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**THE BENEFITS OF CO-TEACHING STUDENTS WITH SPECIAL EDUCATION
NEEDS IN THE GENERAL EDUCATION CLASSROOM**

**A MASTER'S THESIS
SUBMITTED TO THE FACULTY
OF BETHEL UNIVERSITY**

**BY
STEPHEN NELSON**

**IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF ARTS IN SPECIAL EDUCATION**

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**THE BENEFITS OF CO-TEACHING STUDENTS WITH SPECIAL EDUCATION
NEEDS IN THE GENERAL EDUCATION CLASSROOM**

BETHEL UNIVERSITY

**BY
STEPHEN NELSON**

APPROVED

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DECEMBER 2022

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ABSTRACT

This research project has focused on co-teaching students with disabilities in the general education classroom. Co-teaching is synonymous with cooperative teaching and has been increasing in school districts across the United States and internationally. This thesis describes co-teaching and its effectiveness based on a literature review and professional application. Specifically, this thesis aimed to find empirical findings that provide statistical quantitative data to better analyze the effect of co-teaching. There is an underwhelming amount of both longitudinal and empirical experimental designed studies. In regards to co-teaching effects on academic achievement outcomes in students with disabilities, statistically significant increases in reading and math proficiencies have been found. Of the various co-teaching models, each co-teaching strategy can play an important role in the effectiveness of co-teaching as a whole. This thesis gives a professional recommendation for administrators to best support effective co-teaching in the classroom. Future research should seek to provide experimental, quantitative data on the impact of co-teaching on improving academic performance for disabled and non-disabled students.

TABLE OF CONTENTS

TITLE PAGE	1
SIGNATURE PAGE	2
ACKNOWLEDGEMENTS	3
ABSTRACT	4
TABLE OF CONTENTS	5
CHAPTER I: INTRODUCTION	6
CHAPTER II: LITERATURE REVIEW	14
CHAPTER III: APPLICATION OF THE RESEARCH	43
PROFESSIONAL APPLICATION	
CHAPTER IV: DISCUSSION AND CONCLUSION	51
SUMMARY OF LITERATURE	
LIMITATIONS OF RESEARCH	
IMPLICATIONS OF FUTURE RESEARCH	
CONCLUSION	
REFERENCES	63
APPENDIX	69

CHAPTER I: INTRODUCTION

Guiding Question and Rationale

In 1975, Congress enacted one of the most impactful laws in education. Public Law 94-142, *Education for All Handicapped Students Act*, set precedent law for education in the United States to offer free and appropriate education (FAPE) for all children with disabilities. Later in 1990 and 2004, congress reauthorized Public Law 94-142, commonly known as IDEA (*Individuals with Disabilities Education Act*). Since the law's inception, various amendments have ensured all children with disabilities have the right to receive FAPE in the least restrictive environment (LRE). Not only has IDEA reauthorization directly impacted the quality of education services provided to all students, but it has had consequences on how schools are held accountable in interpreting and implementing newly revised IDEA regulations and *No Child Left Behind* (NCLB) in 2001. The desire of schools to meet the educational needs and services for all students in the LRE, in addition to the NCLB federal policy mandate for students with disabilities to access the general education curriculum (inclusion), has led to an increase in implementing a co-teaching model. Today, the co-taught classroom makes intuitive sense to provide the most effective assistance to students with disabilities in a general education LRE setting.

Co-Teaching Defined and History

Co-teaching, synonymous with cooperative teaching, has been increasing in school districts across school districts in both the United States and internationally. In contrast to the sudden increase in appeal, the use of co-teaching is far from a novel concept. Given the passing of IDEA in 1997, teaching emphasized increasing co-teaching models with both general and special education teachers to support special education students in the general education

classroom setting. The ultimate purpose of co-teaching is for two teachers to collaboratively deliver high-quality instruction to all students in the general education classroom as defined by Cook (Cook & Friend, 1995). Cook & Friend (1995) pointed out that co-teaching was introduced as early as the 1960-1970s as an attempt to reorganize the secondary school system. Elements of a co-teaching model were first adopted to help teachers share co-planning responsibilities and teach at the same time (Cook & Friend, 1995). Cook & Friend (1995) defined co-teaching as, “two or more professionals delivering substantive instruction to a diverse, or blended, group of students in a single physical space” (Cook & Friend, 1995, p. 3). For the majority of purposes, the two professionals include a general education teacher and a special education teacher. The two co-teacher roles can be expanded to include two different general education content teachers teaching multidisciplinary curricula, or even a licensed teacher with a professional student-teacher candidate. In addition to two professionals in a co-taught classroom, other staff or volunteers may be present, including paraprofessionals (Cook & Friend, 1995). Nevertheless, co-teaching should achieve the following general outcomes: increase instructional options for a diverse population of students; have a positive impact in improving program intensity and continuity; provide an inclusive environment that reduces the stigma for students with disabilities; and increase support for teachers (Cook & Friend, 1995).

Co-teaching can take various forms. The question of “What does co-teaching look like?” still exists today (Cook & Friend, 1995, p. 6). Friend et al. (2010) have defined six different models of co-teaching (Friend et al., 2010):

- 1) *One-teach/one-observe*
- 2) *Station-teaching*
- 3) *Parallel-teaching*

4) *Alternative-teaching*

5) *Team-teaching*

6) *One-teach/one-assist*

One-teach/one-observe is often common in student-teacher candidate programs. The one-teach/one-observe model may be useful for a support teacher to track student observational data, complete grading paperwork, or assess the main content teacher. Station-teaching is often useful for delivering more than one lesson concept or approach. Additional stations to the main teacher and co-teacher may be created for students to work independently. The ability to split the classroom in half with two teachers to teach the same lesson is an advantage of co-teaching, called parallel-teaching. Parallel-teaching allows two smaller groups that can help increase student participation and engagement. Alternative-teaching is the ability to teach a small group of students (approximately three to eight students) while the other teacher instructs the large class. Alternative-teaching is a useful co-teaching strategy to teach a small group of students who need to make up missing work or instruction, pre-teach useful vocabulary, or as an opportunity for extra review or enrichment.

It is assumed and hypothesized that adding a second licensed teaching professional to a classroom through co-teaching strategies ultimately leads to positive student academic outcomes for all students, especially students with disabilities. It is found that the individualized instructional attention for special education students is nearly doubled in a co-taught setting compared to a single-taught classroom (Magiera and Zigmond, 2005). Lochner et al. (2019) utilized the Instructional Practices Inventory (IPI) tool for measuring student cognitive research. It was also noted that higher-order thinking could generate as much as a 20% gain in students' test scores (Lochner et al., 2019). Results from Lochner et al. (2019) showed a 40% gain in

student engagement. However, results included both students with and without disabilities in co-taught classes. This study was novel in that it is the first of its kind to use the IPI tool to investigate the effect of co-teaching classes versus regular single-taught classes. There is a need to investigate current research after 2019 that focuses on the effects of co-teaching on student engagement for student groups with disabilities and other measures of academic outcomes, both short-term and long-term studies. Since 2019, the question of how effective co-teaching is as a model of instruction, specifically for special education students, still exists. Lochner et al. (2019) noted that current research is needed to investigate co-teaching quality and how effective co-teaching models are, including which models are most effective in school buildings.

To date, there has been a lack of research compiling overall academic, behavioral, and school perspective measures in the past ten years (Hang & Rabren, 2009). Prior to Hang & Rabren's (2009) findings on the efficacy of co-teaching, only Murawski & Swanson (2001) completed a meta-analysis in hopes of finding key correlating outcomes with effective co-teaching. Only six peer-reviewed studies met their criteria, producing quantitative data only, and were used to determine the average effect size of co-teaching. Murawski & Swanson (2001) provided a novel synthesis of the current intervention data of co-teaching at the time. Murawski & Swanson (2001) found only a mean moderate effect size ($ES = 0.40$) of co-teaching interventions ($n=6$).

Taking the lack of peer-reviewed, empirical research published 20 years ago, this researcher aims to synthesize a literature review compiling data on co-teaching in follow-up to Murawski & Swanson (2001). The aim of the literature review is to provide a current review of literature, specifically focusing on the efficacy of co-teaching for special education student populations, as many studies noted a lack of differentiating effects of co-teaching between

general and special education groups (Lochner et al., 2019). As many positive effects (i.e., academic gains, social inclusion) and potential of co-teaching were noted in various studies, Hang & Rabren (2019) noted key discrepancies including: mixed perceptions between general education and special education teachers' roles in classroom management, increase in behavior referrals of special education students, and inadequate amount of time given by building administrators for teacher instructional planning.

Collectively, there is a need to review the research to date in hopes of providing a larger sample size analysis (compared to Murawski & Swanson, 2001) and teasing out positive efficacy outcomes and differences in the data. The future goal is that a literature review may be applicable to finding correlating factors that influence the efficacy of co-teaching. Furthermore, a comprehensive review may provide findings for future studies (i.e., meta-analysis or experimental design studies). A comprehensive review of co-teaching can be useful in providing current practical applications for district and building-wide decision-making for professional development, policy, and instructional practices.

Based on meta-analysis data from Murawski & Swanson (2001), there is a great lack of quantitative, experimental research in the area of co-teaching. Hang & Rabren (2009) also commented on the fact there have been limited empirical studies on co-teaching, including the effects on students with disabilities. With the continual increase in co-teaching models among school districts (both in the United States and internationally) for implementing an inclusive classroom setting that meets the IEP supports for special education students in the least restrictive environment (LRE), it begs the question: *What current empirical data exists to help drive decision-making by teachers and school-wide administrators?* The aim of this Master's

This thesis is to compile a comprehensive literature review on the quantitative research done in the past 20 years since Murawski & Swanson (2001).

What does the data say regarding the effects and efficacy of co-teaching today and since Murawski & Swanson (2001) 20 years ago? Specifically, what quantitative data exists in the past 20 years investigating the effects of co-teaching on academic and behavioral outcomes for students with disabilities? The emphasis of this writer's literature review is to follow-up with the Murawski & Swanson (2001) meta-analysis review. Scruggs et al. (2007) performed a meta-analysis on qualitative research done in follow-up to Murawski & Swanson (2001) (Scruggs et al., 2007). Findings from Scruggs et al. (2007) found that the one-teach/one-assist co-teaching model was the most popular strategy, and special education teachers' roles were often underutilized or undefined (Scruggs et al., 2007). Are the same qualitative observations by Scruggs et al. (2007) still found in the co-taught classroom today, 15 years later?

Applicable to a gap in the research, this researcher wishes to deepen the literature review to focus on the effects of co-teaching on specific special education student populations, primarily searching experimental, quantitative data. Lastly, the researcher narrowed the literature review to a subset of search criteria that matched descriptors of *Minnesota* and *statistical analysis* to find articles that matched the researcher's aim of empirical findings applied to a Minnesota school setting.

Hang and Rabren (2009) provided preliminary results on the efficacy of co-teaching on students with disabilities, with both teachers and students reporting positive perspectives. However, Hang and Rabren (2009) found a discrepancy between general education and special education teacher roles with student classroom management. Furthermore, Hang and Rabren (2009) found special education student behavioral referrals increased with the implementation of

co-teaching, and teachers thought an inadequate amount of time was given to co-teaching planning. McDuffie et al. (2009) found that seventh-grade students in the co-taught classroom had improved academic scores on the unit and cumulative post-test scores compared to non-co-taught classes (approximately 30% of sample size were students with disabilities) (McDuffie et al., 2009). On the other hand, McDuffie et al. (2009) found more student-teacher interactions within the single-taught classroom (McDuffie et al., 2009).

Collectively, this data should be intriguing to administrators when looking to make school-wide decisions regarding co-teaching. There are both benefits and barriers to promoting effective collaboration and co-teaching, including growth in teacher competency and growth in student learning, but offset by time constraints (Mofield, 2019). Schools today need current data on both benefits and challenges regarding effective co-teaching models. Not only at the administrative level, but a comprehensive literature review may also find correlating variables consistent with effective co-teaching outcomes that can be applied to instructional and planning methods of both general education and special education teachers in the co-teaching classroom setting. A comprehensive literature review may be applied to further break down using statistical meta-analysis. Meta-analysis may provide variables that are correlated with co-teaching measures, which may be applied at the school level through application emphasis driving school decision-making, and/or the opportunity to set up a case study or quasi-experiment.

