list of participants based on their secondary level co-teaching assignment. After the purposeful participant selection took place, the district administrator sent out an email explaining the study and provided email recipients access to a link directing willing secondary co-teachers to the PCTS (Austin, 2000) and the TCS (Kajs et al., 2002) through district email.

The email contained a cover letter explaining the purpose of the study and the right of potential participants to decline or withdraw from the study at any time. After potential participants clicked the link, an abbreviated cover letter from the email appeared stating the purpose of the study, outlining that participation was completely voluntary, and detailing the amount of time needed to complete the survey instruments (approximately 15 minutes). The collected quantitative data was analyzed in the Statistical Package for Social Sciences (SPSS) database. The dataset was to be stored in two locations: a password protected computer hard drive and a password protected online cloud database.

Qualitative

Upon receiving approval from the UHCL Committee for the Protection of Human Services and Maroon ISD, qualitative data was collected through a series of semi-structured interviews. After completing the first quantitative phase of the study, participants were asked at the end of the PCTS (Austin, 2000) and the TCS (Kajs et al., 2002) if they would like to participate in an interview to allow the researcher to gain a more in-depth understanding about their co-teaching experience and technology integration abilities and beliefs. Given the anticipated small sample of participants who met the inclusionary criteria, the researcher set the target number of interview participants to a total of 10 teachers: five general education and five special education co-teachers that have a current co-teach assignment.

Participants who provided their contact information were contacted via email or by phone to determine if they were still interested in participating in an interview. If there was still interest in participating, the researcher explained the interview process and noted the amount of time (approximately 20-30 minutes) that it would take to complete. At that time, the researcher and the willing participant identified a mutually agreeable date and

time to conduct the interview and asked if the participant would be willing to allow the researcher to audio record the interview. When the interview was conducted, the researcher reviewed the purpose of the study as well as the components of informed consent (procedures, time needed, risks, benefits, confidentiality, compensation, right to withdraw, researcher's contact information, and signatures for consent) and provided an opportunity for the participant to ask questions. At the conclusion of the interview, all willing participants were provided with a \$25 Amazon gift card in appreciation of their time that they allocated to participating in the study. Following each interview, the recordings were transcribed by a third-party transcription service to allow for an accurate account of the participants' responses. The data was stored in two locations: a password protected computer hard drive and a password protected online cloud database.

Data Analysis

Quantitative

The data from Part I of the PCTS allowed for the participant co-teachers to be divided into two groups, general education and special education teachers using the statistical package, SPSS. Data from Part II of the PCTS and the TCS was used to answer the first and second research question in determining the differences in perceptions of co-teachers (general education vs. special education) on co-teaching practices. An independent samples t test was calculated to measure the difference between sample means. This design was appropriate for this study because it measured the difference between sample means of two independent participant groups: general and special education co-teachers. The third research question was answered using Pearson's r to compare the relationship between perceptions of co-teaching and perceptions of technology integration proficiency and use. This design was appropriate for this study because it helped determine if a relationship existed between co-teachers' perceptions of

co-teaching and their perceptions of technology proficiency and use (general education vs. special education).

Qualitative

The fourth research question was answered using qualitative data from interviews using a constant comparison approach. A thematic analysis process was utilized to analyze the data (Braun & Clarke, 2006). After an interview was conducted, the researcher had a third-party service transcribe the interview. Once the interview was in written format, the researcher uploaded the data set into NVivo, a qualitative data analysis software program, to code the responses from the transcribed interviews. The researcher conducted both an inductive and deductive coding method aligned with the existing literature unique to teacher efficacy regarding technology implementation and co-teaching (Bandura, 1997; Ertmer, 2005; Friend & Cook, 2013; Scruggs et al., 2007). As the interviews were further analyzed emergent codes were established as they naturally developed from reading the transcripts. The interviews were then divided into categories based on their general education and special education teaching assignment. Each interview was read one at a time in its entirety; upon completion, the researcher looked for patterns present in the interview. As more interviews were reviewed, themes emerged in the qualitative data and findings were compared across groups. The researcher reviewed the literature to determine if any of the themes overlapped with themes present in Chapter II.

Qualitative Validity

The researcher was highly aware of her own personal bias from personal and professional experiences of co-teaching. The researcher's experiences shaped the research questions and the area of research. As a result, the researcher's experiences and implicit bias could have influenced the findings. Therefore, to establish validity,

processes were put into place to support the validity of this research. Before the interview process took place, a qualitative expert reviewed the interview questions to ensure they were not leading. After the interviews took place and prior to conducting data analysis, participants were provided a copy of the interview transcripts to afford them the opportunity to verify the accuracy of the information. To remove bias, the interviews were reviewed multiple times to ensure accuracy of the codes using a deductive and inductive coding process (Creswell, 2013). Additionally, the researcher used a triangulation process to analyze findings between three sources of data: existing literature, surveys, and interviews (Creswell, 2013).

Privacy and Ethical Considerations

The researcher obtained all obligatory consents from the UHCL Committee for the Protection of Human Subjects and written consent from the participating school district. Next, the researcher obtained individual participation consent before collecting data. There were no risks to a participant's physical or mental health beyond those encountered in the normal course of everyday life involved in this research. Communication with the participating district and study participants were documented in writing in order to validate all considerations of ethical issues.

A survey cover letter was attached to the email sent to eligible participant candidates outlining the purpose of the survey and highlighting that participation was voluntary; participating students, parents, and teachers were also reassured that the confidentiality of the information obtained would remain confidential. Survey participants gave individual consent to participate in the study.

Identifying names in the data file were changed to pseudonyms in place of individual, school, or district names to ensure anonymity of all participants involved in the study. Additionally, the file itself was password protected and stored securely in a

password protected cloud storage system. Both passwords used on the file itself and the cloud storage system differed to prevent a breach of confidentiality.

Once the study was completed, per the UHCL Committee for the Protection of Human Services, the researcher was to maintain the data for 5 years; once the 5-year window closed, the researcher would take the necessary steps to destroy all data files.

Conclusion

In conclusion, this chapter described the methodological plan for this study. The study was conducted using an explanatory sequential mixed methods design. The qualitative portion of the study looked at co-teacher perceptions and technology as measured by the PCTS (Austin, 2000) and the TCS (Kajs et al., 2002). The interviews were conducted as a follow up to the quantitative results to help gain an in depth understanding of the survey data. In the next chapter, the data is presented and fully described as aligned to the research questions which guided this study.

CHAPTER IV:

RESULTS

The purpose of this study was to explore secondary educators' perceptions of their competence in co-teaching and utilizing integrative technology, and the relationship it has with educators' perceived practices. This chapter describes the data collected from the survey instruments as well as participants' responses to questions designed to collect demographic information. Additionally, the data from interviews with 11 participants is presented.

In the quantitative portion of the study, co-teacher perceptions were measured using Austin's (2000) Perceptions of Co-Teaching Survey (PCTS) and five subsections of Kajs et al.'s (2002) Technology Comfort Scale (TCS). An independent samples t test was conducted to determine differences between the sample means. Furthermore, technology integration abilities and beliefs were compared to co-teach perceptions using Pearson's r. Lastly, additional questions were administered to collect demographic information about the study participants.

In the qualitative portion of the study, interviews were conducted to gain an in depth understanding about participants' perceptions of both co-teaching and integrative technology in the co-teach classroom. The data obtained from the interviews was analyzed using a constant comparison approach to look for common emerging themes utilizing NVivo software. This chapter presents the results of the quantitative and qualitative data analysis to address each research question guiding this study. The findings and their implications are discussed in Chapter V.

Demographic of Survey Participants

Study participants consisted of both general and special education teachers that were currently in a co-teach partnership at the secondary level in a small suburban school

district in Texas. Participants were purposefully selected by a district administrator according to their secondary placement and co-teach assignment and invited to participate in the study. As a result, 71 participants completed the online survey. Of the total participant count, there were 44 general education and 27 special education co-teachers. From this group of participants, five special education and six general education co-teachers participated in a follow up interview for the qualitative portion of the study. Interviews participants were selected based on whether they responded to the option at the end of the survey to participate in an interview. A summary of participants' descriptive factors, including general or special education co-teach assignment, secondary grade level taught, co-teach content area taught, teacher education level, gender, and if the co-teach assignment was voluntary or not, is presented in Table 2.

Table 2

Study Participant Descriptive Factors

Descriptive Factor	<i>n</i>	%
Co-Teach Assignment		
General Education	39	55.1
Special Education	48	44.8
Grade Level Taught		
6th – 8th	47	54.0
9th – 12th	40	45.9

(continued)

Descriptive Factor	<i>n</i>	%
Content Area		
English Language Arts	35	40.2
Math	29	33.3
Science	13	14.9
Social Studies	10	11.4
Teacher Education Level		
Bachelors	56	65.1
Masters	24	27.9
Masters +	6	6.9
Gender		
Male	14	16.2
Female	72	83.7
Assignment Voluntary		
Yes	28	32.5
No	58	67.4

Research Question One

Research Question One (What are the differences in perceptions [general education vs. special education] on co-teaching practices?) was answered by conducting an independent t-test to determine if there was a statistically significant mean difference between the two groups of co-teachers. The results of the independent t-test suggest no

significant difference in perceptions of general education and special education co-teachers on all aspects of co-teaching practices. The perception results were as follows: co-teaching experience, $t(83) = -0.74, p = .46$; co-teaching practices, $t(77) = .95, p = .347$; current employment of co-teach practices, $t(73) = -1.68, p = .09$; teacher preparation for co-teaching, $t(76) = -1.59, p = .12$; school-based supports that facilitate co-teaching, $t(74) = -0.07, p = .94$; and access to school-based supports that facilitate co-teaching, $t(71) = .49, p = .62$. Table 3 displays the mean composite scores of general education and special education co-teachers on co-teaching practices as well as the standard deviations.

Table 3

Mean of Composite Scores of Responses on Co-Teaching (CT) Practices

CT Practice	Assignment	<i>n</i>	<i>M</i>	<i>SD</i>
Current CT	GenEd	47	20.02	3.82
	Sped	38	20.61	3.33
Value of Collaborative Practices	GenEd	45	19.11	3.56
	Sped	34	18.35	3.47
CT Practice Employment	GenEd	45	16.20	5.90
	Sped	30	18.26	3.99
Value of CT Preparation	GenEd	45	26.91	5.45
	Sped	33	28.75	4.43
CT Support Value	GenEd	44	23.02	2.62
	Sped	32	23.06	1.90
CT Support Access	GenEd	44	18.93	4.07
	Sped	29	18.45	4.08

Note. Higher totals indicating teacher perceptions and practices in line with the recommended co-teach practices according to the existing literature.

Research Question Two

Research Question Two (What are the differences in perceptions [general education vs. special education] about their ability to integrate technology into the classroom?) was answered by conducting an independent t-test to determine if there was a statistically significant mean difference between the two groups of co-teachers (general education or special education). The results of the independent t-test suggest no significant difference in perceptions of general education and special education co-teachers on their ability to integrate technology in the classroom. The perception results were as follows: ability to facilitate and inspire student learning and creativity, $t(76) = -1.42$, $p = .15$; ability to design and develop digital age learning experiences and assessments, $t(73) = -1.22$, $p = .22$; ability to model digital age work and learning, $t(73) = -.86$, $p = .39$; ability to promote and model digital citizenship and responsibility, $t(72) = -1.62$, $p = .098$; ability to engage in professional growth and learning, $t(73) = -0.81$, $p = .42$; and overall comfort with technology, $t(70) = -1.32$, $p = .18$. Table 4 displays the mean composite scores of general education and special education co-teachers on technology competence and confidence as well as the standard deviations.

Table 4

Mean of Composite Scores of Responses on Technology Competence and Confidence Survey

CT Practice	Assignment	<i>n</i>	<i>M</i>	<i>SD</i>
Facilitate and Inspire	GenEd	44	15.77	3.38
	Sped	34	16.73	2.27
Design and Develop	GenEd	43	14.81	3.47
	Sped	32	15.78	3.24
Digital Age Work/Learning	GenEd	42	14.97	3.50
	Sped	33	15.63	2.98
	GenEd	43	15.18	2.80

Promote and Model Digital Citizenship	Sped	31	16.29	2.78
Engage in Professional Growth	GenEd	43	14.16	3.07
	Sped	32	14.75	3.15
Overall Technology Comfort	GenEd	42	44.11	7.32
	Sped	30	46.30	6.16

Note. Higher belief scores indicate higher levels of confidence within each domain.

Research Question Three

Research Question Three (What is the relationship between perceptions of co-teaching and perceptions of technology integration proficiency and use?) was measured by conducting Pearson’s *r* to determine if there was a relationship between perceptions of co-teaching and perceptions of technology integration in secondary co-teachers. Seventy-one participants (44 general education and 27 special education co-teachers) were recruited. This method was used since the researcher intended to investigate the correlation between the variables. The degree of correlation between two variables is classified in the form of a correlation coefficient. This is supported by Creswell’s (2013) opinion that correlation designs prompt researchers to use the correlation statistical test to describe and measure the degree of association (i.e., relationship) between two or more variables or sets of scores. According to Creswell (2013), there are two types of correlation studies, one being an explanatory design and the other a prediction design. This study used an explanatory design since the researcher solely sought to investigate the degree of association between two variables. The results of Pearson’s *r* suggest a statistically significant, moderate positive correlation between several areas. These findings are summarized in the subsections that follow (see Table 5 below for a summary of the correlation results).

Value of Recommended Co-Teaching Practices

Results of Pearson's r indicate a significant positive association between value of recommended co-teaching practices and two other domains: ability beliefs of facilitating and inspiring student learning and creativity, $r = .32$, $n = 76$, $p = .005$ and overall technology comfort levels, $r = .31$, $n = 7$, $p = .005$.

Overall in the domain area of value of recommended co-teaching practices, there were two strong, positive correlations with the domains of ability beliefs of facilitating and inspiring student learning and overall technology comfort level. Increases in value of recommended co-teaching practices were correlated with increases in facilitating and inspiring student learning and creativity and overall technology comfort levels.

