

2-5-2026

# General and Special Education Teachers' Perceptions of Challenges in Inclusive Secondary College Preparatory Science Courses

Jennifer Wilson  
*Walden University*

Follow this and additional works at: <https://scholarworks.waldenu.edu/dissertations>

---

This Dissertation is brought to you for free and open access by the Walden Dissertations and Doctoral Studies Collection at ScholarWorks. It has been accepted for inclusion in Walden Dissertations and Doctoral Studies by an authorized administrator of ScholarWorks. For more information, please contact [ScholarWorks@waldenu.edu](mailto:ScholarWorks@waldenu.edu).

# Walden University

College of Education and Human Sciences

This is to certify that the doctoral study by

Jennifer Wilson

has been found to be complete and satisfactory in all respects,  
and that any and all revisions required by  
the review committee have been made.

Review Committee

Dr. Ajay Das, Committee Chairperson, Education Faculty  
Dr. Sydney Parent, Committee Member, Education Faculty

Chief Academic Officer and Provost  
Sue Subocz, Ph.D.

Walden University  
2026

Abstract

General and Special Education Teachers' Perceptions of Challenges in Inclusive

Secondary College Preparatory Science Courses

by

Jennifer Wilson

MA, Wilmington University, 2013

BS, Wilmington University, 2012

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Special Education

Walden University

February 2026

## Abstract

The problem that was addressed through this study is that secondary coteachers struggle to support students with disabilities in inclusionary college preparatory science classes. Grounded in Bandura's theory of collective agency and supported by Pratt's framework for achieving symbiosis, the purpose of this study was to explore secondary coteachers' experiences and challenges as well as their perceptions of collaboration and professional development opportunities related to coteaching in inclusive college preparatory science classrooms in the Mid-Atlantic region of the United States. For this basic qualitative design, semistructured interviews were conducted with 10 secondary college preparatory science coteachers. The data were analyzed using thematic analysis with the following seven themes emerging: coteachers identified students' academic barriers, weak executive functioning skills, and difficulties recovering from absences as challenges, as well as their professional needs for increased time to support coteaching relationships and collaboration, familiarity with both content and coteaching approaches, increased preparation, and more relevant ongoing training. The findings of this study may inform educational leaders in designing targeted support and training opportunities for secondary coteachers. Collectively, these outcomes may contribute to systemic improvements in inclusive secondary science education by expanding equitable access to rigorous college preparatory pathways, promoting academic persistence, and supporting long-term postsecondary opportunities for students with disabilities.

General and Special Education Teachers' Perceptions of Challenges in Inclusive

Secondary College Preparatory Science Courses

by

Jennifer Wilson

MA, Wilmington University, 2013

BS, Wilmington University, 2012

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Special Education

Walden University

February 2026

## Dedication

This dissertation is dedicated to all of the secondary coteachers who strive each and every day to work together to support the success of students with disabilities in rigorous inclusionary college preparatory courses and beyond.

## Acknowledgments

This dissertation cannot be published without acknowledging my family and friends, who made it possible for me to take on this journey. Thank you to my husband and son, who mostly took over running a horse farm along with their already busy lives. And a huge hug to my daughters, as I missed so much of their past 5 years growing up. Thank you to my mom for her constant support and guidance. I extend the utmost gratitude to my friends who always checked in on me and never gave up hope on me achieving this dream.

Thank you to my colleagues who had my back throughout this experience. Your support and enthusiasm kept me forging through the most frustrating of times. I owe immense gratitude to the Drs. Clarke for all of their guidance and direction throughout this experience. I have to thank my advisor, Sara Janssen, for always picking up that phone and checking in at just the right time.

Finally, I must thank my chair, Dr. Ajay Das, for pushing me to reach my highest potential throughout this venture. Thank you for the feedback, the advice, and the support. Additionally, I extend thanks to my committee member, Dr. Sydney Parent, for your recommendations and enthusiastic support.

## Table of Contents

List of Figures.....	v
Chapter 1: Introduction to the Study.....	1
Background.....	3
Problem Statement.....	5
Purpose of the Study.....	7
Research Questions.....	8
Conceptual Framework.....	8
Nature of the Study.....	10
Definitions.....	11
Assumptions.....	12
Scope and Delimitations.....	12
Limitations.....	14
Significance.....	16
Implications for Social Change.....	17
Application to Professional Practice.....	18
Improvement at the Local Level.....	18
Summary.....	19
Chapter 2: Literature Review.....	20
Literature Search Strategy.....	21
Conceptual Framework.....	22
Bandura’s Social Learning Theory on Collective Agency.....	22

Pratt’s Conceptual Framework of Achieving Symbiosis.....	23
Review of the Literature Related to Key Concepts and/or Variables.....	26
Coteaching .....	26
Challenges in Coteaching .....	32
Challenges in Teaching Adolescents and Students With Disabilities .....	40
Summary and Conclusions .....	46
Chapter 3: Research Method.....	47
Research Design and Rationale .....	47
Role of the Researcher .....	50
Potential Biases.....	51
Methodology .....	52
Participant Selection .....	54
Instrumentation .....	55
Procedures for Recruitment, Participation, and Data Collection.....	56
Data Analysis Plan.....	59
Trustworthiness.....	60
Credibility .....	61
Transferability.....	61
Dependability .....	62
Confirmability.....	62
Ethical Procedures .....	63
Participant Selection and Treatment.....	64

Confidentiality of Data .....	65
Summary .....	66
Chapter 4: Results .....	67
Setting .....	67
Participant Demographics .....	69
Data Collection .....	70
Interviews .....	70
Data Analysis .....	71
Results .....	71
Research Question 1: Academic and Cognitive Deficits .....	72
Research Question 2: Challenges Affecting Collaboration .....	83
Research Question 3: Perceptions of Preparedness and Relevant Ongoing Training .....	93
Discrepant Cases .....	101
Evidence of Trustworthiness .....	102
Credibility .....	102
Transferability .....	103
Dependability .....	103
Confirmability .....	104
Summary .....	104
Chapter 5: Discussion, Conclusions, and Recommendations .....	106
Interpretation of the Findings .....	107

Themes Related to Research Question 1 .....	107
Themes Related to Research Question 2 .....	112
Themes Related to Research Question 3 .....	116
Limitations of the Study.....	119
Recommendations.....	120
Implications.....	121
Conclusion .....	123
References.....	124
Appendix A: Individual Interview Questions for Special Education Teachers.....	143
Appendix B: Individual Interview Questions for General Education Teachers .....	145
Appendix C: Initial Letter of Invitation.....	147
Appendix D: Screening Questions.....	148
Appendix E: Survey/Interview Validation Rubric for Expert Panel .....	149
Appendix F: Participant Responses Related to Theme 1 .....	150
Appendix G: Participant Responses Related to Theme 2 .....	153
Appendix H: Participant Responses Related to Theme 3 .....	157
Appendix I: Participant Responses Related to Theme 4.....	159
Appendix J: Participant Responses Related to Theme 5 .....	163
Appendix K: Participant Responses Related to Theme 6 .....	166
Appendix L: Participant Responses Related to Theme 5.....	169

## List of Figures

Figure 1. Pratt's Visual Model for the Framework of Achieving Symbiosis .....	25
Figure 2. The Six Most Commonly Applied Techniques of Coteaching .....	29
Figure 3. Themes and Categories for Research Question 1 .....	73
Figure 4. Themes and Categories for Research Question 2.....	84
Figure 5. Themes and Categories for Research Question 3.....	93

## Chapter 1: Introduction to the Study

Students with disabilities (SWD) have been increasingly included in the general education setting since the No Child Left Behind Act of 2002 (NCLB) and the reauthorization of the Individuals with Disabilities Education Act of 2004 (IDEA) mandated students be taught in the least restrictive environment (LRE; Pratt et al., 2017). IDEA expectations were further pressed with the Every Student Succeeds Act (ESSA) in 2015 (ESSA, n.d.) and the Next Generation Science Standards (NGSS; NGSS, n.d.-b), both with increased pressure on student performance and outcomes on high-stakes testing.

Many SWD require additional academic or behavioral support to access the general education curriculum (King-Sears et al., 2021; Wexler, 2021). The necessary additional supports are typically achieved in the coteaching model, where one teacher is a content area teacher, and the other is a special education teacher. Despite the push for increased inclusion and access to the general curriculum, SWD continue to perform significantly lower in college preparatory science courses than their typical peers (Kaldenberg et al., 2015; Taylor et al., 2020).

Secondary coteachers experience more complex challenges in the coteaching model than primary teachers (Dieker & Murawski, 2003; Keefe & Moore, 2004; Pratt, 2014; Ricci et al., 2021), which has a negative effect on high school students' academic success in science courses (Taylor et al., 2020). Pratt (2014) noted a significant gap in the research on the challenges secondary coteachers experience. Additional research indicates that instructional strategies proven effective at the primary level are more

difficult to implement in secondary academic settings (Keefe & Moore, 2004); however, instructional strategies specific to supporting secondary SWD have not been sufficiently examined in the literature. Boyle (2021) identified only six articles specific to effective strategies to support SWD at the secondary level, and exhaustive searches yielded few results specific to secondary science instruction for SWD.

Additional barriers to the success of coteaching at the secondary level include expert-level content knowledge, lack of coplanning time, and the increased pacing of instruction (Keefe & Moore, 2004). Another significant challenge secondary coteachers experience in supporting SWD in inclusive college preparatory classes is the number of students they serve (Keefe & Moore, 2004). While an elementary special education coteacher can expect to support up to 10 students in a single class through a full school year, a secondary-level special education coteacher might support over one hundred students throughout the school year in a variety of courses with different coteaching partners with varying classroom management strategies (Ansley et al., 2016).

The unique challenges secondary college preparatory science coteachers experience in inclusionary college preparatory science classes will be explored in this study. While current research on challenges experienced by coteachers at the secondary level lacks quality and effectiveness (Losinski et al., 2019; Pratt, 2014), King-Sears et al. (2021) found a significant discrepancy in the positive effect of cotaught classes for SWD in mathematics and language arts compared to other classes, such as science and social studies. Regardless of the increased participation of SWD in inclusive classes in the secondary setting, they continue to perform significantly lower in science achievement

standards and mature to be highly underrepresented in science, technology, engineering, and mathematics (STEM) careers than students without disabilities (Taylor et al., 2020). There is a need to better understand the specific challenges secondary college preparatory science coteachers experience (Pratt, 2014) to improve the coteaching model in inclusionary college preparatory science classes and increase the potential success of SWD.

In Chapter 1, I will provide a background of inclusive education. Chapter 1 will also include the study's problem statement and purpose. The research questions (RQs) will be stated. I will also explain the conceptual framework and nature of the study. Definitions of specific terms related to the study will be provided. The assumptions, scope, and limitations of the study will also be discussed, followed by the significance. Chapter 1 concludes with a summary and an outline of Chapter 2.

### **Background**

In 1975, President Gerald Ford enacted the Education for All Handicapped Children Act (IDEA, 2022). This civil rights law mandated that SWD no longer be excluded from general education settings (IDEA, 2022). Throughout the 1980s, SWD were usually mainstreamed in nonacademic areas such as elective or special classes (Richardson, 1998). While the act provided SWD more rights than before, the IDEA in 1997 enhanced the LRE concept, requiring SWD to be taught with typical peers to the greatest extent possible for each student (IDEA, 2022). When Congress reauthorized IDEA in 2004, the demand for the success of SWD through inclusionary education increased (IDEA, 2022). As the academic expectations for typical students have

increased over the past several decades, so have the academic expectations for SWD (IDEA, 2022). The demand for accountability for the success of SWD in the general education setting only increased with the NCLB, followed by the ESSA.

The inclusion of SWD into the general education setting led to the widespread implementation of the coteaching model for special education students, where a lead teacher and a special education teacher work together to support students of mixed abilities (Dieker & Murawski, 2003). Currently, nearly 95% of SWD receive much of their education in the inclusionary or general education setting (National Center for Education Statistics, 2023). While coteaching has been the model pedagogical practice for supporting SWD in the LRE for nearly three decades, research confirms that coteachers in secondary college preparatory inclusionary classes face complex challenges in delivering instruction effectively, resulting in SWD struggling to meet graduation requirements or achieve college readiness (Colson et al., 2021; Francisco et al., 2020).

Two significant contributors to success in inclusionary coteaching include shared planning (Barron & Friend, 2025; Davis et al., 2012; Jurkowski et al., 2020; King-Sears et al., 2019; Pratt et al., 2017) or collaboration (Keefe & Moore, 2004) and shared parity or compatibility among coteachers (Davis et al., 2012; Johnson et al., 2022; Jurkowski et al., 2020; Keefe & Moore, 2004); however, studies find that many coteachers at the secondary level do not have adequate shared planning and frequently experience a significant lack in parity (Jurkowski et al., 2020; Pratt, 2014; Stefanidis et al., 2019). While Jurkowski et al. (2020) focused on coteaching within Germany's unique educational and cultural framework, the consistency of reported successes and challenges

with those identified in American studies suggests that limitations in shared planning and parity may extend across differing national contexts.

Although the practice of coteaching has progressed since modern models were developed in the 1990s by Cook and Friend (1995), secondary coteachers continue to struggle to implement quality inclusionary instruction (Colley & Lassman, 2021; Colson et al., 2021; Dieker & Murawski, 2003; Duchaine et al., 2021). The nature of coteaching is challenging (Keefe & Moore, 2004; Pratt, 2014), but while it is more complex at the secondary level, it is less documented (Keefe & Moore, 2004; King-Sears et al., 2021; Losinski et al., 2019; Pratt, 2014). Commonly reported coteaching challenges at the secondary level include a lack of coplanning time (Jurkowski et al., 2020; Pratt, 2014), lack of parity (Pratt, 2014), course scheduling challenges, conflict resolution (Pratt, 2014), personal and professional compatibility (Pratt, 2014), and lack of expertise in specialized content areas (Chu et al., 2020; Dieker & Murawski, 2003; Duchaine et al., 2021; Pratt, 2014). Although Chu et al. (2020) examined coteaching within the Canadian secondary education context, the similarities between Canadian and U.S. public school systems (Skerrett, 2010) support the applicability of these findings to American secondary coteaching settings. This study proposes to more deeply explore the unique challenges secondary college preparatory science coteachers experience in delivering effective instruction in the inclusionary classroom.

### **Problem Statement**

In 2022, 98% of SWD in the study site failed to meet science standard proficiency, according to state report card data reported on the state site's website,

suggesting that coteachers in science courses in the local setting may have difficulty delivering specialized instruction to meet the needs of all learners in inclusionary science classes. The difficulty in meeting the needs of diverse learners creates a gap in instructional delivery, causing SWD to fall behind while typical peers move ahead to the next lesson (Colson et al., 2021).

It is well documented that special education teachers at the secondary level feel underprepared to teach students in content-specific settings such as science (Chu et al., 2020; Dieker & Murawski, 2003; Duchaine et al., 2021). Because existing research has not sufficiently examined secondary-level, content-specific coteaching challenges, preservice preparation for secondary educators of SWD often lacks targeted training across content areas (Chu et al., 2020; Colley & Lassman, 2021; Colson et al., 2021; Dieker & Murawski, 2003; Duchaine et al., 2021). This gap in preparation contributes to ongoing challenges in supporting SWD in rigorous college preparatory science courses. The lack of adequate academic support at the secondary level (Colson et al., 2021; Francisco et al., 2020) becomes problematic in the inclusive college preparatory setting as SWD in these courses are pursuing a standard high school diploma yet struggle to meet specific course requirements (Colson et al., 2021).

Research indicates that secondary general education science teachers frequently fail to view themselves as teachers of SWD and may have a negative attitude toward inclusion (Colson et al., 2021; Hester et al., 2020; Keefe & Moore, 2004; Taylor et al., 2020). The issue persists despite two decades of research indicating that secondary general education teachers are more likely to have a negative attitude toward inclusion

than primary teachers. Secondary general education science teachers must be highly qualified to teach a specific area, such as biology, chemistry, Earth science, or physical science (Colson et al., 2021). Special educators are rarely content-area experts, but they must comprehend, break down, and interpret complex science concepts and lessons to support SWD in secondary science classrooms (Colley & Lassman, 2021; Colson et al., 2021; Keefe & Moore, 2004; Preston-Smith et al., 2020). The problem that was addressed through this study is that secondary coteachers struggle to support SWD in inclusionary college preparatory science classes

### **Purpose of the Study**

The purpose of this study was to explore secondary coteachers' experiences and challenges as well as their perceptions of collaboration and professional development opportunities related to coteaching in inclusive college preparatory science classrooms in the Mid-Atlantic region of the United States. The data collected from secondary college preparatory science coteachers was analyzed to reveal themes that identified the barriers that create a lack of adequate support in inclusionary science classes. The results of this study may provide school and district leaders in the local setting with specific information necessary to create targeted training opportunities to better prepare secondary college preparatory coteachers for supporting SWD in inclusionary classes. Leaders in other institutions with similar demographics could use the information in this study to create targeted professional development (PD) opportunities to increase the preparedness of secondary college preparatory science coteachers.

### **Research Questions**

Three RQs underpinned this study:

RQ1: What challenges do secondary coteachers experience when teaching SWD in the college preparatory inclusionary science classroom?

RQ2: What are secondary coteachers' perceptions of collaboration in the college preparatory inclusionary science classroom?

RQ3: What are secondary coteachers' perceptions of ongoing PD opportunities related to secondary-level science coteaching?

### **Conceptual Framework**

Bandura's social learning theory of collective agency provided the conceptual framework for this qualitative study, which supports the topic of concern by focusing on the shared challenges of coteachers in the secondary setting. Bandura (2000) expressed that "individuals are producers of experiences and shapers of events" (p. 75). Indeed, teachers produce learning experiences for their students and shape the events of the classroom and the potential futures of their students. Secondary college preparatory science coteachers must develop collective efficacy to ensure the academic success of all students, including those with disabilities (Pratt, 2014). Bandura (2006) asserts that people must share the desire to work together toward a common goal to create collective efficacy.

A working group must share a high perception of its collective efficacy to function, which is impossible without interdependency (Bandura, 2006). Collective efficacy in coteaching develops from an interdependence between general and special

education teachers (Stefanidis et al., 2019). When coteaching exists without interdependence between the two teachers, there arises “an imbalance in use of expertise and skills which greatly hinders effective instruction and learning for all students” (Pratt, 2014, p. 2). The collective agency of collaboration among secondary coteachers can positively affect student success by combining each teacher’s knowledge, abilities, and influence through collective resources (King-Sears et al., 2019; Stefanidis et al., 2019).

The logical connections between Bandura’s theory of collective agency and my study approach included Pratt’s framework for achieving symbiosis, which has been used to explore the balance that must be reached to attain successful coteaching. Challenges are inherent in collaboration, but when coteachers can work interdependently, they can overcome the challenges and deliver effective, inclusive instruction (Pratt, 2014). While interpersonal differences will be present among coteachers, Pratt’s (2014) research shows how effective coteachers can use their differences to strengthen their interpersonal relationship and professional practice. I review these logical connections in more detail in Chapter 2.

Successful coteachers experience the three stages of achieving symbiosis: initiation, the symbiosis spin, and fulfillment (Pratt, 2014). Initiation occurs when a coteaching partnership is developed, either through self-initiation, expectation, or request, and coteachers experience feelings from hesitation to anticipation in this stage (Pratt, 2014). Coteachers must feel a sense of compatibility to enter the symbiosis spin (Pratt, 2014). The symbiosis spin is a cycle in the stages of testing the water, reflecting to make compatibility improvements, and strategies to build relationships (Pratt, 2014).