Researcher's Reason for Thesis Study

This thesis writer's aim or goal is to explore various models and approaches to co-teaching that support students with disabilities in the general classroom. Specifically, the primary objective of the researcher was to find empirical data on the academic outcomes of co-

teaching. Furthermore, the researcher aims to analyze empirical data on academic outcomes for students with disabilities compared to non-disabled peers. Lastly, the researcher aims to gain insight into the current models of co-teaching that lead to the most effective positive student outcomes. The main objectives for this thesis study may be broken up into the two questions below:

Thesis Questions

- 1) How far has research come on the overall efficacy of co-teaching in the past 10 through 20 years?
- 2) What are the current effective models of co-teaching used in schools today?

CHAPTER II: LITERATURE REVIEW

This literature review will explain and share information from various studies and co-teaching models. The focus of studies selected for this literature review share common search criteria of using strictly the Bethel University Library online ERIC (Education Resources Information Center) database, are full-text available articles and are filtered inclusively by *team-teaching*, *statistical analysis*, and *Minnesota* descriptor words. An in-depth description of the search methodology is written below.

Methodology

A computer database search was done using digital access via Bethel University Library online. ERIC (Education Resources Information Center) database and full-text articles were accessed through Bethel University Library online. ERIC is a digital library funded by the Institute of Education Sciences of the United States Department of Education. Only the ERIC database was used due to feasibility and convenience, compared to Murawski & Swanson (2001), who used PsychLit and EdInfo databases in addition to ERIC. It should also be noted that out of the six total articles selected for the meta-analysis study by Murawski & Swanson (2001), only three were found from non-ERIC database documents at the time (*Exceptional Children; Journal of Learning Disabilities; Learning Disabilities Research & Practice*). ERIC database has grown exponentially in the number of journal articles and education documents it indexes. Given half of the articles that met the strict inclusion criteria by Murawski & Swanson (2001) were sourced from ERIC, and the three remaining non-ERIC sourced documents are from journals that are now included in ERIC, this writer considered the ERIC database the most efficient and primary search tool to begin. Based on the quality and quantity of peer-reviewed,

education-related journals inventoried in ERIC, an ERIC database search only was considered sufficient for the scope of this review.

First, an ERIC database search used the keyword *co-teaching*, and only peer-reviewed journal articles were selected of interest. Without refining the search further, the *co-teaching* keyword search resulted in 530 and 670 peer-reviewed journal articles in the last 10 and 20 years, respectively. Using this methodology, 530 peer-reviewed journal articles related to co-teaching were published across the ERIC journal list. Comparing 20 years ago to 10 years ago, 2001-2011, only 140 additional peer-reviewed journal articles were found published using the form *co-teaching* keyword search. In a span of 10 years after Murawski & Swanson's (2001) search and meta-analysis, only 140 additional peer-reviewed journal articles were found published across all ERIC journals. The difference between 140 journal articles published and the latter 530 articles published between 2011 and 2021 is approximately a 280% increase in published articles in the current 10 years since 2011. Given the wide variety of education journal sources listed within the online ERIC library, it is assumed that 280% of publications found in the current 10 years compared to the first 10 years of the 21st-century mirror the increasing popularity and usage of school districts adopting co-teaching delivery models. Interestingly to note, seven peer-reviewed journal articles were located in Minnesota, tied with New York for the highest location. The seven peer-reviewed studies were filtered by *Minnesota*.

Second, the keyword search was refined using the descriptors *statistical analysis* and *team-teaching*. The ERIC descriptors are words that act as specific subject headings in education used to index articles and documents within the ERIC online library. All ERIC documents are indexed, or tagged, with various subject-related descriptors. By using descriptive words within my search, the researcher was able to narrow the search to limit articles that only

include co-teaching and exclude those that lack quantitative data. Using only the additional descriptor of *team-teaching*, the refined search resulted in only 125 and 166 journal articles in the last 10 and 20 years, respectively. The rationale for including *team-teaching* as an additional descriptor was to follow the Murawski & Swanson (2001) approach to include studies that most likely followed a true co-teaching intervention model. In contrast to the time of Murawski & Swanson (2001), co-teaching delivery models have become more popular and well-known. Therefore, only the descriptor word of *team-teaching* related to the *co-teaching* keyword was used instead of other descriptors, including *cooperative teaching*, *collaborative teaching*, *mainstreaming*, *inclusion*, *pull-in*, *teaming*, and *supportive learning* (Murawski & Swanson, 2001). Since there is an interest only in empirical studies that used an experimental group design to collect data, this writer has included the descriptor of *statistical analysis*. The combination of using descriptive words of *statistical analysis* and *team-teaching* resulted in 14 total results available from ERIC (eight full-text articles available), seven in the past 10 years, and only one article between 10 and 20 years ago. Using the descriptor of *statistical analysis* alone, 46 and 52 results were published in the last 10 and 20 years, respectively. It is noted that one of the studies of the total results pulled was Murawski & Swanson (2001).

To help search for relevant studies that may have been filtered out with the descriptor *statistical analysis*, a second search was done using the keyword *co-teaching* with the descriptors *team-teaching* and *special education*. This search resulted in 48 peer-reviewed journal articles in the past 20 years, and 26 out of the 48 articles were published in the past 10 years.

Hang & Raben (2009) Research

Hang & Rabren (2009) used Scholastics Assessment Test (SAT) scores, discipline records, and attendance records to compile data to measure the efficacy of co-teaching. Hang &

Rabren (2009) found both co-teachers and students have positive perspectives of co-teaching, but their objective to measure the overall effectiveness of co-teaching that included academic outcomes was the first since Murawski & Swanson (2001). SAT Normal Curve Equivalents (NCEs) were analyzed and compared between the 2003-2004 school year with the following 2004-2005 school year (with co-teaching) in Reading, English/Language Arts, and Math. The amount of gain after one year in SAT scores by students with disabilities was compared to all students in the school system. Students with disabilities had statistically significantly higher SAT NCEs in reading and math after being co-taught than the year before without being co-taught, compared to no statistically significant difference in gains with all school system students (Hang & Rabren, 2009). In addition to academic outcomes, Hang & Rabren (2009) also found that students with disabilities had statistically significant increases in discipline referrals, absences, and tardiness during the year of co-teaching compared to the previous school year without co-teaching.

Murawski & Swanson (2001) Research

Murawski & Swanson (2001) used three methods to research the literature related to co-teaching, including database, footnote chasing of pulled review articles, and hand searching specific journals, *Exceptional Children*, *Teacher Education and Special Education*, and *Remedial and Special Education*. The two specific questions sought were to address: (1) Does co-teaching outcomes vary related to grade, gender, length of the study (or intervention), disability type (or severity); and (2) Does the largest effect size of studies vary related to the type of dependent variable (i.e., achievement, grades, social outcomes)? However, based on inclusion criteria, only six total studies were used for meta-analysis. Out of 89 articles after the literature

search, Murawski & Swanson (2001), 52 lacked quantitative data. The following criteria were used on the remaining 37 articles by Murawski & Swanson (2001, p. 259):

1. Tests of significance (e.g., *F*-tests, *t*-tests, or *p*-values) were needed.
2. The study included specific characteristics that define the intervention or delivery of instruction as co-teaching.
3. The co-teaching instruction or experimental group was greater than two weeks in duration.

Since the optimal goal of this literature search and review is to collect the most current empirical research done in the past 20 years after Murawski & Swanson (2001), the literature was refined to include peer-reviewed, published journal articles in the past 10 (2021-2011) and 20 (2021-2001) years. The rationale of limiting the first attempted search result to articles published only in the past 10 years instead of 20 years was for feasibility purposes in filtering out articles that may not meet the inclusion criteria of being an experimental study with sufficient quantitative data on the academic outcomes of co-teaching. It is under the assumption that any research article that met the inclusion criteria would reference, build upon, or footnote previous studies done since Murawski & Swanson (2001) until 2011.

Since the researcher is a current graduate student and special education teacher in Minnesota, a more in-depth summary review concentrated on the Minnesota-filtered articles. The study that provided the most power regarding statistical sample size, length of study, empirical data on academic measures, and analyzed special education student data compared to non-disabled peers was from St. Cloud State University researchers, Bacharach et al. (2010). The Academy for Co-teaching and Collaboration, St. Cloud State University, leads the nation in providing education training and workshops for implementing co-teaching. The co-teaching

workshop and collaboration initiative at St. Cloud State University was two-fold: 1) to help maximize the ability to find quality student-teacher candidate placements in area school districts, especially in rural areas; and 2) to provide continuing professional education and guidance to district administrators and teachers who seek co-teaching strategies.

Summary Review of Minnesota Filtered Articles:

Given the search criteria explained in the methodology, full-text research articles were filtered out based on the descriptor of *Minnesota* after the first keyword search of *co-teaching*. Only seven full-text articles were available for review.

*See Table 1 in the appendix for additional research study summaries.

Bacharach et al. (2010); Bacharach & Heck (2012) Research

Resource: St. Cloud State University Academy for Co-Teaching and Collaboration

(<https://www.stcloudstate.edu/coeld/coteaching/>)

Bacharach et al. (2010) Research

Minnesota has been a pioneer in implementing the co-teaching model within public school districts. Stemming from a growing need for strengthening teacher preparation programs, the St. Cloud State University (SCSU) teacher preparation program utilizes a co-teaching model for student teaching placements. The challenge of finding cooperating school districts and classroom teachers to host teacher candidates has been an ever-increasing need for university education directors. To solve the challenges in preparing high-quality, effective future teachers, SCSU applied a co-teaching approach that maximized the opportunity to use co-teaching to benefit student achievement in the classroom and support a positive student-mentor-teacher relationship. Student-teacher candidates are paired with host cooperating teachers during the student-teaching field experience and are expected to adhere to a co-teaching model compared to

the traditional student-teaching experience. A \$5 million grant (U.S. Department of Education Teacher Quality Enhancement Partnership) was awarded in 2003 to SCSU to undertake the initiative to create, implement, and research the co-teaching model approach in the student-teaching placement experience. At the time of this thesis, the SCSU co-teaching project, The Academy for Co-teaching and Collaboration, has produced some of the most meaningful quantitative and qualitative data on teacher perspectives, student perspectives, and student academic achievement.

In 2010, Bacharach et al. (2010) published four years of quantitative and qualitative data demonstrating the effective impact of co-teaching on student learning. Since Murawski and Swanson's (2001) meta-analysis of co-teaching research, Bacharach et al. (2010) sought to find empirical data that provided insight into the effectiveness of a co-teaching approach. The researchers developed a novel design-based research study over four years, designing and then implementing co-teaching practices over a four-year cycle. Bacharach et al. (2010) used K-6 academic achievement data in math and reading in co-taught versus traditional single-teacher classrooms. Furthermore, Bacharach et al. (2010) sought to find out if K-6 students receiving services under special education, free and reduced lunch, and/or ELL had differences in math and reading scores in co-taught classrooms compared to a traditional classroom environment.

Data pertaining to student academic achievement was taken from one major Minnesota public school district that included 9,800 students across 13 buildings. Over four years, 826 co-teaching student-teacher/cooperating teacher pairs were developed. State standardized assessments, Minnesota Comprehensive Assessment (MCA), and the norm-based standardized assessment, Woodcock Johnson-III (WJ-III), were used as the two academic measures in K-6 students. It is important to note that Minnesota MCA testing is only done once a year and at

certain grade levels; therefore, cohorts of students were compared, versus pre- and post-testing data. WJ-III testing, however, is norm-based for each grade and was administered as pre- and post-test interventions. MCA data measured reading and math proficiency, and WJ-III testing measured broad reading and math clusters. Bacharach et al. (2010) used chi square statistical analysis to compare co-taught or non-co-taught vs. proficient or not proficient students.