Positive Perceptions of Current Co-Teaching Experience

Results of Pearson's r indicate a significant positive association between positive perceptions of current co-teaching experience and five other domains: first, employment of recommended co-teaching practices, $r = .59$, $n = 75$, $p < .001$; second, value of co-teaching preparation, $r = .30$, $n = 78$, $p = .009$; third, value of school-based supports that facilitate co-teaching, $r = .33$, $n = 76$, $p = .004$; fourth, access to school-based supports that facilitate co-teaching, $r = .40$, $n = 73$, $p = .001$; and fifth, ability beliefs of promoting and modeling digital citizenship and responsibility, $r = .235$, $n = 74$, $p = .044$.

Overall in the domain area of positive perceptions of current co-teaching experience, there were five strong, positive correlations with domain areas. Increases in positive perceptions of current co-teaching experience were correlated with employment of recommended co-teaching practices, value of co-teaching preparation, value of school-based supports that facilitate co-teaching, access to school-based supports that facilitate co-teaching, and ability beliefs of promoting and modeling digital citizenship and responsibility.

Ability Beliefs of Facilitating and Inspiring Student Learning and Creativity

Results of Pearson's r indicate a significant positive association between ability beliefs of facilitating and inspiring student learning and creativity and four other domains: first, value of recommended co-teaching practices, $r = .32$, $n = 76$, $p = .005$; second, value of co-teaching preparation, $r = .30$, $n = 75$, $p = .008$; third, value of school-based supports that facilitate co-teaching, $r = .40$, $n = 75$, $p < .001$; and fourth, access to school-based supports that facilitate co-teaching, $r = .28$, $n = 73$, $p = .015$.

Overall in the domain area of ability beliefs of facilitating and inspiring student learning and creativity, there were four strong, positive correlations with domain areas. Increases in ability beliefs of facilitating and inspiring student learning and creativity were correlated with value of recommended co-teaching practices, value of co-teaching preparation, value of school-based supports that facilitate co-teaching, and access to school-based supports that facilitate co-teaching.

Design and Develop Digital Age Learning Experiences and Assessments

Results of Pearson's r indicate a significant positive association between ability beliefs of designing and developing digital age learning experiences and assessments and two other domains: value of school-based supports that facilitate co-teaching, $r = .28$, $n = 73$, $p = .005$ and access to school-based supports that facilitate co-teaching, $r = .34$, $n = 71$, $p = .004$.

Overall in the domain area of ability beliefs of designing and developing digital age learning experiences and assessments, there were two strong, positive correlations with domain areas. Increases in ability beliefs of designing and developing digital age learning experiences and assessments were correlated with value of school-based supports that facilitate co-teaching and access to school-based supports that facilitate co-teaching.

Model Digital Age Work and Learning

Results of Pearson's r indicate a significant positive association between ability beliefs of modeling digital age work and learning and three other domains: first, value of co-teaching preparation, $r = .28$, $n = 73$, $p = .013$; second, value of school-based supports that facilitate co-teaching, $r = .31$, $n = 73$, $p = .009$; and third, access to school-based supports that facilitate co-teaching, $r = .28$, $n = 71$, $p = .020$.

Overall in the domain area of ability beliefs of modeling digital age work and learning, there were three strong, positive correlations with domain areas. Increases in ability beliefs of modeling digital age work and learning were correlated with value of co-teaching preparation, value of school-based supports that facilitate co-teaching, and access to school-based supports that facilitate co-teaching.

Promote and Model Digital Citizenship and Responsibility

Results of Pearson's r indicate a significant positive association between ability beliefs of promoting and modeling digital citizenship and five other domains: first, positive perceptions of current co-teaching experience, $r = .24$, $n = 74$, $p = .044$; second, employment of recommended co-teaching practices, $r = .26$, $n = 70$, $p = .028$; third, value of co-teaching preparation, $r = .29$, $n = 73$, $p = .014$; fourth, value of school-based supports that facilitate co-teaching, $r = .32$, $n = 72$, $p = .007$; and fifth, access to school-based supports that facilitate co-teaching, $r = .33$, $n = 70$, $p = .006$.

Overall in the domain area of ability beliefs of promoting and modeling digital citizenship, there were five strong, positive correlations with domain areas. Increases in ability beliefs of promoting and modeling digital citizenship were correlated with positive perceptions of current co-teaching experience, employment of recommended co-teaching practices, value of co-teaching preparation, value of school-based supports that facilitate co-teaching, and access to school-based supports that facilitate co-teaching.

Engage in Professional Growth and Leadership

Results of Pearson's r indicate a significant positive association between ability beliefs of engaging in professional growth and leadership and three other domains: first, value of co-teaching preparation, $r = .31$, $n = 74$, $p = .007$; second, value of school-based supports that facilitate co-teaching, $r = .38$, $n = 73$, $p = .001$; and third, access to school-based supports that facilitate co-teaching, $r = .30$, $n = 71$, $p = .029$.

Overall in the domain area of ability beliefs of engaging in professional growth and leadership, there were three strong, positive correlations with domain areas. Increases in ability beliefs of engaging in professional growth and leadership were correlated with value of co-teaching preparation, value of school-based supports that facilitate co-teaching, and access to school-based supports that facilitate co-teaching.

Technology Comfort Levels

Results of Pearson's r indicate a significant positive association between ability beliefs of overall technology comfort levels and leadership and three other domains: first, value of co-teaching practices, $r = .33$, $n = 71$, $p = .005$; second, value of co-teaching preparation, $r = .38$, $n = 73$, $p = .001$; and third, value of school-based supports that facilitate co-teaching, $r = .30$, $n = 71$, $p = .029$.

Overall in the domain area of ability beliefs of overall technology comfort levels, there were three strong, positive correlations with domain areas. Increases in ability beliefs of overall technology comfort levels were correlated with value of co-teaching practices, value of co-teaching preparation, and value of school-based supports that facilitate co-teaching.

Table 5

Pearson Correlations Perceptions of Current Co-Teach Experience

	CT Practice Employ	Teacher Prep for CT	School-Based Supports that Facilitate CT	Access to School-Based Supports that Facilitate CT	Ability to Facilitate and Inspire Student Learning & Creativity	Ability to Design & Develop Digital Age Learning Experiences	Ability to Model Digital Age Work & Learning	Ability to Model Digital Citizenship & Responsibility	Ability to Engage in Professional Growth & Learning	Total Technology Comfort
Current Experience	.59**	.30**	.33**	.40**	-	-	-	.24*	-	-
Value of CT Practices	-	-	-	-	.32**	-	-	-	-	.33**
Current CT Practice Employ	.59**	-	-	-	-	-	-	.26*	-	-
Teacher Prep for CT	-	-	-	-	.30**	-	.29*	.29*	.31**	.41**
School-Based Support Value	-	-	-	-	.40**	.28*	.31*	.32**	.41**	.46**
School-Based Support Access	-	-	-	-	.28*	.34**	.28*	.33**	.26**	-

** . Correlation is significant at the .01 level (2-tailed).

* . Correlation is significant at the .05 level (2-tailed).

Research Question Four

Research Question Four (What perceptions do secondary co-teachers have about co-teaching practices and integrative technology in co-teach classrooms?) was answered through inductive and deductive coding of 11 semi-structured interviews (see Appendix D) with general education and special education secondary co-teachers. Each interview lasted approximately 20-35 minutes. Pseudonyms have been used in place of actual participants' names to protect anonymity.

Demographics of Interview Participants

Demographic information of the interview participants was taken from the initial survey. Of the 11 participants, there was six general education and five special education secondary co-teachers who were willing to participate in interviews with the researcher. Eight participants were female and three were male secondary co-teachers. The majority of the sample were from the high school level (nine participants). Several of the general education co-teachers, even though they had numerous years of teaching experience, had minimal experience with co-teaching. Conversely, the special education teachers had more experience co-teaching. Table 6 below summarizes demographic data describing the interview participants.

Table 6

Demographics of Interview Participants

Participant	Education Level	Grade Level	Years of Teaching Experience	Years of CT Experience
<i>General Education Co-Teachers</i>				
Loretta	Bachelors	6-8	14	1
June	Masters	9-12	5	0
Reba	Bachelors	9-12	5	0
Willie	Bachelors	9-12	24	10
Johnny	Masters	9-12	13	4
George	Bachelors	9-12	6	1
<i>Special Education Co-Teachers</i>				
Faith	Bachelors	6-8	5	5
LeAnn	Bachelors	9-12	13	4
Tammy	Masters	9-12	16	2
Patsy	Bachelors	9-12	33	15
Dolly	Bachelors	9-12	10	10

Themes

Each interview was held independently, and the data was analyzed separately before they were combined to identify common themes that addressed the fourth research question. Analysis from the qualitative data showed five common themes related to differences in co-teach teacher perceptions: (a) co-teaching assignment, (b) co-teach misconceptions, (c) co-teach instructional roles, (d) co-teach planning, and (e) co-teaching with integrative technology. The emergent themes and subthemes obtained from co-teachers' responses are provided below, followed by a sample of the participants' responses.

Co-Teaching Assignment

Co-teachers were asked interview questions about their current co-teaching assignment to gain insights about whether they had volunteered for their current

instructional placement. Additionally, the researcher obtained information from the participants illustrating whether administrators allowed them to have input on who they were partnered with. The responses provided by the participating co-teachers were broken down into two sub-categories: (a) assignment and (b) partnership input.

Assignment. During the interviews, co-teachers were asked if their assignment to co-teaching was voluntary. Their responses revealed that the majority of the general education teachers did not volunteer for co-teaching. Conversely, all of the special education co-teachers reported volunteering for their co-teaching assignment. Their responses are detailed in the following subsections.

General education assignments. Five of the six general education teachers indicated that they did not volunteer for the co-teaching assignment and were assigned by administrators without notice. When George was told by his administrator that he would be in a co-teaching partnership, he recounted that they told him, “Hey, you’re getting a co-teacher this year.” George expressed feelings of concern when he found out about the assignment, indicating that he was

a little bit nervous, [because] at my last school I was at, I had a co-teacher who I saw for about five minutes one day in September and she fell asleep in my classroom. I never saw her for the rest of the year.

When George compared his previous to his current experience, he indicated that this year’s assignment was his “first real experience with a co-teacher” and was happy how well it had gone this year. If given the choice of co-teaching next year, he reported he would do it again if the assignment was with the same co-teacher. He stated, “because it would allow us to give feedback to each other... making us better teachers. As we are constantly working off each other.”

The remaining general education teachers did not have the same concerns about the assignment, which is evident when June stated, “My job is to teach the students and do the best that I can. So regardless of someone being in the classroom or not, I’m going to continue with what I was hired for.” While not concerned with the co-teaching assignment, teachers reported being influenced by other general education teachers about the barriers with co-teaching. This is the case when general education teacher, Reba, reported,

I love working with [my co-teacher]. However, I know from other co-teachers that there are other co-teachers that don’t even show up to the assignment on time and come in and just talk to the kids. They’re not a great pair.

Overall, highlighting the influence other teacher’s experiences had on her perceptions of co-teaching.

This subsection illustrated the finding that school administrators are not allowing general education teachers to volunteer for co-teaching assignments. The initial assignment did raise concerns for two of the general education interview participants based on previous negative experiences with co-teaching. The following section will present special education co-teacher perceptions of their co-teaching assignment.

Special education assignments. All five special education teachers indicated they had volunteered for their co-teaching assignment and provided similar comments that supported it was an understood expectation of their job duty during the hiring process in the district. Dolly reported that she knowingly applied for her current co-teaching position because she “[likes] having two teachers in the classroom. I think it is really beneficial to the students... I’ve been solo and I’ve been a co-teacher, and I just think co-teaching is a much better experience for the sped and non-sped students.” Similar sentiments were maintained by special education teacher Leann when she stated, “[I

volunteered for co-teaching] because I had a co-teacher in my class recently and I really liked it. I thought it was an awesome way to help kids.”

This subsection illustrated the finding that special education co-teachers volunteered for their co-teaching assignment during the hiring process and it was an understanding that co-teaching was part of their job duty. Two of the participants emphasized wanting to participate in this instructional arrangement because they believed it was a model that focuses on supporting all students. Related, the following section will present general and special education co-teacher perceptions of partnership input.

Partnership input. All 11 co-teachers interviewed illustrated that they did not have input on who they would be assigned to co-teach with. This presents the finding that there is no difference in perceptions between general education and special education co-teachers on partnership input. When asked how she felt about not having input on who she would co-teach with, special education co-teacher, Tammy, stated:

That’s definitely something that needs to be changed. I work with one teacher where we do not vibe at all and I’m with her for two periods and it’s miserable.

But then I have another teacher who’s fantastic, who I would teach all day with if I could. So, there’s no input from the teachers as to who they’re paired with.

General education teacher, Johnny, expressed similar needs of obtaining input from co-teachers. He specifically reported the need to build upon good partnerships with multi-year or multiple period assignments when he expressed the following:

I really wish and think that it would be ideal for co-teach [partnerships] to really build, you know, those relationships and to allow or kind of encourage teachers and co-teachers to find a partnership that works for them and to nurture that partnership. As an administration and as a district, I don’t know how it works on the junior high and elementary school levels, but I feel like at the high school

level there's so many moving parts and schedules to fit. [Administrators] are not supportive of fostering those relationships or doing all day partnerships... in the past I had a co-teacher and myself, we actually requested to do that (co-teach for the following year and all day) at it was strongly discouraged.

When a follow up question was posed to Johnny asking him to explain why administrators were against it, he indicated that administrators felt like it would be overwhelming for both co-teachers and that "a lot of times teachers don't like someone in their room. Teachers tend to like to be on their own." Johnny felt as though the teaching profession has a stigma against co-teachers. He reported that it does not necessarily come from administrators, but is rather an industry belief that working alone is preferable: "Maybe I am detecting this awareness, but I do feel like there's a sense of that, like it's better to be by yourself than to be with a co-teacher. And I don't know where that comes from." Johnny went on to elaborate that he "[feels] like that's sort of a general consensus or unspoken philosophy" among educators.

Special education teacher, Faith, was disappointed when she did not have input on her co-teaching assignment. Especially when she found out that she was not paired with the co-teacher she had the previous school year, she reported the following:

In the past, I'll be honest, I've been upset who I've been paired with because I think, you know from the year previous, I thought I had some really solid, great relationships with the co-teachers that I've worked with. But when you don't get paired back up with that teacher... I mean it's a whole relationship. So, when you don't get to go back next year and teach with that same teacher in some ways it's hurtful because you work that whole school year to work out the, you know, the strengths and the weaknesses. And then to have to start over on page one again the next school year... to be completely honest, it is frustrating.