Partnership building through the symbiosis spin leads to fulfillment (Pratt, 2014). Once in the fulfillment stage, coteachers no longer face relational challenges and can focus on instructional and student needs (Pratt, 2014). Upon achieving symbiosis, coteachers can employ collective agency to deliver quality instruction. To achieve symbiosis, teachers must better understand the challenges secondary college preparatory science coteachers experience when teaching SWD in the inclusionary classroom. This study explored the specific challenges these educators experience when supporting inclusionary classes with SWD, which may prevent them from achieving working symbiosis.

### **Nature of the Study**

The nature of this study was a qualitative approach utilizing a basic qualitative design to explore secondary college preparatory science coteachers' experiences with challenges in inclusionary classrooms, as well as their perceptions of collaboration and professional development opportunities related to science coteaching. Semistructured individual interviews were used to allow participants to describe their experiences and perceptions in their own words within the context of their instructional roles (Babbie, 2017; Kekeya, 2021). A basic qualitative design was appropriate for this study because it supported an in-depth examination of how participants made meaning of their instructional experiences and professional contexts without bounding the inquiry to a specific case.

Data were analyzed using thematic analysis, which involved systematic coding to identify recurring patterns and themes across participant responses. This analytic approach aligned with the study's research questions by capturing both experiential data

on instructional challenges and perceptual data on collaboration and professional development. The study aimed to generate meaningful findings that may inform the development of targeted strategies to strengthen coteaching practices for SWD in inclusionary college preparatory science classes.

### **Definitions**

I use several terms in the study that may require me to clarify their meaning related to the research context. I define each term as it specifically relates to the context of this study. The definitions are as follows:

*Active involvement in instruction:* In coteaching, the practice of both the general and special education teachers taking an active role in delivering the course instruction (Johnson et al., 2022).

*Collective agency:* Collective agency is the drive to work collaboratively to achieve a common goal (Bandura, 2000).

*Coteaching:* Coteaching is universally accepted as the practice of two certified teachers delivering instruction and evaluating educational outcomes in the same classroom simultaneously (Kloo & Zigmond, 2008).

*Deductive disclosure:* The process of identifying non-identified study participants through information related to their personalities, traits, or experiences. This is especially possible in smaller qualitative studies (Ravitch & Carl, 2020).

*Inclusion:* Inclusion is the teaching practice where all students, including SWD, are provided an equitable education, often within a classroom, offering a grade-level

curriculum with a mix of special education and general education students (Francisco et al., 2020).

*Inquiry-based learning*: Inquiry-based learning is the process by which a learner develops understanding through questioning, exploring, and experimenting using critical thinking skills (Chikaluma et al., 2022).

*Least restrictive environment (LRE)*: The practice where SWD are taught to the greatest extent possible in the same setting as students without disabilities by providing them with the services required to be successful (Colley & Lassman, 2021).

### **Assumptions**

There are several assumptions within the study. It was assumed in this study that the coteachers interviewed were willing to participate and provide accurate, unbiased, and complete responses during the interview process. Another assumption was that participants gave in-depth responses, thereby providing rich data for the study. Participant responses were assumed to be truthful and honest. Additionally, it was assumed that participants were familiar with different styles of coteaching and had experienced challenges while coteaching in the secondary college preparatory inclusionary science setting. It was assumed that interviewees took part in the study with genuine interest and not to receive any potential compensation.

### **Scope and Delimitations**

The study focused on the challenges of supporting SWD experienced by secondary science coteachers in the college preparatory inclusionary setting. Delimitations of this study included the semirural geographical location, which offered a

limited participant pool. The study was conducted in a single, semirural school district. I planned to recruit additional participants from two other similar neighboring districts if I needed to obtain additional volunteers for ample interview data; however, I was able to meet my target interview pool with 10 participants. The participants were limited to the secondary setting serving Grades 9–12. I chose not to include the teachers in the middle school because teaching teams are divided by grade level, and the structure of cotaught classes is more similar to that of the primary grades in this district, thereby not reflecting the unique challenges of the secondary school system. Participants included 10 total general education and special education teachers, each of whom had experience coteaching in the inclusionary college preparatory science setting within the past 5 years. I applied Bandura’s theory of collective agency and Pratt’s framework of achieving symbiosis to frame the study to explore the human nature of working together for a common goal while experiencing relational challenges.

Other conceptual frameworks were considered for this study, but were ultimately rejected. Classroom management frameworks can be closely related to student success and teacher efficacy (Pianta & Hamre, 2009), but I found this framework was not as appropriate for a study focusing on the secondary level as special education coteachers in high schools may teach with several different partners across different content areas (Dieker & Murawski, 2003) and may experience several different classroom management techniques throughout the day. A teacher efficacy framework, the belief that a teacher’s positive thoughts on their efficacy can affect the quality of their practice (Lawrent, 2024), could have also been considered for the study. Although Lawrent’s (2024) study focused

on schools in Tanzania, I determined that a teacher efficacy framework failed to fully encompass the nuances involved in the partnership of the coteaching experience.

By examining secondary coteachers' experiences with instructional challenges and their perceptions of collaboration and professional development in college preparatory science classrooms, this study may inform secondary school leaders' efforts to improve organizational structures and better prepare coteachers for collaborative practice. Although the findings may not be transferable to larger or more urban districts due to the study being conducted in a single school with a limited number of participants, the results may still offer relevant insights for school administrators and professional development providers seeking to support secondary college preparatory science coteachers.

### **Limitations**

In conducting this qualitative study, I encountered several limitations. A significant challenge to the study was gaining access to participants (Ravitch & Carl, 2020). Because the study was conducted in a semirural location with a single area high school and focused on only secondary teachers who have cotaught SWD in inclusionary science courses, I had a limited potential participant pool. Qualitative research requires interview data to reach saturation (Rubin & Rubin, 2012). I reached saturation in interview data through 10 local participants.

I relied on interview input from teachers from a small, rural community. The interconnected nature of a location with a limited population leads to duality in teachers' professional and personal roles (Heslop et al., 2018). Heslop et al. (2018) stated,

“maintaining a participant’s right to...confidential participation, and ethical researcher-participant boundaries can be difficult within the socially proximate rural setting” (p. 3).

Because I collected data on challenges experienced by teachers in this rural area, I needed to ensure confidentiality in the reported responses (Ravitch & Carl, 2020).

Triangulation is the process by which researchers strengthen their study through multiple input sources (Lambert, 2012). While the lived experiences of students and their parents may have added a deeper layer of rich data to the study, youth with disabilities and their families are considered a vulnerable population, and it was not appropriate for a doctoral candidate to include this population in the research (Lambert, 2012).

The study was limited to self-reported data because the data were collected through interviews (Johnson et al., 2022). Data quality relies upon participants providing complete and honest responses without bias or altered responses to avoid judgment (Johnson et al., 2022). The specific regionality of this study in a semirural area with few high schools limited the sample size, and the results may not align with challenges faced in urban schools or districts with larger populations (Ruble et al., 2023). Last, as a highly qualified teacher in several aspects of secondary science and special education, it was challenging, albeit crucial, to be constantly aware of my inherent biases and remain impartial when reviewing and analyzing the data (Ravitch & Carl, 2020). I addressed this challenge by maintaining a self-reflective journal through the notes section of NVivo throughout the data analysis process.

### **Significance**

This study is significant because, although the need for improved preservice training related to coteaching and inclusive practices is well documented (Chu et al., 2020; Duchaine et al., 2021), existing research has not sufficiently examined the challenges secondary coteachers experience in college preparatory inclusionary science courses within real-world classroom settings (Colson et al., 2021; Duchaine et al., 2021; Keefe & Moore, 2004). By examining secondary coteachers' experiences with instructional challenges and their perceptions of collaboration and professional development at the secondary level, this study addresses a gap in practice related to effective coteaching in rigorous science courses.

Research indicates that coteaching has a significant positive effect on academic achievement for SWD, especially at the secondary level (King-Sears et al., 2021). Still, many successful primary-level practices do not align with the structure of the secondary setting (Colson et al., 2021). In the local district, 98% of SWD in 2022 performed below or significantly below state science standards as opposed to 79% of all students, according to state report card data. The records disaggregate data for SWD but do not report only students without disabilities; therefore, the 79% below standards includes SWD. The local district reported slightly more SWD failing to achieve proficiency in state science standards than the state study site, which reported 95% in 2022.

Data from the local setting indicated 73% of 2023 high school seniors with disabilities who had participated in inclusive cotaught science courses as graduation requirements failed at least one course, failed at least one quarter, or received a 65%, the

minimum grade required for earning a course or quarter credit. Additionally, 99% of SWD who dropped out of high school in the local district from 2021 through 2023 failed at least one science course.

### **Implications for Social Change**

Lack of academic success is closely related to student dropout at the secondary level, and SWD who fail to graduate experience less favorable postsecondary outcomes than those who do graduate (Duchaine et al., 2021; Wells, 2025). When schools cannot provide appropriate instruction to support SWD, they are more likely to fail or drop out (Wells, 2025). Inclusion is intertwined with social justice (Kamenopoulou, 2016) because SWD who drop out of high school experience poorer postsecondary outcomes, including poverty, underemployment, and unemployment, high-risk behaviors, homelessness, and mental and physical health issues (Wells, 2025). The implications of this study can provide new insights into secondary coteaching, which can potentially increase the success of SWD, leading to increased graduation rates for this demographic. By examining the specific challenges secondary coteachers experience, secondary school leaders and professional development providers may implement structural changes and develop more targeted training opportunities to better prepare secondary college preparatory science coteachers to support SWD in the science curriculum (Duchaine et al., 2021), thereby promoting positive social change through improved access to rigorous instruction, increased graduation rates, and strengthened postsecondary outcomes.

### **Application to Professional Practice**

This study addressed a gap in practice related to secondary science coteaching by examining coteaching challenges within a more specific instructional context. Colson et al. (2021) noted little information on coteaching at the secondary level, and much of what exists is outdated. The theoretical significance of this study connected the need for collectivism in the secondary inclusive setting. Content-specific secondary education teachers have been historically individualistic in their teaching approach and overwhelmingly implement the One-Teach, One-Support coteaching model (Preston-Smith et al., 2020). This model is commonly considered the least effective coteaching model at the secondary level and leads to an imbalance of power, lack of parity, and poorer student outcomes (Barone & Crişan, 2023; Preston-Smith et al., 2020). Tying together the theory of collective agency (Bandura, 2000) with achieving symbiosis (Pratt, 2014) connects the coteachers in an interdependent effort to achieve the common goal of providing all students with the individual instruction they need for success.

### **Improvement at the Local Level**

Local level data from the 2022–2023 school year reveals that 73% of senior SWD have failed a minimum of one science course, at least a single quarter of a course, or received a final grade of 65%, the minimum grade required to earn course credit. Low grades negatively affect students' overall grade point average, which could diminish their chances of success in scholarship opportunities and college acceptance. Furthermore, when students fail courses, they must retake them, burdening already overpopulated classes with additional students. By examining the unique challenges experienced in

secondary college preparatory inclusionary science settings, local school leaders may better support coteachers in strengthening instructional practices, which may contribute to improved academic outcomes for SWD.

### **Summary**

The first chapter of the study briefly described the purpose of the study, which was to explore the specific challenges experienced by secondary college preparatory science coteachers when supporting SWD in inclusionary classes. Research indicates that special education teachers experience numerous challenges in the inclusionary setting (Hester et al., 2020), but little is known about addressing the challenges experienced in the inclusive secondary college preparatory science classroom (De La Paz et al., 2023). The study aimed to better understand specific secondary coteaching challenges to identify what changes, if any, could improve instructional practices in secondary inclusionary science courses. In Chapter 2, I provide the literature review. The literature review explains the conceptual framework in greater detail and provides an extensive review of coteaching, including the history and the challenges coteachers experience.

## Chapter 2: Literature Review

The literature review aims to provide a relevant and recent knowledge base for this study. Furthermore, the literature review explains the problem and purpose driving the study: that secondary coteachers struggle to support SWD in inclusionary college preparatory science classes and to explore secondary coteachers' experiences and challenges as well as their perceptions of collaboration and professional development opportunities related to coteaching in inclusive college preparatory science classrooms in the Mid-Atlantic region of the United States. Coteaching has been integral to inclusive teaching since the NCLB and the 2004 reauthorization of the IDEA mandated improved student performance and instruction in the LRE (Hamilton-Jones & Vail, 2014; Solis et al., 2012). Effective strategies for coteaching are well documented at the primary level (Alnasser, 2021; Jones & Winters, 2024; King-Sears et al., 2021; Preston-Smith et al., 2020), but Preston-Smith et al. (2020) note only two studies focused on coteaching secondary science courses.

Chapter 2 includes the literature search strategy, which outlines the databases and search terms I used to identify scholarly articles related to the aim of this study. In Chapter 2, I discuss the conceptual framework of the study. An extensive review of literature related to coteaching includes the history of coteaching and the challenges of coteaching specific to the secondary level. Chapter 2 concludes with a discussion of the challenges of teaching adolescents, followed by a summary and conclusion.

### Literature Search Strategy

I implemented targeted searches through the university library database, utilizing EBSCOHost and ERIC to develop the literature review. Additional information was obtained through Google Scholar. DOI information was obtained for many citations through CrossRef.org. Other database searches included the US Department of Education, SAGE Publications, ProQuest, and the Council for Exceptional Children. Several journals yielded significant research on this study, including *International Journal of Inclusive Education*, *Journal of Human Behavior in the Social Environment*, *Journal of Special Education*, *Learning Disabilities Quarterly*, *International Journal of Instruction*, and *Journal of Research on Educational Effectiveness*. Database searches focused on terms related to the study, including *special education*, *students with disabilities*, *coteaching*, *coteachers*, *secondary or high school*, *barriers or challenges*, *science*, *team teaching*, *interdependence*, and *inclusion*.

The literature review yielded an abundance of current articles focusing on the lack of teacher preparation for effective coteaching strategies within the past 5 years, but few articles focused specifically on the challenges secondary college preparatory science coteachers experience in the classroom, either with students, pedagogical practices, or professional relationships. Many effective coteaching methods found in research articles were only appropriate at the primary level and thus were unsuitable for the study. This section will review the study's conceptual framework and theoretical foundation as well as the history, styles, efficacy, and challenges of coteaching in inclusive classroom settings.

## **Conceptual Framework**

Bandura's social learning theory on collective agency supports this study through the focus on group action and interdependence in coteaching (Stefanidis et al., 2019). Secondary coteachers should share the common goal of helping all students achieve (Pratt, 2014); therefore, their collective effort yields the desired result through the collaboration of their skills and expertise. Despite Bandura's (2018) well-documented research warning against the Western ideals of autonomy and individual accomplishment, secondary coteachers frequently fail to develop a sense of acceptance of each other (Pesonen et al., 2021; Stefanidis et al., 2019) or achieve mutual parity (Jurkowski et al., 2020; Pratt, 2014; Stefanidis et al., 2019). Although the Pesonen et al. (2021) study was situated in a Scandinavian context, this study examines teachers' sense of belonging within coteaching relationships, a relational construct that extends beyond national or cultural boundaries. The theoretical framework of coteachers' collective agency through the mutual reliance of each other's skills, knowledge, and resources (Stefanidis et al., 2019) aligns with Pratt's framework of achieving symbiosis for effective coteaching (Pratt, 2014). Pratt (2014) asserts that effective coteaching can only be achieved when partner teachers reach professional fulfillment through collective engagement. A description of the framework and theory is provided to further explain the alignment within this study.

### **Bandura's Social Learning Theory on Collective Agency**

Bandura (2000) asserts that while the environment has a role in shaping people, people can also shape the environment. When people share similar beliefs, they have the

ability to collaborate and combine their knowledge, skills, and resources to influence the environment and outcomes (Bandura, 2000, 2006; King-Sears et al., 2019; Stefanidis et al., 2019). This phenomenon is particularly true in the practice of coteaching, as successful coteachers often share similar perceptions of coteaching, content and pedagogical knowledge, and opportunities to coplan, as well as compatible personal characteristics (King-Sears et al., 2019). As the function of collective agency relies on the group's interdependence with one another (Bandura, 2000), successful coteaching also relies on the coordinated effort

of the partner teachers (Pratt, 2014). Coteachers may be able to apply the principles of collective agency to reshape the environment of a traditional general education classroom, transforming it into an inclusive setting that supports the success of a diverse group of learners.

### **Pratt's Conceptual Framework of Achieving Symbiosis**

Pratt's (2014) grounded theory study explored how achieving symbiosis improved collaborative teaching through interdependence and addressed common barriers that prevent the development of effective coteaching environments. Through the study, Pratt developed the conceptual framework of achieving symbiosis. Pratt noted in their study that "While significant research exists on the nature of coteaching relationships, the research and existing theories lack an explanation for how secondary coteachers overcome challenges to collaboration" (p. 3). Participants in Pratt's study addressed the need for coteachers to share an interdependent relationship. Pratt built their framework of

achieving symbiosis through a three-stage process consisting of initiation, symbiosis spin, and fulfillment.

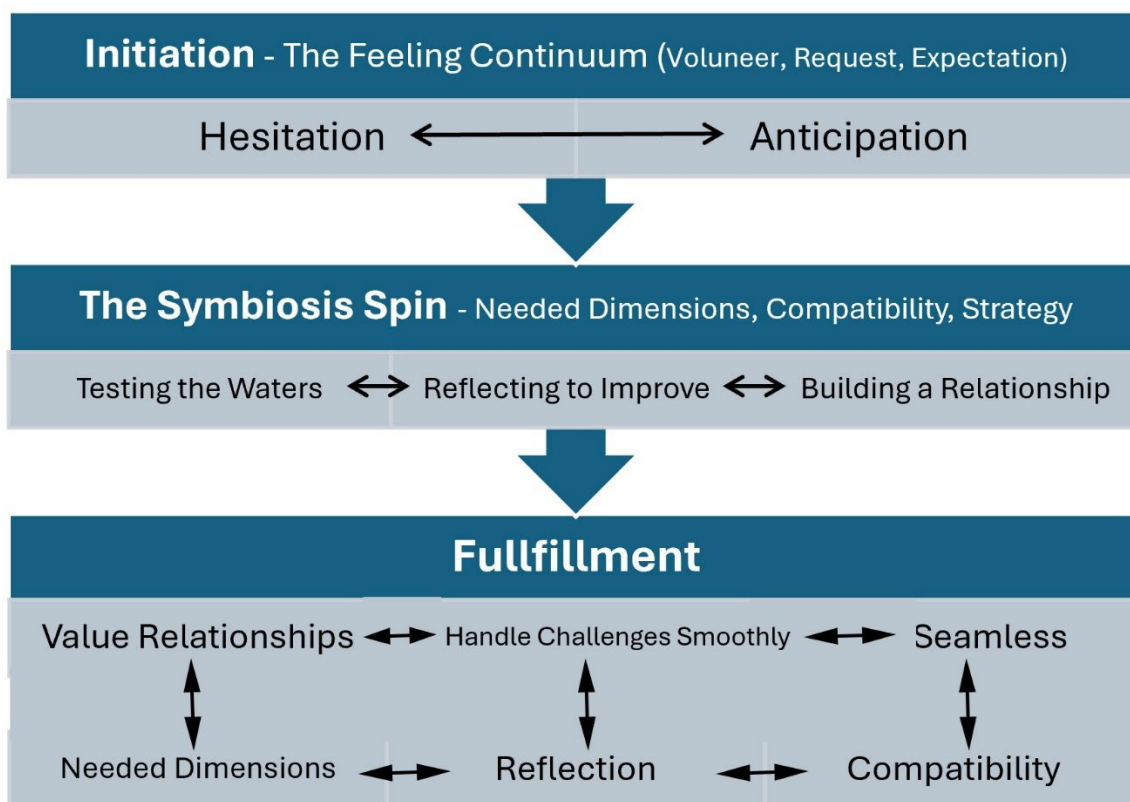
The initiation stage develops through a self-initiated partnership, a requested partnership, or an expected partnership (Pratt, 2014). Expected partnerships are pairings that the administration creates when the teacher has no choice and must comply with their given teaching schedule. The expected partnership develops from the complex secondary-level need to meet scheduling and staffing demands. Regardless of the type of partnership, Pratt found that teachers experienced a continuum of feelings from “hesitation to anticipation” (p. 6). Research indicates that where coteachers begin on the feeling continuum scale is more closely related to prior or lack of coteaching experiences than how the partnership was developed.