Positive Effects of Long-term Co-teaching

Bacharach et al. (2010) long-term case study findings showed statistically significant positive effects of co-teaching on MCA reading scores each year over four years, given a 99% confidence interval ($p < .01$) (Bacharach et al., 2010). Specific to MCA math data over four years, chi-square analyses found statistically significant positive effects of co-teaching on math proficiency over all four years (Bacharach et al., 2010). Special education students and free/reduced lunch eligible students showed a statistically significant increase in reading and math proficiencies. It should be noted again that these quantitative results are for students K-6.

Given WJ-III tests of academic achievement, nationally normalized and standardized, in the cluster areas of reading skills, Bacharach et al. (2010) found statistically significant differences (post-test versus pre-test) in mean gains across all four years (minimum $p < .05$) in K-6 grade students. Regarding the broad cluster area of reading skills, K-6 grade students showed a positive increase in mean gains (minimum $p < .05$) with co-taught classes compared to non-co-taught classes across all four years (Bacharach et al., 2010). Math cluster WJ-III scores showed increase mean gains in co-taught classes across all four years (Bacharach et al., 2010). Two years out of the four-year study showed statistically significant increases in co-taught classes compared to non-co-taught classes ($p < .01$) in WJ-III math cluster scores (Bacharach et al., 2010). Across the cumulative four years, 72% of special education-specific students (K-6 grade)

reached state standardized assessed (MCA) math proficiency compared to only approximately 55% of total special education students in a traditional single-teacher (experienced veteran classroom teacher), and, slightly lower, 48.9% of special education students in a traditional single student-teacher taught classroom (Bacharach et al., 2010). Identical results were seen with the cumulative percentage of special education students in co-taught classrooms compared to both single-teacher student-taught and traditional experienced teacher classrooms, 74.4% of total students met reading proficiency compared to 46.4% and 52.9% of total students, respectively (Bacharach et al., 2010).

The four-year study of Bacharach et al. (2010) is novel in its ability to collect empirical data on academic achievement in co-taught classrooms compared to traditional non-co-taught classrooms. Specifically, the ability to break down academic achievement scores in co-taught classrooms based on special education students compared to non-special education students is extremely powerful in applying findings. Implications of these findings are extremely promising to support the use of co-teaching to have a positive impact on academic achievement outcomes. A strength of this study is that two academic outcome measures were used, including state standardized testing and norm-based academic assessment used in special education comprehensive evaluations. Although this four-year program is limited to one of the largest school districts in Minnesota, the large sample size and longitudinal nature of this study make its implications very powerful for guiding decisions to support the positive impact on academic outcomes of co-teaching.

Bacharach & Heck (2012) Research

Heck (Bacharach & Heck, 2012), in collaboration with Bacharach, presented additional qualitative data on the perspectives of co-teaching, following the completion of the four-year co-

teaching program study from Heck et al. (2010). Bacharach & Heck (2012) presented multiple qualitative findings from both student and teacher perspectives. Quantitative data on academic achievement was only available for K-6 grades, so student and teacher surveys were done to collect data for grades 7-12. Over four years, which included a total of 1686 total students interviewed, approximately 80% of students stated co-teaching allowed them to receive more help with questions (Bacharach & Heck, 2012). The ability to enjoy different teaching styles and receive more individual attention was rated as a benefit of co-teaching by approximately 69% and 66% of students, respectively (Bacharach & Heck, 2012). The ability to get two perspectives was rated by 66% of students as a benefit, and similar ratings (ranging from 60% to 43% of students) followed from teachers building off of each other, more creative lessons, assignments graded and returned faster, to better discussions and more in-depth knowledge (Bacharach & Heck, 2012).

Interestingly to note, 4% of students surveyed in grades 7-12 rated co-teaching to have no benefit at all (sample size = 1686) (Bacharach & Heck, 2012). Among the same sample size of students surveyed, some students commented that the drawbacks of co-teaching included teacher explanations might be confusing due to two explanations and/or confused with whom to go to for help (~19% and ~14%, respectively) (Bacharach & Heck, 2012). Negative perceptions and views of co-teaching were very low by secondary students, especially given the large sample size and duration of data collected. Bacharach & Heck (2012) cited that almost 80% of students confirmed that co-teaching should be used more often compared to a classroom with a traditional single teacher. Collectively, students in grades 1-12 commented that they spent less time waiting in class, received more help and individual attention, and had increased opportunities to work in small groups (Bacharach & Heck, 2012).

Teachers who co-taught together during the four-year study had the opportunity to report their perceived benefits of co-teaching. Approximately 95% of co-teachers reported that they felt they were able to give more help to students with high needs (Bacharach & Heck, 2012). Since this study involved student-teachers paired with experienced teachers as a co-teaching team, additional benefits noted by teachers and administration included mutual benefits in professional growth, enhanced energy for teaching, and better staff/teacher relationships (Bacharach & Heck, 2012). Ninety percent or more of 249 co-teachers, who were the specific first-year teacher candidate, reported that co-teaching leads to improved classroom management, increased collaboration skills, and more teaching time (Bacharach & Heck, 2012). Overall, qualitative data presented by Bacharach & Heck (2012) provided additional support and correlation with the positive quantitative academic outcomes seen by co-teaching.

Montgomery & Akerson (2019); Akerson & Montgomery (2017) Research

Researchers Montgomery & Akerson (2019) developed an action-based research project to study the effect of co-teaching to facilitate collaboration between educators (Montgomery & Akerson, 2019). Montgomery & Akerson (2019) hypothesized that the intervention of using co-teaching with student-teacher candidates and experienced teachers would increase the collaboration of future educators (Montgomery & Akerson, 2019). Montgomery & Akerson (2019) cited the definition of Cook & Friend (1995) and attended co-teaching workshop consultation from the St. Cloud State University, The Academy for Co-Teaching & Collaboration. Montgomery & Akerson (2019) broadened their definition of co-teaching to include two teacher candidates co-teaching under the supervision of the mentor, experienced, licensed teacher; this definition of co-teaching is aligned with Bacharach et al. (2010), where two professionals are engaged in co-teaching (Montgomery & Akerson, 2019). Intervention

throughout the semester field experiences included conducting labs modeling the various co-teaching models prior to implementing specific models and student-teacher reflection.

Data collected by Montgomery & Akerson (2019) was in the form of a post-teaching survey at the end of the semester field experience co-teaching in the classroom. The study's sample size in all was 44 (all female) teachers, and provided feedback in the form of rating scales and open-ended survey responses on the perceived benefits and drawbacks of co-teaching (Montgomery & Akerson, 2019). Research provided evidence that time spent planning for co-teaching is productive and essential for the benefits of co-teaching, in which 89% of teacher participants agreed that planning time for co-teaching is necessary and productive (Montgomery & Akerson, 2019). Ninety-eight percent of study participants revealed an increase in the ability to collaborate with other education professionals due to co-teaching (Montgomery & Akerson, 2019). Montgomery & Akerson (2019) revealed that one-teach/one-assist and station co-teaching models were rated the most valuable by 84% and 82% of co-teacher participants, respectively (Montgomery & Akerson, 2019). One-teach/one-observe co-teaching model was rated as not valuable by approximately 2% percent of co-teachers (Montgomery & Akerson, 2019). All participants of the study (n=44) listed the benefits of co-teaching as allowing more individual student attention, students experiencing two perspectives, students experiencing greater opportunities for academic growth, and allowing them to meet student needs more quickly (Montgomery & Akerson, 2019). Insight into the challenges of co-teaching included data that revealed only 35% of teachers said both teachers in a team-taught pair participated in the planning of lessons and activities (Montgomery & Akerson, 2019). The researchers noted the disparity in both co-teachers emphasizing common lesson planning may be due to a lack of planning time or assuming the responsibility of lesson planning fell on a lead teacher in the class

(Montgomery & Akerson, 2019).

Montgomery & Akerson (2019) highlighted that overall co-teacher pairs sought collaboration to lesson plan as a team and found it beneficial (Montgomery & Akerson, 2019). Results also noted that co-teachers listed communication and planning time as challenges in successfully implementing co-teaching, so the future question of how administrators can support time for reflection on co-teaching strategies and building in extra planning time (Montgomery & Akerson, 2019).

Morton & Birky (2015) Research

Researchers Morton & Birky (2015) applied a similar design-based research study approach that was implemented by the researchers of Bacharach et al. (2010) at St. Cloud State University. Teacher candidates (teaching license/master's degree candidates) participated in a four-month full-time co-teaching partnership at the end of an 11-month program. Prior to the co-teaching experience, student-teachers led the classroom as single-teacher, traditionally taught classes. Both teaching opportunities allowed for comparison between the two teaching models, co-taught versus traditional individual-taught classrooms. Morton & Birky (2015) carried out their study over three years, which included data collected from 284 high school 9-12th grade students between two adjacent suburban high schools. In addition to student data, 40 teacher candidates, 40 cooperating teachers, two teacher educators, two university supervisors, and two high school principals participated in the study. The authors noted that the specific co-teaching strategy depended on the specific content area and student performance (Morton & Birky, 2015). The most popular co-teaching strategies utilized were one-teach/one-assist and team-teaching. Professional development was provided each month in the form of a half-day workshop and served as a platform for feedback by the university supervisors and building principals. The

professional development workshops presented opportunities for co-teaching pairs to share effective strategies that could be implemented throughout the design-based research study.

Data was collected in the form of surveys, anecdotal comments, written reflections, classroom observation notes, and student-teaching evaluations. Unlike Bacharach et al. (2010), quantitative student data on academic achievement outcomes was not obtained. Morton & Birky (2015) took a unique approach in collecting quantitative data on student ratings on their belief if they learned the intended content material with co-teaching, what they liked or didn't like about co-teaching, and if they wished or did not wish that more classes utilized co-teaching. Student data was quantified using the Likert scale, coded, and analyzed.

Results from Morton & Birky (2015) supported Bacharach et al. (2010) findings of the positive impact of co-teaching on both students and teaching pairs (Morton & Birky, 2015). Co-teaching classrooms resulted in the highest student engagement and fewest interruptions, which is hypothesized to lead to maximal instructional time and effectiveness (Morton & Birky, 2015). Although student data was not further analyzed based on general education versus special education students, cooperating teachers reported increased effectiveness in meeting diverse learners through co-teaching (Morton & Birky, 2015). The majority of students also rated increased individual attention as a positive benefit of co-teaching (Morton & Birky, 2015). With the intervention of professional development monthly and collaboration between teaching pairs, both collaborative experienced teachers and new student-teachers benefited with a renewal of energy and professional growth (Morton & Birky, 2015).

Tschida et al. (2015) Research

The overall purpose of the studies, Bacharach et al. (2010) and, in follow-up, Morton & Birky (2015), were multifold: (1) to investigate the impact of co-teaching on student and teacher

outcomes; and (2) to investigate the potential of co-teaching as a solution in meeting problems with finding quality student-teacher placements (Bacharach et al., 2010; Morton & Birky, 2015). Tschida et al. (2015) hypothesized that an adaptation of a co-teaching model to increase the ratio of two student co-teachers with a main content teacher (2:1 ratio) would enhance the positive impacts of a typical co-taught classroom with one co-teacher and main content teacher (1:1: ratio). The main goal of this study was to use a 2:1 ratio of co-teaching to reduce the burden of finding limited placements for student-teachers, especially in rural areas. However, it may be argued that the positive effects of a typical co-taught classroom (1:1 co-teacher: main content teacher), may further be amplified if the ratio is doubled. Perhaps, such a study could tease out the individual impact of increasing the teacher-student ratio in co-teaching.

Both elementary and special education teaching programs were used. Qualitative data was gathered from student co-teachers, experienced individual teachers, and the student-teachers' university supervisors. Teachers were provided training on co-teaching strategies during the fall term, and then participants were engaged in the study teaching in the classroom during the spring term. Data were collected by interview and survey. One of the limitations of this study is that only qualitative data was gathered versus quantitative outcomes.