Ultimately within this theme, all of the special education teachers volunteered for their co-teaching assignment and job expectations were conveyed during their application and hiring process. Special education teachers reported that they liked working in co-teaching environments because of the opportunity to work with special education students. They also reported that they enjoyed working in collaborative teaching environments over solo teaching. On the other hand, the general education co-teachers did not have similar experiences when being assigned to co-teaching. This is evident when all general education teachers reported having not volunteered for their current co-teaching assignment.

Moreover, all interviewees testified that they did not have input of who they would be paired with for co-teaching. This was seen across the board for general education and special education teachers as an opportunity of improvement because it would prevent pairings with co-teachers that were toxic partnerships or allow co-teachers to build upon the gains from the previous year by building stronger teaching relationships. Conversely, one participant brought up the idea that there is an unspoken industry belief among general education teachers that it is better to work in a solo teaching environment than to work with a co-teacher. When a co-teacher did find a positive partner that they would like to work with the following year, they were strongly discouraged by their campus administrators. Interviewees indicated that administrators view co-teaching assignments as a burden on the general education teacher. Therefore, assignments were not continued the following year as a relief of burden on the general education teacher. Even though co-teachers were willing to continue the partnership, it was strongly discouraged by administration. While results capture the emphasis of educator responses, Chapter V presents the results alongside the existing literature to

highlight underlying misconceptions and lack of school-based supports for co-teaching practices.

Co-Teach Misconceptions

Misconceptions about co-teach practices were presented in all of the interviews. When the researcher inquired about what co-teach approaches were being used in the co-teach classroom, the co-teachers were not able to recall the approaches or identify the co-teach practices. These findings present equal misconceptions between general education and special education co-teachers of their knowledge of co-teaching practices.

General education teacher, Johnny, had trouble remembering the approaches, stating, "I am trying to remember the name now." Similar sentiments are evident as general education teacher, Willie, blankly looked at the researcher when a follow up question ("Are you familiar with the co-teach approaches?") was asked. He responded with "No." The researcher then listed all of the approaches so that he had enough information at hand to answer the initial question. During the interview with general education teacher, June, a similar experience took place. The researcher responded to the long silence with, "Do you want me to go over the different approaches?" June responded with, "Yes." When co-teach approaches were not provided, participants answered the interview question incorrectly. This is the case when general education teacher, Loretta, responded to the interview question. She provided information that was not in line with co-teach models but was instead more of general instructional approach she used in the classroom. She reported, "We use a model called workshop in which there is a mini lesson, in which the teacher gives the instruction and models what will be done."

Similar responses were also experienced by the researcher when interviewing the special education teachers. When special education co-teacher, Dolly, illustrated what approaches were being used in her co-teach classroom, she was unable to identify the

approach and stated, “I would say it is a blend of just... the... the kids know we are both presenting. We are both the teachers.” Special education co-teacher, Faith, was also unable to recall the approach and stated, “I forget what it’s called, but yeah, we are a team and I, she will ask for input and I interrupt, which is appropriate, you know, when it’s obviously appropriate and it is at times.” In another special education co-teacher example, Tammy also had trouble answering and mumbled, “So there’s like... I guess you would... I guess you would say that I do...” She went on to describe, “She’s like the main, I don’t remember all the names of the models, but, [my co-teacher] is like the main person and I just kind of small group in the back [after she’s done with whole group instruction].” Special education co-teacher, LeAnn, also was unable to recall the models being used and stated, “So with... with the... the... we use more ... more... like, what is it called? The partner can teach one.”

The comments shared by all co-teachers equally illustrate a limited understanding of co-teach practices despite their current co-teaching assignment. Many of the interview participants required guidance from the interviewer to be able to answer the interview questions. If guidance was not provided, participants would answer the question incorrectly, as noted within this subsection. Though the teachers were asked to illustrate what co-teach approaches were being used (see Appendix D), their responses yielded a strong emphasis on the lack of professional development in the area of co-teaching. While results capture the emphasis of educator responses, Chapter V will present the results alongside the existing literature to highlight underlying misconceptions and the lack of professional preparation to support co-teach implementation.

Co-Teach Instructional Roles

Co-teachers illustrated the instructional roles of both co-teachers in the classroom. Nine of the participants reported the general education teacher is leading instruction. The

responses also demonstrate the special education teachers are in subordinate roles. Their responses will be broken further down by assignment to highlight the differences in co-teacher perceptions of existing instructional roles.

General education teacher perspectives of instructional roles. Five of the six general education co-teachers reported that they are leading instruction in the co-teach classroom. This is the case in the interview of a high school general education teacher, George, who reported:

I use technology, usually I start off with a warm up in that class. I'll take over the initial instruction in terms of you know, the notes and lecture direct instruction part of it. When we get to the assignment... at that point we're all kind of involved and helping move around the room and helping whichever students need help.

George went on to explain the instructional arrangement in his class: "I led the primary instruction and a lot of that's at my request... it gives her the chance to catch up some of the massive paperwork load she has while I am doing that." General education teacher, Loretta, reported similar sentiments, stating, "I'm leading instruction." General education teacher, Reba, asserted, "So I'm always leading instruction because [the special education co-teacher] doesn't have time to plan with me." She went on to elaborate, "She [finds out] what we are doing when she walks in. So, we're usually just doing one teach, one facilitate model every single day." When general education teacher, June, was asked to provide insight to her typical class period in her co-teach classroom, she also provided an illustration of the general education teacher leading instruction, stating, "I am leading instruction. My co-teacher does not plan with me because of her caseload. I think it is over 50 students. Well, it's definitely a lot of students."

Conversely, Willie reported that in his partnership the special education co-teacher was leading instruction. He stated, “[the] majority of time I let her do it.” Conversely, when interviewing Willie’s co-teacher during another interview, she indicated that the person with whom she co-taught was not an effective teacher and administrators assigned the duo to co-teaching as a means of ensuring student learning needs were being met. This is evident when she stated, “I believe honestly that they feel [my co-teacher] would not be effective in the classroom and they wanted me to be in at least two of those classes to ensure that the needs of the students are met.”

General education teachers leading instruction is further confirmed when the interview participants were asked why there was a strong correlation between general education teachers, the implementation of co-teach models, and technology integration in the survey data. Four of the six general education teachers indicated that they are leading instruction because special education co-teachers do not feel comfortable using technology in the classroom. General education teachers illustrated beliefs systems that the co-teach classroom belongs to the general education teacher and the special education teacher’s role was diminished to a visitor. For instance, Johnny stated,

I think it’s because the way that it feels is that they’re entering into the room... and it’s not their classroom. They are coming into someone else’s and it’s like going over to someone’s house and taking over their TV, or, you know, and like [saying] “Hey let me put on a TV show” and you know, let me tell you what to make for dinner. You shouldn’t do that... you know, and it’s kinda the same thing. I think that there’s this idea of, well, I’m coming into their general ed teacher’s room. I’m going to help out where I can, see what I can do. But I am not going to tell them what they should be doing.

Highlighting the imbalance between general and special education co-teachers.

June also expressed similar sentiments in her interview. She stated, “It may be that because perhaps they don't have a lot of instructional practices, they may feel a disconnect... because I'm doing the presentation.” She went on to state, “The other teacher may feel as though they're not running the show [because I am presenting].” On the other hand, Reba presented concerns about the lack of a common planning time being the barrier that prevents co-teachers from delivering instructional content. She reported, “Again, I think it just goes back to [the special education co-teacher].” She went on to elaborate, “We don't have the planning time, the [special education] co-teacher doesn't even know what's going on usually until she comes in the room. So really the co-teacher doesn't have, they're not really guiding anything at all.” Ultimately, general education teachers presented information illustrating they are leading instruction in co-teach classrooms.

Special education teacher perspectives of instructional roles. Four of the five special education co-teachers reported that general education teachers are leading instruction in the co-teach classroom. Special education teacher, Faith, provided information about being in a subordinate role in her partnership:

I am the greatest secretary he's ever had... there is no collaboration. We have met with administration and they don't want it to be that way, but [my co-teacher] is not capable of doing anything else. So, I have to work around that to get my students what they need. I know I should say our kids, but in [the classes I have with this co-teacher], in that classroom, he very much treats them as my kids. General education teachers leading instruction is further suggested when the interview participants were asked why there was a strong correlation between general education teachers, the implementation of co-teach models, and technology integration within the survey data. Four of the five special education teachers indicated that it was ultimately

the general education teacher's classroom and they had limited control of technology integration. Special education teacher, Dolly, reported:

Honestly, I think it's because it's their classroom. They know how their [technology] works. They know the ins and outs of their classroom. As the co-teacher, I travel to two other classrooms, as well as having a resource class of my own. [While] each of the technology is similar, it's different. I think the general ed teachers are more comfortable with their classroom and more comfortable with the technology that they use all day. They don't travel.

While one special education teacher could not think of a reason why there was a correlation, the other special education teachers expressed similar sentiments. Leann reported, "Even though I work with two great co-teachers, it's their classroom." Tammy also indicated that the general education teacher determines what events will occur within the co-teach classroom. She stated, "I think the amount that the [general education co-teacher] wants me to co-teach is dictated by them."

Conversely, only one special education teacher reported that they are leading instruction in their co-teaching assignment. This was presented in the previous subsection by general education teacher Willie; Patsy indicated that she was paired with Willie as an intervention by administrators because they felt like Willie was an ineffective teacher. Willie's instructional practices are further highlighted in the subsections that follow.

To recap the interviewees' perspectives of this theme, a majority of the participants provided insights and examples supporting the finding that general education teachers are leading instruction. Most of the general education teachers reported that they lead instruction because co-teachers are not involved in planning and presented beliefs that special education co-teachers feel uncomfortable in the general education co-teacher's classroom. Some of the general education teachers indicated that leading

instruction was a preference on their part because the special education co-teacher's instruction would be disruptive. One general education teacher believed leading instruction afforded the special education co-teacher the opportunity to work on their large amounts of paperwork. Similar findings were evident when special education co-teachers illustrated perceptions of feeling like a guest in their co-teacher's classroom and indicated that the general education teacher leads instruction because of the lack of co-planning taking place. Co-teacher responses yielded a strong emphasis of general education teachers leading instruction and special education teachers in subordinate roles. While results capture the emphasis of educator responses, Chapter V will present the results alongside the existing literature to highlight underlying misconceptions and lack of access to school-based supports needed to facilitate co-teaching.

Co-Teach Planning

Interview participants were asked to illustrate co-planning in their co-teach partnership. Eight of the participants reported that they were not planning for co-teach instruction; the remaining three participants indicated they were planning for co-teach instruction but illustrated participating in common planning for their content area and not co-planning for co-teaching. Their responses are delineated in the following subsections.

General education co-teacher perceptions of co-teach planning. Five of the general education teachers reported that they did not plan for co-teach instruction with their co-teacher. A common reason planning did not take place was the lack of a common planning period between co-teachers. Johnny indicated that the lack of planning with his co-teacher was not ideal. He stated, "I have a co-teacher that is not involved in planning at all. So, when she doesn't know exactly where it's going, because she's not involved in any of the planning meetings, I think it's really difficult." June and Reba noted a similar experience and indicated that their co-teachers also did not have a common planning

period with them. Loretta reported that she completes the lesson plans for her class and that her co-teacher will look over them and provide insight into where concepts might need to be scaffolded for special education students. Conversely, George illustrated that he and his co-teacher share the same planning period. Subsequently, he further revealed instructional planning took place with their department and solely supported general education instruction. He stated,

We have a common planning period and we talk a lot about what we're doing next, what's coming up. And we've kind of settled into a groove where we don't really spend a lot of time planning what we're going to do each day because I have OCD, my classroom runs basically exactly the same every single day or I can't handle it.

Willie also indicated that he had a common planning period with his co-teacher, but also illustrated planning for general education lesson plans and failed to illustrate co-planning taking place. He stated, “We just do lesson plans, so I don't, you know, we just normal lesson plans and then we just know what to do in those classes for differentiation.” Ultimately suggesting misconceptions between general lesson plans and co-planning for co-teach instruction.

Special education co-teacher perceptions of co-teach planning. Special education co-teachers maintained similar perceptions about co-teaching planning as general education co-teachers. Three of the special education co-teachers reported an inability to plan with their co-teacher because of a lack of a common planning period. While two co-teachers reported planning with their co-teachers, their responses also illustrated general planning with their content area and failed to reveal co-planning for co-teaching. Faith indicated that co-planning was not possible because her co-teacher was

unwilling to relinquish control in the co-teach classroom, ultimately highlighting the importance of positive relationships existing between co-teachers. She stated,

[My co-teacher] is not comfortable doing that because I think he's scared that if we plan then he has to give me more responsibility in the classroom and he's not willing to do that. However, he is willing to let me grade every single paper.

Leanne, on the other hand, knew she and her co-teacher should be planning for co-teach instruction but indicated that they seldom do so. She stated, “We are supposed to. And very rarely we actually do, but we are supposed to.”

Co-teachers such as Tammy reported that she was able to plan with some, but not all, of her co-teachers because they did not have a common planning period. She indicated,

Some of us are and some of us aren't. I had the same conference period with two of them. But we do most of our planning via email or, or just a quick chit chat, the last five minutes of class.

Pasty, on the other hand, reported that she did all of the planning for her co-teach class. In previous subsections, Patsy noted that she led instruction and was assigned to a general education teacher by administrators because of their concerns of his teaching practice. Patsy would communicate with her co-teacher about the lesson, but her illustration did not present co-planning. She stated, “We talk about what we're going to do, what is going to be taking place in the classroom.” However, during the interview Patsy also reported, “This is partly my doing because of the difference in philosophy and teaching it is more the majority of the time it is instruct and assist.” When the researcher asked how the general education co-teacher would assist students, she illustrated a unique imbalance in their relationship, stating that the general education co-teacher’s contribution was more “one teach, one sit on the computer or look at your phone.”

To recap the interviewees' perspectives of this theme, most general education and special education co-teachers reported that co-planning with their co-teacher was not taking place. A prevalent reason for this was because co-teachers did not have common time for co-planning. However, even when such time was provided, co-teachers illustrated participating in common planning for their content area for general education lesson plans and failed to illustrate co-planning for co-teach instruction. While results capture the emphasis of educator responses, Chapter V will present the results alongside the existing literature to highlight underlying misconceptions and lack of access to school-based supports needed to facilitate co-teaching.