Pratt (2014) proposed that after the initiation stage, coteachers experience the symbiosis spin, a cycle of the challenges they face through compatibility, the dimensions of symbiosis, and the strategies needed to increase the efficacy of interdependence. Research indicates that coteachers “test the waters” of one another’s “personality, teaching style, expectations for students, and goals for coteaching” (Pratt, 2014, p. 7). Pratt found that coteachers developed interdependence through trust and respect while relying on various strategies to overcome partnership challenges, such as open-mindedness, open communication, and asking for help. Pratt posits that the symbiosis spin requires that teachers be willing to work through challenges and misunderstandings without taking personal offense.

According to Pratt's (2014) research, achieving symbiosis is attained when coteachers experience personal and professional fulfillment in their partnership. Pratt theorizes that the fulfillment stage requires maintenance through reflection and mutual respect, but effective coteaching partners do not return to the symbiosis spin stage. Pratt's research provided a framework (see Figure 1) for further exploring the challenges coteachers experience in the secondary science college preparatory inclusive classroom.

**Figure 1**

*Pratt's Visual Model for the Framework of Achieving Symbiosis*



*Note.* The figure highlights a conceptual framework illustrating the process of achieving symbiosis in coteaching relationships, based on Pratt (2014).

## **Review of the Literature Related to Key Concepts and/or Variables**

### **Coteaching**

#### ***History of Inclusion and Coteaching***

Coteaching in inclusionary settings involves a general education and a special education teacher delivering instruction to students with and without disabilities in the same class (Friend et al., 2010; Jurkowski et al., 2020; Kaler et al., 2025). According to Kloo and Zigmond (2008), coteaching is a setting where “two certified teachers—one general educator and one special educator—[who] share responsibility for planning, delivering, and evaluating instruction for a diverse group of students, some of whom are students with disabilities” (p. 13). The various methods of coteaching will be addressed in the section below.

Historically, SWD were often taught in segregated classes or schools (Pratt, 2014). In 1975, the Education for All Handicapped Children Act presented a landmark mandate that children with disabilities be taught in the LRE (Richardson, 1998). While the new law was designed to improve the educational opportunities for SWD, many teachers and students found themselves in new academic situations, and both professional and educational failures abounded (Richardson, 1998). To address the lack of general education teacher preparation in special education support, mainstreaming SWD focused on elective-type courses, often failing to integrate students in core academic courses such as math and ELA through the 1980s (Richardson, 1998). In 1990, the IDEA reaffirmed the significance of inclusionary education, and the mandates behind it required academic success in all subjects, including core content areas (Richardson, 1998). To support the

new federal regulations requiring success for SWD, the practice of coteaching became increasingly utilized (Richardson, 1998).

In 2001, U.S. lawmakers enacted the NCLB, which significantly increased the pressure for the success of all students, both general and special education (Pratt et al., 2017). NCLB increased the standards of teaching professionals by requiring teachers to be highly qualified (Green et al., 2021). Highly qualified was defined as having a minimum of a bachelor's degree, state licensure, and proven content knowledge (Green et al., 2021). In 2004, Congress reauthorized the IDEA and increased the pressure for SWD to succeed in the LRE (Pratt et al., 2017). By 2010, coteaching was the standard practice to meet the academic support needs of SWD and the accountability needs of teachers and schools (Pratt et al., 2017). NCLB was replaced by the ESSA in 2015 (Francisco et al., 2020; Green et al., 2021). ESSA removed the highly qualified provisions and allowed individual states to determine the eligibility of special education teachers (Green et al., 2021), but still requires 95% of students within a school to be tested at standardized measures, including those with disabilities (ASCD, n.d.).

As of 2022, approximately 15% of students in the United States (7.3 million) receive special education services, with 95% of those receiving their education in regular school settings (National Center for Education Statistics, 2023). Although the number of SWD has increased significantly from 6 million students in 2017, with 80% being served in the general education setting for at least half of the school day (Stefanidis et al., 2019), NCES (2023) reported that in 2021 40% of schools reported difficulties in filling special education teacher roles, a significant increase compared to 14% in 2012. These trends

highlight growing demands on special education services and staffing, which place increased pressure on schools to effectively support SWD in inclusive instructional settings.

### ***Coteaching Styles***

Coteaching is achieved through various pedagogical techniques (Jurkowski et al., 2020). Friend et al. (2010) described the six primary styles of coteaching: one teach, one observe; station teaching; parallel teaching; alternative teaching; team teaching; and one teach, one assist (see Figure 2). In the one teach, one observe method, the general education teacher delivers instruction to the full group of students while the special education teacher focuses on gathering data through observation. Students are divided into separate groups in the station teaching method, where they rotate through direct instruction under each teacher and independent instruction in the third. During parallel teaching, both teachers present the same instruction to half the class.

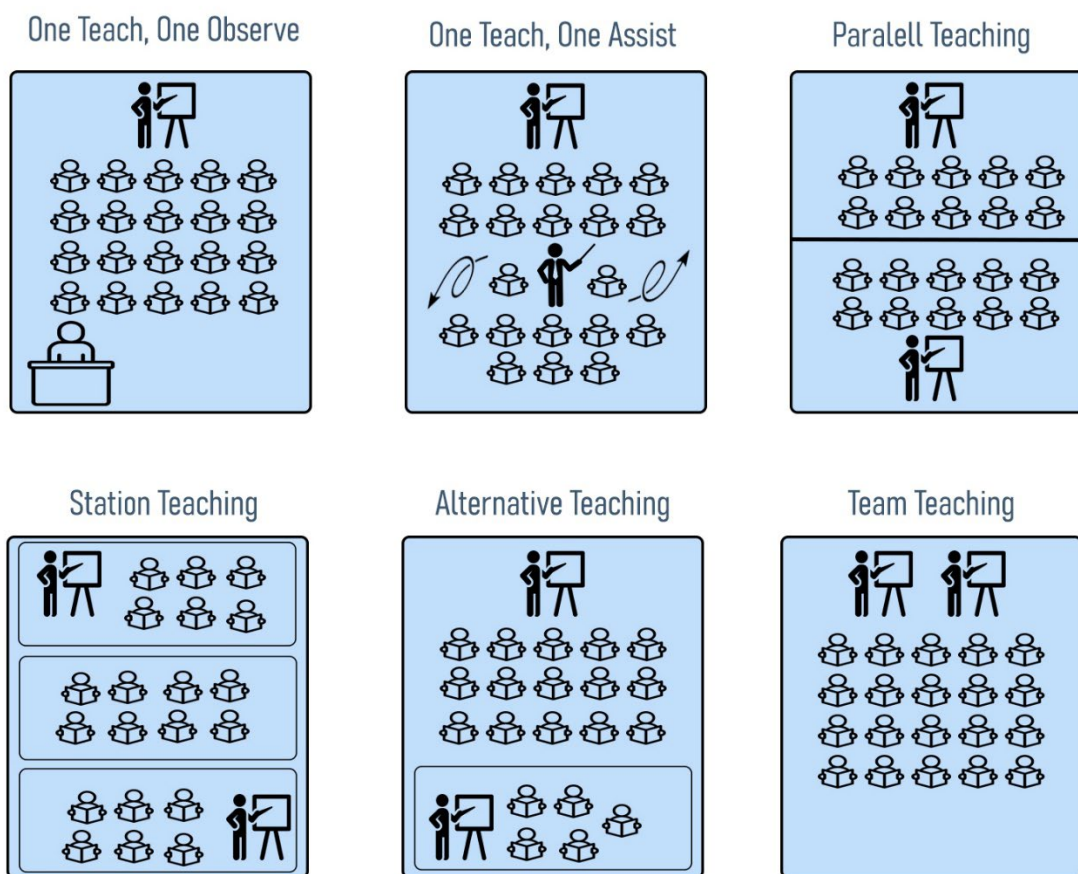
The alternative teaching style is a method where one teacher instructs the main group while the other teacher works separately with a small group to provide additional levels of support (Friend et al., 2010). In the teaming method, both teachers present the lesson together for the whole class. Finally, in the one teach, one assist format, one teacher will deliver whole-class instruction while the other will float through the classroom and provide assistance as needed. Research indicates that while the one teach, one assist format is the most frequently used style of coteaching, it underutilizes the special education teacher and creates a lack of parity (Barone & Crişan, 2023; Davis et al., 2012). Overall, the empirical reporting of coteaching styles has historically lacked

current studies focused on the efficacy of coteaching, especially at the secondary level (Davis et al., 2012; King-Sears et al., 2021; Wilson & Michaels, 2006).

**Figure 2**

*The Six Primary Applied Techniques of Coteaching*

## The Six Primary Coteaching Approaches as Described by Friend



*Note.* Conceptual illustration of the six primary co-teaching approaches described by Cook and Friend (1995).

### *Efficacy of Coteaching*

While current researchers debate the efficacy of coteaching on outcomes for SWD (King-Sears et al., 2021), some research on coteaching has shown benefits for both students and teachers (Kaler et al., 2025; Pratt et al., 2017). According to Pratt et al. (2017), students benefit from varied instructional delivery methods, and teachers experience the opportunity to mentor one another in new approaches (King-Sears & Strogilos, 2020). Friend et al. (2010) stated that coteaching could address a diverse range of students, including those without disabilities. Although a meta-analysis by King-Sears et al. (2021) indicated a benefit to coteaching in general, it found that the positive effect of coteaching in content areas such as science and social studies yielded a significantly weak positive effect ( $g = 0.08$ ) as compared to coteaching in math and language arts ( $g = 0.60$ ).

The level of active involvement in instruction (AII) among coteachers is significant to the positive effect of coteaching on the academic achievement of SWD (Johnson et al., 2022). AII is achieved when both teachers in a coteaching environment are actively involved in the instruction. This results in a high-support environment, which fosters the success of SWD. Although empirical research indicates AII can increase the success of SWD at the secondary level, many cotaught secondary classes are reported to be formatted with the special education coteacher in a support position, such as one teach, one assist, rather than an equal teaching position (Capin et al., 2022; Johnson et al., 2022; Keeley, 2015; King-Sears et al., 2021; Wexler et al., 2018; Wilson & Michaels, 2006).

### *Elements of Successful Coteaching*

Research indicates many elements support the success of coteaching partnerships. Although students' success should be at the forefront of planning for all teachers, coteaching requires significantly more than teaching alone. Some of the most crucial elements of successful coteaching include coplanning (Barron & Friend, 2025; Davis et al., 2012; King-Sears et al., 2019; Pratt et al., 2017), mutual relationships (Barron & Friend, 2025; Pesonen et al., 2021; Rytivaara et al., 2019), parity (Johnson et al., 2022; Pratt et al., 2017), and common knowledge of student needs and content (King-Sears et al., 2019). Although Rytivaara et al. (2019) examined coteaching within a Finnish educational context, the study's focus on mutual relationships between coteachers reflects relational components of collaboration that are not specific to any single national education system, thereby strengthening the literature review by demonstrating consistency in key coteaching elements across diverse educational contexts.

Planning allows teachers to prepare instruction, review data, and adjust the content or delivery methods as needed (Barron & Friend, 2025; King-Sears et al., 2019; Pratt et al., 2017). When general and special education teachers work together in an inclusive classroom setting, the success of SWD is dependent on coplanning (Barron & Friend, 2025; Pratt et al., 2017). Copious opportunities to participate in coplanning activities build parity between general and special education teachers and support the structure of a cotaught class (King-Sears et al., 2019; Pratt et al., 2017). Research indicates that planning with coteachers must focus on both long- and short-term goals to

address the desired student outcomes and daily academic or behavioral challenges (Pratt et al., 2017).

According to multiple studies, effective teaching partnerships rely on coteachers' mutual respect for each other's roles and shared parity (Barron & Friend, 2025; Drelick et al., 2024; Pesonen et al., 2021; Pratt, 2014; Pratt et al., 2017; Rytivaara et al., 2019). Successful coteaching partnerships require mutual feelings of acceptance, respect, and support (Barron & Friend, 2025; Pesonen et al., 2021; Pratt, 2014). Research suggests these elements increase professional motivation, improving classroom teaching dynamics (Pesonen et al., 2021). Johnson et al. (2022) found that shared parity in teaching roles leads to the AII of both teachers; without it, the special education teacher is frequently relegated to more of a paraprofessional role (Barone & Crişan, 2023; Barron & Friend, 2025; Johnson et al., 2022; Keeley, 2015; King-Sears et al., 2021; Pratt, 2014; Wexler et al., 2018; Wilson & Michaels, 2006).

### **Challenges in Coteaching**

#### ***Challenges in Special Education Teacher Stress and Attrition***

The 2023 Report on the Condition of Education indicated a significant increase in difficulty filling special education teacher positions from 2012 (14%) to 2021 (40%). Hester et al. (2020) reported that special education teachers experience significant burnout due to burdensome workloads (Ansley et al., 2016; Eddy et al., 2024; Hester et al., 2020; Jackson & Parker, 2023; Jafree et al., 2023; Ruble et al., 2023), student behavior (Herman et al., 2023), and lack of appreciation (Hester et al., 2020). Adding to the stress experienced by special education coteachers is a reported lack of administrative

support (Ansley et al., 2016; Hester et al., 2020; Jackson & Parker, 2023; Jafree et al., 2023; Ruble et al., 2023). Although the findings of Jafree et al. (2023) must be interpreted within the context of Pakistan's unique educational system and cultural norms, the consistency of identified stressors with those reported in U.S.-based literature is notable and supports the consideration of special education teacher stress as a phenomenon that may extend across diverse educational settings.

Secondary special education coteachers often experience significant stress and burnout when supporting students in various content area classes where they may lack content area expertise (Ansley et al., 2016; Keeley, 2015; Pratt, 2014). Furthermore, special education coteachers are responsible for burdensome paperwork, data collection, and participation in individualized education plan (IEP) meetings for their entire caseload, all while utilizing much of their planning time to write IEPs and conduct progress monitoring (Hester et al., 2020; Jackson & Parker, 2023). Unlike primary special education teachers, secondary special education coteachers often face larger caseloads (Hester et al., 2020). Additionally, secondary special education coteachers are often expected to manage communications with frustrated parents.

Although administrative support is one of the most important factors leading to teacher job satisfaction (Ansley et al., 2016), many special education teachers feel under supported (Ansley et al., 2016; Eddy et al., 2024; Herman et al., 2023; Hester et al., 2020; Ruble et al., 2023). Along with the lack of support in scheduling and paperwork demands, special educators also frequently face challenges due to insufficient resources provided by their building or district administrators (Hester et al., 2020). Additional

challenges present when special education teachers are evaluated by administrators with little knowledge of special education, and when administrators fail to view SWD as valuable to the school. The elevated stress levels unique to special education teachers lead to increased teacher attrition (Billingsley, 2004; Herman et al., 2023; Jackson & Parker, 2023) and increase feelings of failure and exhaustion (Eddy et al., 2024).

The effects of increased special education teacher burnout since the late 2010s have caused a significant shortage of special education teachers, which further exacerbates existing stressors within the profession (Leko et al., 2024). When school districts are short-staffed in special educators, they are still legally required to provide students with supports, leading to caseloads so large that students may be underserved (Leko et al., 2024; Ruble et al., 2023).

### ***Challenges in Parity and Equity***

Although AII is imperative for successful coteaching, findings across the past two decades indicate that special education teachers at the secondary level often take more of a paraprofessional support role than a teaching role (Barone & Crişan, 2023; Barron & Friend, 2025; Johnson et al., 2022; Keeley, 2015; King-Sears et al., 2021; Pratt, 2014; Wexler et al., 2018; Wilson & Michaels, 2006). While secondary special education teachers are trained to provide specialized instruction to support the needs of SWD in the general education curriculum, content area teachers do not often integrate time or practice into their lessons for these accommodations (Wexler et al., 2018). The struggle in designing effective inclusive instruction provided by both the content area and general

education teachers leads to a lack of equity in planning and parity in teaching (Barone & Crişan, 2023; Pratt, 2014; Wexler et al., 2018).

Ansley et al. (2016) described additional challenges influencing parity unique to coteaching at the secondary level, including the number of coteachers a single special education teacher may need to work with daily. Secondary coteachers support students in several classes, often with different general education teachers throughout the school day (Ansley et al., 2016; Keeley, 2015). Special education coteachers also must adjust to different teaching personalities, classroom management styles, and coteaching role expectations from class to class (Ansley et al., 2016). Special education teachers experience significant stress when their role in the coteaching environment is unclear (Herman et al., 2023). Building an equal working relationship can be challenging because special education teachers may only push into a specific teacher's inclusionary class once daily.

### ***Challenges in Coplanning***

Coplanning is crucial to successful coteaching (Barron & Friend, 2025; Davis et al., 2012; King-Sears et al., 2019; Pratt et al., 2017; Zamkowska et al., 2025). Although the significance of coplanning in the coteaching relationship is well documented (King-Sears et al., 2019; McLeskey et al., 2014; Pratt et al., 2017), studies reveal that secondary coteachers face difficulties in adequate coplanning time and role parity in department planning (Davis et al., 2012; King-Sears et al., 2019; Pratt et al., 2017; Swanson & Bianchini, 2014; Zamkowska et al., 2025).

While schools with successful inclusion programs allow for ample planning time among general and special education teachers (King-Sears et al., 2019; McLeskey et al., 2014), many coteachers struggle to find the time to plan together (King-Sears et al., 2019; Pratt et al., 2017; Zamkowska et al., 2025). A lack of adequate shared planning time is especially true in the secondary setting, where special education teachers may teach with multiple partners across different content areas (Dieker & Murawski, 2003; Wagner et al., 2024). King-Sears et al. (2019) noted that many successful coteachers who lacked adequate coplanning time resorted to planning before or after work hours; however, the unspoken expectation of an additional unpaid workload contributes to special education teacher burnout (Hester et al., 2020).

Research indicates that even in schools that provide coplanning opportunities, there is an imbalance in focus, with much of the planning time allotted for content area and little to analyzing the needs of SWD (Davis et al., 2012; King-Sears et al., 2019; Pratt et al., 2017; Swanson & Bianchini, 2014). King-Sears et al. (2019) noted that coteachers tend to plan more for content delivery than specially designed instruction (SDI) for SWD. Differences in planning styles also make it difficult for coteachers to focus on SDI when coplanning (Pratt et al., 2017). Together, these planning constraints limit coteachers' ability to collaboratively design and implement instruction that fully addresses the individualized needs of SWD.

### ***Challenges in Compatibility and Conflict***

Pesonen et al. (2021) noted that “successful coteaching is based on teachers’ mutual and collegial relationship” (p. 425). General and special education coteachers

have different skills and knowledge bases (Chatzigeorgiadou & Barouta, 2022) and must share mutual respect (Rytivaara et al., 2019). While situated in Greece, Chatzigeorgiadou and Barouta (2022) highlight the complementary roles of general and special education coteachers, a principle that aligns with inclusive classroom practices across contexts. Mutual respect is crucial in developing compatibility. Compatibility leads to a sense of belonging; in its absence, teachers lose motivation (Pesonen et al., 2021). Fostering a working professional relationship is often described as the most significant challenge in coteaching. Without a healthy professional relationship, coteachers will struggle to resolve conflicts (Jurkowski et al., 2020).