Co-teachers and cooperating content teachers emphasized the benefit of increasing the co-teaching ratio to 2:1 was that students were able to receive more remediation or enrichment (Tschida et al., 2015). Co-teachers commented that the most effective model of co-teaching was the use of station work, so students could work in smaller groups (Tschida et al., 2015). Student achievement growth was reported as positively impacted by the additional 2:1 co-teaching model, compared to a traditional 1:1 model (Tschida et al., 2015). The success of co-teaching correlated with a strong, collaborative relationship between teachers (Tschida et al., 2015).

Interestingly to note, the researchers did not strategically assign co-teachers (student teachers) with mainstream teachers based on compatibility but were matched randomly per the study methods. Tschida et al. (2015) suggested that co-teaching inherently promoted stronger professional growth and teaching practices due to the need to collaborate (Tschida et al., 2015). Co-teachers had positive impacts in the classroom actively co-teaching primarily with team-teaching and alternative-teaching, in which one co-teacher takes a smaller group of students (Tschida et al., 2015). Tschida et al. (2015) also highlighted findings that utilizing teaching candidates for co-teaching, increased the total amount of hands-on teaching and planning time over their student-teaching placement (Tschida et al., 2015). The ability to use co-teaching also allows teachers to see multiple teaching styles, classroom management strategies, and different ways of working with students (Tschida et al., 2015). Overall, Tschida et al. (2015) concluded that the 2:1 co-teaching model enhanced collaborative skills between teachers, and allowed greater opportunities for differentiation in teaching students through stations and one-teach/one-assist co-teaching models that positively impact student outcomes (Tschida et al., 2015).

Hartnett et al. (2014) Research

Hartnett et al. (2014) piloted a 2012-2013 school year co-teaching study, adapted from (Bacharach & Heck, 2010). During the 2012 school year, six school districts that spanned rural, suburban, and urban settings in Missouri were used for the study (Hartnett et al., 2014). In the following 2013 school year, the researchers partnered with over 21 school districts. The total number of participating districts, including administrators, cooperating and co-teachers, and students, gave the study greater reliability, unique to educational case studies of this kind (Hartnett et al., 2014). The goal of the study was to identify strengths, weaknesses, and other areas of interest related to implementing a co-teaching model.

Hartnett et al. (2014) used journal reflections and surveys to collect data, adapted from

Bacharach et al. (2010). Teachers included cooperating veteran teachers and student-teachers that made co-teaching pairs. Reflective journals were collected weekly and gave the researchers updated, ongoing data to review. The purpose of the end-of-year survey was to identify common patterns between co-teaching teams. Student grade levels included primary through 12th grade that were included in the study. The findings of Hartnett et al. (2014) were novel in showing trends in using multiple co-teaching strategies (Hartnett et al., 2014). Hartnett et al. (2014) findings revealed that co-teaching teams used multiple strategies over the school year, and the type of strategy used varied by week (Hartnett et al., 2014). In the beginning week, Hartnett et al. (2014), reported that 90% and 75% of cooperating teachers preferred using the one-teach/one-assist and one-teach/one-observe methods, respectively (Hartnett et al., 2014). After one month (approximately five weeks) of co-teaching, co-teaching teams utilized a variety of co-teaching strategies (Hartnett et al., 2014). A shift in co-teaching strategies occurred after the first month of the school year, in which the utilization of alternative/differentiated co-teaching increased four-fold (10% to 40%) (Hartnett et al., 2014). Data noted by Hartnett et al. (2014), revealed that team-teaching and station-teaching became the most effective at the five-week mark (Hartnett et al., 2014).

Interestingly to note, Hartnett et al. (2014) found co-teaching teams reduced the amount of time they effectively used co-teaching strategies due to increased demands of grading, conferences, and other teaching demands (Hartnett et al., 2014). The percentage of co-teachers that reported shifting from using co-teaching strategies to the one-teach/one-observe strategy was nearly 35% (Hartnett et al., 2014). Compared to the fifth week of the school year, the use of multiple co-teaching strategies decreased from approximately 90% of co-teachers using effective co-teaching models to only 10% of co-teaching strategies, versus one-teach/one-observe

(Hartnett et al., 2014). Hartnett et al. (2014) analyzed data that found differences between specific co-teaching pairs of teachers in how they defined the specific co-teaching strategy they used (Hartnett et al., 2014). Specifically, greater differences were in how the teachers reported using station-teaching, when it was parallel teaching (Hartnett et al., 2014). This provides insight to question what professional development is needed to mentor teachers regarding co-teaching strategy definitions and how this looks in the classroom.

Hartnett et al. (2014) did not find significant differences between what co-teaching models were preferred by teachers (Hartnett et al., 2014). Team-teaching and one-teach/one-assist were reported as the most comfortable co-teaching models used by teachers, approximately 45% and 35%, respectively (reported out of the 7 total strategies) (Hartnett et al., 2014). Supplemental and alternative-differentiated co-teaching models were reported by teachers as the least comfortable teaching strategy (Hartnett et al., 2014). Regarding academic benefits to students, teachers and administrators rated the greatest benefit of co-teaching to students was the more individualized attention (Hartnett et al., 2014). Administrators rated another benefit of co-teaching as providing more immediate feedback to students and maximizing classroom instruction time (Hartnett et al., 2014). In contrast, Hartnett et al. (2014) found that students did not find the co-teaching team to be confusing as a drawback, but building administrators noted one drawback of co-teaching to be the dependence of the co-teacher on the veteran mainstream teacher managing classroom behavior (Hartnett et al., 2014).

Karahan & Roehrig (2017) Research

Karahan & Roehrig (2017) utilized a descriptive case-study approach to gathering data on the use of co-teaching between two different content teachers. Karahan & Roehrig (2017) utilized a high school science teacher and a high school social studies teacher, both experienced

teachers, to deliver co-taught subunits on river-related issues in students' communities. The study involved one high school located in a large suburb in Minnesota. Co-teachers taught the co-taught class as an environmental ethics high school class that included both high and low-achieving students. Karahan & Roehrig (2017) hypothesized that a co-teaching strategy that utilized the collaboration of a science and social studies content teacher can best address socio-scientific issues (SSF), compared to traditional single-taught classes. The authors proposed that co-teaching can help address the need for science teachers to engage students in critical thinking about controversial scientific ethical issues, where a single science teacher may feel ill-equipped (Karahan & Roehrig, 2017). Secondly, it was hypothesized that the use of co-teaching between two content area teachers may help increase student engagement, critical thinking, and support for student project-based learning. Thus, Karahan & Roehrig (2017) proposed that co-teaching can lead to improved academic and social outcomes for all students, especially students with diverse learning needs.

The co-taught environmental ethics class included 31 total students (25 male; 6 female) and lasted over a semester (Karahan & Roehrig, 2017). Both teachers highlighted the benefit of co-teaching to be an avenue for providing multi-disciplinary content and an effective approach to best reach diverse student learners (Karahan & Roehrig, 2017). Data was collected through interviews, observations, and reflective journals. The foundation of the co-taught class was its project-focus and student-driven structure to investigate controversy. Another foundation for the class was that students could take on opportunities to make a difference in going out to help their community. The majority of the semester class work was centered around a student-driven community-based environmental project. Karahan & Roehrig (2017) concluded that co-teaching allowed a more enriched and greater quality of learning for all students due to the ability of both

teachers to collaborate on pedagogical practices and expertise in content (Karahana & Roehrig, 2017). The semester also included field trips to different watershed locations that also highlighted Minnesota Native American culture, and emphasized perspectives from social, economic, and environmental perspectives (Karahana & Roehrig, 2017).

Unfortunately, Karahan & Roehrig did not collect specific student data (Karahana & Roehrig, 2017). However, the implications of this study were novel, since it presented a unique approach to using co-teaching to deliver a multi-disciplined curriculum (Braham & Roehrig, 2017). The authors noted that both teachers collaboratively co-designed the semester curriculum, in addition to delivering the instruction through co-teaching (Karahana & Roehrig, 2017). A further thought is that the use of co-teaching with two general education, mainstream teachers can produce classes where students have more freedom to investigate student-driven, project-based outcomes; thus, a co-taught class, as studied by Karahan & Roehrig (2017), may offer differentiation and supports for inclusion of all students (special education and non-disabled peers) together.

Summary Review of Team-teaching and Statistical Analysis Filtered Articles:

When search criteria for co-teaching included descriptors of *team-teaching* and *statistical analysis*, eight full-text articles were available for review. However, out of the eight articles, three articles focused on post-secondary education. Of the remaining five articles, one study measured the impact of professional development related to co-teaching on primary through secondary educators, and did not include student outcomes (Bowlin et al., 2015). Summaries of all eight articles are provided in the appendix. An additional study focused on English language learners (ELL), but due to the novelty and implications of findings, the study is described below (Aliakbari & Nejad, 2013).

*See Table 2 in the appendix for additional research study summaries.

Aliakbari & Nejad (2013) Research

Aliakbari & Nejad (2013), used a quasi-experimental design to investigate the effect of co-teaching practices on English language learners (ELL) grammar proficiency (Aliakbari & Nejad, 2013). The researchers focused on two class groups of grammar instruction in an Iranian junior high school with 58 total students (Aliakbari & Nejad, 2013). Aliakbari & Nejad (2013) designated one class (28 total students) as the experimental group using co-teaching by a collaborative pair of well-trained teachers (Aliakbari & Nejad, 2013). The control group class (30 total students) was taught by a single teacher, and pre-and post-tests were used to measure language proficiency and grammar. Important to note, the researchers did their best to account for any other outside influences on learning such as differences in the sequence of grammar points taught and potential disturbances by having two teachers in the classroom that students may not be familiar with. The co-taught experimental group utilized a team-teaching model to deliver instruction in a methodical, cautious, and collaborative manner.

Statistical analysis was done by analyzing descriptive stats and a *t*-test of means between the two class groups. Aliakbari & Nejad (2013) stated the null hypothesis as no statistically significant difference in grammar proficiency between the co-taught class group versus the individual single-teacher taught class. Both classes, the experimental co-taught group and the traditional single-teacher taught control group, had the same range of scores, and no statistically significant difference was found between means (95% confidence interval) (Aliakbari & Nejad, 2013). The findings by Aliakbari & Nejad (2013) have great implications for those considering strictly empirical data on the effect of co-teaching. Although the study used an English language learning context, the results argued against the full implementation of co-teaching interventions

for improving sole academic outcomes. This result opposed academic improvements found by Bacharach et al. (2010). It is important to note that this study only used one model of co-teaching, team-teaching, and was done in an Iranian education system. The authors argued that co-teaching may not be the most appropriate teaching model in all educational systems, cultures, or situations (Aliakbari & Nejad, 2103). Additionally, the authors argued that caution should be taken when deciding to implement a co-teaching model given the substantial resources and training needed to effectively produce collaborative co-teachers (Aliakbari & Nejad, 2013).

Keeley et al. (2017); Keeley (2015); Burks-Keeley & Brown (2014) Research

To gain insight into the impacts of co-teaching on secondary students, Keeley et al. (2017), measured student perceptions of common co-teaching models used in the classroom (Keeley et al., 2017). Keeley et al. (2017), outlined the caveat with co-teaching, even though in theory it should provide the best possible LRE environment for students with disabilities: “structural deterrents (p. 521)” defined as factors out of the control of co-teachers, but the structure of the school system itself; and “perceived issues (p. 521)” defined as factors that include feelings and conflicts between team-teachers in a co-teaching pair (e.g., differences in teaching philosophy, classroom management responsibilities, personality conflicts, lack of confidence in curriculum, differences in opinion of effective planning and co-teaching strategies) (Keeley et al., 2017). This study was novel in that it specifically sought to collect empirical data on student perceptions of co-teaching, given the use of various co-teaching models. Furthermore, the researchers, Keeley et al. (2017), sought to answer if there were perceived differences among students, among teachers, and, uniquely, between students and teachers, between the different co-teaching models. This study included both general education and special education student participants. It was hypothesized that statistical analysis of students’

perceptions and teachers' perceptions may differ given the different types of co-teaching methods used (Keeley et al., 2017).