Co-Teaching with Integrative Technology

As a second component of the fourth research question, interview participants were asked to respond to questions associated with integrative technology. Interview questions focused on perceptions of technology in the co-teach classroom, including integrative technology use, access to technology resources, and the impact of technology on co-teaching practices (see Appendix D). The intent of the interview format was to give depth to the survey responses about the relationship between the educators' perceive competence and their co-teaching practices involving technology. Five of the eighteen interview questions focused on technology and co-teaching. Specifically, questions were centered on three subtopics: access to resources, supports, and technology equipment; the impact of technology integration on co-teaching practices; and how technology is used. Despite the questions asked, a majority of the participants focused attention on the lack of technology resources and failed to capture the integration of technology as applied to enhance teaching and learning in co-teach classrooms. The responses of the interview questions are broken down further into the following subcategories: (a) integrative

technology misconceptions, (b) lack of technology resources to support two teachers, and (c) perceived infrastructure barriers to support co-teaching.

Integrative technology use misconceptions. Co-teachers were asked about their daily use of integrative technology in the co-teach classroom and how it impacted co-teach instruction. Co-teachers' responses focused on the lack of equitable resources within the classroom and failed to illustrate how technology increased value to the curriculum through transformational uses with intentions of enhancing student learning in meaningful ways. Ten of the eleven participants, five general education and five special education co-teachers, illustrated integrative technology use in their co-teach classroom as a substitute for other already existing options. An example of this was presented by general education co-teacher, Loretta, who emphasized replacing traditional paper notebooks with digital ones using district issued iPads. This is seen when she stated, "It's practically a journal, but it's online. We didn't want them walking around with more stuff in their backpacks... so this is the route we went." She went on to explain that instead of passing out paper copies of instructional resources, students were able to download their reading assignments: "It's the same thing. They can use their styluses or keyboards to take notes or highlight anything they need. That's how we function here, we don't use journals at all." In a similar line of thinking, general education co-teachers Johnny and Willie described using technology as a means of turning paper assignments. Special education co-teachers Patsy and Dolly also talked about ways that technology acts as a direct tool substitute with little to no functional change and failed to illustrate meaningful digital learning experiences taking place in the classroom. This was emphasized when Patsy stated, "I use [technology] to obviously check [attendance]." Patsy went on to talk about mirroring her iPad through her Apple TV via the classroom projector to show students visuals on her iPad. She explained, "I show them different examples, walk them

through stuff, show film slips, or have them complete a paper assignment and submit it online.”

Conversely, there was one general education co-teacher, George, who described using technology in transformational ways that illustrated adding value and impact to lessons by providing students learning experiences that would not exist without integrative technology (Puentedura, 2014). This was evident when George emphasized project-based learning assignments in his U.S. history class. George explained to the researcher,

We do a lot of technology projects where [the students] will use their iPads to make videos or posters. When we get to the twenties, I make them create 1920s style radio programs with certain criteria they have to include. The students get really creative and I get some really good ones. I get some terrible ones, but most of them are really good. I am always trying to find new ways to implement [technology] along the way to engage students.

George was the only teacher who was able to convey higher level uses of technology in his classroom.

In sum general and special education co-teachers focused on the lack of equitable resources and failed to illustrate meaningful uses of technology within the classroom. In the limited instances where technology use was illustrated both general education and special education co-teachers’ responses suggested substitutions for already existing options. All but one participant’s response failed to capture transformation uses that promote and support meaningful learning. The next subsection will present participant beliefs about the lack of classroom instructional technology to support two teachers.

Lack of technology to support two teachers. Participants were asked their perceptions about technology in the classroom, specifically if available integrative

technology resources supported co-teach instruction as they relate to the implementation of the recommended co-teach instructional approaches. Seven of the eleven participants focused on lack of access to technology equipment. Participants went on to indicate that current classrooms support solo instruction and fail to support the instruction of two teacher as they relate to the recommend co-teaching approaches. The perceptions of general education and special education co-teachers will be separated and presented in the following subsections.

General education co-teachers' perceptions of lack of technology. Two of the general education teachers perceived there was enough technology in the classroom. However, during the interview Willie reported that both he and his special co-teacher were older teachers who did not use integrative technology often. This is seen when he reported, "We use technology limited... I'm old fashioned, I don't believe in technology in the classroom to be honest with you." Willie also reported his comfort levels were low in comparison to younger teachers when he stated, "Especially the younger teachers because they were raised on it and we wasn't." George also believed there was enough technology in the classroom to support implementing the recommended co-teach approaches. However, in previous subsections he also reported that he leads instruction in his classroom because he was unable to relinquish control to the special education co-teacher.

Conversely, three of the general education teachers perceived that there was not enough technology in the classroom to support the implementation of co-teaching approaches. Loretta indicated that there was only enough technology to support the instruction of one teacher at a time. She stated, "[My co-teacher] has her iPad, and we can stream the iPad from the projector [through the Apple TV] and we can switch back and forth. Participants eluded to the idea that in order for co-teachers to utilize

technology they each needed their own equipment, rather than talk about how they could use technology within the context of the various co-teach approaches. This was seen when general education teacher, Johnny, echoed these beliefs when he stated,

You know, in our class we have one projector with one big projector screen that's attached to, you know, my computer. So, if I'm doing a PowerPoint or Nearpod or notes or showing a video or anything like that, it's all directed from one station. So that dual teaching just doesn't have that effect.

Reba maintained similar beliefs about the lack of technology in the classroom to support co-teaching. She indicated,

No. There are not enough resources present. Even though we both have technology, there is only enough instructional technology to support one teacher in a classroom. We both cannot be using technology at the same time, so we are forced to do instruction one way.

On the other hand, one general education teacher reported that while they felt that they had enough technology in their classroom, a lack of integrative technology could be a concern in other partnerships. These perceptions were illustrated when special education teacher, Patsy, stated “I think it could, in my case I don't think [it's a concern] for the situation we are in. However, it might be in another class or even in another subject matter.”. Similar sentiments were presented by June, who believed that in other districts that were not as rich in technology as the site district, the lack of technology could hinder the partnership's co-teaching abilities.

Special education co-teachers' perceptions of lack of technology. Similarly, four of the special education co-teachers perceived that there was not enough technology in the co-teach classroom to support integrative technology and varied implementation of the co-teaching approaches. When Tammy provided her perspective, she reported, “For

some of the models you'd have to switch things up. Maybe one teacher doesn't use technology, or they use it in a different manner." After thinking about the question further, Tammy went on to elaborate that, "I guess technically there should be like a projector in the front and a projector in the back [to support the instruction of both teachers], but that's not going to happen." Dolly also shared similar beliefs. When asked how additional technology would support the classroom, she indicated the following:

I just feel having my own desk, my own computer, I can bring my iPad in all day, but there's, there's some applications that just cannot be done on an iPad. I would also like to have my own document camera at my own desk because I like, I like having my own stuff. I like, I can share all day, but I just feel that if I'm a certified teacher and they're a certified teacher, we should have equal resources. I think it would definitely put the message out there that we are both teachers if we needed to present. And in the past we've done this when we were teaching writing, I can put the another screen up and we can show two different ways to write an expository essay, how to break down a prompt, how to pre-write.

Because resources are not equitable within the classroom, during four interviews co-teachers discussed the special education teacher moving students into different instructional settings to implement small group instruction. This movement was defined by the participants as a parallel co-teaching approach. LeAnn provided an example that illustrated moving a small group of students into a classroom next door to the co-teach setting. She indicated that this practice took place because the classroom lacked instructional technology to support co-teach approaches. Going next door to her own classroom allowed her to have access to more equitable integrative technology resources and an opportunity to present instructional content. She stated, "We have enough

technology because my classroom is next door. So when we parallel teach, we just, uh, split the classroom [and my group goes next door].”

Conversely, Patsy believed that there was enough integrative technology available in her co-teach classroom. She did, however, offer the idea that “I think there could not be enough in other classrooms, in my case I don’t think that is [the case]. For the situation I am in, it is not impactful as... maybe it is in other classes or subject matters.” Patsy’s co-teacher, Willie, reported limited technology use in their co-teach classroom in the previous section. Similarly, Faith also believed there was enough technology to support two teachers in the classroom, but in previous subsections she described having a subordinate role in her assignment. She illustrated having to be creative with technology because her co-teacher would not allow her to deliver instructional content in their co-teach classroom. She reported, “[My co-teacher] doesn't want me near his projector. So, I had to learn how to do things on my iPad [in small groups] in the [back of the] classroom [to help the special education students].”

In sum, a majority of the participants perceived that there is not enough technology in co-teach classrooms to support the facilitation of a varied implementation of co-teaching approaches. Those who perceived that there was enough technology indicated that they did not allow their co-teacher to co-teach or illustrated that technology was minimally used. While results capture the emphasis of educators’ responses, Chapter V will present the results alongside the existing literature to highlight underlying misconceptions between co-teaching and integrative technology.

Perceived Infrastructure Barriers

Two co-teachers provided feedback indicating co-teach classrooms are set up to support solo teaching environments and fail to support co-teaching. One general education teacher, Johnny, reported there were several changes he would make to his co-

teach classroom. He stated, “I would streamline and make [co-teach] classrooms. I would have a certain set of classrooms that were designed for co-teaching.” He went on to elaborate the components of the classroom that would be needed, suggesting that “...maybe they need to be a little bigger, have two teacher desks you know, an extra, you know projector, whatever kind of technology to have two of [everything].” Both Johnny and his previous co-teacher, Dolly, recognized the need to establish equity with physical technology equipment. Johnny illustrated this when he stated “the classrooms that we have are built for a one teacher model. And so, you know, when you try to add two teachers in, structurally there’s not the infrastructure to lend itself to that model.” Johnny went on to provide specific examples of infrastructure barriers:

So, we have a situation where we have one computer, right? We have one projector... one teacher’s name is on the wall. And so, all of that lends itself to this idea that even structurally, it appears that I am the lead teacher. They come into my classroom, you know, like there’s a picture of me and my wife on the desk, not my co-teacher and her partner. So that sort of deal.

In Dolly’s interview, she provided additional information about the lack of accessibility to physical technology equipment and resources and stated, “So I think if there was two of everything, we’d be able to implement more co-teach models. Our district is very technology strong, so they want us using technology every day.”

When Johnny and Dolly were co-teaching, a group of co-teachers on their campus wrote and received a grant to create a second instructional zone in the classroom that consisted of a mobile screen, projector, and Apple TV. Johnny and Dolly reported that the additional instructional technology allowed for an increase in instructional flexibility for the various co-teach approaches. Dolly explained how it benefited her English I

students when they were learning how to write an expository essay and explained as follows:

So, the general education teacher was at their seat or standing up with their iPad modeling how we break down the expository prompt and that was done on the main screen. And then I brought in, well we got a grant a few years ago for a screen that we could pop up on another wall of the room and I can wheel in a projector and then I can mirror [my iPad] onto there. The kids actually found that very beneficial because it showed them that there's not just one way to break down an expository prompt or one way to plan [an essay]. It just took a little bit more set up and planning to be able to get that. So, if I had, if we had the resources there already, I feel like we'd be able to do a lot more shared teaching.

Both Johnny and Dolly emphasized the need of equitable resources in the co-teach classroom.

In sum, the qualitative findings drastically contrasted the qualitative findings presented within this study. Interview participants believe that co-teach classrooms lack technology resources which, along with other barriers, hinder the implementation of co-teach practices. A few teachers reported moving small groups of students into an alternate instructional setting outside of the co-teach classroom. This was done because classroom setups fail to provide equitable access to both co-teachers, largely restricting the special education teacher from technology resources. Co-teachers expressed beliefs that co-teach classrooms do not have the infrastructure to support co-teaching when they have been designed and set up to support solo teaching environments. Beliefs were maintained that co-teach classrooms should be equipped with equitable resources to allow for an increase of varied implementation of co-teaching approaches within the co-teach classroom, which provided insight into misconceptions held by the participants which will be

discussed further in the next chapter. While results capture the emphasis of educators' responses, Chapter V will present the results alongside the existing literature to highlight underlying misconceptions between co-teaching and integrative technology.

Conclusion

This chapter presented the results of qualitative and quantitative data collected from surveys and interviews, participant demographics, and the processes of answering the research questions. Overall, this study's quantitative data revealed that general education and special education co-teachers have similar perceptions about co-teaching practices and integrative technology. Conversely, the qualitative data presented misconceptions of co-teaching practices, school-based supports, and integrative technology. In the next chapter, the findings of this study will be compared with those in the existing literature. Implications of this study in special education and future research recommendations will also be discussed.

CHAPTER V:
SUMMARY, IMPLICATIONS, RECOMMENDATIONS,
LIMITATIONS, AND CONCLUSIONS

Summary of Findings

The purpose of this study was to explore secondary educators' perceptions of their competence in co-teaching and utilizing integrative technology, and the relationship it has with educators' perceived practices. As indicated in the review of the literature presented in Chapter II, research in the areas of co-teaching and integrative technology is quite extensive (Chen et al., 2018; Cook & Friend, 2010; Friend, 2008, 2014; Friend & Cook, 1996, 2007, 2013; Lengel & Lengel, 2006; Mastropieri et al., 2005; Murawski & Lochner, 2011; Okojie, 2011; Peery, 2017a; Rafool et al., 2012; Scruggs et al., 2007; Villa et al., 2005). However, information within the literature is limited to the significant gaps between secondary co-teach educators' perceived competence in co-teaching and use of integrative technology and actual practice.

To quantify co-teachers' perceptions of their competence involving integrative technology and its role in the implementation of the recommended co-teaching approaches (models) across secondary content areas, 71 co-teachers employed at a school district in Texas completed Austin's (2000) Perceptions of Co-Teaching Survey (PCTS) and Kajs et al.'s (2002) Technology Comfort Scale (TCS). Willing participants also participated in semi-structured interviews; qualitative data enriched the understanding of perceptions and beliefs of co-teaching and integrative technology. Within this chapter, the study findings are contextualized in the larger body of research literature. The remainder of this chapter summarizes the findings of this study and compares the results with the previous research literature. Implications for educators as well as

recommendations for future research, study limitations, and conclusions are also presented.