Teachers in a cotaught setting are inherently susceptible to conflict (Pratt, 2014). Professional compatibility is crucial to conflict resolution (Jurkowski et al., 2020; Pratt, 2014). Partnering to support students requires that coteachers approach conflicts professionally and be able to resolve them as they collaborate to support the needs of their students (Davis et al., 2012; Jurkowski et al., 2020; Pratt, 2014). These findings suggest that when strong, respectful professional relationships are absent, secondary coteachers may struggle to collaborate effectively and support SWD in inclusive settings.

### ***Challenges in Teacher Preparation for Inclusive Education***

Research indicates that many coteachers are unprepared to support SWD in inclusive educational settings (Chu et al., 2020; Dieker & Murawski, 2003; Duchaine et al., 2021). Coteachers must be trained in the art of effective and efficient coplanning (Davis et al., 2012; Pratt et al., 2017) as well as behavioral (Wexler, 2021) and content areas (King-Sears et al., 2019; Wexler, 2021). Although it is well documented that

coplanning is an essential element of successful coteaching (Davis et al., 2012; King-Sears et al., 2019; Pratt et al., 2017; Zamkowska et al., 2025), there is a lack of PD and training in effective coteaching planning (Davis et al., 2012; Sasson & Malkinson, 2021). Studies suggest that even when coteachers are provided adequate coplanning opportunities, they lack the skills to use the time efficiently (Pratt et al., 2017; Sasson & Malkinson, 2021).

Research indicates pervasive barriers regarding the inclusion of students with emotional and behavioral disabilities in the general curriculum (Gilmour et al., 2021; McGuire & Meadan, 2022). While special education teachers are more familiar with practices supporting students with emotional and behavioral disabilities (Eddy et al., 2024), general education teachers report experiences of burnout (Gilmour et al., 2021) and challenges meeting students' social needs (McGuire & Meadan, 2022). These findings suggest that general education teachers may feel insufficiently prepared to address the complex academic and behavioral needs of students with emotional and behavioral disabilities in inclusive settings.

### ***Challenges in Cotaught Inclusive Settings as Reported by Students***

Although some studies have indicated that coteaching in inclusionary classes has a positive effect on the academic success of SWD in highly effective schools (King-Sears et al., 2021; McLeskey et al., 2014), other studies have indicated that SWD struggle to receive the supports they need (Johnson et al., 2022; King-Sears & Strogilos, 2020). The students' voice is important in determining what effective coteaching entails, but few

studies take into account SWD perspectives, especially at the middle and secondary levels (Connor & Cavendish, 2020; Wagner et al., 2024; Wilson & Michaels, 2006).

SWD often require SDI to succeed in the inclusionary general education setting (Rodgers et al., 2021), but they report their special education coteachers often rely on general modifications to support them instead of integrating specialized techniques to break down and explain concepts in new ways (Johnson et al., 2022). Students express that while they benefit from additional organizational and emotional support provided by coteachers, they do not always receive the specific instructional support they need to succeed academically in class (Preston-Smith et al., 2020). Additionally, some SWD are overwhelmed when being forced to work in heterogeneous groups, expressing a preference to be in the exclusionary setting (Preston-Smith et al., 2020).

Research indicates that students experience distractions and contradictory explanations in the inclusionary general education setting (King-Sears & Strogilos, 2020; Wilson & Michaels, 2006). Distractions can occur when a special education coteacher is providing the accommodation of reading aloud a passage or questions to SWD while other students are reading and working independently (Rönn-Liljenfeldt et al., 2024; Wilson & Michaels, 2006). Students in cotaught classrooms also report confusion resulting from the coteaching model (Rönn-Liljenfeldt et al., 2024; Wagner et al., 2024; Wilson & Michaels, 2006). Although the Rönn-Liljenfeldt et al. (2024) study is situated in Finland, it documents student-reported experiences in cotaught classrooms that align with findings from U.S.-based studies. According to studies, students may receive contradictory information and explanations from coteachers, and sometimes the teachers

disagree with each other's methods, modifications, or expectations (Wagner et al., 2024; Wilson & Michaels, 2006). This is especially evident in the copious reporting of the overutilization of the one teach, one assist model of coteaching (Drelick et al., 2024; Johnson et al., 2022; Keeley, 2015; King-Sears et al., 2021; Wagner et al., 2024; Wexler et al., 2018; Wilson & Michaels, 2006). Although the one teach, one assist method of coteaching is the most commonly utilized model in the secondary setting, students understand when a coteacher is taking a secondary role and prefer models of true team teaching (Johnson et al., 2022; Keeley, 2015; King-Sears et al., 2021; Wexler et al., 2018; Wilson & Michaels, 2006).

## **Challenges in Teaching Adolescents and Students With Disabilities**

### ***Challenges Specific to Teaching Adolescents in Secondary Education***

While coteachers in all grade settings may share similar difficulties in inclusive settings, secondary coteachers experience challenges unique to supporting adolescent students and the complexity of the secondary-level subject matter. Due to these challenges, secondary education is an area of higher special education teacher shortages, with areas such as math and science being even greater within that context (Leko et al., 2024). Research shows that students in the secondary setting undergo significant cognitive development from their freshman year through graduation (Desatnik et al., 2023; Jensen & Nutt, 2015), and those students with adverse childhood experiences (ACE) display even greater difficulties through adolescent development (Brieant et al., 2023; Mercera et al., 2024). Despite the research by Mercera et al. (2024) being an international context, this study's focus on adverse childhood experiences supports its

relevance, as trauma-related constructs are not specific to national education systems.

Adolescents who have experienced ACE frequently struggle with academic success and exhibit poorer attendance, lack of engagement, and emotional or behavioral challenges.

Adolescent SWD are more likely to experience social-emotional stressors than typical students (Katsiyannis et al., 2025; Wood & Orpinas, 2021), which could detract from academic performance (Mercera et al., 2024) and weaken the teacher-student relationship (Wood & Orpinas, 2021). SWD are more likely to experience bullying from peers (Katsiyannis et al., 2025; Wood & Orpinas, 2021). As adolescents, students continue to develop their academic cognitive abilities (Jensen & Nutt, 2015) as well as their social cognitive skills (Desatnik et al., 2023).

According to Jensen and Nutt (2015), adolescent sleep cycles are profoundly different from those of adults and prepubescent children, and sleep has a significant effect on learning and long-term potentiation. Teenagers require more sleep than adults and younger children, and the quantity of sleep is directly linked to their moods, health, and eating habits. Jensen and Nutt found that while adolescent brains create melatonin 2 hours later than adults, it remains in their system through their full sleep cycle. This phenomenon makes it harder for adolescents to fall asleep early and makes them more groggy when they wake. Adolescent students who attend high schools with early start times may not be able to get enough sleep, which can affect their attendance, attention, moods, ability to focus on academics, and long-term potentiation.

Adolescents experience extreme emotional turmoil and stress (Jensen & Nutt, 2015; Siegel, 2014), and secondary teachers must be skilled in supporting them through

their ups and downs (Siegel, 2014). According to Jensen and Nutt (2015), “a teenager’s response to the world is driven by emotion, not reason” (p. 171). Furthermore, research indicates that during adolescence, the teenage brain experiences an increase in the chemical dopamine, which is responsible for increased thrill-seeking behaviors and impulsivity (Siegel, 2014). Although adolescents experience the deep stresses of academic pressures, the uncertainty of their future, their developing sexuality, and more complex relationships (Jensen & Nutt, 2015; Siegel, 2014), research has proven that the adolescent brain does not respond properly to the stress-relieving hormone, tetrahydrocannabinol (THC) (Jensen & Nutt, 2015). Opposed to a calming effect, THC in adolescents increases anxiety (Jensen & Nutt, 2015), which could affect adolescent behavior in school.

Teachers at the secondary level must be able to understand the dynamic nature of adolescent feelings and behaviors. Abundant research indicates that content knowledge is more complex at the secondary level than at the primary grade level (Ansley et al., 2016; Keeley, 2015; King-Sears et al., 2019), and it is crucial for special education teachers to be proficient in the subject areas in which they are supporting students (King-Sears et al., 2019). Special education coteachers must be experts in meeting the academic, behavioral, and emotional needs of SWD while teaching content-specific and demanding subject matter such as chemistry, British Literature, and Algebra II. Likewise, general education coteachers must understand how to academically and behaviorally support SWD in their classroom (Chatzigeorgiadou & Barouta, 2022; Wexler, 2021).

Coteachers also experience challenges with the home-school partnership (Chase, 2024). A lack of a positive parent-teacher partnership for SWD can lead to frustration on the part of the caregiver and stress and burnout for the teacher. Parents may experience frustration when special education teachers refer to student needs and supports in professional language and then feel demoralized when general education teachers only bring up the needs or weaknesses of their child.

### ***Academic Expectations in the Next Generation Science Standards Era***

The NGSS mandates that all learners, regardless of ability, must receive effective science instruction that allows them to meet rigorous expectations in science and engineering proficiency (De La Paz et al., 2023; NGSS, n.d.-a). NGSS requirements state that all students must be able to create and participate in scientific argumentation (De La Paz et al., 2023) in inquiry-based learning experiences (Rizzo & Taylor, 2016; Watson & Bell, 2022). According to NGSS (n.d.-b), all high school students are expected to be proficient in the following areas:

Asking questions and defining problems ..., developing and using models ..., planning and carrying out investigations ..., analyzing and developing data ..., using mathematics and computational thinking ..., constructing explanations and designing solutions ..., engaging in argument from evidence ..., [and] obtaining, evaluating, and communicating information.

### ***Challenges in Science Pedagogy and the Needs of Students With Disabilities***

With the push for increased proficiency in science performance through the NGSS, science exploration requires a different pedagogical approach than the traditional

textbook format (Kaldenberg et al., 2015; Stroupe & Hancock, 2022; Taylor et al., 2020). While many other subject area focus on acquiring new information (Stroupe & Hancock, 2022) or memorizing vocabulary and facts (Kaldenberg et al., 2015), the introduction of the NGSS pushed for more inquiry-based learning for science instruction (Drew et al., 2020; Rizzo & Taylor, 2016; Taylor et al., 2020; Watson & Bell, 2022). Modern science pedagogy suggests that all students should “develop their own questions, make observations, and create investigations as a means to understanding the big ideas” (Kaldenberg et al., 2015, p. 161); yet SWD frequently struggle with such higher-level cognitive demands for numerous reasons such as significant challenges in literacy and writing abilities (Drew et al., 2020; Steele, 2007; Terceño & Greca, 2023) and poor social, emotional, and organizational skills (Drew et al., 2020; Steele, 2007).

Research indicates that many SWD lack the prerequisite academic vocabulary required to understand basic scientific concepts (Drew et al., 2020; King-Sears et al., 2019; Steele, 2004; Terceño & Greca, 2023), and science texts are thick with context written well above the reading ability of SWD (Drew et al., 2020; Mason & Hedin, 2011; Steele, 2004; Terceño & Greca, 2023). Because SWD often require the preteaching of related vocabulary before exploring a scientific inquiry, they struggle in the cotaught setting at the general education pace (Colson et al., 2021). Mason and Hedin (2011) also noted the literacy struggles SWD experience when reading scientific text due to the difference in text structure and the inferential format of related comprehension questions. The NGSS links scientific inquiry with rich text crafted in complex structures (Lannin et al., 2024). Complex text structures can include a variety of formats, such as cause and

effect or compare and contrast (Lannin et al., 2024). Compounding struggles with complex text and question structures, SWD frequently lack prerequisite background knowledge of scientific concepts, creating another layer of difficulty in the science curriculum (Drew et al., 2020; Mason & Hedin, 2011).

In addition to engaging in scientific inquiry and complex text structures, NGSS also requires students to produce argumentative writing to support their claims (Drew et al., 2020). 95% of SWD, including those at the secondary level, experience significant challenges with the most basic writing skills, such as spelling and foundational grammar, and are frequently unable to produce a quality written scientific argument (Drew et al., 2020). The significance of the challenges SWD face with written expression leads to decreased motivation and increased frustration (Drew et al., 2020).

SWD are legally obligated to the SDI as outlined in their IEP; however, literature reports a wide range of definitions on exactly what SDI is and how it is implemented (Rodgers et al., 2021). Although coteachers are intended to provide SDI for SWD, multiple studies have revealed that many special education teachers cannot explain what the SDI is for each student they support (Rodgers et al., 2021). The need for direct instruction before scientific inquiry places SWD at a disadvantage in the inclusionary classroom when the general education teacher does not provide time or opportunity to modify the lesson delivery (Colson et al., 2021; Preston-Smith et al., 2020; Russo-Campisi, 2017). A common modification for SWD is extended time to complete an academic task (Russo-Campisi, 2017), but the need for a preview or review of academic vocabulary may detract from additional allotted time to complete the assigned

investigation. Russo-Campisi (2017) identified a significant research-to-practice gap in teachers' ability to support SWD through evidence-based practices (EBP).

### **Summary and Conclusions**

This chapter detailed the theoretical framework. Bandura's social learning theory of collective agency supports the interdependence required for coteachers to work together effectively in his conceptual framework of collective agency. Pratt's framework for achieving symbiosis supports this theory. Pratt (2014) asserts that coteachers go through three stages as they achieve symbiosis: initiation, the symbiosis spin, and fulfillment. As coteachers achieve symbiosis, they develop mutual reliance and can effectively support SWD in inclusionary classes.

The literature review also provided information from numerous scholarly articles related to elements of successful coteaching, the challenges of coteaching, and the barriers preventing effective coteaching practices. Specific coteaching challenges within the secondary science inclusionary class were also identified, although there is a lack of abundant research in this area. The research suggests an existing gap in practice resulting from the specific challenges coteachers experience when teaching SWD in the secondary college preparatory inclusionary science classroom. In Chapter 3, I describe in depth the research method I used. The next chapter includes the rationale for the research design and details of the target participants. In addition, I discuss the data collection method, the data collection instrument, and the data analysis process.

### Chapter 3: Research Method

I used a qualitative approach with basic qualitative design to conduct my study exploring the challenges secondary college preparatory science coteachers experience in the inclusionary classroom. For this study, I collected data through semistructured interviews. The study took place in a semirural high school located in the Mid-Atlantic region of the United States. The study site is a Title I district with fewer than 5,000 students in 2022, according to state report card data. The high school population in the district consisted of 58% minority students and 16.2% SWD. In Chapter 3, I describe the methodology used in the study, including the research design and rationale, the role of the researcher, participant selection, instrumentation, procedures, and data analysis plan. The chapter concludes with a discussion of the trustworthiness and ethical procedures within the study.

#### **Research Design and Rationale**

I sought to answer the following RQs:

RQ1: What challenges do secondary coteachers experience when teaching SWD in the college preparatory inclusionary science classroom?

RQ2: What are secondary coteachers' perceptions of collaboration in the college preparatory inclusionary science classroom?

RQ3: What are secondary coteachers' perceptions of ongoing PD opportunities related to secondary-level science coteaching?

In this basic qualitative study, I explored secondary college preparatory science coteachers' perceptions of supporting SWD in inclusive college preparatory science

classrooms. A qualitative research approach was appropriate for this study because it allowed for an in-depth exploration of participants' perceptions and experiences that could not be adequately captured through quantitative methods (Babbie, 2017; Kekeya, 2021; Sabnis et al., 2023). A basic qualitative design was selected to support the examination of how secondary college preparatory science coteachers made meaning of their instructional roles, collaborative practices, and professional learning related to supporting SWD. This design was determined to be the most appropriate after considering alternative qualitative approaches, including narrative, ethnographic, and phenomenological designs, which did not align as closely with the study's research questions or purpose. Narrative design relies on capturing data through storytelling, which explores who a participant is (Taherdoost, 2022). While sharing stories of teaching in cotaught inclusionary secondary science courses would capture some of the teachers' experiences, it might miss specific nuances required to answer the RQs (Taherdoost, 2022). Because this study did not aim to explore who secondary college preparatory science coteachers are, narrative design was not an appropriate design.

The ethnographic design was inappropriate for this study because it focuses more on cultural and social phenomena (Suryani, 2013). In addition, this approach would have involved a time frame of real-world observations of secondary college preparatory science coteachers in the inclusive classroom (Taherdoost, 2022). While direct observations may provide details seen from the outside observer, many behind-the-scenes challenges may not be visibly evident. Therefore, while the inclusion of SWD in

secondary college preparatory science classes could be considered a cultural issue, it was not appropriate for the ultimate aim of the study.

Although phenomenological design is commonly used in qualitative research to examine individuals' lived experiences (Tuffour, 2017), it was not appropriate for this study because the primary focus was not on describing the essence of participants' experiences. While semistructured interviews prompted secondary college preparatory science coteachers to reflect on their instructional experiences, the purpose of the study was to examine how coteachers interpreted those experiences and formed perceptions related to collaboration, professional development, and instructional support for SWD. This focus on meaning-making rather than lived experience aligned more closely with a basic qualitative design. A basic qualitative design was the most appropriate approach for this study because it supported an in-depth exploration of secondary college preparatory science coteachers' experiences and perceptions related to supporting SWD in inclusive classrooms. Basic qualitative research is well suited for studies that seek to understand how individuals interpret and make meaning of their professional experiences within specific educational contexts (Maxwell, 2013). This design allowed for the systematic examination of participants' perspectives regarding instructional challenges, collaboration, and professional development without the constraints of a bounded case or the requirement for multiple data sources.

Through semistructured interviews, participants were able to share detailed accounts of their instructional roles and coteaching experiences, providing insight into the challenges and supports influencing inclusive science instruction. A basic qualitative

design was particularly appropriate for this study because the purpose was not to examine a specific case or setting in depth, but rather to identify common patterns and themes across participants' experiences and perceptions (Kekeya, 2021). The findings generated through this approach may inform future instructional practices and professional development efforts aimed at strengthening coteaching effectiveness and improving academic outcomes for SWD in secondary science classrooms. I determined that a semistructured interview was the best method to collect qualitative data for the study as the slightly looser format engaged the participants in a meaningful conversation (Kekeya, 2021), allowing me to probe for clarity or deeper information as needed. I utilized purposeful sampling to recruit participants, ensuring participants had recent classroom experiences related to the context of the study. I chose this approach to ensure the collection of rich, contextually grounded data from participants whose experiences directly aligned with the purpose of the study.

### **Role of the Researcher**

My role in the study encompassed being the primary instrument in the data collection and analysis process (see Simons, 2009; Tufford & Newman, 2012). Kekeya (2021) described the role of the qualitative researcher as the one who facilitates the discussion of the participants' experiences. I asked open-ended questions in semistructured interviews to collect rich data that explored the study's RQs. While the study took place in the district in which I work, I was not in an authoritative position over any interview participants. I am not currently teaching in a college preparatory cotaught class. I had cotaught with one potential participant for a single semester and did not

include that teacher in the invitation to participate. All other participants were coworkers with whom I have no further relationship. I collected data through semistructured interviews until saturation was reached. The data were then examined for recurring themes related to the RQs.

### **Potential Biases**

I have been a teacher for 10 years and have held diverse roles in elementary and secondary settings. Throughout my career, I have been a primary general education teacher, a secondary special education coteacher in multiple sciences, social studies, and English Language Arts (ELA) roles, a secondary self-contained special education coteacher, a secondary resource-setting ELA teacher, a special education coordinator, and a district special education transition specialist. My professional experience in special education at the secondary level, combined with certification in multiple science content areas, informed my interest in examining challenges related to supporting SWD in cotaught secondary science classrooms. Through my professional practice, I have observed that SWD often encounter greater instructional challenges in secondary science courses than in English language arts or social studies; however, this study was designed to examine participants' reported experiences and perceptions rather than rely on my own professional assumptions.