Keeley et al. (2017) used both student and teacher rubrics that included the following topics: classroom management; teaching model; teacher confidence; behavior; learning; student confidence; teacher authority (Keeley et al., 2017). One secondary school building was used within one school district to select student participants for the study (sample size $n = 122$). Out of a total of 122 students, 40 students received special education services (approx. 33%) (Keeley et al., 2017). Co-taught pairs included a general education teacher with a special education licensed teacher, and two were dual-certified (five co-teaching teams). The researchers also systematically used an inter-rater for 20% of the co-teaching observations to ensure reliability between classroom observations and agreed 100% between ratings. The co-teaching pairs had an average of nearly 19 total years of teaching experience. Demographic data of the district and students was gathered, including special and general education percentages, race/ethnicity, gender, and free/reduced lunch status.

The researchers designed a 6-week period for co-teachers to implement five models of co-teaching (one-teach/one-assist, station-teaching, parallel-teaching, alternative-teaching, and team-teaching models). Keeley et al. (2017) chose to not include the one-teach/one-observe model due to the minimal interactions between co-teaching pairs (Keeley et al., 2017). The intervention also included allotted planning sessions for co-teaching pairs. Co-taught classes were the same as single-taught general education classes in length at 54 minutes, and input was gathered from rubrics and observations after every two days of instruction. Statistical analysis used an ANOVA to test for mean differences, given a 95% confidence interval (Keeley et al., 2017).

When answering the question about which co-teaching model was the most recognizable co-teaching model, students preferred station-teaching (Keeley et al., 2017). Keeley et al. (2017) found that students were oblivious to the models of co-teaching used unless it was the most obvious form of station-teaching (Keeley et al., 2017). The researchers concluded that professional development should not place a high emphasis on the structure of the co-teaching models in the classroom (Keeley et al., 2017). Students rated parallel-teaching to provide students with higher confidence levels compared to one-teach/on-assist and station-teaching (Keeley et al., 2017). This finding is very surprising since one-teach/one-assist and station-teaching reduce the student-to-teacher ratio compared to parallel-teaching. Teacher perspectives rated one-teach/one-assist co-teaching models as the least preferred and least effective, because it isn't as cohesive and shared in terms of delivering instruction collaboratively together (Keeley et al., 2017). Teachers rated a preference for alternative-teaching, parallel-teaching, or team-teaching for having the most positive impact on student behavior, student confidence, and teacher authority (Keeley et al., 2017). This study offered a unique lens to see how the data interact or change between student and teacher groups, statistically speaking. Keeley et al. (2017) found that there was more variation within teacher responses, and student responses showed a tight consistency in responses, resulting in surprisingly lower variation (Keeley et al., 2017). This is significant in that students rated all co-teaching methods positively with little variation between responses. Students' behavior remained consistently unchanged regardless of the co-teaching model being used, unlike teachers who connected student behavior to the specific co-teaching model being used at the time (Keeley et al., 2017). Keeley et al. (2017) commented that this finding may allow co-teachers to become more comfortable in using varied co-teaching methods, instead of perceiving the method to influence student behaviors and classroom

management (Keeley et al., 2017). In regards to student learning, teachers rated the one-teach/one-assist as the poorest for having positive impacts on student learning; however, students rated the one-teach/one-assist as having the highest impacts on student learning (Keeley et al., 2017). This data was found to be contradicting the previous pilot study by Burks-Keeley & Brown (2014) and highlights the need for further research in this area (Burks-Keeley & Brown, 2014). This is hypothesized to be true based on the amount of individualized attention per student the one-teach/one-assist model provides compared to other co-teaching methods.

Overall, this data suggests that all co-teaching models had a positive impact when they were varied over the 6-week period of co-teaching (Keeley et al., 2017). The authority of the teachers that are perceived by students may not come from the exact form of the co-teaching model being used, but from other perceived issues (e.g., teaching philosophy, teaching style, classroom management style, and rapport with students). The questions that these findings present include: whose voice should carry more weight when making structural co-teaching model decisions, the voice of the student compared to the voice of the teacher; and given that student voices had very little variation when correlated with the changing of co-teaching models, what other related factors impact students' perceptions on co-teaching besides the specific model being used?

The data published by Keeley et al. (2017) was aligned with a pilot study of student and teacher perceptions of co-teaching methods published in 2014 (Burks-Keeley & Brown, 2014). The 2014 pilot study was the first of its kind to collect data pertaining to teacher and student perceptions of each co-teaching model. Again, the one-teach/one-observe model was not incorporated in this study, due to the minimal interaction between co-teachers when one teacher observes and does not deliver or assist with instruction. The hypothesis that led up to the Keeley et al. (2017) study, following the 2014 pilot study, was that if co-teachers and administrators can

gather formative data on students' perceptions (including teacher perceptions) in relation to the specific types of co-teaching strategies used, then they can find correlative indicators between perceptions and the overall efficacy of teaching and learning (Burks-Keeley & Brown, 2014; Keeley et al., 2017).

Researchers Burks-Keeley & Brown (2014) selected a southeastern United States school district for a junior high school to participate in this study (grades used included two eighth-grade and two ninth-grade classes). As a pilot study, the sample size of students participating equaled 37 students, and 15 were students receiving special education services (mild to moderate disability types including SLD, AD/HD, and ASD) (Burks-Keeley & Brown, 2014; Keeley, 2015). Overall, four classes of students were used in this study but involved two co-teaching pairs (an English Language Arts teacher with a special education teacher). The co-teaching pair would teach the classes for two days using a specific co-teaching model and then switch to a new model. So, the total co-teaching days included 10 consecutive days with various methods. This initial design and set of procedures were the pilot study for the previously mentioned Keeley et al. (2017) study (Burks-Keeley & Brown, 2014; Keeley, 2015).

Burks-Keeley & Brown (2014) used pilot survey rubrics and ANOVA statistical analysis to seek the statistically significant difference between the various co-teaching models used (total of five) for the various perceptions of classroom management, teaching models, teacher and student confidence, engagement, behaviors, teacher authority, etc.). A 95% confidence interval was used, but decided as a pilot study to filter data that measured significance with a 92% confidence interval. One-teach/one-assist co-teaching model was perceived by teachers as the least effective for establishing classroom management, compared to station and parallel-teaching (Burks-Keeley & Brown, 2014; Keeley, 2015). Students perceived the one-teach/one-assist co-

teaching model as the least significant for both teachers presenting new material to the class, compared to the parallel and team-teaching approaches (Burks-Keeley & Brown, 2014; Keeley, 2015). Prior to Keeley et al. (2017), Burks-Keeley & Brown's (2014) pilot study found that students perceived the amount that they learned and confidence to be lowest with the one-teach/one-assist model compared to the other co-teaching models (Burks-Keeley & Brown, 2014; Keeley, 2015). Students felt more confident in the content area with station, alternative, parallel, or team-teaching models compared to one-teach/one-assist, and felt they have learned more with alternative, parallel, and team-teaching models (Burks-Keeley & Brown, 2014; Keeley, 2015). It is important to note that the pilot study of Burks-Keeley & Brown (2014) included a much smaller sample size in students and teaching pairs, in addition to less flexibility in the timeline of the study to deliver instruction (Burks-Keeley & Brown, 2014; Keeley, 2015). It would be an advantage to have a further breakdown of student data comparing special education student perspectives versus those without disabilities in the co-taught classroom.

Bowlin et al. (2015) Research

Bowlin et al. (2015) used a quasi-experimental approach for a recent study to measure the influences of general and special education teachers' beliefs, attitudes, and knowledge on co-teaching (Bowlin et al., 2015). The researchers collected teacher data from 177 total participants (ages 19-53 years old) enrolled in a large university teaching program taking special education courses. The specific teachers taking an urban focus course were not included in the study, and only 153 total teachers completed the online pre-course survey. Pre-service teachers included 32 males and 126 females studying various teaching areas including early childhood, primary, secondary, middle school, and special education (13 total special education teachers, ~8%) (Bowlin et al., 2015). Pre- and post-course surveys gathered data on attitudes, inclusion, sense of

efficacy, demographic questions, and other questions related to strategies for effective inclusive classrooms. Student teachers were given an intervention of viewing a one-hour co-teaching video or observing a co-taught classroom for one hour during the special education course.

Mean scores of responses were analyzed by ANOVA between pre-survey results and post-survey results for the categories: awareness/knowledge; attitude; inclusion; and sense of teacher efficacy. Mean scores were then analyzed by ANOVA test of means between students who watched the co-teaching video intervention compared to those watching and connecting with effective co-teaching pairs. Bowlin et al. (2015) found that participants in a stand-alone special education course can have a positive impact on teacher knowledge, attitude, and perception of their abilities (Bowlin et al., 2015). Experimental results of watching a video on co-teaching versus observing co-teaching in the classroom were interesting to note. Bowlin et al. (2015) found that participants who just watched the video on co-teaching had increased self-efficacy but not an increase in knowledge or attitude (Bowlin et al., 2015). The authors found that attitudes, knowledge, and perceived abilities correlated with the specific teaching level, where post-survey results were higher for primary-level teachers compared to secondary teachers (Bowlin et al., 2015). Interestingly, there was no statistically significant correlation between attitude, efficacy, knowledge, and demographic variables. The researchers also noted that a significant finding included that a small positive correlation existed between the amount of interaction a teacher has with those with disabilities and the positive increase there is with a sense of efficacy (Bowlin et al., 2015). This result is not surprising, since there was a similar positive correlation between confidence and attitudes with increasing experience (Bowlin et al., 2015). Knowledge of co-teaching was not correlated to the other factors of attitude, efficacy, or demographics, based on statistical analysis (Bowlin et al., 2015). Lastly, the researchers found

emotion-based attitudes may be a positive predictor of teachers' sense of self-efficacy towards co-teaching; whereas knowledge, which the authors define as topics of legal issues, disabilities, and teaching strategies, do not add as a positive predictor of self-efficacy (Bowlin et al., 2015).

Bowlin et al. (2015) did not measure specific student outcomes or in-classroom experiences, however. This study suggested potential direct or indirect connections with teacher training that may impact teacher self-efficacy and attitudes (Bowlin et al., 2015). The limitations of this study included a small sample size. This study also implied that knowledge plays a minor role in teacher self-efficacy compared to teacher attitudes; therefore, professional development should prioritize which specific knowledge areas are most essential and emphasize more training to influence teacher attitude. Bowlin et al. (2015) findings lay a foundation to support professional development and training for all teachers in special education areas and co-teaching, since the video training was more effective than in-person observations of co-teaching (Bowlin et al., 2015).

CHAPTER III: APPLICATION OF RESEARCH

District A (Minnesota) Co-Teaching Model

During the time of this thesis writing, a small public charter school (District A) in the east metro area of Minnesota was used to provide insight into the application of findings. Given anecdotal records and applied pedagogy, the researcher was able to obtain a running record of perceptions and outcomes for students and teachers. There was an overall positive perception of co-teaching among administrators, general education and special education teachers. There were still some common questions regarding the specific roles of the individual special education teacher in a co-taught classroom. All co-teachers supporting the mainstream content teacher were special education staff with expertise in the specific content area. This researcher taught in the co-taught classroom in both middle and high school classroom settings, ranging from grades five through 10th-grade classes. The researcher taught with three different general education content teachers, covering science and math subjects. In all, the researcher co-taught students ranging from fifth grade through tenth grade.

District A incorporates all three schools (elementary, middle, and high school) into one main building. The estimated enrollment of District A is 1200 students K-12, which equals an approximate student/teacher ratio of 18:1. Approximately 13% of the student body receives special education services. To meet the continuing growing need of students in special education, District A has implemented co-teaching in the majority of its middle school core classes and some high school classes.