This current study consisted of an explanatory sequential mixed methods design conducted in the spring of 2020. Participants were invited to participate based on their current secondary co-teach assignment within Maroon ISD, which is a suburban school district located in Texas. The participants were current secondary co-teachers, 18 years or older, with a valid teaching certificate. In the first phase of the study, quantitative data was collected from 71 participants who completed Austin's (2000) PCTS and Kajs et al.'s (2002) TCS. In the second phase of the study, qualitative data was collected from 11 participants (six general education and five special education co-teachers) who agreed to participate in semi-structured interviews as a means of gaining insight into their perceptions and experiences as it pertains to co-teaching. The sections below present a summary of findings as they relate to each research question.

Research Question 1

The quantitative results related to the first research question (What are the differences in perceptions [general education v. special education] on co-teaching practices?) examined if there was a statistically significant mean difference in between general education and special education co-teacher perceptions on co-teaching practices. The quantitative results from this study indicate that there was not a statistically significant mean difference between general education and special education co-teachers' perceptions of co-teaching practices. These results coincide with the findings of Austin (2000) revealing that perceptions of co-teaching are generally similar regardless of assignment (general education or special education). To further analyze the specific differences in general education and special education perceptions of co-teaching practices, the researcher looked at the four individual domains (see Appendix E) of the

PCTS to determine if mean differences in the individual survey domains existed. The quantitative data is further confirmed, as it did not present significant mean differences within the following individual domains of the survey: (a) co-teacher perceptions of current experience, (b) recommended collaborative practices, (c) teacher preparation for collaborative teaching, and (d) school-based supports that facilitate collaborative teaching. Quantitative data collected in this study revealed that co-teachers generally value the practice of co-teaching. These findings continue to support the findings of Scruggs and Mastropieri (1996) and Austin (2000), who previously reported that teachers overall maintain positive attitudes toward recommended inclusive practices. Within the context of this study both general and special education co-teachers valued and maintained positive perceptions about their current experience revealing that they worked well with their assigned partner and valued the professional experience. Similarly, co-teachers valued recommended collaborative practices, teacher preparation, and school-based supports. Moreover, while the results revealed similar perceptions, two domains presented significant differences between co-teacher responses within the value and employ columns. These findings continue to support Austin (2000), who suggested co-teachers may not have access to many of the recommended practices, preparation, and school-based supports needed to successfully implement co-teaching.

Research Question 2

The quantitative results pertaining to the second research question (What are the differences in perceptions (general education vs. special education) about their ability to integrate technology into the classroom?) examined if there was a statistically significant mean difference in general education and special education co-teachers' perceptions of their ability to integrate technology into the co-teach classroom. The quantitative results from this study indicate there was not a statistically significant mean difference between

general education and special education co-teachers' perceptions of their competence in using integrative technology in the co-teach classroom. To further analyze the specific differences in general education and special education co-teacher perceptions, the researcher looked at the five individual domains (see Appendix F) of the TCS to determine if mean differences in the individual survey domains existed. However, the qualitative data is further confirmed and did not present significant mean differences within the individual survey domains. Knowledge about technology is a prerequisite for its use in the classroom and teachers need to feel confident in their ability level to use technology if they are going to successfully incorporate technology into their teaching practices (Al-Awidi & Alghazo, 2012; Benson, & Ward, 2013; Ertmer & Ottenbreit-Leftwich, 2010; Hatlevik & Hatlevik, 2018). Therefore, in addition to general knowledge about technology, teachers' beliefs about their ability to use technology is instrumental to integrate technology into the classroom. Self-efficacy beliefs influence their thought patterns and empower action that allow individuals to pursue their goals, overcome setbacks, and take control of events that impact their lives (Bandura, 1986, 1993, 1997).

Of the 71 participants in the quantitative portion of this study, 89% expressed that they were comfortable or very comfortable with using technology in classroom activities. Within the survey data, 25% of the 71 teachers reported struggles with using technology to teach higher order thinking skills and 33% reported struggles with incorporating technology applications into their lesson plans. These low perceptions of technology ability beliefs could be due to the lack of professional development focused on lesson plans reflecting higher order thinking and the incorporation of technology applications. Conversely, high proficiency levels within the four other domains (see Appendix F) is likely the result of being provided professional development and time to learn, adapt, and

implement concepts into practice. However, research question four will present misconceptions and gaps with teacher competency and actual classroom practices.

Research Question 3

To evaluate the quantitative results of the third research question (What is the relationship between perceptions of co-teaching and perceptions of technology integration proficiency and use?), the researcher used Pearson's r , indicating a moderate, positive correlation between several domains on Austin's (2000) PCTS and Kajs et al.'s (2002) Technology Comfort Scale (TCS). The follow subsections outline this study's correlation findings and make connections to the existing literature.

Perceptions of current co-teaching experience. Pearson's r showed that perceptions of current co-teach practice employment, teacher preparation for co-teaching, school-based supports that facilitate co-teaching, access to school-based supports that facilitate co-teaching, and ability to design and develop digital age learning experiences and assessments are statistically significant factors that are independently associated with positive perceptions of current co-teaching experience. Currently, literature is not present to support the positive correlations between these domains. It does, however, present connections to these findings.

In Austin's (2000) PCTS, the subsection Co-Teacher Perceptions of Current Experience (see Appendix E) invited co-teachers to rate their current co-teaching experience and compatibility with their co-teacher. Of the overall sample, 88% of the participants revealed that both they and their co-teacher work well with each other in their co-teach classroom. The existing literature highlights compatibility among co-teachers as being a vital element for co-teaching success (Rice & Zigmond, 2000; Scruggs et al., 2007). Elements of professional compatibility reported by teachers as reported by Rice and Zigmond (2000) include: shared views regarding academics and

behavioral expectations, a willingness and ability to communicate, the ability to see feedback as objective rather than criticism, equivalence in knowledge and ability, and the willingness to take instructional risks.

Conversely, 32% of the overall sample reported doing more than their counterpart co-teacher. Confirming the likelihood that barriers exist when implementing co-teaching practices. Co-teaching has been compared to a marriage, as partners must work together and tolerate each other's tendencies for successful co-teaching to occur (Friend & Cook, 2007). When co-teachers work well with each other, all students, including those with disabilities, are more likely to experience success and have positive inclusive experiences in co-teach classrooms. On the contrary, when co-teachers experience conflict, regardless of a specific issue, the experience and the outcome for students becomes increasingly unlikely (Mastropieri et al., 2005). This contextual difference can partially be linked to the fact that historically teacher preparation prepares educators to be independent practitioners who are individually responsible for the outcomes in solo classroom settings (Rice & Zigmond, 2000). Therefore, if teachers are not adequately prepared to work in collaborative partnerships such as co-teaching, they are more likely to work as solo practitioners in the co-teach classroom. (Rice & Zigmond, 2000).

Co-teachers possessing high levels of self-confidence in their own abilities would approach complex tasks as challenges rather than obstacles (Bandura, 1993). Turel (2014) revealed that high self-efficacy regarding technology are likely to result in an increase of technology integration into the classroom. Turel also maintained it is vital to not only equip teachers with what they need for teaching, but also provide them with on-going training and development that supports implementation. Teachers with low self-efficacy are unlikely to have positive perceptions about their co-teaching experience and their ability of designing and developing digital age learning experiences and assessments

(Bandura, 1993). It is also likely that teachers with low levels of self-efficacy regarding co-teaching and integrative technology will find innovative teaching models and integrative technology as threatening and overwhelming. The results from this study suggest that co-teachers generally maintain positive perceptions about their current co-teaching experience and positive beliefs about their integrative technology ability levels. Teachers likely felt more confident with technology because of the vast amount of professional development and ongoing support provided in the area of integrative technology. While findings continue to support imbalance existing within the co-teach partnership.

Perceptions of value of co-teaching practices. Pearson's r revealed that perceptions of a co-teacher's ability to facilitate and inspire student learning and creativity and the overall perceptions of technology comfort are statistically significant factors that are independently associated with perceptions of value of co-teaching practices. Currently, research literature in this domain is limited and fails to support the positive correlations between these domains. It does, however, present connections to these findings.

In Austin's (2000) PCTS, the subsection Recommended Co-Teaching Practices (see Appendix E) invited co-teachers to rate their value of recommended co-teaching practices. The qualitative findings indicate that majority of the participants believe co-teachers should jointly share classroom instruction and classroom management responsibilities. Additionally, 35% of the participants reported not having belief values toward planning for joint instruction daily. The existing literature reveals evidence supporting a common planning time for co-teachers, regarding it as a critical time for co-teachers to (a) purposefully outline the lesson objective, types of activities needed to meet the objective, proper sequence of those activities, and materials needed, as well as (b)

anticipate the amount of time needed for each activity and how students should be grouped (Jensen, 2000).

In co-teaching, co-instruction is the responsibility of both teachers—the only way for it to be accomplished is when co-planning takes place (Brendle et al., 2017). When this happens, the partnership can identify a clear understanding of the instructional goal and the appropriate co-teach instructional approach that will allow meaningful learning to occur (Brendle et al., 2017). However, a frequently noted issue in the literature is the lack of co-teachers having a common planning time (Brendle et al., 2017; Manset & Semmel, 1997; Scruggs et al., 2007).

When looking at the subsection with the TCS that collected quantitative data from co-teachers about the perception of their ability to facilitate and inspire student learning and creativity in the classroom, teachers generally had high levels of confidence in all five areas. The teacher's level of technological self-efficacy is a significant determining factor that hinders or enhances integrative technology into the classroom environment. The beliefs a teacher maintains shape the classroom environment and guide their instructional practices (Bandura, 1997). When using integrative technology in the classroom, it is not enough for teachers to have essential technology knowledge and skills (Abbitt, 2011). The study results suggest that co-planning and co-teaching, by definition, is not taking place. Cook and Friend (1995) stressed that co-teaching is more complex than having two teachers in the same classroom, specifying that co-teaching involves shared ownership in the planning, instructing, and assessment of all students. Any practice implementation within co-teaching that do not follow co-teach implementation recommendations should be viewed as an inappropriate underuse of qualified teaching professionals (Friend & Cook, 2013). For co-instruction and integrative technology to be

present in the co-teach classroom, factors such as professional development, time, and necessary supports must have a significant influence on implementation.

Perceptions of teacher preparation for co-teaching. Pearson's r revealed that perceptions of their ability to (a) facilitate and inspire student learning and creativity; (b) model digital age work and learning as well as digital citizenship and responsibility; (c) engage in professional growth and learning; and (d) maintain overall technology comfort levels are statistically significant factors that are independently associated with perceptions of teacher preparation for co-teaching. Currently, literature does not exist to support the positive correlations between these domains but does present connections to these findings.

In Austin's (2000) PCTS, the subsection Teacher Preparation for Co-Teaching (see Appendix E) invited co-teachers to rate the usefulness of teacher preparation for co-teaching. A majority of the participants reported having value in school district workshops/mini lessons (78%), mentoring by experienced co-teachers (84%), and pre-service coursework in co-teaching (77%). The literature reveals evidence that many co-teach partnerships have not been prepared professionally to co-teach (Avramidis & Norwich, 2002; Scruggs & Mastropieri, 1996; Scruggs et al., 2007). Research has indicated that when teachers are provided appropriate professional preparation, they are more likely to implement inclusive practices (Avramidis & Norwich, 2002; Scruggs & Mastropieri, 1996; Scruggs et al., 2007).

When co-teachers are prepared, they are able to support flexible thinking; implementation of research-based teaching strategies; exposure to co-teaching approaches; use of technology; as well as information on various disabilities, collaborative skills, interpersonal skills, and communication skills needed to be effective in the co-teach classroom (Scruggs et al., 2007). However, when they are not adequately

prepared, they are forced to improvise. Ultimately, being unprepared has a significant impact of teacher efficacy and outcomes of special education students (Scruggs et al., 2007).

The literature stresses the need for professional preparation programs (traditional and alternative paths) to include co-teaching in their coursework and equip teachers with the skills needed to be successful in a co-teach classroom. Additionally, Cook and Friend (2010) maintained that the preparation responsibility does not rest on the shoulders of preparation programs, but rather charge that there is a critical need for all stakeholders involved in co-teaching to be prepared for application as recommended. Without these essential skill sets, co-teachers are more likely to form an imbalanced relationship instead of becoming instructional partners (Cook & Friend, 2010). The results of this study suggest that in the areas of co-teaching and technology ability beliefs, factors such as professional development has the greatest influence on preparing teachers for co-teaching and integrative technology in the classroom.

When looking at the subsection of the TCS that collected quantitative data from co-teachers about their perception of ability to promote and model digital citizenship and responsibility in the classroom, teachers generally had high levels of confidence in all five areas. Eighty-four percent of the survey participants felt confident or very confident teaching and modeling safe, legal, and ethical use of digital information and technology in the classroom. When reporting ability levels in the area of facilitating and inspiring student learning and creativity, 89% of co-teachers reported beliefs that they felt confident or very confident with promoting, supporting, and modeling creative and innovative thinking and inventiveness in the classroom.

Attitudes toward technology, whether positive or negative, influence the implementation of technology in the classroom (Tondeur et al., 2008). As noted by Hicks

(2011), teachers have reported that their overall comfort with technology can hinder use in the classroom. More specifically, Hicks asserted the predominant reason teachers feel as though they cannot implement technology into the classroom setting is because they fear they will appear inadequate in front of their technology savvy students because of skill deficits. Therefore, providing teachers with professional development opportunities will likely allow them to maintain high comfort levels resulting in technology integration in the classroom. The results from this study suggest that professional preparation, professional development, and support are valued by co-teachers. When provided, they feel prepared for the unique demands co-teaching and technology integration. Additionally, co-teachers generally maintain high self-efficacy beliefs about their ability to (a) facilitate and inspire student learning and creativity; (b) model digital age work and learning as well as digital citizenship and responsibility; (c) engage in professional growth and learning; and (d) maintain overall technology comfort levels. These findings suggest high levels of teacher confidence, which are likely the result of ongoing professional development to support the district's one-to-one initiative. The high values maintained by co-teachers in the areas of professional development are likely reflective of the need for professional preparation in the area of co-teaching. Co-teachers may feel unprepared to implement co-teaching practices as recommended due to the lack of school-based supports and ongoing professional preparation.