As a former coteacher in a secondary science classroom who is highly qualified in both special education and several specific branches of science, I needed to be aware of my potential biases developed through my lived experiences so that I could prevent them from influencing my interview protocols, research, and data analysis. Because qualitative

research delves into the human experience of a social matter, data are not represented numerically; therefore, researchers can utilize bracketing to avoid misrepresenting interview data caused by their personal experiences and ideals (Tufford & Newman, 2012).

Tufford and Newman (2012) explained the inevitable subjective nature of qualitative research and support the practice of bracketing to avoid bias in data collection and analysis. Empirical research offers numerous and varying definitions describing bracketing, but the practice is generally defined as an ongoing process of self-awareness in which a researcher continuously evaluates and seeks to understand their unique biases and experiences to mitigate personal preconceptions and create richer data analysis (Tufford & Newman, 2012). Common methods of bracketing include writing reflexive memos through the research process exploring subjectivity in the data collection and analysis process, engaging with a nonrelated professional to discuss the researcher's response to the data collected, and a reflexive journal outlining experiences and preconceptions before data collection and updated throughout the research journey (Tufford & Newman, 2012). I maintained a reflexive journal throughout the research process of the study.

### **Methodology**

This basic qualitative study involved data collection through semistructured interviews to explore secondary coteachers' experiences with challenges and their perceptions of supporting SWD in inclusionary college preparatory science classrooms. While the quantitative research method is appropriate for comparing specific variables to

explore their relationships in a system (Maxwell, 2013), this study relied on examining the individual experiences of secondary college preparatory science coteachers. The numerical data nature of the quantitative method does not allow for the richness of the individual experience (Taherdoost, 2022). The mixed method study combines both qualitative and quantitative approaches and can be especially beneficial when collaborating with a team of researchers (Taherdoost, 2022). I did not choose a mixed method because I felt the qualitative interview data would be sufficient to meet the aim of the study, and I was not working with other researchers in a collaborative study. The qualitative method's open structure allowed me to collect nonnumerical data such as perspectives, emotions, and experiences, making this an appropriate research method for the study (Ravitch & Carl, 2020).

The semistructured interview process allowed the participants to share their unique experiences as secondary college preparatory science coteachers. I analyzed the data through thematic analysis by coding the responses using NVivo to better understand the challenges they face in the inclusionary college preparatory classroom. A basic qualitative design was appropriate for this study because it supports the exploration of how individuals interpret and make meaning of their experiences within real-world professional contexts. Basic qualitative research is well suited for examining complex human experiences and perceptions, particularly in educational settings where examining participants' perspectives is central to the purpose of the study (Kekeya, 2021). This design allowed for the collection of rich, descriptive data through participant interviews without the structural requirements of a bounded case. My study aimed to explore the

individual experiences of secondary college preparatory science coteachers. Multiple studies examining the challenges of coteaching highlight the significance of teacher relationships as an integral component of student success (Pesonen et al., 2021; Pratt, 2014; Pratt et al., 2017; Rytivaara et al., 2019). Therefore, collecting secondary coteachers' experiences and perceptions through semistructured interviews provided rich data to support the purpose of this study.

### **Participant Selection**

The participant population of this study was secondary general and special education coteachers with recent experience in inclusionary college preparatory science classes in my high school. I utilized the master schedule across the past 3 school years to identify all content area science teachers and all special education teachers who supported at least one inclusionary science course in the building to develop a list of potential participants. Participants were invited to share their interest in participating via an initial email explaining the purpose and aim of the study.

The potential participant list was developed through the purposeful sampling method to focus on participants with the experiences necessary to provide rich data relative to the RQs. Random sampling was not appropriate for this study because of the specific details directly related to participant qualifications and experiences. Potential participants in this study were required to have had recent experience in the secondary inclusionary science classroom within the past 5 years to provide relevant data related to the RQs. They should also have had at least 1 year of experience to better understand the challenges they may encounter in the inclusionary secondary science setting. It is

imperative that the researcher recognize and understand the limitations of the selection method (Ravitch & Carl, 2020). In the study, purposeful sampling significantly limited the pool of potential participants but was necessary to obtain data specific to the RQs. As of the 2024 school year, the location of this study employed five general education science teachers, all of whom were required to teach at least one inclusionary class, and nine special educators who had cotaught inclusionary science classes within the past 5 years. While this was a potentially limited participant pool, the district is located in a small semirural town. This study yielded 10 total interview participants.

### **Instrumentation**

I collected data by conducting face-to-face, semistructured interviews with qualified and consenting participants. The purpose of the semistructured interview was to allow the participants to elaborate on their responses and for me to provide follow-up questions to their responses for either clarification or greater depth of data (Kekeya, 2021). I conducted interviews individually at a mutually agreed-upon time and location to build trust and rapport with the participants (Ravitch & Carl, 2020). Ravitch and Carl (2020) and Maxwell (2013) express the significance of participant validation through member checks. All participants were provided with a printed copy of their transcript via hand delivery within a week after the interview for the opportunity to review for accuracy and to add any additional information they may have considered post interview. The interview questions were open-ended and based on the information gathered through the literature review on secondary college preparatory science coteachers' experiences in the inclusionary classroom (see Appendices A and B). Data from the semistructured

interviews were transcribed and analyzed through organizing, coding, and seeking recurring themes (see Creswell & Guetterman, 2019).

### **Procedures for Recruitment, Participation, and Data Collection**

Prior to beginning the study, I obtained approval from Walden University's Institutional Review Board (IRB). In the local setting, I contacted the director of human resources to gain approval for the research. The building administration and special education coordinators were notified of the plan and purpose of the research upon the approval of the director of human resources. When I received building-level approval, I determined which teachers may be eligible by reviewing the building master schedule from the past 3 years. Staff contact information is also available through the building master schedule. Upon review, I contacted all eligible potential participants via an electronic invitation sent using Google Forms (see Appendix C).

The initial invitation letter detailed the purpose of the study and the participant's role. The invitation form also included a brief questionnaire to collect related demographic information to ensure that each participant had experience coteaching in the inclusionary secondary science classroom for at least 1 year and within the past 5 years (see Appendix D) and a link to the letter of informed consent. The electronic invitation had the option to accept participation. If a potential participant chose not to accept the invitation, they were instructed to close the invitation form, and no identifying information was collected. In the invitation, potential participants were assured of confidentiality throughout the study and had the option to include any questions or concerns related to the study or their participation. I collected and recorded participant

responses in a spreadsheet where all participants who agreed were assigned a numerical identification for the means of data reporting and publishing. Prior to participation agreement, respondents were provided with a letter of informed consent, alerting them to their rights, including confidentiality and the right to discontinue participation at any time before publication.

As the primary instrument in data collection, I was responsible for gathering all the information and then providing a rich description of the findings through thematic analysis (Simons, 2009). I collected data through semistructured interviews and provided participants with copies of their transcripts to offer member checking for transcription accuracy and additional interview responses the participants may have thought of after the initial interview (Maxwell, 2013; Ravitch & Carl, 2020). Interviews ranged from 44–65 minutes and were conducted with all consenting participants. Participants chose a mutually agreeable location to conduct the interviews outside of regular working hours. The location all participants chose was the school’s special education meeting office, which is located away from the central offices and has a small window with a privacy shade.

I audio recorded the interviews in the school's special education office with my computer. I also used a digital recording device through my phone as a backup. Files were transferred to a password-protected cloud storage folder and then destroyed from the recording device. An interview protocol (see Appendices A and B) was followed to ensure consistency throughout the data collection procedure. I recorded field notes throughout the interview process to record nonverbal data, including expressions and

body language. Each interview was initially transcribed within 48 hours to ensure the conversation was fresh in my memory. The data collection event lasted approximately 6 weeks; this was 2 weeks longer than anticipated due to one participant having been away on vacation. Participants were debriefed with study details, an invitation to receive the results after publication, and a thank you for their voluntary participation.

### ***Expert Panel Review***

Prior to conducting interviews for this study, I submitted the interview questions to an expert panel for review. The expert panel identified unnecessary words or questions and rephrased questions to make better sense, thus increasing the validity of the data collection instrument and the responses (Hyrkäs et al., 2003). Each member had a terminal degree in education. Expert 1 is a graduate of Walden University with an Educational Doctorate specializing in special education and is the current Secondary Director of Student Services in my district of employment. Expert 2 holds an EdD in leadership and is a retired building-level administrator with 30 years of experience. Expert 3 holds an EdD in leadership and has over 15 years of experience supporting SWD.

All three panelists were provided with copies of the interview questions (see Appendices A and B) for special education teachers and for content area teachers, and a rubric (see Appendix E) to guide their analysis process. The data collection survey contained areas to offer specific written feedback in addition to a quality scale. Panelists were also provided with a brief overview of the study, the focus, and the RQs. Panelist feedback was collected into a data spreadsheet to easily view the responses in one place.

Expert 1 provided the most in-depth written feedback as well as a brief in-person discussion. Expert 2 provided in-person verbal feedback, and Expert 3 provided feedback through an online chat. All three panelists marked all questions as either meets or exceeds expectations. All three panelists mentioned Question 4 failed to include “social-emotional challenges.” I corrected this and reduced the wordiness of the question to state “other.” Expert 3 raised a potential concern over Question 12, asking both “time” and “process”, but Experts 1 and 2 did not deem the wording double-barreled as the words are related to the same topic. Expert 3 also noted that “behavioral” and “social-emotional” may be the same thing; however, upon conferring with Experts 1 and 2, they agreed that while behavioral challenges may arise from social-emotional challenges, they do not always, thus are separate issues coteachers may experience when teaching SWD. Expert 1 was concerned about exploring the compatibility between coteachers. I explained how much of the literature cited in Chapter 2 identified lack of compatibility as a significant challenge in coteaching, making exploration of this topic important to the study. Another significant note made by Expert 1 addressed Question 5. They found that, as written, the wording made it sound like a test question, which could be off-putting to participants. I reworded the question. Additional suggestions made by Expert 1 were reviewed to further improve clarity, conciseness, and consistency.

### **Data Analysis Plan**

In the study, data from individual interviews were transcribed verbatim into text format so that I could begin the coding process. Ravitch and Carl (2020) described codes in research as the process “that researchers use . . . to organize data into manageable units

of chunks so that they can find, group, and thematically cluster various pieces of data” (p. 177). I coded and organized the data using NVivo on my personal computer in a password-protected cloud-based file maintained at my residence. Interviews were reviewed and analyzed multiple times for accuracy and error analysis. From the transcriptions, I utilized coding to identify key themes that emerged after reaching saturation (Ravitch & Carl, 2020; Rubin & Rubin, 2012). I organized the themes that emerged through my data analysis into color-coded categories to enhance my ability to group the details that supported each RQ (Ravitch & Carl, 2020). This technique aided me in the process described by Creswell and Guetterman (2019), where qualitative data are analyzed by organizing, coding, discovering, and reporting. I will destroy the data within 5 to 7 years after the research publication.

Discrepant cases in qualitative analysis are those that deviate from the typical responses from which the recurring themes emerge through research (Booth et al., 2012). Discrepant data causes the researcher to take a closer look at the data they collected, which increases the overall credibility of the study results (Booth et al., 2012) and can lead to fresh insights within the study (Erickson, 2012). I used the discrepant data that arose in my study as an opportunity to view those results more critically and dig deeper for potential insights I may have otherwise missed and reported them in the results.

### **Trustworthiness**

Trustworthiness in this study was critical as qualitative studies have historically been scrutinized for the propensity to researcher bias and the subjective nature of interview data (Cope, 2014); however, qualitative methods are useful in social research as

they capture people's perceptions in a way quantitative methods cannot (Kekeya, 2021; Maxwell, 2013; Ravitch & Carl, 2020; Sabnis et al., 2023). Trustworthiness in a qualitative study can be established through credibility, dependability, transferability, and confirmability (Cope, 2014). In this study, multiple strategies were intentionally employed to strengthen trustworthiness across each of these criteria.

### **Credibility**

Ravitch and Carl (2020) compared the credibility of qualitative research to the internal validity of quantitative research. Credibility can be established through several methods, including an internally aligned research design that provides rich data while considering the significance of the participants, setting, and data analysis for authentic results (Ravitch & Carl, 2020). I invited potential participants in this study based on their professional experience in secondary science coteaching. I established trust and comfort during the interview process by ensuring that interviews were conducted in a comfortable and welcoming environment. I further developed the credibility of the study by the practice of bracketing via a reflexive journal, thereby recognizing and avoiding my own inherent biases in the data analysis process.

### **Transferability**

Researchers of quantitative studies often seek to establish external validity through generalization (Ravitch & Carl, 2020); however, I created transferability of my study across different and broader settings. While the data provided by the interviews in the study were unique to the context of the participants, future readers should be able to analyze the responses and results and determine how the information could benefit the

needs of their school or district (Creswell & Guetterman, 2019). I established transferability of the study by utilizing purposeful sampling and providing a thick description of the setting and participants without jeopardizing confidentiality (Ravitch & Carl, 2020). Robust data provides readers with the information needed to contextualize the findings in their own locality (Ravitch & Carl, 2020).

### **Dependability**

Dependability in a qualitative study refers to the stability of the data (Ravitch & Carl, 2020). Ravitch and Carl (2020) suggest that qualitative research dependability can be strengthened by clearly articulating the rationale for selecting a specific research design and aligning that design with the chosen data collection methods. I meet dependability requirements in this qualitative research study by ensuring the interview participants had a broad range of years of experience, teaching styles, coteaching styles, perceptions of inclusion, and varying experience with general education and special education students. Participants were provided with a printed copy of their interview transcript via hand delivery, and were given the opportunity to schedule a second, optional interview if they wished to add or clarify interview data.

### **Confirmability**

Ravitch and Carl (2020) explain that confirmability is not an attempt to make a qualitative study objective, which is not possible, but rather aims to “acknowledge and explore the ways that our biases and prejudices map onto our interpretations of data and to mediate those to the fullest extent possible” (p. 171). Through the bracketing process with a reflexive journal, I built confirmability by ensuring I did not influence the

reporting of my findings by applying my personal biases and spinning the results to a personal agenda (Ravitch & Carl, 2020). I elicited the mentorship of my coworker and Doctor of Special Education through Walden University, Dr. Clarke, to help me analyze and reflect on my interpretations of the data.

### **Ethical Procedures**

The Belmont Report, issued by the National Commission in 1979, led to groundbreaking protection for persons involved in research and experimentation (McDermott & Hatemi, 2020). Prior to the digital era, the Belmont Report served as a basis to protect research participants; however, the digital era has led to new challenges in participant protection within social research. McDermott and Hatemi noted, “[t]here has been a rapid and dangerous decline in adherence to the core foundations of ethical research on human participants when it comes to field experiments in the social, behavioral, and psychological sciences” (p. 48). McDermott and Hatemi warn that interventions stemming from new social research may be inadvertently dangerous because the new global-scale ease of obtaining research information results in new interventions being applied without the public’s knowledge or consent. I minimized this unintended potential harm to my participants by making options clear through informed consent, minimizing social pressures through the interview process, and allowing participants to opt out at any time. Additionally, McDermott and Hatemi strongly urge researchers to separate scholarly research and activism to minimize the potential corruption of current research findings.

The study only proceeded after I received approval from Walden University's IRB. To gain approval, I satisfactorily completed Form A, the Description of Data Sources and Partner Sites, and then provided additional required documents and addressed potential ethical issues upon board review. Upon receiving approval from the IRB with approval number 03-10-25-1060870, I contacted the district administration with details of the proposed study and the rights and responsibilities of the participants.

### **Participant Selection and Treatment**

I selected participants from the pool of secondary general and special education teachers with coteaching experience in college preparatory science courses. Purposeful sampling limited my potential participant pool, but this was necessary to ensure rich data as all participants had the required experience related to the purpose of the study (Ravitch & Carl, 2020). Potential participants were invited via electronic communication and provided with a letter of informed consent with a brief description of the study, including the objectives, methods, and risks involved with participation. Participants were informed that their voices would be recorded for data collection purposes pending their consent and they were reminded again before recording the interviews. Obtaining informed consent from the participants added a layer of ethical practice and trust in the research project (Ravitch & Carl, 2020). Participants had the right to withdraw from the study at any time, before, during, or after the interview prior to publication of the final study. Although I work in the district where the study took place, I am not in an authoritative position over participants, which could have skewed participant responses due to the imbalance of power (Blackstone, 2012). I developed a good rapport with the participants by ensuring

the interviews took place in a comfortable, neutral, and mutually agreeable time and location (Ravitch & Carl, 2020). Participants did not receive incentives for their participation.

### **Confidentiality of Data**

Data confidentiality is critical in qualitative research (Ravitch & Carl, 2020; Rubin & Rubin, 2012). I recorded interviews for playback using a voice recording device. Participants' identities remained confidential through a numerical identification system. I further ensured the confidentiality of the interview responses by not reporting data that would disclose irrelevant and easily identifiable information such as sex, age, years taught, and specific science area(s) taught (Lambert, 2012). Ravitch and Carl (2020) advise that absolute anonymity may be difficult to maintain in smaller studies because of the process of deductive disclosure. Collecting data through individual interviews as opposed to focus groups will help maintain confidentiality (Ravitch & Carl, 2020). Rubin and Rubin (2012) stated that researchers must also ensure they do not use direct quotes that would reveal the identity of a participant. As an added layer of security for confidentiality, Ravitch and Carl (2020) recommend that "identifying information should be removed from all study materials, including transcripts and/or coding sheets, so that responses cannot be connected to individuals" (p. 215). I stored the interview and transcription data on a password-encrypted cloud-based storage system and the data will be destroyed within 5 to 7 years after study publication. I will be the only person with access to the interview data throughout the study.

## Summary

The purpose of Chapter 3 was to describe the methodology of the study clearly and concisely, allowing other researchers to contextualize the information or replicate the study for their own research needs. In this chapter, I discussed the research design and provided the rationale for the selected design. The study employed a qualitative approach using a basic qualitative design. I utilized purposeful sampling to determine qualified potential participants who had coteaching experience with SWD in the inclusionary secondary science college preparatory classroom within the past 5 years. Participants were offered a transcript review and a second, optional interview for member checking.

I collected data through semistructured interviews via a voice-recording device on my phone and stored the data in a password-protected cloud storage system. I then transcribed the data and used NVivo to identify and organize codes within the data. I used the codes to identify emerging themes relevant to the three RQs. To avoid degrading the quality of the data analysis, I used bracketing via a reflexive journal to help me identify my biases and avoid overt subjectivity. I established the trustworthiness of the study by ensuring credibility, transferability, dependability, and confirmability. The research may promote social change by examining the challenges secondary college preparatory science coteachers experience when teaching SWD in inclusionary classrooms.

Chapter 4 discusses the results of this qualitative study. In Chapter 4, I provide a description of the setting, the data collection experience, the data analysis process, and the results. Additionally, I provide evidence that will support the trustworthiness of the study and conclude the chapter with a summary.

## Chapter 4: Results

The purpose of this basic qualitative study was to explore general and special education teachers' perceptions of inclusionary challenges in college preparatory science classes. Coteaching in the inclusionary format has been proven to support the academic achievement of SWD in some schools (King-Sears et al., 2021; McLeskey et al., 2014), but numerous studies suggest many schools still struggle to implement the practice effectively (Johnson et al., 2022; King-Sears & Strogilos, 2020; Preston-Smith et al., 2020). Coteacher perceptions explored in this study were guided by three RQs that identified challenges directly related to instruction, collaboration, and teacher preparation. I collected data for this study through semistructured, private interviews. My aim for this study was to collect data that may provide valuable insight into narrowing the gap in practice when supporting SWD in secondary inclusionary science courses.