The goal of District A was to have a general education teacher and content-specific special education teaching pair for core classes (math, science, reading/language arts, history/social studies). In the middle school (grades 5-8), special education teachers had duties

of teaching small-group resource room or foundational classes, such as academic support (study skills), foundations math, foundations reading, foundations science, and basic functional or life skills (for individual DCD student(s)). In addition, special education teachers were assigned co-teaching duties based on content expertise and background. The ability to hire and place specific content-focused special education teachers in a co-taught classroom was an ideal initiative. Special education teachers had one preparation hour (prep time) to complete various lesson planning, grading, modifying assessment/curriculum, and special education due process responsibilities (parent communications, IEP/special education clerical due process writing, scheduling IEP meetings, etc.) At times, special education teachers may be called to help assist on a day-to-day basis with individual student behaviors or needs. Due to the numerous teaching duties and responsibilities, most co-teachers did not have common planning times. This was one area of recommendation.

Positive Instructional Benefits

Overall, perceptions of general education teachers involving the special education teacher in a co-taught classroom were positive. Both general education and special education teachers across secondary grades commented that they do see the benefit of having two licensed teachers in the classroom supporting all students. One of the benefits included having another teacher who can help support students who may have missed lessons or need remedial teaching through the alternative-teaching model. Another benefit of using the one-teach/one-assist model was that students needing individualized attention were able to receive one-to-one help. The one-teach/one-assist model helped engage students in ways that the special education co-teacher could use proximity to address attention or behaviors. In science classes, station-teaching and parallel-teaching strategies were occasionally used.

General education teachers at the middle and high school levels commented that they see co-teaching as a positive way to support all students in the inclusive classroom. The use of content-specific special education teachers was especially valued, given their expertise in behaviors, special education, and content. General education teachers also commented that the use of a special education co-teacher was beneficial in managing classroom behaviors. It was common for the special education co-teacher to address student behaviors one-on-one with the specific student, as the general education teacher could continue with the instruction. Often the general education teacher would be responsible for delivering instruction, while the special education co-teacher would assist (one-teach/one-assist model). This researcher also noted one of the benefits of having a content area specialist (special education) teacher co-teaching with the general education teacher is the ability to collaborate more effectively with curriculum and lesson planning. Both principals and teachers agreed that having content-specific special education teachers was the ideal model in that they can have a strong foundation in the curriculum content and be more effective in teaching students. The special education co-teacher was able to help provide other opportunities to explain and re-explain specific concepts through a team-teaching model.

Furthermore, the special education teacher was responsible for modifying assignments and assessments, as necessary, and providing guidance to the general education teacher for meeting accommodations per student individualized education plans (IEPs). The opportunity to be in the classroom as a co-teacher also allowed ample opportunities for data tracking and observation of students. As stated before, the special education co-teacher often handled student discipline and challenging behaviors. Perceptions by both general and special education teachers on the overall effectiveness and implementation of co-teaching were mixed. This aligns

with Murawski and Swanson (2001) review that the overall mean effectiveness of co-teaching was to be 0.40 (40%), moderately effective in impacting student outcomes. Both general education and special education teachers commented that they did not feel adequate time and intentionality was provided to allow for common planning times and collaboration. The lack of common planning times was even more apparent during the direct COVID-19 following year, where school staffing was in-flux. There was no specific professional development or training provided to teachers, regarding co-teaching. Due to year-to-year changes with master teaching schedules and student needs, special education teachers may not be guaranteed to teach with the same content mainstream teacher year-to-year. Another reality of having special education teachers team-teaching in a co-taught class were times that the teacher would need to be excused and handle an individual case-load student behavior.

Overall, special education and general education teachers were in favor of a co-teaching model. However, at times both teachers felt conflicted about specific teaching roles. The special education staff who co-taught felt the majority of grading should be done by the general education teacher. Whereas, the general education teacher thought grading and prep work should be shared and split evenly. It was uncertain at times which teacher should address specific student behaviors. Based on the class makeup and student needs, the special education teacher was expected by the general education teacher to be more intrusive to address student needs; however, the special education teacher expected the general education teacher to interact more with some specific students with disabilities to foster inclusiveness at times. Interestingly, the special education teachers did not always feel empowered to provide valuable feedback to the general education teacher, regarding effective best practices. This perception may be due to a lack of collaborative training for team-teaching pairs. Special education teachers felt there was a

disconnect within the district between what mainstream general education teachers know about the many responsibilities expected by special education teachers versus what they do not know or think they know. In other words, some special education teachers felt the mainstream general education teacher did not fully understand all of the responsibilities, duties, and interactions they have on a daily basis. It was also commented by teachers that very few professional development sessions and/or professional learning community (PLC) groups have provided training for effective team-teaching strategies or how to most effectively use the special education co-teacher to support students. Often, the idea of introducing co-teaching training would be brought up but would be overshadowed by division, district, and state-mandated goals for educators. Lastly, due to changes in the turnover of special education teachers and paraprofessionals, co-teaching teams may have not had as much time and collaboration to build trust, commitment to using various co-teaching models, and trying new teaching methods.

The greatest commented benefit of co-teaching when District A teachers were asked included effective monitoring of students in the classroom and the ability to work with students in small groups or individualized attention. The co-teacher assumed duties to ensure the accommodations and modifications of curriculum were met, assist with discipline and behavioral interventions, and help deliver instruction. The special education teacher would also work with students who needed small-group testing or tests read aloud. Teachers commented that they have seen growth and success in some students with disabilities in the co-taught classroom. The researcher has recorded that in one class sample, students with disabilities showed an increase in scientific conversion calculations, measured by weekly short assessments, through interventions provided by the one-teach/one-assist and alternative-teaching models. The small group of students (2-3 students) with disabilities received extra support in a co-taught classroom, mainly

with one-teach/one-assist and alternative-teaching practices. The students showed an average 20% increase in various science conversion skills over two quarters. Direct collection of students and intervention was not formally tracked. However, the use of curriculum-based measures or assessment of designated power standards may provide ample opportunities to track student data in the co-taught classroom versus traditionally single-taught classes.

Although there was 1:1 paraprofessional support for some students in a co-taught classroom, the role of the special education teacher, at times, was perceived almost like that of a paraprofessional. Without administration support and communication on the purpose and intent of co-teaching, the roles and responsibilities between special education and general education teachers are blurred and misunderstood. The implementation of co-teaching lends itself as an avenue for student support in classes or schools where a lack of paraprofessional support may be the reality. However, it is argued that a licensed special education teacher is able to understand the curriculum and collaborate with the general education teacher in a defined co-teaching model, using specific co-teaching strategies and still supporting individual student needs. In other words, co-teaching in District A was not intended to replace the value of paraprofessional staff, given co-teaching pairs collaborated and strategically followed various defined co-teaching models.

Future Professional Recommendations

Based on the researcher's experience within District A's structure of co-teaching and literature review, the researcher lists the following future recommendations for administration:

1. Administrators should provide adequate opportunities for co-teachers to receive professional development. Professional development opportunities should be intentional to provide research-based co-teaching strategies, time for co-teachers to collaborate together to foster communication

and collaboration, effective co-teaching instructional strategies, and how to monitor co-teaching effectiveness through collecting data on student outcomes.

2. Administrators should provide co-teaching pairs with adequate common preparation time for common lesson planning and collaboration.

3. Administrators should clearly communicate the overall purpose, benefits, and vision of what co-teaching looks like in the classroom and school.

4. Administrators should encourage co-teaching pairs to explore a variety of the many co-teaching models.

5. Administrators should seek input from co-teaching pairs and special education teachers regarding reflection on perceived roles, responsibilities, attitudes, and input.

6. Administrators should collaborate with co-teaching teams and special education teachers regarding forms of data collection to help monitor student progress.

7. Administrators should explicitly and clearly share the value and importance of co-teaching.

8. Administrators should strategically seek the best fit for co-teaching pairs that allow them to teach together yearly, allow growth, and allow teachers to select their preferred team teacher.

9. Administrators should continue to seek current empirical data that allows statistical analysis for determining research-based and best practices related to co-teaching.

10. Administrators should use common sense in considering the various academic, social, and legal LRE benefits in making data-driven decisions related to co-teaching. Common-sense should strive to ensure the vision, guidance, and training best fits the needs of teachers, students, and, overall district goals related to co-teaching. The implementation of co-teaching should emphasize sustainability and may require an individualized approach, such as strategically placing special education students within the co-taught classroom, but adding a supplemental

course for individualized intervention for students needing tier two and tier three supports.

11. Administrators should seek area universities, if possible, that can collaborate with providing student-teacher candidates to pair with veteran teachers to co-teach. Universities can help promote valuable training, while student-teacher placements with teachers in a co-teaching setting can foster positive mentorship, instructional ideas, and renewed attitudes.

CHAPTER IV: DISCUSSION AND CONCLUSION

SUMMARY OF LITERATURE

The use of co-teaching has grown exponentially in the past ten years to accommodate students with disabilities in the least restrictive environment. Co-teaching has now become the most common model for supporting students with disabilities within the mainstream general education setting (Jones & Winters, 2022). The use of empirical studies to collect data on its effectiveness, however, is still modest at best given the results of the researcher's study. Data-driven decision-making to come up with solutions in education is now the expected norm within school systems today. Co-teaching has become an instructional and, in some cases, a financial solution to meet the increasing demands of supporting an increasing number of students with disabilities in the inclusive LRE setting. The question pertaining to data-driven decision-making is relevant to the implementation of co-teaching today: specifically, does co-teaching become the most appropriate solution for the challenge of improving student academic outcomes of special education students in a mainstream general ed. curriculum?

On the other hand, data-driven decisions, when not interpreted or applied appropriately in a way that makes sense, may lead to costly consequences in time, money and potentially reversed desired student outcomes (Schildkamp, 2019). Schildkamp (2019) revealed most data-driven decision-making focuses on student summative assessments; yet, major gaps in assessing the effective use of other educational areas should not exclude or minimize gaps in analyzing the effectiveness of co-teaching (Schildkamp, 2019). Keep in mind, the goal of this study was not to seek flaws or barriers in any particular district or administration decision-making process but to aid the decision-making process by searching for empirical data related to co-teaching. This study used a literature review to compile relevant empirical and quantitative data that can be

statistically analyzed to drive the decision-making process. Critique of the decision-making process itself for each individual district or building is beyond the scope of this study, but the intended goal is to provide up-to-date insight into statistical findings that may correlate co-teaching with positive student academic outcomes; the researcher holds the belief that each district administration needs to make common-sense decisions that consider all stakeholders and factors as much as possible (i.e., staffing, student demographics, academic outcomes, financial budget, and master schedules, etc.). Although limitations of this study exist, given a methodical literature search, the researcher found a major gap in the number of current published empirical data of co-teaching on the effects on student academic outcomes. The social effects of co-teaching on special education students' feelings and measures on the degree of inclusion and the effect of inclusiveness on general education students were also beyond the scope of this study.

This thesis writer aimed to find out how many currently published quantitative empirical studies exist that specifically looked at the efficacy of co-teaching: *how far has research come on the overall efficacy of co-teaching, in the past 10 through 20 years*; and, out of selected studies, *what common themes correlate with effective models of co-teaching being used?*

Murawski & Swanson (2001) sought empirical research related to co-teaching to perform a statistical meta-analysis to find common correlating factors (Murawski & Swanson, 2001). Using a wide strategy including database search, footnote chasing, and hand searching specific special education-related journals, Murawski & Swanson (2001) only pulled 89 total articles, and 37 used quantitative data (Murawski & Swanson, 2001). Specific criteria of using tests of statistical significance and using an experimental design lasting more than two weeks reduced the number of articles for meta-analysis to six studies (Murawski & Swanson, 2001). Murawski & Swanson (2001) found a moderate mean effect size of co-teaching to be 0.40, and reading and

language arts content areas resulted in the largest effect size on student achievement with 1.59 (Murawski & Swanson, 2001). This may suggest that co-teaching should be a recommended solution emphasized in the reading and language arts content areas. An increase in academic outcomes for students with disabilities in the area of reading is aligned with current research (Bacharach et al., 2010). Only four of the six studies focused on student academic outcomes, whereas one study focused on social outcomes and one study on attitudinal outcomes (Murawski & Swanson, 2001).