Perceptions of current co-teach practice employment. Pearson's r revealed that perceptions of their ability to model digital citizenship and responsibility are statistically significant factors that are independently associated with perceptions of current co-teach practice employment. Currently, literature does not exist to support the positive correlations between these domains; it does, however, present connections to these findings.

In Austin's (2000) PCTS, the subsection Co-Teacher Perceptions of Co-Teach Practice Employment (see Appendix E) asked co-teachers to rate current co-teaching practice employment into their co-teach classroom. Co-teachers reported shared instruction was taking place 48% of the time and 28% of the time they met daily to plan for shared instruction. The literature reveals evidence that the special education co-teacher is seldom provided equal status in the co-teach classroom (Rice & Zigmond, 2000). Often times the special education teacher will take on subordinate duties reducing their role to a paraprofessional. Co-teachers are not prepared professionally for co-teaching, which makes implementation a difficult task to take on when the proper tools and resources have not been afforded to you (Cook & Friend, 1995). Additionally, at the secondary level instructional inequity can be attributed to the fact that the special education teacher often lacks content knowledge, making it increasingly difficult for them to have an equal role during instruction (Scruggs et al., 2007). Based on the existing literature, for co-teach practices to be employed teachers need be provided professional preparation, ongoing professional development, and school-based supports for co-teach implementation to ensue.

As noted in a previous subsection, a majority of co-teachers in this study maintained high levels of ability beliefs regarding modeling digital citizenship and responsibility in the classroom. According to Curran and Ribble (2017), a digital citizen is an active participant in an online community and is not only a resident, but also an enabler of change. Teachers need real-world learning opportunities that allow them to apply higher level order thinking skills specifically in the area of digital citizenship. Moreover, students need opportunities that allow them to see a positive model use social media and technology (Curran & Ribble, 2017). Many schools still fail to provide teachers and students with access to real-world digital citizenship learning opportunities

(Scheffer, 2015). This outdated approach fails to prepare students for the digital world in which people live. When schools encourage safe, ethical, and knowledgeable use of technology and equip teachers, they are empowered with the tools to integrate technology into both the curriculum and the culture of the classroom (Scheffer, 2015). The results of this study suggest that co-teachers generally believe they are employing co-teaching practices and feel comfortable modeling digital age work and learning in the co-teach classroom environments. However, these findings indicate that there are grave misconceptions and misunderstandings about co-teaching which are likely a result of the minimal co-teach preparation and development. Conversely, the presented high efficacy scores are a result of ongoing technology professional development provided by the school district to support their one-to-one technology initiative.

Perceptions of school-based support value. Pearson's r revealed that perceptions of ability beliefs to (a) facilitate and inspire student learning and creativity; (b) design and develop digital age learning experiences; (c) model digital age work and learning as well as digital citizenship and responsibility; (d) engage in professional growth and learning; and (e) maintain overall technology comfort levels are statistically significant factors that are independently associated with perceptions of co-teaching school-based support value. Currently, literature does not exist to support the positive correlations between these domains; it does, however, present connections to these findings.

In Austin's (2000) PCTS, the subsection School Based Supports that Facilitate Co-Teaching (see Appendix E) asked co-teachers to rate their value of recommended co-teaching school-based supports. Participants reported having values for school-based supports that provided a mutual planning period (94%) and administrative support of collaboration (96%). Aforementioned in previous sections, co-planning and professional preparation is a critical component of successful co-teaching. Additionally, the literature

highlights the importance of the role of administrative support in the co-teach classroom. Pugach and Winn (2011), Murawski and Lee Swanson (2001), and Walther-Thomas (1997, 2000) all stressed the importance of having a campus wide philosophy in place to create a culture of both shared responsibility and collaboration to allow for more inclusive practices to ensue. Schoolwide models are more likely to embrace co-teaching concepts, teaching arrangements, and instructional roles that go beyond the classroom (Cobb Morocco & Mata Aguilar, 2002). Collaborative practices that are connected to co-teaching are not limited to the classroom itself and require organizational support (Cobb Morocco & Mata Aguilar, 2002). For co-teaching to yield its intended benefits, the organization needs to have visible administrative support (Brendle et al., 2017; Manset & Semmel, 1997; Scruggs et al., 2007).

Many campus administrators do not receive adequate training on what they should be looking for in a co-teach classroom as evidence of effective practices (Murawski & Lochner, 2011). For administrators to continuously improve co-teaching practices on their campus, they need to be knowledgeable so they can extend guidance on implementation. Additionally, when guidance and support is needed, they can provide or require development on co-teaching practices based on their assessment of instructional practices (Murawski & Lochner, 2011).

As presented in the previous subsections, co-teachers who participated in this study maintain high level ability beliefs regarding technology in all the domains as measured by the TCS. Teachers' beliefs about technology, whether positive or negative, influence implementation of in the classroom (Tondeur et al., 2008). The literature reveals the importance of factors such as professional development, time, and necessary supports in order to feel comfortable using integrative technology in the classroom. The results from this study suggest that teachers have an overall positive perception of their

technology abilities. The study also suggests that high values for school-based supports could be explained by current experienced barriers within their co-teaching assignment.

Perceptions of school-based support Access. Pearson's r revealed that perceptions of ability beliefs to (a) facilitate and inspire student learning and creativity; (b) design and develop digital age learning experiences; (c) model digital age work and learning as well as model digital citizenship and responsibility; (d) engage in professional growth and learning; and (e) maintain overall technology comfort levels are statistically significant factors that are independently associated with perceptions of access to co-teaching school-based supports. Currently, literature does not exist to support the positive correlations between these domains; it does, however, present connections to these findings.

In Austin's (2000) PCTS, the subsection School Based Supports that Facilitate Co-Teaching (see Appendix E) asked co-teachers to rate their access to recommended co-teaching school-based supports. Only 33% of the participants indicated that they have access to a mutual planning period, while 61% reported having access to professional development opportunities in the area of co-teaching. When teachers lack access to school-based supports in the areas of co-teaching (Cook & Friend, 2010) and integrative technology (Inan & Lowther, 2010), the literature reveals the unlikelihood of implementing innovative teaching strategies. This is further seen in the study of Miranda and Russell (2011), which revealed that regardless of the amount of support provided, if teachers perceived they were unsupported, they will allow their perceptions to hinder implementation. Therefore, as mentioned in a previous subsection, it is critical for administrators to present a supportive environment that supports co-teaching. The results of this study confirm the lack of professional preparation for co-teaching (Avramidis &

Norwich, 2002) as well as the need for mutual planning time (Brendle et al., 2017) and administrative support (Cook & Friend, 2010).

Research Question 4

Qualitative data collected through interviews with secondary co-teachers provided insight into answering the fourth research question (What perceptions do secondary co-teachers have about co-teaching practices and their beliefs regarding integrative technology in the co-teach classroom?). There were five themes that emerged concerning teacher perceptions: co-teaching assignment, co-teach misconceptions, co-teach instructional roles, co-teach planning, and co-teaching with integrative technology. A summary of each theme is necessary to understand co-teacher perceptions.

Co-teaching assignment. Co-teachers shared their perceptions about their co-teaching assignment. A majority of the general education co-teachers indicated that they did not volunteer for their co-teaching assignment. Some of the general education co-teachers expressed hesitation and concern with co-teaching based on previous inclusive experiences and their peer teacher's negative perceptions. Conversely, all special education co-teachers indicated that they volunteered for co-teaching and explained that the assignment was understood when they applied for the job at the beginning of the hiring process.

All participants interviewed illustrated that they did not have partnership input of who they would be assigned to co-teach. Equally, general education and special education co-teachers felt that this was an area in which their administrators could improve. These beliefs were maintained because in some cases, co-teachers had toxic relationships with their co-teachers or had good relationships with their co-teachers that could be expanded upon the following year. Co-teachers felt as though administrators were unsupportive of multiple period or all-day assignments. When asked why they felt

this way, co-teachers reported that they felt like co-teaching has a stigma or “unspoken philosophy.” They also presented perceptions that within the teaching profession teachers believe it is better to work in solo teaching environments. It was indicated that administrators view co-teaching assignments as a burden on the general education teacher. Assignments were not continued the following year as a relief burden for the general education co-teacher. Even though co-teachers were willing to continue the partnership, it was strongly discouraged by administration.

Co-teachers presented several misconceptions maintained by administrators that are concerning and hinder proper co-teach implementation. It is imperative that administrators create environments for co-teaching to be successful. This can be achieved by creating opportunities that allow teachers to volunteer for co-teaching, provide input on their co-teaching partnership, and by embedding district and campus wide structures that are supportive of co-teaching (Friend, 2014; Walsh, 2012).

Compatibility between co-teachers is a vital element of a successful co-teaching partnership (Rice & Zigmond, 2000; Scruggs et al., 2007). When co-teachers work well with each other, all students, including those with disabilities, are more likely to experience success and have positive inclusive experiences in co-teach classrooms. On the contrary, when co-teachers experience conflict, regardless of a specific issue, the experience and the outcome for students becomes increasingly unlikely (Mastropieri et al., 2005). This contextual difference can partially be linked to the fact that historically teacher preparation prepares educators to be independent practitioners who are individually responsible for the outcomes in their classroom (Rice & Zigmond, 2000). Therefore, teachers are not adequately prepared to work in collaborative partnerships such as co-teaching (Rice & Zigmond, 2000).

It takes time to establish a co-teaching relationship and implement a variety of co-teaching approaches (Cook & Friend, 2010) Therefore, it is critical that administrators support teachers volunteering for co-teaching, provide opportunities that allow teachers to offer input, and support multi-year assignments. It is even more critical for administrators to listen and support co-teacher needs, especially when teachers request and provide feedback in areas in which their partnership needs assistance or offer insights in which they can continue to grow. This finding aligns with research emphasizing the need of administrator support of co-teaching (Cook & Friend, 2010; Murawski & Lee Swanson, 2001; Pugach & Winn, 2011; Walther-Thomas, 1997).

Co-teach misconceptions. The most significant finding of this study highlighted the difference between self-perceived competence levels and the misconception of recommended practices when educators were asked to describe or elaborate about their knowledge of co-teaching and integrative technology. Misconceptions of co-teach practices were revealed equally between general and special education co-teachers in pedagogical and technology pedagogical knowledge. General and special education co-teachers focused on misconceptions and failed to illustrate meaningful implementation of co-teach practices or integrative technology within the classroom despite their high self-reported scores. Accordingly, the following sections will align maintained misconceptions with the existing literature base.

Pedagogical knowledge. According to Koehler and Mishra (2009), educators who have an in depth understanding of pedagogy are knowledgeable of instructional techniques or teaching strategies that should be employed into the classroom. However, during participant interviews both teachers and administrators depicted having limited pedagogical knowledge of inclusive practices. When co-teachers were asked about co-teaching practices, all the participants were unable able to identify foundational concepts

and instructional approaches despite their current co-teach assignment. These significant misconceptions of co-teaching practices raise additional concern as many of the study participants reported numerous years of co-teaching experience.

Related, both general education and special education co-teachers revealed that co-planning for co-instruction did not taking place due to the lack of the school-based support of a common planning time. In contrast, when co-teachers were provided a common planning time with their partner, they failed to demonstrate co-planning for inclusive instruction. Planning provides teachers the opportunity to purposefully consider various aspects of a lesson and make meaningful connections to the learner (Jensen, 2000). Consequently, within the content of this study misconceptions of instructional practices maintained by teachers and administrators and the lack of school-based supports significantly hindered co-teach implementation.

During the interviews many of the participants highlighted negative administrator perceptions towards co-teaching. One of the general education teachers suggested that co-teach assignments were not continued beyond one-year because general education teachers should be relieved of the burden of co-teaching. Even when co-teachers asked for multi-year assignments, multi-year assignments were strongly discouraged because of perceived drawbacks maintained by campus administrators.

The existing literature notes that administrators have a significant role in influencing school climate, which in turn influences classroom practices by creating shared beliefs and a school community (Cohen, McCabe, Michelli, & Pickeral, 2009). An administrator is responsible for shaping and leading an inclusive culture by implementing collaborative practices both in and outside of the classroom (Cobb Morocco & Mata Aguilar, 2002). Unfortunately, many administrators have not received adequate training on what they should be looking for in co-teach classrooms as evidence of effective

instructional practices (Murawski & Lochner, 2011). Without the guidance and support of administrators, the true potential of co-teaching will miss the mark of meeting its full potential.

Technology pedagogical knowledge. The quantitative data of this study reported by participants significantly contrasted findings revealed within the qualitative. General and special education co-teachers reported high levels of competency in all five domains of the TSC. However, the qualitative findings suggest teachers maintain limited technological pedagogical knowledge, which drastically contrasted their self-reported ability beliefs. It is perilous that educators have in-depth knowledge of cultivating student understanding through the implementation of content driven, pedagogically-sound, and technologically-forward instructional practices (Mishra & Koehler, 2006).

As previously mentioned, study participants focused on the lack of equitable resources and failed to illustrate meaningful uses of technology within the classroom. In the limited instances where technology use was revealed, both general and special education co-teachers' responses indicated substitutions for already existing options. Participants described using district iPads in place of paper notebooks and as a means of submitting photos of completed paper assignments online. However, according to Puentedura (2014) this use of technology falls within substitution level of the SAMR model. When integrative technology is used as a substitute to alternative options, it fails to create a meaningful learning experience for students. Conversely, when integrative technology provides students with a learning experience that would not exist, the value and impact of the lesson is increased and transforms student learning.

In sum, a significant finding of this study highlights the significant differences between self-perceived competence levels and maintained misconceptions of technological pedagogical knowledge. The findings of this study confirm the earlier

findings of Kaymakamoglu (2018) who identified a mismatch between teachers' stated beliefs, perceived practice, and actual classroom practices. Like Kaymakamoglu (2018), the findings of this study suggest that beliefs do not always translate into practice, as teachers' beliefs, perceived practice, and actual classroom practice may differ.