Chapter 4 contains five sections. In the first section, I describe the setting of the study, including the participant selection. The second section outlines my data collection process describing the participants, location, and the instrumentation. Next, I describe the data analysis process before providing the results of the analysis. I conclude the chapter by providing evidence of trustworthiness and a chapter summary.

### **Setting**

I proposed that the study would be conducted at the sole high school in my district of employment. On March 10, 2025, the Walden University IRB approved my study, approval number 03-10-25-1060870, with my committee's recommendation to remove the specific state references due to the significantly small geographical area and

population of my study. I agreed to reference only the regional location and remove all references that could identify the state and specific locale of the study.

Upon reviewing my interview data, I determined that identifying participant responses, even with random coding, could lead to a breach of confidentiality. Kaiser (2009) asserted that in small research settings, traditional methods of direct identifiers are not always sufficient to ensure confidentiality to the greatest extent possible, thereby preventing the researcher from presenting the full richness of data. Additionally, Creswell and Poth (2018) emphasized the necessity to adapt data reporting to ensure the confidentiality of participants. To maintain participant confidentiality and maximize the richness of data I can report, direct identifiers and pseudonyms were not used in this study.

Given the small and specialized population of secondary college preparatory science coteachers within the district, even coded labels (e.g., P1, P2) could risk deductive disclosure, as colleagues familiar with the participants might infer their identities through contextual details. Therefore, in compliance with APA 7, section 1.9 (2020) research standards, “Researchers must avoid providing information that could lead to the identification of participants, directly or indirectly, through context or combination of descriptors,” responses are reported using general descriptors (e.g., “one teacher,” “a special education teacher,” or “a content area teacher”) and in random orders throughout to preserve anonymity while maintaining narrative clarity (Creswell & Poth, 2018; Kaiser, 2009; Lincoln & Guba, 1985).

## **Participant Demographics**

I obtained the list of secondary general and special education teachers who were coteaching inclusionary science courses through the secondary master schedule. After identifying all potentially qualifying participants, I used a secure electronic invitation to share their experiences for this study. The email included the purpose of the study and contact information if they were interested in participating. The initial invitation form required potential participants have at least 1 year of experience coteaching in a secondary inclusionary science class and had that experience within the past 5 years so that the data would be relevant.

Of the 12 potential participants identified, 10 indicated an agreement to participate by clicking on the link to read the letter of informed consent and subsequently choosing the “I Consent” button. Participants who declined were free to close the tab with no identifying information collected. Participants were clearly informed that participation was voluntary and could be withdrawn at any time. I maintained confidentiality by assigning numbers to interview participants for internal data management purposes only and avoiding any numerical or pseudonym identification in the study results. Of the 10 participants who agreed to contribute to the study, five teachers were general education teachers, three teachers were special education support teachers, and two teachers were dual-qualified. To further protect confidentiality, the qualification of each participant was not listed in the study results.

## **Data Collection**

This section describes the data collection process, including the interview process. The data collection process spanned 3 weeks and included 10 participants. This sample size of 10 participants was appropriate, as I proposed to recruit 8 to 10 teachers in the study. Of the 10 participants, five were general education teachers, three were special education teachers, and two were dual qualified teachers. I scheduled interviews with individuals who agreed to participate through their preferred contact method.

### **Interviews**

I conducted semistructured interviews in person in a private meeting room with a window shade after school hours. Audio was recorded via voice recording through my cell phone, as well as a Zoom meeting with the video disabled. The Zoom data were not cloud stored. Prior to the interviews, participants were reminded that they could choose not to answer any questions and could decline participating at any time. The interviews consisted of 21 questions for special education teachers and 18 questions for general education teachers. For the dually qualified participants, I used the special education interview questions. Interviews ranged from 44–65 minutes.

Upon completion of the interviews, I transcribed the responses verbatim into a Word document. After reviewing the transcript and removing any identifying information such as names, codes, or specific locations, I uploaded the files to a password-protected Google Drive folder. All participants were provided with a copy of their transcript for their review; no participants requested revisions to the data that were initially captured.

### **Data Analysis**

I analyzed the interview data utilizing thematic coding. I gathered the responses for each interview question and created a list of codes that arose from each. From those codes, I identified developing themes to answer each of the three RQs. Each theme was color-coded for visual identification through my analysis process.

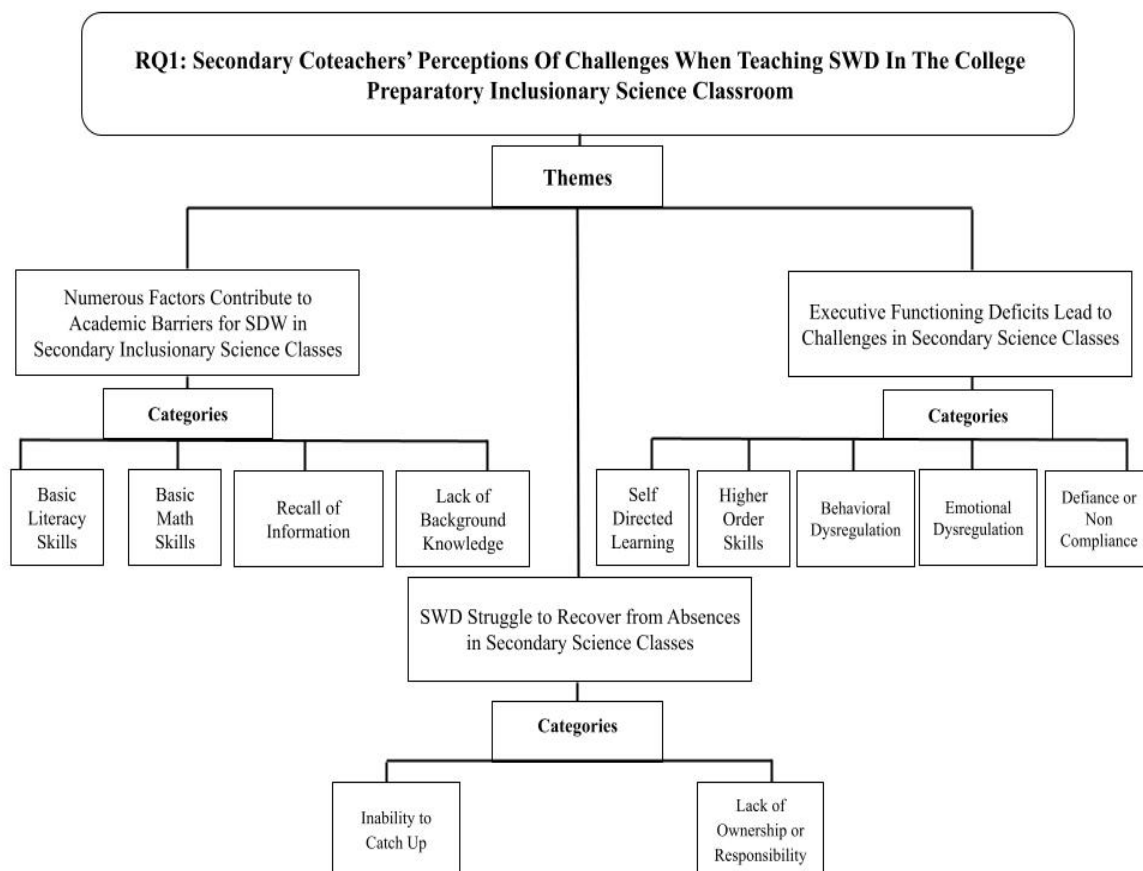
I used NVivo to organize my thematic coding data. The NVivo program made it possible for me to efficiently highlight, organize, and visualize the data. I then transferred the data to a Microsoft Word document where I created a color-coded table to better visualize the relationships among the responses. After organizing the responses in the tables, I identified seven recurring themes that spanned the three research questions. The interview results also yielded two discrepant cases within responses for RQ1. Both respondents taught similar courses, and these responses are described in the results section.

### **Results**

Upon coding, organization, and analysis of the data, I noticed emerging themes intersecting across all three RQs. Across all three RQs, respondents noted academic and cognitive deficits, a general lack of preparedness, a need for more appropriate PD and training opportunities, and a need for more time and consistency to address the challenges experienced when supporting SWD in inclusionary college preparatory secondary science classes. Interpretations of the intersecting themes are discussed in depth in Chapter 5.

**Research Question 1: Academic and Cognitive Deficits**

The first RQ asked, What challenges do secondary coteachers experience when teaching SWD in the college preparatory inclusionary science classroom? With this question, I explored secondary coteachers' perceptions of challenges when teaching SWD in this setting. The purpose of this question was to establish the challenges specific to supporting SWD in inclusionary secondary science classes before exploring potential causes of these challenges. To answer this question, I coded the responses and organized those codes into three main themes that were unique to science classes, including academic barriers, executive functioning deficits, and absenteeism. Coteacher responses indicated numerous challenges with class sizes, student dynamics, diverse learner needs, external life stressors, affective barriers to engagement, and disability stigma; however, these challenges can be applied to any class setting and are not unique to the secondary science classroom. I developed three overarching themes from RQ1 responses that explain the challenges secondary college preparatory science coteachers experience in the inclusionary classroom. I present the three themes and their subcategories that arose from RQ1 in the hierarchical map displayed in Figure 3.

**Figure 3***Themes and Categories for Research Question 1****Theme 1: Numerous Contributors to Academic Barriers for Students With Disabilities***

The first theme that emerged in RQ1 is that numerous factors contribute to academic barriers for SWD in secondary inclusionary science classes. I developed the theme of numerous academic barriers from the following categories: gaps in literacy skills, math skills, challenges in recall of information, and lack of background knowledge. Science is a unique subject in that, among the complexity of the content and

inquiry-based learning, students also must be able to read texts containing heavy academic vocabulary, understand units of measurement, and perform basic to intermediate mathematical calculations. Embedded within the academic challenges SWD experience in science classes is the unique lab experience of secondary science courses. Coteacher responses indicating academic barriers were coded into subcategories, including literacy, math, recall of information, and lack of background knowledge. Appendix F displays all respondent quotations that yielded the supporting categories within the theme of multiple academic barriers posing challenges in the inclusionary secondary science classroom.

**Challenges in Basic Literacy Skills.** Nine participants' responses noted significant discrepancies in the reading level of SWD and the levels at which academic science text is written, and three responses specifically noted challenges in reading in the lab setting. Participants stated, "And part of that is the reading level that we're required to use... Versus the reading level of actual students," and "They struggle with reading, and so much of scientific wording and language is it's so content-specific. And like, if they're a kid that doesn't have that strong foundation and like, prefixes, they're like, I don't even know what this word means, let alone, like, how to answer the questions." Also discussed were challenges specific to vocabulary acquisition. For example, participants noted "You have so many kids with that limited reading proficiency and vocabulary," "Not understanding the vocabulary," "They struggle with reading and so much of scientific wording and language is it's so content-specific," and "Some sciences, Earth science, biology. They're very language-heavy. They're very academic vocabulary-heavy."

In addition to challenges accessing the more complex reading levels and academic vocabulary of science classes, there were literacy challenges related to the laboratory setting. Participants noted that not only did some SWD struggle with the ability to independently read lab instructions, but others were reluctant to read them independently, with one response specifically noting that the lack of referring to written lab instructions led to dangerous situations.

**Challenges in Basic Math Skills.** In addition to basic literacy skills, several participants also expressed that SWD experience challenges with foundational math skills. Challenges in math appeared to be more related to the physical sciences. Teachers in the physical sciences noted that challenges with basic math skills, such as addition and subtraction, led to difficulties in understanding activities related to the periodic table, red shift, and atoms. Additionally, one participant noted that in the lab setting, SWD struggled with understanding measurements, weights, and the different systems of measurement.

**Challenges With Recall of Information.** Six participant responses referred to SWD challenges, recalling previously learned information. When students are not able to recall information, coteachers must slow down the pace and revisit concepts that are required for the next unit or lesson, as noted by this participant: “It's really hard just to keep moving forward when you're always having to take that step back. And, ‘Oh, what did we do last class?’” Participants specifically noted that recall issues are not necessarily from previous years, but from day-to-day or from previous units. Teachers noted this specifically leads to a lack of connection of ideas, “And by the time we are ready to move

on, they have forgotten from the beginning of the year and can't build or connect," and "There's that... there's a disconnect, and they seem to just forget the information that they've learned."

**Challenges With Lack of Background Knowledge.** Participants indicated that a lack of background knowledge in scientific concepts, vocabulary, and tools further exacerbates the academic challenges experienced in the secondary inclusionary science classroom. Eight responses indicated that SWD experience significant difficulties in secondary science classes because of a lack of background knowledge. One participant tied in the lack of background knowledge spanning from middle school to high school:

Their lack of prior knowledge was one of the biggest struggles because science builds so much, uhm, and it builds on a foundation, like maybe in middle school, they, they might have failed science class, right? So, like, they never actually had that information.... but they were still passed along.

One participant noted that adverse situations, not a lack of intelligence may lead to the lack of background information: "They struggle so much internally and so many are so smart, but maybe they are in a homeless situation or a foster situation and then they move a lot and have all these holes," while another teacher observed that even if the student is interested in the subject matter, the lack of background information in scientific study and the scientific method is a barrier: "Yeah, so that, and a lot of them want to do it or something they find interesting, but they don't have whatever background knowledge they need to be able to." Furthermore, participants recognized how students' lack of background knowledge was a barrier in the lab, hindering them from using "tools and

equipment” or knowing the difference between equipment, such as a “graduated cylinder versus a test tube versus a beaker.” These responses suggested that even if students were interested in science classes, many were not able to fully engage in the context.

### ***Theme 2: The Challenges Stemming From Executive Functioning Deficits***

The second theme that emerged in RQ1 is that executive functioning deficits lead to challenges in secondary science classes. Executive functioning skills include the higher cognitive abilities that help individuals manage their own behaviors, self-direct their learning, and persist toward goals (McClain et al., 2022). Executive functioning skills are especially important in the secondary science classroom because of the rigorous material, the complex thought process needed, and the requirement of self-control in the unique hands-on experience of the lab setting. I organized 42 participant responses into five categories to develop the overarching theme related to executive functioning challenges. These categories included difficulties with: self-directed learning, higher-order processing skills, behavioral dysregulation, emotional dysregulation, and defiance or noncompliance. The full table of participant responses used to develop the second theme is listed in Appendix G.

**Deficits in Self-Directed Learning.** Science classes are unique in their structure of inquiry-based learning. Science is reliant on experimentation, and experimentation is reliant on inquiry. Eight participant responses indicated that SWD are hesitant to participate in the inquiry of self-directed learning. Several participant responses indicated that SWD prefer to memorize information and be given information without having to seek it out. For example, one participant stated,

Inquiry-based learning was typically just... It's kind of a higher level of learning where we want to kind of not force-feed the kids information, and we kind of want them to discover it on their own. And it can be really challenging, because many students just are of the mindset in their experience in... in the classroom of "Just tell me what I need to know. What... Why are you making me, giving me this rigmarole run down this path, and I have to find out for myself? You're the teacher. Do your job."

Additionally, participants described SWD in inclusionary science classes as wanting to be "spoon-fed" the information and unwilling to ask questions or generate "independent thoughts" or "make up their own ideas."

**Deficits in Higher Order Processing Skills.** Multiple participant responses indicated that SWD exhibit deficits in higher-order processing skills. Participant responses that were categorized as deficits in self-directed learning suggest that SWD prefer the lower order of learning skills, such as memorizing and understanding basic concepts. For example, one participant noted student typical responses would be: "Look, just, what do I need to memorize... What's the shortcut?" Science, however, requires higher levels of processing information, such as analyzing and evaluating. Participant responses included the following statements: "We're asking a much higher level of thought to be taught," "And they don't know how to infer about things," "It's the higher level, higher order thinking questions," and "They struggle with understanding the ideas and things that they cannot see, it's really hard to think that extra abstract and ask questions."

Additionally, one participant's response connected deficits in higher-order thinking skills to challenges in interpreting data: "What are you going to do with that data once you have data, once you have it? So, collecting the data, looking at the data, but extrapolating what that could possibly mean is, is a huge leap for them." Several participants noted that the deficits in higher-order processing skills result in frustration for SWD in secondary inclusionary science classes.

**Behavioral Dysregulation.** Participant concerns about SWD in the lab setting were most notable in the responses that I categorized into behavioral dysregulation. 14 responses fell into the behavioral dysregulation category, nine of which were directly related to the lab context. Participants described students breaking eggs before the lab even started, and an inability to respect the materials. Notable comments suggested that participants were concerned about safety when participating in labs. For example, one participant said, "If I can't trust you with a piece of paper to turn into me for me to be able to like, legibly read this, how am I going to give you like all this glassware, or these chemicals, or solutions that like you're not supposed to drink?" Another stated, "...but then you throw in things that are hazardous and people that get distracted, and they are curious, and they want to try their own experiments, and their own stuff. And then it starts to get dangerous." Similarly, a different participant described instances where SWD would strip the metal edges out of their wooden rulers and play with the sharp strips.

Overall, many participants indicated that safety concerns resulting from behavioral dysregulation resulted in limiting either the number of labs or the depth of lab experiences. For example, one stated, "So my labs that we do like the physical hands-on

labs, I try to make as simple as possible because (snicker)... I don't trust them with more advanced things,” while another said, “We can't go to the lab because so and so is throwing this, and so and so can't sit in their chair right. And so and so is doing this. So yeah, the lab, I'm, like, very hesitant on unless it's like something very simple, like a water lab where the worst thing we do is put food coloring in the water.”

**Emotional Dysregulation.** Participant responses that I categorized under emotional dysregulation were not as numerous as those under behavioral dysregulation; however, I still felt the challenges described were significant enough to include as a supporting category. Five responses indicated that SWD experience feelings of frustration and being overwhelmed: “They get frustrated easily,” “They were in moments of frustration, rather than being personal, it was more they were frustrated that they were struggling,” “[in the] the moments where there's behaviors, he was frustrated,” “They're just overwhelmed.” One participant specifically recognized that stress is normal for everyone, but SWD seem to be lacking the emotional regulation abilities to handle “life’s bumps.”

**Defiance or Noncompliance.** When creating the categories that supported the theme of executive functioning deficits, I decided to separate defiance and lack of emotional dysregulation because they are not always interconnected. Six participant responses described how defiance in SWD contributes to the academic challenges they experience in supporting students in inclusionary science classes. One participant described verbal combativeness as a form of defiance, while another described students ripping up assignments and throwing things. Several of the participants believed that

defiance resulted in whole-class disruptions: “Acting out in class, the classic disruption, disturbance, interruption,” “the classic disruption, disturbance,” “Students that are like overtly defiant and yelling, interrupting,” “A lot of disruption. Like they’ll talk to each other, or they’ll talk over myself or my coteacher or they’ll kind of disrupt, like whether it’s during whole group time or small group time.”

### ***Theme 3: The Long-Term Impact of Absences***

The third subset of classroom challenges resulted in the theme that SWD struggle to recover from absences in secondary science classes. Attendance challenges are significant in the SWD population in that they exacerbate the barriers to academic success. Teachers noted that SWD experienced more significant challenges with recovering from absenteeism than typical students, and some SWD were more likely to be absent from classes than their typical peers. Because science is a study that builds upon previously learned information and skills, students must be able to learn any concepts they may have missed while absent and may miss important hands-on lab experiences that cannot be made up. Respondents pointed out in their discussions that absences may not arise solely from truancy, but also as a result of specific special education services that may pull them from class, such as social worker visits, transition services, IEP meetings, or mental health services. I categorized participant responses addressing absenteeism into two categories: the inability to catch up and a lack of ownership or responsibility for making up missed work. Appendix H displays the full data of secondary college preparatory science coteachers’ experiences with student absences.