The researcher followed similar steps to Murawski & Swanson (2001) in the literature search to seek experimental, quantitative data (Murawski & Swanson, 2001). Using the methodical search process across the ERIC peer-reviewed journal database, as described in detail in the previous section, only a total of 48 peer-reviewed articles fit the selection criteria that were published in the past 20 years since Murawski & Swanson (2001). Only eight articles (~16%; 8/48 total articles) were available in full-text that were pulled for review and analysis, that fit the criteria of descriptive words of *statistical analysis* and *team-teaching*. *Minnesota* filtered articles were of interest to the researcher, since the researcher is a current special education teacher in Minnesota. Only seven articles (~5%; 7/140 total articles searched with a descriptor of *co-teaching*) were related to co-teaching in Minnesota. The total number and percentage of overall co-teaching studies found by the researcher showed an apparent gap in the use of quantitative experimental design to collect statistical data on co-teaching factors. Given the gap in experimentally designed studies on co-teaching, administrators and districts should look for ways to collect pertinent data related to the efficacy of co-teaching.

Out of the total studies reviewed, Bacharach et al. (2010) and Heck (2010) have the most complete longitudinal data to date on co-teaching (Bacharach et al., 2010; Bacharach & Heck,

2010). Co-teaching should be used to help support students. Both disabled and non-disabled students benefit from co-teaching in academic measures, especially in areas of reading and math proficiencies (Bacharach et al., 2010). For math proficiency, co-teaching intervention resulted in a nearly 20% increase in special education students' state standardized test scores compared to traditional non-co-taught classes (Bacharach et al., 2010). For reading proficiency, co-teaching intervention resulted in approximately a 25% increase in special education students' state standardized test scores (Bacharach et al., 2010). Academic achievement scores, given WJ-III norm-based academic achievement tests, showed a parallel increase in student scores in co-taught classes compared to non-co-taught classes (Bacharach et al., 2010). In addition to specific academic outcomes, co-teaching improved students' access to receive more individualized attention, more help with difficult material, and learning (Bacharach & Heck, 2012). Not only should co-teaching be advocated to promote improved student academic outcomes, 80% of students themselves advocate for co-teaching as the main delivery model compared to traditional single-taught classrooms (Bacharach & Heck, 2012).

Students in both primary and secondary levels advocate for co-teaching as a means to provide opportunities to work in small groups and receive more individual help (Bacharach & Heck, 2012). Regarding which co-teaching model is most effective, the majority of data point to one-teach/one-assist and team-teaching as the most popular (Morton & Birky, 2015). Overall, co-teaching data shows higher student engagement and lessens the number of behavioral interruptions (Morton & Birky, 2015). Data revealed by the literature in this study show a direct correlation between an increase in teacher-to-student ratio through co-teaching and positive impacts of co-teaching (Tschida et al., 2015). This is expected due to the decreased teacher-to-student ratio, allowing for smaller group work, teacher access, and remediation (Tschida et al.,

2015). This insight reveals that the most important asset to improving student success in the classroom is the resource of qualified teachers. It may be unfeasible from both financial and staffing standpoints. Nonetheless, districts should try to pursue potential co-teaching options, given the academic gains possible. The St. Cloud State University model of collaborating with school districts to help place student-teacher candidates provides a unique opportunity to structure a co-teaching classroom, to counter potential financial and staffing challenges for two licensed teachers in one classroom.

For effective co-teaching to happen, common planning time needs to be prioritized and structured for teachers (Montgomery & Akerson, 2019). Co-teaching allows for collaborative professional development between general education and special education teachers (Montgomery & Akerson, 2019). Administrators need to recognize that communication and planning challenges exist to effectively execute co-teaching (Montgomery & Akerson, 2019). Administrators should advocate for co-taught classrooms that can help refresh the energy or professional growth of teachers, especially with teachers who may benefit from having new perspectives and collaboration within their classrooms (Morton & Birky, 2015). Co-teaching gives teachers an opportunity to gain valuable lenses on various teaching styles, ways of working with different types of students, and collaboration to strengthen classroom management (Tschida et al., 2015). In terms of specific co-teaching models that are most effective in enhancing collaboration of co-teaching pairs, station teaching and one-teach/one-assist co-teaching models positively impacted students (Tschida et al., 2015).

The natural progress of co-teaching models used in the classroom follows the one-teach/one-assist and one-teach/one-observe models as the preferred choice at the beginning of a school year (Hartnett et al., 2014). One may argue that there is a place and time for the one-

teach/one-observe model in a co-teaching classroom, such as the observing teacher may be able to complete grading, collect observational student data, or observe the team teacher. However, it is argued that the one-teach/one-observe should be used sparingly and does not fit a truly defined criteria of effective, collaborative co-teaching. The one-teach/one-observe co-teaching model is the easiest for paired teachers to implement with the least amount of planning and collaboration. Ultimately, the most effective co-teaching models use a variety of different co-teaching strategies over a school year (Hartnett et al., 2014). Administrators should encourage co-teaching pairs to explore the different co-teaching strategies across the curriculum. Once co-teaching teams become more comfortable with each other, curriculum, and students, station-teaching and team-teaching become the next most effective strategies to deliver (Hartnett et al., 2014). Station-teaching and team-teaching take more collaboration and planning versus the one-teach/one-assist model, so co-teaching pairs may be less inclined to intentionally collaborate and plan these models early on in the school year. Parallel-teaching may commonly be mistaken as station-teaching (Hartnett et al., 2014). Parallel-teaching can also be effective by reducing the student-to-teacher ratio; thus, parallel-teaching should also be encouraged at times to help boost effectiveness. Parallel-teaching can be encouraged to help increase student confidence by reducing the student-to-teacher ratio (Keeley et al., 2017). However, research has shown a discrepancy between teacher definitions of co-teaching models and their exact definitions (Hartnett et al., 2014). Administration needs to practically help teachers define and see each co-teaching strategy used. It should be noted that seeing a co-teaching strategy does not have to be in the classroom but can be as simple as a shown video example to help build teacher efficacy (Bowlin et al., 2015).

At the most elaborate collaborative and planning level, co-teaching is an effective tool for a multi-disciplinary approach to supporting students (Karahan & Roehrig, 2017). The use of co-teaching may be proposed as a solution to create a unique classroom environment that supports diverse learners through project-based learning (Karahan & Roehrig, 2017). Could future solutions to engaging diverse learners be to combine content areas that not only tackle specific subject area content, but ethical and social issues? The collaboration of two co-teaching teams may help create the support needed for classes to take on larger, project-based learning objectives that are student-driven. Karahan & Roehrig (2017) laid a foundation for such an approach to learning that gives students more freedom working in groups that can promote inclusion and differentiation for special education students.

Students were keener to view station-teaching as an effective co-teaching method (Keeley et al., 2017). Station-teaching is one of the most labor intensive and strategic uses of the co-teaching models. However, station-teaching can have a high reward in student outcomes for the amount of time and resources needed to plan. Station-teaching allows students to receive a differentiated support system from one teacher teaching a skill set, a second co-teacher offering remedial or support, and a third station for students to work independently. Alternative-teaching is also a strategic intervention for delivering instruction with a remediation group of students (Keeley et al., 2017). Yet, research suggested that at some level, other factors influence effective co-teaching beyond the specific structure of the co-teaching model being used (Keeley et al., 2017; Burks-Keeley & Brown, 2014). A common theme among the research reviewed in this study is that each co-teaching model can be beneficial and has a place within the sequence of units throughout the school year. The exact co-teaching method used may vary based on scope, subject area, lesson goals and activities. Co-teaching leads to academic achievement gains,

increased student engagement, fewer classroom management interruptions, and increased individual attention for students with disabilities (Morton & Birky, 2015).

Students may feel more confident given station-teaching, alternative-teaching, parallel-teaching, or team-teaching, but this should be weighed against the academic achievement gains produced when one-teach/one-assist and team-teaching produce academic gains. One-teach/one-assist has value. On the other hand, the one-teach/one-assist model may be seen as the most intrusive of instructional strategies, where a co-teacher may be more inclined to assist students with disabilities more than others; this increased attention, although may have academic benefits, may counter the social and inclusive goal by singling the student out disproportionately to non-disabled students. In contrast to Bacharach et al. (2010), a statistically insignificant effect of co-teaching was found between a co-taught group and experimental control traditional single-taught group of English language learners (Aliakbari & Nejad, 2013). The co-taught class used a team-teaching model only to deliver instruction. Although this research focused on English language learners, it provides findings that the co-teaching model, specifically a team-teaching model, did not statistically increase academic assessments compared to before co-teaching was used (Aliakbari & Nejad, 2013). This should be taken with caution, given the small sample size and short length of the study compared to the findings of Bacharach et al. (2010) (Aliakbari & Nejad, 2013; Bacharach et al., 2010). This data does suggest, however, that only using one co-teaching strategy of team-teaching is not the most effective, aligning with previous studies mentioned in this study. Administrators and teachers should seek to apply a similar experimental design of using pre- and post-tests as Aliakbari & Nejad (2013) to collect data on the effectiveness of co-teaching in the classroom related to academic gains, in addition to academic achievement tests as Bacharach et al. (2010).

LIMITATIONS OF RESEARCH

Many of the limitations of this study have been noted in previous sections. Compared to Murawski & Swanson (2001), this study is limited by its database search in only using the ERIC database. Due to the scope and feasibility of this study, the researcher limited the literature search only to those available in full-text from ERIC online database. The previous methodology section noted the reasoning for only utilizing the ERIC database. The overall findings of this study should be applied with caution due to the few empirical research studies that fit the criteria of this study. Unlike Murawski et al. (2001), this study did not use meta-analysis to further test studies that used statistical tests of means to determine correlation factors and mean effect size. This study was limited in the specific keyword and descriptor words used in the database search, and did not incorporate hand searching of journal articles and footnote chasing.

IMPLICATIONS OF FUTURE RESEARCH

School districts have also been optimistic about the impact co-teaching can have at all school levels over the long term to help close achievement gaps (Walsh, 2012). Future research is needed to investigate the impact a school system-level approach can have on closing achievement gaps between general education and special education students (Walsh, 2012). This data and research have been broken down for the state of Massachusetts and other states should follow (Jones & Winters, 2022; Walsh, 2012). Longitudinal data over nearly 10 years of a large Massachusetts school district, produced by Jones and Winters (2022), found co-teaching to have a minimal positive effect on students with and without disabilities on math scores in elementary students, and an overall neutral to negative effect on both groups of students in secondary grades (Jones & Winters, 2022). This data reveals the importance of school districts to not hastefully

implement co-teaching as a means to meet special education requirements of inclusion in the LRE but to strategically and initially support a sustainable vision for co-teaching to support all students. For example, students in co-taught classes may also receive extra support through supplementary courses in their class schedule. Future research should expand on Bacharach et al. (2010) and Jones and Winters (2022) longitudinal studies to gather administrative data on the effectiveness of co-teaching. Data on student academic growth in co-taught classes should be analyzed compared to non-co-taught traditional classes. Student data, including demographic data, compared to which content areas use a co-taught class can help find correlations between the co-taught classroom and other variables. Lastly, a more comprehensive literature source that extends beyond the scope of this thesis should follow the protocol of Murawski et al. (2001). Studies that utilize an experimental design and use statistical tests of means can be used for meta-analysis to determine the effect size and correlations of co-teaching with a more current and larger sample size.

CONCLUSION

In summary, the use of co-teaching is becoming the norm for supporting students with disabilities in the least restrictive environment (LRE). Co-teaching offers social and inclusion benefits for both general and special education in a mainstream heterogeneous classroom. With respect to specific academic outcomes, the benefits of co-teaching have mixed results. Long-term data has shown academic gains in both math and reading proficiency. Teachers and students note the benefit of co-teaching models to increase individual student attention, lower student-to-teacher ratios, offer greater differentiation and remedial teaching, and provide access to different teaching styles.

Multiple co-teaching models should be used strategically to benefit both teachers and

students. Parallel-teaching is an effective co-teaching model to increase student confidence with unfamiliar or challenging content material. One-teach/one-assist is an important strategy to help improve academic outcomes for students by offering individualized student attention, increasing student engagement, and addressing student behaviors. Team-teaching and alternative-teaching methods are also proven methods that help support effective co-teaching. Alternative-teaching and station-teaching allow for students to work in small groups and receive remedial intervention, including allowing the teacher to collect progress monitoring or curriculum-based assessment data. A variety of co-teaching techniques should be taught and tried in the classroom.