Co-teach instructional roles. Co-teachers illustrated instructional roles of both co-teachers in the classroom. Perceptions were illustrated equally between general education and special education co-teachers, emphasizing that co-teach instruction is led by the general education co-teacher. Most participants indicated that co-teach instruction was not shared in the classroom because of the lack of a common planning time. Additionally, general and special education co-teachers presented beliefs that special education co-teachers feel uncomfortable within the general education co-teacher's classroom. Some general education co-teachers indicated that leading instruction was a preference on their part because the special education co-teacher's instruction would be disruptive to the class. Conversely, special education co-teachers illustrated being in subordinate roles in the co-teach classroom; in one instance a special education teacher defined their role as "the greatest secretary he's ever had."

These findings align with the existing literature revealing general education teachers are leading instruction and special education teachers maintain subordinate roles in co-teach classrooms (Rice & Zigmond, 2000; Scruggs et al., 2007; Sweigart & Landrum, 2015; Vannest & Hagan-Burke, 2010). A frequently noted barrier in the literature that hinders co-teach implementation is the lack of co-planning and administrative support (Brendle et al., 2017; Manset & Semmel, 1997; Scruggs et al., 2007). However, it must be reiterated that co-teachers are more than two educators present in the same classroom; co-teaching involves shared ownership of the instruction of all students (Cook & Friend, 1995). Any instructional arrangement that fails to

capture co-teaching as recommended is a misuse of qualified teaching professionals (Friend & Cook, 2013).

Co-teach planning. A majority of the participants were consistent with their responses and collectively reported the failure of planning for co-teach instruction. A common reason co-planning was not taking place was because co-teachers were not afforded a common time for planning to transpire. However, even when a common planning time was provided, co-teachers illustrated planning for general education instruction and failed to highlight special education preparation. These findings align with the existing literature highlighting the lack of planning taking place for co-teach and inclusive instruction (Brendle et al., 2017; Manset & Semmel, 1997; Scruggs et al., 2007).

Co-teaching with integrative technology. Many of the participants focused on the lack of equitable technology equipment and failed to frame how technology was being used to enhance and support the learning of students, ultimately emphasizing a limited interpretation of integrative technology. Co-teachers perceived that there is not sufficient integrative technology in the classroom to support the implementation of the co-teach models. Those who perceived that there was adequate technology also indicated that they did not allow their co-teacher to co-teach or exemplified that technology was minimally used. Some co-teachers described the removal of student groupings to alternative settings and labeled this practice as the parallel teaching co-teach. These findings continue to highlight the misconceptions of co-teaching and present new a finding that co-teachers maintain misconceptions about integrative technology as they relate to the co-teach models according to the instructional needs of the students. Based on these findings, not only are teachers not using the recommended co-teaching approaches, but they are not also utilizing integrative technology in meaningful ways. Ultimately, integrative

technology is being used in ways that, according to Puentedura (2014), are considered a substitution for tools that could be accomplished without it.

As presented in previous subsections, co-teachers presented misconceptions about fundamental co-teaching practices. Moving students to an alternative setting to access integrative technology resources is not indicative of effective implementation of the parallel co-teaching approach. Parallel teaching takes place when the class is split into two heterogeneous groups, where the teachers deliver the same instructional content to both groupings within the same classroom setting (Friend & Cook, 2013). As already noted, co-teachers are frequently unprepared professionally to work in co-teaching environments.

More specifically within this study, teachers maintained high implementation and confidence levels of co-teaching and integrative technology. This finding continues to support discrepancies among teachers' beliefs, perceived practice, and actual classroom practice in most cases. This mismatch between teachers' stated beliefs and their actual classroom practice allows for the interpretation that teachers have not developed the needed craft knowledge to implement both co-teaching and integrative technology in the secondary co-teach classroom. Although most teachers reported high levels of implementation in both areas within the quantitative data, the qualitative data collected during the interview process emphasized significant gaps between secondary co-teacher knowledge and beliefs of co-teaching and actual practice. It is unreasonable to expect educators to understand and implement co-teaching or integrative technology without professional preparation when it drastically differs from traditional solo teaching arrangements (Cook & Friend, 2010; Hew & Brush, 2007). Conversely, if teachers are not provided professional development and opportunities to veer away from the substitution level of technology integration, they are less likely to use technology in

meaningful ways that create innovative and new learning experiences for their students (Puentedura, 2014).

Infrastructure supports solo teaching. Co-teachers expressed beliefs that the infrastructure in secondary co-teach classrooms are set up to support solo teaching assignments and are not supportive of co-teaching. Beliefs were presented by co-teachers that maintain co-teach classrooms should set up with equal integrative technology resources to support the instruction of two teachers and the co-teach approaches. Co-teachers believed that providing this support, along with other critical school-based supports including a common planning time, would allow for an increase in the implementation of varied co-teaching approaches. These beliefs were maintained because current classroom setups support solo teaching environments and, along with other barriers, hinder the varied implementation of co-teach approaches in the classroom setting. The findings presented above coincide with those of Friend (2008), who asserted that special consideration needs to be given to the setup of co-teach classrooms and emphasized that co-teach classrooms require a reflective setup to establish shared or equal workspaces within the classroom. Without equity in the classroom environment, as seen in this study and others, the special education teacher's role is diminished to that of subordinate in comparison to the general education teacher (Friend, 2008; Rice & Zigmond, 2000; Sweigart & Landrum, 2015; Vannest & Hagan-Burke, 2010). However, for these additional resources to be meaningful in co-teach environments, co-teachers need professional preparation on research based co-teach instructional practices (Friend, 2008) and ways to use integrative technology that modify instruction based on the needs of the students (Puentedura, 2014). Without this professional preparation or support, the full potential of co-teaching will not be realized.

Implications for Practice

As a result of this examination of secondary co-teacher perceptions regarding instructional technology in the co-teach classroom, implications for administrators and teachers emerged. For administrators, this research revealed the critical need for leaders to be knowledgeable about co-teaching practices. Administrators are a critical component of establishing a positive school climate for both teachers and students (Cohen et al., 2009). For teachers, the research provided deeper insight into the barriers in the co-teach classroom. The research also highlighted the importance of professional development, co-teach lesson plans, and supporting as well as encouraging multi-year co-teaching assignments.

Implications for Administrators

School administrators have a significant role in influencing school climate, which in turn influences the classroom climate through belief systems (Cohen et al., 2009; Murawski & Lee Swanson, 2001; Pugach & Winn, 2011; Walther-Thomas, 1997, 2000). Teachers' actions are shaped by the shared beliefs and culture of the school community, and in turn administrators are substantially responsible for shaping and leading the vision of the school. Based on the findings concluded from the current study, administrators should ensure teachers' actions and co-teach classroom experiences are in line with the literature base regarding co-teach instruction. Administrators have a responsibility to engage co-teachers in professional development opportunities that are geared toward implementing co-teach instruction and integrative technology in meaningful ways. This will ultimately support enriching competency gaps teachers maintain when designing student centered learning experiences.

Additionally, this study revealed the need for documenting co-teach implementation through specific co-teach lesson plans. Lesson plans provide teachers the

opportunity to purposefully outline the lesson objective and consider how they will make meaningful connections to their learners (Jensen, 2000). Lesson plans need to specify the role and responsibilities of both teachers, provide reflective differentiation, and detail scaffolded instruction through the use of one of the co-teach instructional approaches (Murawski & Lochner, 2011). Finally, administrators need to open dialogue between co-teachers and encourage as well as support multi-year co-teaching assignments. For co-teachers to expand upon their practice, they need to be provided the time and experience to perfect their craft.

Implications for Teachers

Regarding teachers, this study continues to highlight the need for professional preparation specifically geared toward co-teaching. The current study concluded that co-teachers are not properly prepared to work in co-teaching environments. Ongoing trainings related to co-teaching and integrative technology would allow for co-teachers to collaborate and gain insights regarding means to support student learning, as well as provide an opportunity to observe individuals model and implement practices as recommended (Cook & Friend, 2010; Puentedura, 2014). By providing professional preparation, teachers would be able to develop strategies to better meet the needs of all students, especially those with disabilities. Such trainings should be provided during the teacher preparation process for aspiring teachers as well as ongoing development opportunities for novice and veteran teachers. When teachers are provided appropriate training and professional development opportunities, they are more prepared and less likely to be resistant to implementing innovative and inclusive practices in the classroom. In addition to professional development, campus administrators should focus on providing an instructional coach to support the complexity of co-teaching as a means of providing teachers with support and encouragement as they reach their full potential.

Collectively, co-teaching and integrative technology instructional practices will fail to meet their full potential if educators do not have a full understanding of recommended instructional practices.

Recommendations for Future Research

Finding from this study involved obtaining information (quantitative and qualitative) regarding perceived competence of co-teaching and integrative technology from secondary co-teachers as it related to their self-reported practices. Although the findings provided data and information about secondary co-teach perceptions, recommendations for future research will help expand the knowledge base on this topic. The following recommendation is based on data and findings from this study.

The most significant finding of this study highlighted the significant differences between self-perceived competence levels and misconception of recommended practices when educators were asked to describe or elaborate about their knowledge of co-teaching, pedagogical knowledge and integrative technology. Therefore, future research must explore these areas of discrepancy. With further research conducted in this area, greater insights regarding secondary co-teacher knowledge and beliefs of co-teaching and integrative technology and actual practices could yield recommendations for instructional practice within the co-teach classroom.

Limitations

As with any study, there will always be limitations in the research findings. First, external validity is a concern, as the low number of participants in comparison to the vast number of co-teachers limit the findings to other school districts. In addition, the findings may not be generalizable to other grade levels since this study focused on secondary co-teachers. Furthermore, the limited number of respondents (71) for the survey portion

restricts the generalizability of the findings to teachers with a current co-teach assignment.

Coefficient alpha reliability is commonly referenced and used as a measure of reliability. In two of the sections of Austin's (2000) PCTS, reliability scored below the threshold for an acceptable value. Therefore, in the areas of Co-Teacher Perceptions of Current Experience and Value of School Based Supports that Facilitate Collaborative Teaching, data presented in this study may be considered as unreliable. Limits to interval validity are also a concern, as self-reported survey instruments were used within this study and are prone to participant response bias. Therefore, the data will only be as accurate as the honesty of the co-teacher participants. Potential bias influenced by social desirability has an influence on a participant's response when completing a survey; as such, participants may have answered the survey or interview questions based on how they perceived the researcher wanted them to respond. Given that the data is dependent on the influence, bias, and honesty of the participants, the results may not have been a true snapshot of the actual perceptions of co-teachers regarding co-teaching and the role technology has in the co-teach classroom. Therefore, the results were reviewed with these limitations in mind.

Conclusion

The purpose of this study was to explore secondary educators' perceptions of their competence in co-teaching and utilizing integrative technology and the relationship it has with educators' perceived practices. The literature indicate that co-teaching is provided to students with disabilities as a means of keeping them in LRE with the support of special education (Cook & Friend, 1995). Given that instruction is often presented through technology, this study sought to explore how instructional technology played a role in the co-teach classroom based on secondary co-teacher perceptions. A review of the literature

presented a gap between secondary co-teacher knowledge and beliefs of co-teaching and integrative technology and actual practice. Therefore, the findings, implications, and recommendations from this study suggest that there are numerous misconceptions about co-teaching and integrative technology preventing implementation from taking place. Also, further recommendations listed in the implications highlight that administrators and teachers play a significant role in the implementation of co-teaching and integrative technology within the co-teach classroom. This study seeks to provide a significant contribution not only to teachers and school leaders, but also the overall ongoing discussion of co-teaching and integrative technology.

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APPENDIX A:
SURVEY COVER LETTER



University
of Houston
Clear Lake

January 2020

Dear Participant:

Greetings! Because of your current co-teach assignment you are being invited to participate in this research study by completing the *Co-teacher Perceptions & Technology* survey. The purpose of this survey is to examine the role of technology in the co-teach classroom.

Your participation in this study is completely voluntary and you may decline participation at any time. There are no known risks of participation beyond those encountered in everyday life. Your responses will remain confidential and anonymous. Data from this research will be kept under lock and key and reported only as a collective data set. No one other than the researcher will know your individual answers to this questionnaire.

If you agree to participate in this project, please answer the questions on the survey as best you can. The survey itself should take *approximately 10 minutes to complete*. All completed surveys will be entered in a drawing to win one of (2) \$50 Amazon gift cards as a token of appreciation for participation. Only 110 potential participants are being invited to participate, so the odds are very much in your favor!

Within the survey itself there is a second opportunity for you to consider participating in an interview with the researcher, again participation is completely voluntary. An equal number of general education and special education participants will be selected to participate. Those who complete the interview will receive a \$25 Amazon gift card as gesture of appreciation. Many thanks in advance for your consideration!

Sincerely,

Christina Cavaliere

Christina Cavaliere, BA, MS
Doctoral Student
Educational Leadership Program
College of Education

APPENDIX B:
INFORMED CONSENT

You have been purposefully selected to participate in a study based on your current secondary co-teaching assignment. This research seeks to explore the relationship between co-teaching and integrative technology and has been approved by the Committee for the Protection of Human Subjects at the University of Houston- Clear Lake.

It is anticipated that the survey will take **approximately 10 minutes to complete**. Once you start the survey, you can exit at any time, though only completed surveys can be used in this research.

Through the Qualtrics tool, your confidentiality will be kept to the degree permitted by the technology being used. No guarantees can be made regarding the interception of data via the Internet or email. The data collected from the study will be used for educational and publication purposes, however, you will not be identified by name. Internet administration will be set so that computer IP address logs will be deleted. Participant's data for this research project will be maintained and safeguarded on a password-protected database by the Principal Investigator or Faculty Sponsor for a minimum of three years after completion of the study. After that time, the participant's documentation may be destroyed. All participant responses will be aggregated and presented as synthesized findings as to protect your identity. Assurances are made that no identifiable information such as your name or school will be revealed. If you have additional questions during the course of this study about the research or any related problem, you may contact the researcher, Christina Cavaliere, by email at _____ or the faculty sponsor, Elizabeth Beavers, Ph.D., may be contacted by email at _____

Your voluntary participation in this research project is indicated by acknowledging the “agree” acknowledgement below.