**Inability to Catch Up.** Participants noted several concerns related to SWD's inability to catch up after class absences. Responses suggested that SWD are overwhelmed with the make-up work: "They come back, and they see where the rest of the class is, and they feel defeated before they even attempt to catch up. They say they can't do it, so why even bother," "And so, then they just want to give up because it kind of piles up on them, and they feel already defeated, and they feel like they can't do it." Additionally, responses indicated that science builds upon previously learned information; for example, one participant stated, "When you're missing pieces of that puzzle, it's hard to jump in and do the next thing if you don't have that previous knowledge or information." Furthermore, it was specifically noted that it is difficult for SWD to catch up when they miss a test review or lab instructions: "...or you might have missed the review for the test that we're about to take," "because if you miss a day you might have missed the planning for the lab that we're getting ready to do, or you might have missed the background information to plan the lab that we do," "Absences, yeah, catching back up, especially in a science setting, when you have labs and the material you do one day builds on the from the day before. It's cumulative. If attendance was poor, they never caught back up."

**Lack of Ownership or Responsibility.** The second supporting category that developed the theme that SWD struggle to recover from absences is a lack of ownership or responsibility for completing make-up work. This is especially notable since high school students should be preparing for the responsibilities of adulthood, and in science courses, students must be prepared for labs:

Uhm... and then... there are the struggles when students are absent, and they're already behind when they're here. So many don't take ownership at all for their makeup work. I mean, this is high school. I am not going to hold your hand and send you home with a dozen copies of your makeup work. When you're out, you're expected to look online and see what you missed and come back to school prepared. But they don't. And then they're another day, or even another week behind. And then we're in a lab or getting ready to take a test, and they have absolutely no idea what's going on.

One participant expressed this concern with her comment that suggested secondary SWD lack the understanding that their work is their responsibility: "...and especially as juniors, like when you are absent, you come to me for your makeup work. I don't hunt you down. I don't write you a cute little paper." Other respondents felt that SWD believes they should be exempt from the makeup work when they are absent. For example, one stated, "And it feels like they expect you to just excuse it all, but then they aren't getting any of the content and how can that just become a passing grade and course credit?" while another said "I feel like students with disabilities, a lot of the times if they're absent from the class, they expect to be excused from any work that they missed, like when I say, 'Oh hey, you're missing this assignment', they just say, 'Oh, well, I was absent that day.'"

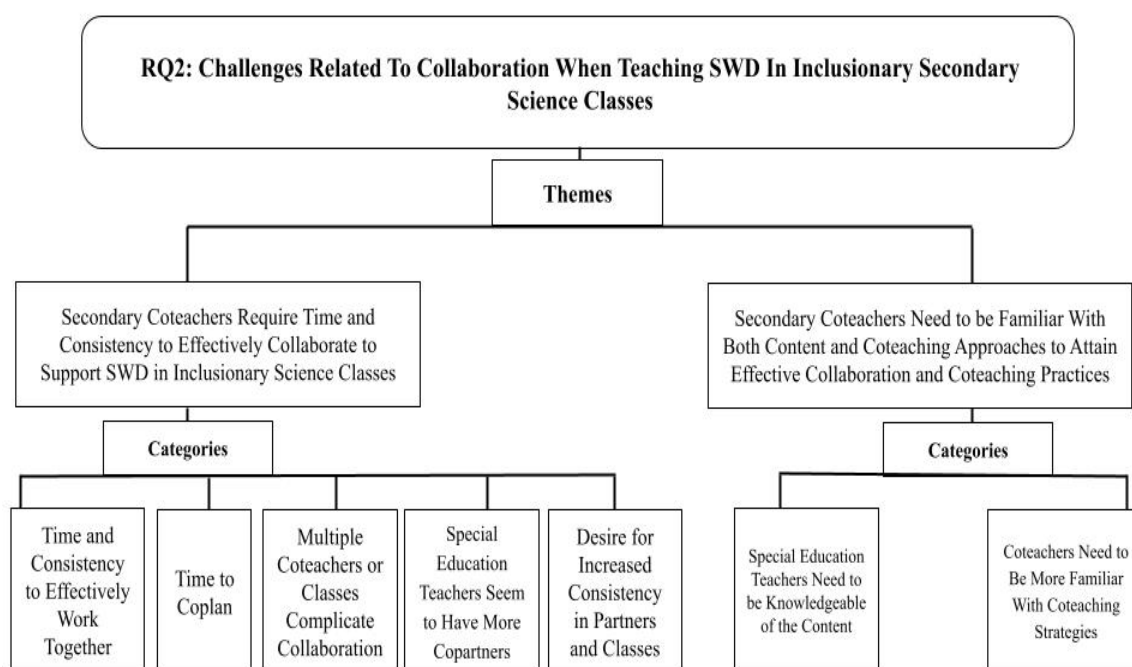
### **Research Question 2: Challenges Affecting Collaboration**

The second RQ was, What are secondary coteachers' perceptions of collaboration in the college preparatory inclusionary science classroom? With this question, I focused on identifying challenges related to collaboration when teaching SWD in inclusionary

secondary science classes. Responses to the interview question exploring collaboration were coded into several categories. I organized these categories to develop two main themes related to secondary college preparatory science coteacher collaboration. The first theme is that coteachers require time and consistency to effectively collaborate to support SWD in inclusionary science classes. The second theme is that the coteachers need to be familiar with both content and coteaching approaches to attain effective collaboration and practices. I displayed the themes that emerged from RQ2 in a hierarchical map with the categories I developed from participant responses in Figure 4.

**Figure 4**

*Themes and Categories for Research Question 2*



***Theme 4: The Necessity of Time and Consistency for Coteachers to Effectively Support Students With Disabilities***

I determined five subsection categories from responses to RQ2, which I then used to develop the theme of time and consistency. These subsections included time to effectively work together, time to have coplanning opportunities, acknowledgement that multiple coteaching partners complicates the ability to collaborate and coplan, that special education teachers seem to have more partners than do the general education teachers, and an emerging desire to have consistent coteachers and classes. Appendix I displays all participants' responses related to these five subcategories within the theme.

**The Requirement of Time and Consistency to Effectively Work Together.**

Participants emphatically stressed that the coteaching relationship takes time to develop. One coteacher recalled that the longer they worked with a specific coteacher, the better their coteaching became: "And I cotaught with [name omitted] for many years, and in the beginning it was... we weren't nearly as good as we were as time went by, we just got a lot better." This aligns with Pratt's (2014) framework for achieving symbiosis, where coteachers build a partnership in the symbiosis spin. It is not until they can build a successful relationship that coteachers can enter the fulfillment stage of their partnership, which results in a seamless coteaching experience. Another teacher echoed this sentiment:

So I think it served a purpose, and it was functional. But I absolutely think that if there had been more time to grow those relationships and to create a more solid foundation where, you know, the coteacher felt more confident in the subject

matter, and everybody felt comfortable, kind of stepping up and stepping back. I think that would have been a much more effective model, not to say that it didn't work to a level.

Additionally, coteachers expressed that it takes time for special education coteachers to build sufficient content knowledge so that they can effectively support SWD. One stated, “because it's like you're getting thrown into a subject that you might not know...” while another expressed their frustration over lack of consistency, “Like everything's rushed, and everything is on the fly and... and people get moved in and out of positions, and that consistency that I feel like it takes time to build naturally.”

**The Need for Time to Coplan.** Many participants indicated that additional time to coplan would significantly improve their coteaching practices. One participant passionately stated, “No one ever had the chance to plan together. No matter how good you are at your job or how good you get along, it is really hard to give the kids what they really need when there is absolutely no time given for collaboration,” while another teacher expressed that time to plan together would be “super helpful.” Although the majority of respondents expressed the need for coplanning time, many also observed the complexities of creating that time within a secondary schedule. One special education teacher stated that they currently have six coteachers, while a general education teacher also recognized the same challenge: “Like if I have a coteacher, you most likely won't have the same prep. And if we do, they're also coteaching with how many other teachers?” An additional response noted that challenges of collaboration extend beyond simple coplanning into PD opportunities as well:

There was absolutely no collaboration! (chuckle). None. None at all. There wasn't time. She was with another teacher during my planning time, and I was teaching another class during her planning time. It was absolutely impossible to collaborate together, and even on PD days, we had to do our own content-specific trainings.

### **Multiple Coteachers or Classes as Impediments to Collaboration.**

Respondents connected the sentiment that coplanning is complicated when they have multiple coteachers or when special education teachers support multiple class subjects. One coteacher's frustration with multiple partners and classes was evident in their response:

And then we'd need planning with coteachers, and really the only way that would be possible is, you know, if we didn't have teachers that we were assigned to, like so and so and so and so across a bunch of courses. If we would just have the same coteachers as much as possible, then we could maybe have that common planning.

Other coteachers also revealed feelings of frustration with the complexity of having multiple coteachers when they questioned, "But I mean, how could you if you have multiple partners... multiple coteachers?" and "Well, how do we collaborate? Where? Which one do I collaborate with first?"

### **Increased Prevalence of Copartners for Special Education Teachers.**

Connecting with the interview question related to the complexities of multiple copartners, I inquired of both special education and general education teachers how many coteaching partners they have had across the past 1–3 years. Responses indicated that special

education teachers seem to have significantly more coteaching partners than general education teachers. Whereas several general education teachers responded that they only had one or two coteachers within the queried timeframe, responses from the special education teachers indicated that they taught with many partners every school year, and even more from year to year. Special education teachers reported working with 6-12 different general education teachers within the past 3 years. Additionally, one special education teacher expressed their frustration in supporting four different subject areas within the same school year.

**A Desire for Increased Consistency in Partners and Classes.** The final category that I used to develop the fourth theme is that both general and special education coteachers indicated a desire for increased consistency in partners and classes. One special education teacher's response likened changing classes to starting over: "So, I feel like every time you get moved to a new class, you start from scratch." Other participants expressed that the administration should work harder to keep coteachers in the classes and with the same teaching partners as much as possible. One stated "You know, if there are three ninth grade TAM (team approach to mastery) English classes. Then why isn't the same person in those three classes with that same teacher? I don't know. It doesn't make sense," while another noted, "I think if, if the collaboration between two teachers work, the admin needs to try and keep them together because it only benefits the kids." A third respondent expressed confusion regarding special education coteachers supporting in different classes, "If there's a teacher who has three TAM classes and all three TAM

classes have a TAM teacher, I just don't understand why they don't have the same TAM teacher. I don't understand why there are different people going in and out.”

Other responses indicated that consistency in coteachers would lead to improved collaboration: “Yeah, if you had the same coteacher, you could definitely collaborate,” “And that we can work with just one coteacher as much as possible. And that we can have those common plannings and that we can have that time for collaboration and that we can work together as a single unit with a common goal of supporting these students and giving them the best education that we possibly can.”

***Theme 5: The Need for Familiarity With Both Content and Coteaching Approaches to Attain Effective Collaboration and Coteaching Practices***

The second overarching theme that I developed from the responses to RQ2 is that secondary coteachers supporting SWD in inclusionary science classes need to be familiar with both content and coteaching approaches to collaborate so they can deliver effective instruction and support. The theme is supported by two subcategories expressing that special education coteachers need to be knowledgeable in the content, and all coteachers need to be better trained in various coteaching styles. Appendix J displays all participant responses that I used to develop the three subcategories to support Theme 5.

**Special Education Teachers Need to Be Knowledgeable in the Content.** There was an overwhelming response that when coteachers are supporting SWD in the sciences, the support teacher must be knowledgeable in the content. One special education support teacher expressed that to support SWD for success in the sciences, they need to understand both content and labs:

So, I mean, that in order for me to support those kids, I also have to understand the content. I can't just go in and be like, 'Oh, I'm just gonna remove a multiple choice, you know, to modify it for you', you have to really understand it and be able to bring it down for them, or just sometimes even change the lab for them entirely in order for it to be more appropriate for their level. So, yeah, when you're modifying, you have to know it.

Another special education teacher expressed their concern that they are not able to present the material differently for their students: "How will these kids benefit from a helper who doesn't understand the content, because I might not be able to break down complicated ideas for them if I don't understand them myself?" Other participants noted that the experience of supporting a new science class is similar to taking on a student role. One stated, "I feel like to go into a new science class with a new science teacher, I feel like I... I have to relearn things," while another sat with the students: "I, like, acted like a student. I would just... I would literally sit with the kids, and they would be saying something, and I would look at the kid. I'm sitting next to, like, 'do you know what, like, I don't know what the heck they're talking about', and I would raise my hand."

Similarly, general education teachers expressed that coteaching is not as effective when the support teacher does not know the content well. One general education teacher stated, "So it's, it's hugely important [referring to knowledge of content]. They [special education coteacher], otherwise, they're not doing a whole lot. They can't really do a whole lot. And so that's a big challenge, you know." [spec ed teacher knowing the content]. Another general education teacher explained the challenges they faced when

attempting to teach in small groups or pull out groups when the special education teacher did not know the content, “And, and, while [they were] very... smart, [they were] not a content expert. It was really hard for [them] to be a lead in high school [science] on [their] own.” Another general education respondent tied in the need for special education coteachers to be familiar with science content with the need for consistency in teaching assignments, “And so, you have to have somebody who's willing to put in the time and learn the learn the content, and for a coteacher, a special ed co teacher who doesn't know that they're guaranteed that same placement the following year, why would they want to put the time in to learn that subject?”

**Coteachers Need to Be More Familiar With Coteaching Strategies.** When asked questions about specific coteaching approaches, most participants were not able to name or describe more than two coteaching approaches. Many also indicated that they felt the team teaching approach (whether formally named or not) was the most effective, but they were unable to implement it in their current or recent coteaching partnerships. Notable quotes indicating a general lack of coteaching approach knowledge include: “Oh, I know there are a bunch, but we haven’t done many” [referring to coteaching approaches], “I can’t name them right off the bat, but you've, I mean gosh there's any of a zillion different things” (laugh) [referring to coteaching approaches], “If you're asking me to name like name drop these things, I'm going to be on the struggle bus” [referring to coteaching approaches], “Um, you could have both teachers kind of simultaneously. Again, I think there I feel like there's a million ways that any of that stuff can happen”

(laugh), “One teach, one assist. Both team teachers take a lead role. I guess that's all there is.”

After I described different coteaching approaches, many noted in their responses that they typically implement the one-teach, one-assist model: “Usually, my coteacher would support the students while I taught the content”, “Uhm, yeah, so like I said, I would usually deliver the lesson while [they] circulated throughout the room. [They] would make sure the students were paying attention and [they] would help explain instructions and get kids going”, “So, a lot of the times we'll do... what... one teach- one assist”, “In science, it's usually one teach, one assist”, “The one-teach one-assist is as far as I could tell, really, the only thing I've ever done in secondary science classes,” “I feel like then I would lean on the coteacher to do that [support special education student needs] while I managed the rest of everybody, or try to anyway”, “So you've got the idea where the general education teacher kind of does everything and the special education teacher should (long drawn out emphasis) be (laugh), you know, moving around, walking around, working with the students.”

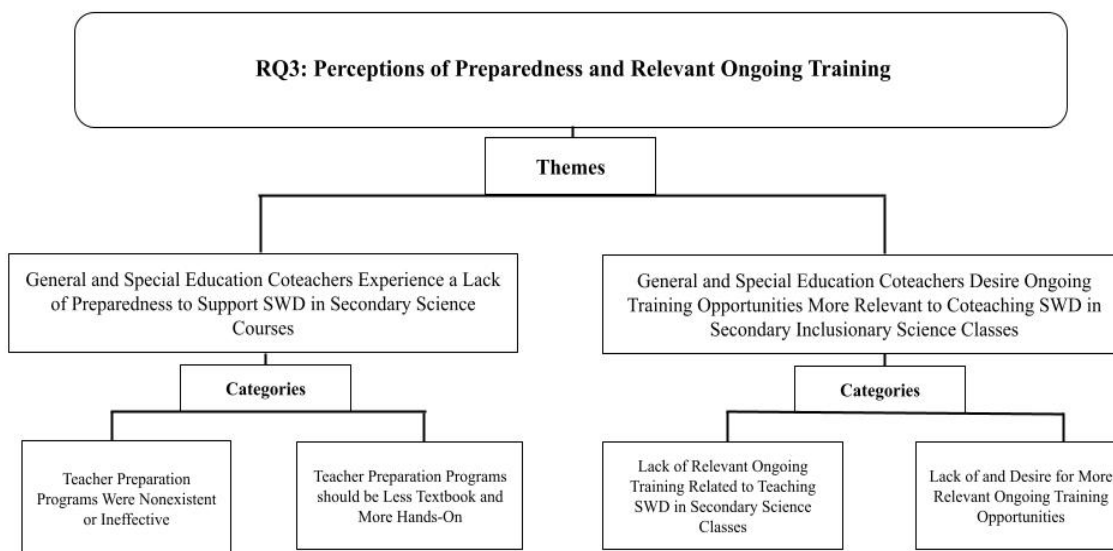
Additional comments indicated feelings that while it was the most utilized coteaching model, the one-teach one-assist approach is not ideal, or even places the special education in more of a paraprofessional role. The frustration in not being able to implement more effective coteaching strategies is evident in the following two responses: “I think it was effective to a level, but I feel like it underutilizes the second teacher in the room”, (big sigh) “It works because it has to work. Because of the scheduling and the limitations placed on us.”

### Research Question 3: Perceptions of Preparedness and Relevant Ongoing Training

The third RQ asked, What are secondary coteachers' perceptions of ongoing PD opportunities related to secondary-level science coteaching? Here, I explored coteachers' perceptions of preservice training and relevant ongoing training to prepare them to support SWD in inclusionary secondary science classes. I developed two overarching themes from the responses to interview questions exploring RQ3. The first overarching theme is that general and special education coteachers experience a lack of preparedness to support SWD in secondary science courses. The second overarching theme is that secondary college preparatory science coteachers desire more relevant ongoing PD opportunities. Figure 5 offers a hierarchical illustration of the themes that emerged from the categories I developed from participant responses.

**Figure 5**

*Themes and Categories for Research Question 3*



***Theme 6: General and Special Education Coteachers Experience a Lack of Preparedness to Support SWD in Secondary Science Courses***

I developed the first overarching theme of a lack of preparedness to teach SWD in secondary science classes. I coded the interview responses into two subcategories that included perceptions indicating that teacher preparation programs were nonexistent or ineffective because they did not prepare coteachers for supporting SWD at the secondary level, and that general and special education teachers would have benefited from fewer textbooks and more practical or hands-on experiences in their preservice training opportunities. Appendix K displays all participant responses supporting this theme.

**Teacher Preparation Programs Were Nonexistent or Ineffective.** When I asked participants about their teacher preparation programs in relation to teaching secondary SWD in inclusionary classes, almost all special and general education teachers noted either one class or no classes that they could recall, leading to an overwhelming feeling of being unprepared. Several responses noted limited preparations: “I never had... I don't remember talking much, if any, on coteaching relationships”; “I don't remember having a class that did that”; “I don't think I had any specific classes on working with students with disabilities.” Others echoed similar responses, emphasizing a total lack of preparation: “And so, I mean, I guess I just had zero preparation”; “Okay, so I would say none. There is no actual class in my experience that prepared for, like a coteaching environment.” One participant voiced their frustration humorously, but poignantly: “I don't feel prepared as much as it's just like ‘Make this sorcery. Just learn by doing in this job’.” Whereas two other participants focused their responses directly on the lack of

preparation specific to the secondary level: “As far as like secondary level, there was, there was definitely none, nothing. There was nothing at all about high school kids with disabilities” and “Little to none...I don't remember getting a lot of training on students with disabilities, period.”