Progress monitoring data on student outcomes for students with disabilities in co-taught classrooms should be collected. Suggestions for data collection on academic outcomes include district formative systems of standardized tests, state standardized tests, curriculum-based measurements, or summative assessments. The feelings and attitudes of teachers should also be collected to help gauge strengths and weaknesses in the co-teaching model where teachers need extra support. Co-teaching has its challenges regarding staffing and financial resources. One solution is the collaboration between nearby universities that can collaborate with placing and training student-teacher candidates to work with school district teachers to co-teach.

Recommendations for administration include: clearly communicating the value of co-teaching at the classroom, school, and district levels; providing adequate planning and collaboration time for co-teaching teams; providing time for reflection and analysis of data related to the effectiveness of co-teaching; helping co-teaching pairs understand defined roles and responsibilities within the classroom; providing adequate training for staff to grow in the effective co-teaching strategies

and role of special education teachers.

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APPENDIX**Table 1. Appendix, p. 1**

*Table format adopted from Murawski & Swanson (2001)

Keyword: *co-teaching*; Descriptors: *team-teaching*; *statistical analysis*

Filtered: Peer-reviewed; Journal Articles; Full-text Available

Table 2. Appendix, p. 2

*Table format adopted from Murawski & Swanson (2001)

Keyword: *co-teaching*; Descriptors: *team-teaching*

Filtered: Peer-reviewed; Journal Articles; Full-text Available; Minnesota

Primary Author(s)	Title	Date Published	Source Published	Education Level (Elementary, Middle, High School, Post-Secondary)	Research Design	Study Used Defined Co-Teaching Practices (Cook & Friend, 1995)	Sample Size	Length of Study	Location of Study	Grades	Disabilities Included	Basic Results
Aliakbari & Nejad	<i>On the Effectiveness of Team Teaching in Promoting Learners' Grammatical Proficiency</i>	2013	<i>Canadian Journal of Education</i>	Junior High	Quasi-experimental	Yes	58	One Semester (10 Unit Sessions, which was equivalent to two semesters worth of lessons)	Iran	11-13 year old males	ELL (English Learner Language)	No statistically significant difference between single teacher control group vs. co-taught classroom. Student perceptions of co-teaching models was consistent vs. teacher ratings of co-teaching models that had variation.
Bowlin, et al.	<i>Co-teaching and Collaboration: Preservice Teachers' Knowledge, Attitudes, and Perceived Sense of Efficacy in Teaching Students with Disabilities</i>	2015	<i>Journal of the American Academy of Special Education Professionals</i>	Post-Secondary (Undergraduate Teaching licensure program in Special Ed.)	Quasi-experimental	Yes	177	One semester	USA	Teachers (19-53 year)	Yes	Exposure to pre-service training for co-teaching resulted in increased teacher attitudes, knowledge, and perceived abilities of students with disabilities and non-disabilities. Increased student contact with students with disabilities resulted in an increased sense of efficacy. Teacher attitudes correlated with teacher perspectives of sense of efficacy toward co-teaching. Teacher increase in knowledge, attitudes, and sense of self-efficacy following intervention of pre-service introductory special education course.
Burks-Keeley & Brown	<i>Student and Teacher Perceptions of the Five Co-Teaching Models: A Pilot Study</i>	2014	<i>Journal of the American Academy of Special Education Professionals</i>	Faculty of General and Special Ed. Teacher Programs; Secondary (8-9th grades)	Survey Questions	Yes	37 (students) and 2 (teachers)	10 days	USA	8-9th grades	Yes	One-teach/one-assist co-teaching model was significantly less effective in classroom management compared to station and parallel teaching models. The specific co-teaching model a significant impact on student perspectives to learning (the amount of lesson understood and confidence). Co-teaching model of one-teach/one-assist resulted in statistically significant lower student perceptions of learning, confidence, and classroom management. Alternative teaching model scored statistically significant lower than station, parallel, and team-teaching models.
Hunt & Gilmore	<i>Learning to Teach: Teaching Internships in Counselor Education and Supervision</i>	2011	<i>The Professional Counselor</i>	Graduate Program (Ph. D.)	Survey Questions	Not referenced	14	NA (600 Clinical Hours)	USA	Counselor Doctoral Students	No	This study applied co-teaching to give graduate students more support, knowledge, mentorship, and self-efficacy in their profession.
Lang & Bell	<i>Preparing Preservice Teachers for Inclusive Classrooms: A State-wide Survey of Teacher Education Faculty</i>	2017	<i>Journal of the American Academy of Special Education Professionals</i>	Faculty of General and Special Ed. Teacher Programs	Survey Questions	Yes	154	NA	USA	Post-secondary Faculty	Yes (surveyed special education faculty)	Special education faculty are more confident and teach more on co-teaching compared to general education faculty.
Keeley	<i>Measurements of Student and Teacher Perceptions of Co-teaching Models</i>	2015	<i>Journal of Special Education Apprenticeship</i>	Faculty of General and Special Ed. Teacher Programs; Secondary (8-9th grades)	Survey Questions	Yes	37 (students) and 2 (teachers)	10 days	USA	8-9th grades	Yes	Teacher response showed statistically significant preference and confidence about their learning for one teach/one assist co-teaching model, since it is the easiest to implement. Co-teaching models should be altered to favor student preference. Students preferred parallel teaching and team-teaching. Students perceived significantly improved learning with station, parallel, or team-teaching models vs. one-teach/one-assist.
Turklich, et al.	<i>Transferring Educational Theories and Knowledge Using a Co-teaching Mentor Model: A Discipline Appropriate Approach</i>	2014	<i>Journal of University Teaching and Learning Practice</i>	Post Secondary (Undergraduate Students)	Case-Study	No	Class sizes (30-40; 80; 80-100 students)	7 years; 4 years (2 separate case studies)	Australia	Post-secondary Faculty	No	Post-secondary students rated courses that were co-taught as highest in department and improved student retention rates.
Keeley, et al.	<i>Evaluation of the Student Experiences in the Co-taught Classroom</i>	2017	<i>International Journal of Special Education</i>	Secondary	Experimental	Yes	5 co-teaching pairs; 9 teachers; 122 students	6 weeks	USA	Secondary grades NA	Yes	Parallel co-teaching model had statistically highest student confidence compared to one-teach/one-assist and station teaching models. Teachers perceive station teaching model to have lowest influence of student behavior, confidence, and teacher authority. Students ranked one-teach/one-assist co-teaching model as highest ranked, in contrast to teachers. Student perceived learning rated one-teach/one-assist model as most supportive. Student behavior perceptions was unchanged across co-teaching models. Teacher perceived authority may be influenced not by the various co-teaching models, but by other factors (teaching style, classroom management, rapport).

Appendix. Table 1. *Adopted from Murawski & Swanson (2001)

Keyword: *co-teaching*; Descriptors: *team-teaching*; *statistical analysis*

Filtered: Peer-reviewed; Journal Articles; Full-text Available

Primary Author(s)	Title	Date Published	Source Published	Education Level (Elementary, Middle, High School, Post-Secondary)	Research Design	Study Used Defined Co-Teaching Practices (Cook & Friend, 1995)	Sample Size	Length of Study	Student Grades	Disabilities Included	Basic Results
Montgomery & Akerson	<i>Facilitating Collaboration through a Co-Teaching Field Experience</i>	2019	Networks: An Online Journal for Teacher Research	Post-Secondary Teacher Candidates	Action-based research study	Yes	44 female teacher candidates	NA	K-5th grade	Yes	Given survey results by teacher candidates rated one-teach, one-assist and station co-teaching models as the most valuable. Teacher candidates perceived co-teaching to meet student needs more quickly, give students multiple perspectives, increase individual student attention, and allow for greater opportunities for academic growth.
Akerson & Montgomery	<i>Peer-to-Peer Co-Teaching: Idea to Implementation</i>	2017	SRATE Journal	Post-Secondary Teacher Candidates	Action-based research study	Yes	22 teacher candidates	NA	K-5th grade	Yes	Teachers perceive co-teaching supports improved classroom management and keeping students on task. Teacher candidates stated co-teaching increased individual student attention.
Morton & Birky	<i>Innovative University-School Partnerships Co-Teaching in Secondary Settings</i>	2015	Issues in Teacher Education	High School; Graduate Teacher Candidates	Design-based research study	Yes	40 teacher candidates; 40 cooperating licensed teachers; 2 high school principals; 284 sampled high school students	3 years	9-12th grade	Yes	Investigated the effectiveness of co-teaching on the performance of the teacher, future teacher candidates, and classroom performance. Classroom management resulted in fewer behavioral problems. Students reported increased academic support and clarification of the lesson, more engaging lessons, and more timely feedback.
Tschida, et al.	<i>It Just Works Better: Introducing the 2:1 Model of Co-Teaching in Teacher Preparation</i>	2015	Rural Educator	Post-secondary teacher candidates; Licensed teachers; University professors; Kindergarten-High School	Design-based research study	Yes	25 teacher candidates; 14 cooperating licensed teachers; 6 university professors; Co-teaching classrooms (14), total sample size n = 25 students vs. non-co-	1 semester	K-12th grade	Yes	Co-teaching allows improved quality teacher placements in rural areas. A 2:1 (2 co-teachers and 1 content teacher) allowed for differentiation with small-groups, redirection of off-task students, and correction of misbehaviors. First study to compare a 2:1 co-teaching model vs. traditional 1:1 co-teaching model.
Hartnett, et al.	<i>A Work in Progress: Unraveling the Lessons Learned in a Co-Teaching Pilot</i>	2014	Educational Renaissance	Post-Secondary Teacher Candidates; Pre-Kindergarten-High School	Design-based research study	Yes	76 students (21 school districts)	1 semester	Pre-K-12th grade	Yes	Teacher candidates (co-teachers) used multiple co-teaching strategies at various times of teaching semester. Greatest commented benefit for students was increased individual attention. 100% of administrators supported co-teaching. Almost 70% of building administrators commented co-teaching takes too much time compared to estimated 15% of teachers. Approximately 80% of students (n = 1686) said co-teaching allowed students to get more help with questions and approximately 70% responded saying they benefit from different styles of teaching with more individual attention.
Bacharach & Heck	<i>Voices from the Field: Multiple Perspectives on a Co-Teaching in Student Teaching Model</i>	2012	Educational Renaissance	Elementary; Middle; High School	Experimental	Yes	826 pair of co-teachers (34 pre-K classrooms; 601 K-6 classrooms; 120 secondary classrooms; 71 special ed. Classrooms)	4 years	1st-12th grade	Yes	Data over 4 years resulted in statistically significant improvements in Minnesota Comprehensive Assessment (MCA) in each year for reading and math in co-taught classes versus non co-taught classes. Woodcock Johnson (WJ) test of academic achievement results showed statistically significant increases in all 4 years in reading and 2 years in math in co-taught classes compared to non co-taught classes. Teachers in co-taught classrooms rated high feelings of improved classroom management, teaching time, confidence, teaching time, and opportunities to deepen curriculum and reflection.
Karahan & Roehrig	<i>Case Study of Science and Social Studies Teachers Co-Teaching Socioscientific Issues-Based Instruction</i>	2017	Eurasian Journal of Educational Research	High School	Descriptive Case-Study	Yes	Pair of co-teachers (1 science teacher; 1 social studies teacher); 31 secondary students (25 male; 6 female)	1 semester	Secondary grades NA	Yes	Co-teaching supports project-focused and student-driven class structure (semi-structured instruction) (class discussions, field trips). Co-teaching fosters perspectives from both teachers own content expertise. Co-teaching provides opportunity for multi-disciplinary classes with two different content areas that can provide richer learning experiences for students.

Appendix. Table 2. *Adopted from Murawski & Swanson (2001)

Keyword: *co-teaching*; Descriptors: *team-teaching*

Filtered: Peer-reviewed; Journal Articles; Full-text Available; [Minnesota](#)