THE UNIVERSITY OF HOUSTON-CLEAR LAKE (UHCL) COMMITTEE FOR PROTECTION OF HUMAN SUBJECTS HAS REVIEWED AND APPROVED THIS PROJECT. ANY QUESTIONS REGARDING YOUR RIGHTS AS A RESEARCH SUBJECT MAY BE ADDRESSED TO THE UHCL COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (281-283-3015). ALL RESEARCH PROJECTS THAT ARE CARRIED OUT BY INVESTIGATORS AT UHCL ARE GOVERNED BY REQUIREMENTS OF THE UNIVERSITY AND THE FEDERAL GOVERNMENT. (FEDERALWIDE ASSURANCE # FWA00004068)

APPENDIX C:
CONSENT PERCEPTIONS OF CO-TEACHING SURVEY

From: **Vance Austin**
Subject: Re: [EXT]: Permission to Use Co-teaching Survey Instruments
Date: September 5, 2018 at 9:23 AM
To: Christina M Cavaliere



Of course, Christina.

No worries. You have my permission to use them and/or adapt them as you see fit.

Best wishes,

Vance Austin

Vance Austin, PhD
Chair, Special Education Department
vance.austin@mville.edu
914-323-7262 (Office)
845-598-8214 (cell)

From: Christina M Cavaliere
Sent: Tuesday, September 4, 2018 11:20 PM
To: Vance Austin
Subject: [EXT]: Permission to Use Co-teaching Survey Instruments

****External Email****

Dr. Austin,
I contacted you last spring for permission to use your survey instruments. Because I switched school districts over the summer I lost your email giving permission to use them. If it would be possible, could you give me consent a second time? I apologize for my oversight, and thank you in advance for your help a second time. :)

Sincerely,

Christina Cavaliere

APPENDIX D:

SEMI-STRUCTURED INTERVIEW PROTOCOL AND QUESTIONS GUIDE

Interview Protocol

Good morning (afternoon, evening). My name is Christina Cavaliere and I am a University of Houston Clear Lake doctoral student. Thank you for being willing to participate in my study on co-teaching. The purpose of your participation is to get your perceptions of your experiences in your current co-teach assignment. There are no right, wrong, desirable or undesirable answers. I would like you to feel comfortable with saying what you really think and how you really feel. This study will contribute to the existing literature base on co-teaching and may provide teachers in a co-teaching assignment a resource with implementation based on your experience.

Before we begin, do you have any questions about the study?

I would like to remind you that your participation in this is voluntary and you may choose to withdraw at any time. If it is okay with you, I will be recording our conversation. The purpose of this is so that I can get all the details but at the same time be able to carry on an attentive conversation with you. I assure you that all your comments will remain confidential. I will be reporting the data in a manner that does not reference specific individuals or will use pseudonyms in place of names to insure anonymity. Are you still willing to participate?

Semi-Structured Interview Questions

1. In your co-teaching partnership are you the general or special education co-teacher?
2. Was your co-teaching assignment(s) voluntary?
Yes- What prompted you to volunteer for that instructional model?
No- How do you feel about being assigned to co-teaching?
Did you have input from your administrator in who you would be partnered with?
3. Describe your relationship with your co-teacher?
4. Walk me through a typical day in your co-teaching role.
What approaches (models) are being used?
Who is leading instruction?
How do you plan for co-teaching?
5. Walk me through a typical day of your co-teacher.
What approaches (models) are being used?
Who is leading instruction?
How do you plan for co-teaching?
6. It is my understanding that the district requires annual co-teach training for co-teach partnerships.
Describe this training. What are some of the concepts that were taught during this training? Are you using these ideas? Why or why not?
7. Do you and your co-teacher plan for co-teach instruction?
Yes- Tell me about that.
No- Why not?
8. Are you required to document planning for co-teach instruction through co-teach lesson plans?
9. How does school-based supports influence your co-teach classroom?
10. Are there any school-based supports you are lacking?
11. In a perfect world, is there anything you would change in your co-teach classroom?
12. Does content knowledge impact you in the co-teach classroom? If so how? If not, why not?
Does content knowledge have an impact on your co-teacher? If so how? If not, why not?
13. In the survey data I saw data supporting the general education co-teacher being a strong link to both employing co-teach practices and technology integration. Is this the case for you? Why or why not?
14. In the survey data I saw data supporting the special education co-teacher does not have a link to employing co-teach practices and technology integration. Is this the case for you? Why or why not?
15. Walk me through your daily technology use in a typical class period.

16. Does technology impact co-teach instruction?
Is there enough technology to support two co-teachers?
Yes- Is the technology support an initiative of the district?
No- What would you change?
17. Does technology impact the implementation of co-teach approaches (models)?
Yes- How? Can you give me a recent example?
No- Why not?
18. Is there anything else you think I should know about your co-teaching experiences?

APPENDIX E:
PERCEPTIONS OF CO-TEACHING SURVEY

¶ _____

Perceptions of Co-Teaching Survey

The purpose of this survey is to learn from your experience of collaborative teaching. The results of this survey will be used to help improve teaching practices. Your participation in this survey is voluntary. Your responses will be kept strictly confidential, no identifiers will be used, and all responses will be presented as aggregate data.

PART ONE
Teacher Information

Definition of Terms

Collaborative Teaching or Co-Teaching refers to the assignment of a general education teacher and a special education teacher to work together, sharing responsibility for the planning and execution of instruction.

Collaborative Teachers or Co-Teachers, as defined for the purposes of this study, are general and special education teachers who are teamed for providing instruction to a heterogeneous class for one or more periods of instruction per day.

General Education Teacher refers to any teacher certified to provide instruction in an elementary level classroom or a secondary level subject area.

Special Education Teacher refers to any teacher certified to provide instruction to any student in grades K-12 who is classified as having one or more disabilities.

1. Please mark the grade level of the collaborative class(es) that you teach.

- Elementary
- Middle School/Junior High
- High School

2. Check the content area(s) of the class(es) that you teach collaboratively.

- Reading
- Social Studies
- Sciences
- English/Language Arts
- Mathematics
- Fine Arts
- Physical Education/Health
- Foreign Language
- Business
- Technology
- ESL/Bilingual
- Practical Living/Home and Careers
- Other: _____ (please specify)

3. Please mark the area of certification in which you are currently employed.

- Special Education K-12
- General Education (Elementary K-6)
- General Education (Secondary 7-12)

4. Check the *highest* level of education you have achieved.

- Bachelors
- Masters
- Masters +
- Doctorate

5. How many total years of teaching experience do you have? _____ years

6. What is your gender?

- Male
- Female

7. Please write the number of:

Years as a collaborative teacher _____ years
 Years taught with this co-teacher _____ years
 Number of teachers with whom you co-teach daily _____ teachers
 Number of classes you teach collaboratively in a day _____ classes
 Number of subjects you teach collaboratively in a day _____ subjects

8. Did you volunteer for this collaborative teaching experience? Please check one answer.

- Yes
- No

PART TWO
Co-Teacher Perceptions of Current Experience

Please circle a number from 1 to 5 to indicate your level of agreement or disagreement with each statement below about co-teaching.

Strongly Agree	Agree	Neither	Agree	Disagree	Strongly Disagree
1	2	3	4	5	5
1. My co-teaching partner and I work very well together.	1	2	3	4	5
2. Collaboration has improved my teaching.	1	2	3	4	5
3. In my collaborative experience, I do more than my partner.	1	2	3	4	5
4. Co-teaching is a worthwhile professional experience.	1	2	3	4	5
5. My partner and I solicit each other's feedback and benefit from it.	1	2	3	4	5

Other Comments _____

Recommended Collaborative Practices

Please circle a number from 1 to 5 to indicate your level of agreement or disagreement with each statement below about co-teaching. You are asked to rate each statement according to: (a) **your belief in the value of the practice (the column titles "value")**, and (b) **whether you currently employ the practice (the column titles "employ")**.

	Strongly Agree 1	Agree 2	Neither 3	Disagree 4	Strongly Disagree 5					
	Value					Employ				
6. Co-teachers should meet daily to plan lessons.	1	2	3	4	5	1	2	3	4	5
7. Co-teachers should share classroom management responsibilities.	1	2	3	4	5	1	2	3	4	5
8. Co-teachers should share classroom instruction.	1	2	3	4	5	1	2	3	4	5
9. Co-teachers should regularly offer feedback.	1	2	3	4	5	1	2	3	4	5
10. Co-teachers should establish and maintain specific areas of responsibility.	1	2	3	4	5	1	2	3	4	5

Other collaborative practices you find effective _____

Teacher Preparation for Collaborative Teaching

What kinds of academic preparation do you think would be beneficial to collaborative teaching? Please circle the number from 1 to 5 beside each of the following academic preparations that best describes your perception of its usefulness to a collaborative teacher.

	Very Useful 1	Somewhat Useful 2	<u>Of</u> Limited Use 3	Not Useful 4	Don't Know 5
11. Student teaching placement in a collaborative class	1	2	3	4	5
12. School district in-service presentations on alternative assessments	1	2	3	4	5
13. School district workshops/mini courses on facilitating collaborative teaching	1	2	3	4	5
14. Mentoring by experienced collaborative teacher(s)	1	2	3	4	5
15. Pre-service courses in collaborative teaching	1	2	3	4	5
16. Pre-service special education courses for general education teachers	1	2	3	4	5
17. Pre-service general education courses for special teachers	1	2	3	4	5

Other _____

School-Based Supports that Facilitate Collaborative Teaching

What kinds of school-based services should be provided in order to facilitate collaborative teaching? For the purpose of this study, school-based services are defined as services including teaching materials/equipment, administrative support, and provision of adequate planning time.

Please circle a number from 1 to 5 to indicate the importance you place on each of the following school-based supports. You are asked to rate each statement according to (a) your belief in the value of the school-based service (column titles "Value") and (b) whether you currently have access to or receive the school based service (column titles "Access").

	Very Useful 1	Somewhat Useful 2	<u>Of Limited Use</u> 3	Not Useful 4	Don't Know 5
			Value		Access
18. Provision for scheduled mutual planning time.	1	2	3	4	5
19. Administrative support of collaboration.	1	2	3	4	5
20. Adequate teaching aids and supplies appropriate to learning levels.	1	2	3	4	5
21. In-service training opportunities provided (workshops, etc.).	1	2	3	4	5
22. Summer planning time allocated.	1	2	3	4	5
23. Opportunities to modify <u>classroom</u> configuration.	1	2	3	4	5
Other _____					

APPENDIX F:
TECHNOLOGY COMFORT SCALE

* 1. What is your student ID number?

* 2. Age:

- under 25
- 26-30
- 31-40
- 41-50
- ove 50

* 3. What certification level are you seeking?

- I am not an education major
- EC-6th
- 4th-8th
- 8th-12th
- Early childhood, non-certification
- EC-12

* 4. What certification content are you seeking?

- I am not an education major
- Generalist
- Bilingual
- ESL
- Math
- Science
- Social Studies
- Language Arts
- Special Education
- Art
- Early Childhood, non-certification

* 5. Facilitate and Inspire Student Learning and Creativity

Respond to the following questions based on your competency levels at this point in your education program:

- 5 – Very Competent
- 4 – Competent
- 3 – Uncertain
- 2 – Somewhat Competent
- 1 – Not Competent

	1 - Not Competent	2 - Somewhat Competent	3 - Uncertain	4 - Competent	5 - Very Competent
I am able to promote, support, and model creative and innovative thinking and inventiveness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can engage students in exploring real-world issues and solving authentic problems using digital tools and resources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and thinking, planning, and creative processes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments. Promote, support, and model creative and innovative thinking and inventiveness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 6. Design and Develop Digital Age Learning Experiences and Assessments

Respond to the following questions based on your competency levels at this point in your education program:

- 5 – Very Competent
- 4 – Competent
- 3 – Uncertain
- 2 – Somewhat Competent
- 1 – Not Competent

	1 - Not Competent	2 - Somewhat Competent	3 - Uncertain	4 - Competent	5 - Very Competent
I can design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 7. Model Digital Age Work and Learning

Respond to the following questions based on your competency levels at this point in your education program:

- 5 – Very Competent
- 4 – Competent
- 3 – Uncertain
- 2 – Somewhat Competent
- 1 – Not Competent

	1 - Not Competent	2 - Somewhat Competent	3 - Uncertain	4 - Competent	5 - Very Competent
I can demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital age media and formats.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 8. Promote and Model Digital Citizenship and Responsibility

Respond to the following questions based on your competency levels at this point in your education program:

- 5 – Very Competent
- 4 – Competent
- 3 – Uncertain
- 2 – Somewhat Competent
- 1 – Not Competent

	1 - Not Competent	2 - Somewhat Competent	3 - Uncertain	4 - Competent	5 - Very Competent
I can advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can promote and model digital etiquette and responsible social interactions related to the use of technology and information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can develop and model cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital age communication and collaboration tools.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 9. Engage in Professional Growth and Leadership

Respond to the following questions based on your competency levels at this point in your education program:

- 5 – Very Competent
- 4 – Competent
- 3 – Uncertain
- 2 – Somewhat Competent
- 1 – Not Competent

	1 - Not Competent	2 - Somewhat Competent	3 - Uncertain	4 - Competent	5 - Very Competent
I can participate in local and global learning communities to explore creative applications of technology to improve student learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can exhibit leadership by demonstrating a vision of technology infusion, participating in shared decision making and community building, and developing the leadership and technology skills of others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can evaluate and reflect on current research and professional practice on a regular basis to make effective use of existing and emerging digital tools and resources in support of student learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can contribute to the effectiveness, vitality, and self-renewal of the teaching profession and of their school and community.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 10. Please read each item carefully and circle the number on the scale that most accurately describes your level of comfort with each of the following activities at this point in time.

- 1 - Very Uncomfortable
- 2 - Uncomfortable
- 3 - Neutral
- 4 - Comfortable
- 5 - Very Comfortable

	Very UnComfortable	UnComfortable	Neutral	Comfortable	Very Comfortable
Using technology in classroom activities	<input type="radio"/>				
Sharing lesson plans with others	<input type="radio"/>				
Writing lesson plans which incorporate the use of technology	<input type="radio"/>				
Using electronic discussion groups	<input type="radio"/>				
Using web materials as resources for classroom activities	<input type="radio"/>				
Using the web to share materials with others	<input type="radio"/>				
Making assignments which require students to use technology	<input type="radio"/>				
Using technology to teach higher order thinking skills	<input type="radio"/>				
Incorporating the TEKS for Technology Applications into lesson plans	<input type="radio"/>				
Using lesson plans other teachers have developed	<input type="radio"/>				
Teaching basic computer skills	<input type="radio"/>				