Compounding the lack of relevant appropriate coursework, participants also noted a significant lack of relevance in their preparation programs as related to supporting secondary SWD. One participant expressed their frustration as “I would say like the preparation is, yeah, it's not working.” Another participant responded with some confusion and disbelief when I asked about their preservice preparation, “...Which doesn't sound right, but if I can't remember, then that means that if I did have a class, it didn't do its job.”

Respondents expressed additional concerns about the lack of training specifically related to supporting adolescent SWD. They stated the following: "I was definitely not really ready to handle the inclusive classes, and especially in the high school level. It was like nothing in the college courses even touched older kids. That I do remember. I just wasn't really prepared or comfortable at first,” and “Teacher preparation program... so my teacher preparation program, which was K-6, there was one special education class. So, I didn't really have anything to prepare for high school."

Two veteran general education teachers also explained that when they were in college, inclusionary classes did not exist, which contributed to their frustration in supporting SWD in their classes. One stated, “So there really wasn't coteaching for my

first 20-some years. There was a special ed classroom. There wasn't inclusion," while the other said, "There was really no such thing when I went through it."

**Teacher Preparation Programs should be Less Textbook and More Hands**

**On.** The second subcategory that supported the theme that secondary coteachers are unprepared to support SWD in inclusionary science classes is that the courses lack real-world relevance. Several teachers specifically expressed frustration that the only class provided in their preservice training that covered SWD only offered basic definitions and stereotypical snapshots of disabilities. One stated, "There was mostly just the textbook stuff. Like what the specific disabilities are and how they look stereotypically. You know, this is Autism, and this is dyslexia. The real basics of what some disabilities look like and how to support them," while another participant mirrored that sentiment with their response, "I took one class on students with, I don't remember what it was called, but it was like a students with disabilities class where we like we learned about ADHD, then we learned about autism, and so we learned about the different special education... um... issues students have."

Other respondents contrasted textbook classifications with reality in their responses. One stated, "Just because a book says that a disability might present in a student a certain way, doesn't mean it actually will," while another reflected, "I mean, everyone is different, and is there really a textbook for any kid with a disability?" Another respondent corroborated this feeling by recognizing individuality in their response, "You can't just read about a one-size-fits-all intervention and then expect it to work on every kid. They are all different, and they all respond differently."

Frustration was evident in several coteachers' responses: "And, it was very frustrating because like what was being discussed in my classes that I was taking, it just didn't look the same as what was going on in the classroom," "I like, thought I learned something that was groundbreaking and you try to implement it in the classroom and it's like that did not go how we talked about in class," "But it would have been so much better if the learning was more situational," "Gosh, I would have learned so much more actually working with students more in my student teaching." Moreover, additional participants expressed the absolute need for more in-depth and hands-on preservice training opportunities. One stated, "I would've been so much more prepared if I had seen how to support spec ed kids in person instead of just reading about it in a book. Like, they barely even talked about interventions and how to approach different situations," while another noted, "Like no matter what we learned in our teacher prep program or where it was. I think we need to have the ability to sit down and do it in the here and now with the people we need to do it with." Another participant expressed that preservice training lacked practical opportunities to become familiar with not only supporting secondary SWD, but also coteaching:

Everything was like, theoretical too. So, it wasn't like in practice other than student teaching. So, in that regard, like, given an opportunity to experience coteaching, but it wasn't in student teaching, that I felt like I got that opportunity to work on, like, 'Well, how do you even coteach? Like, how do you work in a science class, secondary science classroom to provide...?' No, I don't feel like any class outlined that on paper or in readings or in books. It was, it was just

purely like being in the classroom and doing it and learning from another teacher that had been doing it in practice.

***Theme 7: General and Special Education Coteachers Desire Ongoing Training Opportunities More Relevant to Coteaching SWD in Secondary Inclusionary Science Classes***

The second theme I developed for RQ3 is that secondary coteachers desire more relevant ongoing PD opportunities. I supported this theme with two subcategories that included a lack of relevant ongoing training and a desire for ongoing training opportunities more relevant to coteaching SWD in secondary inclusionary science classes. Appendix L displays the full participant responses supporting the second theme of RQ3.

**There is a Lack of Relevant Ongoing Training Related to Teaching SWD in Secondary Science Classes.** The first subcategory supporting the theme that coteachers desire more relevant ongoing training is that they passionately feel there is a lack of the training they need. Nearly every participant responded emotionally that they do not receive ongoing PD that would help them better support secondary SWD in inclusionary science courses. Notable responses indicating extreme frustration included: “ZERO. Literally zero,” “Hmm. Professional development. Directly related to secondary science, no. No, that doesn't exist. No,” “None, okay, none,” and “None. None that was directly related. None. OK, ever.” Other respondents answered the interview question with less emotion but still recognized the abundant lack of relevant ongoing training. One coteacher noted in their response that their PD opportunities are more related to

classroom management, “I can't recall things that we have done, as, like, a... a department or a school that's specifically related to supporting students with disabilities. It's more so like classroom management, but it's never talking specifically about students with disabilities.”

### **Coteachers Indicate a Desire for More Relevant Ongoing Training**

**Opportunities.** After asking coteachers about their preservice and ongoing development opportunities, I sought to determine how they could feel more prepared to support SWD or what additional PD opportunities would benefit their coteaching efficacy. Responses indicated a universal desire for more relevant training and a wide range of ongoing development opportunities focusing on coteaching, supporting adolescent SWD, and science-specific strategies. One participant expressed their concerns that PD opportunities should be geared towards adolescents, coteaching, and science-specific:

I think we could do an exploratory on science. On... you know... How to be safe? How to break groups down? How to maybe work better in splitting lab settings? How to teach kids to inquire... how to do that inquiry-based learning, and how to address all of that with just high school kids with special education. High school kids, not elementary kids.

Special education teachers expressed that general education teachers should have more training to prepare them for supporting SWD in inclusionary classes. One respondent asserted that teaching secondary SWD in inclusionary classes is both teachers' jobs, and general education teachers may benefit from coteaching training: “I think there needs to be professional development for the gen ed teachers on how to be a

strong coteacher, because they have that role as well.” Another respondent expressed concern that secondary level general education teachers would benefit from increased awareness of the needs of SWD, “like a professional development that allowed them to see things through our lens and see things a little bit more through the special ed, like the student with a disability, because some are gen ed teachers, you know, might be so focused in on the content that they're trying to teach, and they're not able to really understand what their students need.” On the same note, a veteran general education teacher indicated their desire for improved coteaching training, “There needs to be, there needs to be some training for this, you know, you can't, you can't go with... if you're a veteran teacher and you've never done coteaching, and the principal says, ‘Oh, you're coteaching next...year for three classes.’”

Other respondents expressed frustration with a lack of PD opportunities relevant to adolescents. One content area teacher stated:

Well, definitely having professional development that is specific to high school students and their developmental stage would be really helpful. And how do we support secondary students with disabilities in science? Yeah, having PD that is geared towards secondary students and high school- stuff that would give us updated and new techniques and strategies would be really helpful.

Another special education teacher was concerned about adolescent apathy and stated, “How do you make them care? I guess you can't make anybody care... How do you guide them into caring, you know? Yeah, things for older kids. Older kids and... and their unique... situations. Yeah.”

Special education teachers also expressed that common PD sessions should include secondary science-specific content. One participant revealed a desire to have training opportunities that would allow them to better understand the content. They stated, “Maybe their professional development is going to be centered around a refresher course on [a specific course] so that they can be a stronger teacher,” Another coteacher corroborated this statement when they said: “The same professional development that the gen ed teachers get, like, I need to go and be trained on all of these things as well. But I don't think they put as much... they don't invest in much in the coteachers, because they could move year to year.”

### **Discrepant Cases**

The results of this study yielded a high degree of similar responses across interview questions, which can be expected in a study conducted in a small school within a small district. The degree of homogeneity contributed to the study reaching saturation within the anticipated data collection period. However, two cases of discrepancy arose in RQ1, IQ 2. IQ2 asked: What behavioral challenges have you experienced when teaching SWD in cotaught inclusive science classes? While most participants noted a broad spectrum of disruptive behaviors, two teachers expressed that the SWD in their classes were more academically engaged and posed fewer behavioral challenges than their typical peers. I noted contextual factors common to both cases, including the fact that these participants taught science courses that were not state requirements, were more advanced in content, had significantly fewer SWD in proportion to typical students, and contained mostly students who were actively seeking courses that would boost their

transcripts for college applications. These differing perspectives provide an alternative perspective on the study through another lens, in which supporting secondary SWD in science classes can be viewed by future researchers.

### **Evidence of Trustworthiness**

#### **Credibility**

The credibility of this study was achieved through various techniques. The participants in this study were carefully chosen for their unique professional experiences and insights related to the problem of the study. Also, because I am dually certified in special education and secondary science, it was imperative for me to maintain a reflexive journal as I analyzed the data. I maintained this journal in the notes section of NVivo as I coded and categorized my data. This helped me identify my biases and avoid allowing them to influence my findings.

One bias I identified during data review was an inclination to compare my own special education support practices with those described in the interviews. As I found myself doing this, I journaled my thoughts and refocused on the participant response. Another bias I encountered when interviewing general education teachers was thinking about ways I would have built in support for SWD in cotaught classes. To mitigate this bias, I recorded these thoughts in my journal and narrowed my focus back to the participant responses.

Additional credibility of this study was established through saturation and member checking. This study reached saturation when respondent feedback was essentially similar, thus data collection could cease. I conducted member checking by

providing participants with a copy of their interview transcript for review to ensure accuracy. I made no adjustments to the strategies to develop credibility that were outlined in Chapter 3.

### **Transferability**

Transferability of a study is its ability to be generalized across other contexts (Creswell & Guetterman, 2019). Although the study was conducted in a small district with a small sampling size, I utilized purposeful sampling to recruit participants with extensive recent experience coteaching secondary SWD in inclusionary science classes to gather robust data. These findings can potentially apply to several other small, rural, and semirural neighboring districts with comparable populations. There were no adjustments to the proposed transferability strategies of the study as outlined in Chapter 3.

### **Dependability**

Dependability in a qualitative study is achieved through stability of data (Ravitch & Carl, 2020). In this study, I provided a thorough argument for my chosen research design and the alignment of the data collection method. I created an interview protocol that would dig deep for rich responses and provided participants with copies of their interview transcripts for member checking. The participants had a wide range of experience and were well-balanced with five special education teachers, three general education teachers, and two dually certified teachers. All participants were offered the opportunity for an optional second interview to add to or clarify responses, although all declined the opportunity, feeling that their responses were accurately collected and interpreted. I made no changes to the dependability strategies described in Chapter 3.

## **Confirmability**

Confirmability refers to the degree of objectivity within a qualitative study (Ravitch & Carl, 2020). Although it is not possible to approach qualitative data fully objectively, the researcher must become aware of their inherent biases and acknowledge those throughout the study (Ravitch & Carl, 2020). To help me identify my biases, I maintained a reflexive journal throughout the data collection and analysis processes, and I reflected on those feelings with my mentor and coworker, an EdD graduate of Walden University. I made no adjustments to my proposed confirmability strategies, which I outlined in Chapter 3.

## **Summary**

This study presented three RQs that were explored through 10 semistructured interviews. The interview responses provided the study with rich data derived from each participant's unique perspective and experience. All participants provided thoughtful and thorough responses to the interview questions, which I used to develop seven overarching themes to answer the RQs through thematic analysis.

Results for RQ1 indicated that secondary college preparatory science coteachers experience numerous challenges in the classroom when supporting SWD in inclusionary classes. While some of the challenges described could be related to any secondary inclusionary class, three themes emerged that were specific to the uniquely complex nature of science classes. The three themes were related to academic challenges, executive functioning deficits, and complications related to absenteeism.

RQ2 sought to determine the challenges secondary college preparatory science coteachers experience in collaboration. The results yielded two themes complicating collaboration: coteachers require time and consistency, and effective collaboration requires both partners to be knowledgeable of content, familiar with supporting SWD, and aware of coteaching approaches and strategies.

RQ3 explored secondary college preparatory science coteachers' perceptions of ongoing PD opportunities related to supporting SWD in inclusionary classes. From the results, I developed two themes that indicate a lack of ongoing PD opportunities more directly aligned to the nuances of coteaching and supporting SWD at the adolescent age in secondary science classes, and coteachers' desires to have more relevant training opportunities.

In Chapter 5, I discuss my interpretations of the findings. I also connect the findings with Pratt's (2014) framework of achieving symbiosis, which explores how coteachers develop efficacy in their partnership. The limitations of the study are discussed along with recommendations, implications, and a conclusion.

## Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this basic qualitative study was to explore coteachers' perceptions of challenges in supporting secondary SWD in inclusionary science classes. This study was unique in its narrow focus on the experiences of secondary college preparatory science coteachers. While the literature review in Chapter 2 provided a detailed interpretation of Bandura's (2000) theory of collective agency, Pratt's (2014) framework for achieving symbiosis, and a thorough history of coteaching, the findings presented in Chapter 5 expand on the concepts to focus specifically on the challenges faced by secondary college preparatory science coteachers. Education leaders can use the findings of this study to develop new training opportunities within their buildings. Chapter 5 begins with my interpretation of the findings, followed by a discussion of the study's limitations. I provide recommendations based on the findings and the implications of the study results. Chapter 5 concludes with a summary.

In Chapter 4, I discussed the findings of the study. The interview results yielded seven themes describing the challenges secondary college preparatory science coteachers experience when supporting SWD. I thoroughly detailed how the participant responses revealed codes that I grouped in subcategories to develop each of the seven overarching themes. The seven themes were (a) numerous factors contribute to academic barriers for SWD in secondary inclusionary science classes, (b) executive functioning deficits lead to challenges in secondary science classes, (c) SWD struggle to recover from absences in secondary science classes, (d) coteachers require time and consistency to effectively collaborate to support SWD in inclusionary science classes, (e) secondary coteachers

need to be familiar with both content and coteaching approaches to attain effective collaboration and coteaching practices, (f) general and special education coteachers experience a lack of preparedness to support SWD in secondary science courses, and (g) general and special education coteachers desire ongoing training opportunities more relevant to coteaching SWD in secondary inclusionary science.

### **Interpretation of the Findings**

In this section, I will discuss the seven themes that emerged from the findings of the study. These themes are supported by my findings from the exhaustive literature review I conducted in Chapter 2. The themes are organized in this section by RQs. The conceptual framework of Bandura's (2000) theory of collective agency grounded these interpretations. Collective agency, as explored in the literature review of Chapter 2, is the shared desire to work together to achieve a common goal (Bandura, 2006). I focused on the shared challenges of secondary general and special education teachers as they seek to successfully support SWD in inclusionary science courses.

#### **Themes Related to Research Question 1**

In my first RQ, I wanted to explore the challenges secondary coteachers experience, specifically in the classroom when supporting SWD. The purpose of examining this topic was to determine what challenges outside of the training for and the direct coteaching relationship exist when supporting SWD in secondary science classes. When coteachers achieve symbiosis in their working partnership and enter the fulfillment stage, they can handle a variety of challenges seamlessly (Pratt, 2014), tying into the interdependence of collective agency (Bandura, 2000). My analysis of RQ1 data yielded

three themes: numerous factors contribute to the academic barriers SWD experience in secondary science classes, executive functioning deficits lead to additional challenges SWD face in secondary science classes, and SWD struggle more to recover from absences in science classes.

### ***Numerous Contributors to Classroom Challenges***

I developed the first theme of numerous academic barriers from several subcategories that included a lack of basic literacy and math skills, challenges with recall of information, and a general lack of scientific background knowledge. Drew et al. (2020) found that SWD exhibit significant deficits in literacy and writing skills, hindering their ability to adequately report their scientific findings and craft arguments or explanations. Similarly, Kaldenberg et al. (2015) noted that despite science courses being more inquiry-driven than other content areas, basic literacy skills remain paramount for students to access science coursework in the classroom and in the lab. In addition to needing to be able to read lessons and assignments, students must be able to read instructions and materials to successfully participate in a lab. In addition to literacy skills, many science courses require mathematics skills. Boyle (2021) asserted that secondary SWD often perform significantly below their typical peers in numerous academic skills, including mathematics.

Steele (2004) explored the numerous challenges SWD experience when learning in science courses, especially noting challenges with memory and higher-order thinking skills. Additionally, Rizzo and Taylor (2016) found that SWD require more explicit instruction than is ideal in science instruction. This is significant because science is a

subject that builds upon previously learned foundations. Respondents of this study noted an overall perception that SWD seem to struggle with recalling previously learned material, which leads to deficits when presented with new material and requires additional time for explicit instruction. Students learn the basics of science, such as the scientific method, at an early age (Rizzo & Taylor, 2016); however, interview data suggested that SWD at the secondary level overwhelmingly lack the prerequisite scientific background knowledge needed to succeed in secondary science courses. These findings align with those presented by Steele (2004). These academic barriers contribute to the difficulties secondary coteachers experience when supporting SWD in science classes.

### ***Executive Functioning Deficits***

SWD often experience deficits in various areas of executive functioning (Messer et al., 2022). Although Messer et al. (2022) was conducted in the United Kingdom, the study's focus on executive functioning in adolescents with and without special educational needs supports its relevance to this research. Interview participants shared the significance of how these deficits manifest in the secondary science setting. SWD exhibit deficits in executive functioning across numerous aspects of the secondary science class, such as self-directed learning, higher-order cognitive skills, behavioral dysregulation, emotional dysregulation, and defiance or noncompliance.

Rizzo and Taylor (2016) postulated the significance of inquiry-based instruction to meet NGSS standards and effectively prepare students for the increasingly STEM-controlled job market; however, their research found that open inquiry is often

inappropriate for SWD, who were more successful with structured inquiry. Numerous participants shared concerns that, in their experiences, SWD preferred to be given direct information and facts to memorize as opposed to creating their own inquiries of scientific situations, tying into both Steele's (2004) and Rizzo and Taylor's (2016) research, noting that SWD seem to struggle more with more complex cognitive functions. Study respondents noted that SWD often seem uncomfortable with asking and then seeking answers to their own questions as well as with making mistakes, reflecting Rizzo and Taylor's (2016) findings. Science is a unique subject in that it requires the participant to explore numerous options, including wrong answers, to develop an idea that could be a possibility.

Additionally, several responses indicated that SWD exhibit challenges with analyzing, interpreting, and synthesizing information gained from a lesson or a lab experience. Scientific concepts require students to analyze the learned content and apply it to new concepts. When in the lab, students need to go beyond observing the experiment. Participant responses suggested that SWD experience difficulties in analyzing the data and then interpreting the meaning or significance, as well as synthesizing the new information across different scenarios. These findings align with Steele's (2004) assertions that SWD struggle with complex cognitive processes more so than students without disabilities.

Rizzo and Taylor's (2016) research emphasized the significance of the hands-on inquiry experience of labs in science education. However, participants expressed significant challenges in the lab setting related to behavioral and emotional dysregulation.

Participants expressed inherent dangers present in secondary science labs, from equipment to chemicals to fire. Interview data suggested that behavioral dysregulation, such as the inability to control bodily movements or respect classroom supplies, makes it difficult to safely conduct a more complex lab. Additionally, emotional dysregulation, regardless of the catalyst sparking the challenge, can lead to students shutting down during coursework or presenting with behaviors that are unsafe in a lab. Behavioral and emotional dysregulation are closely linked to defiance and noncompliance, which several participants expressed led to the disruption of the entire class. These challenges often limit SWDs' participation in hands-on activities, which, according to Rizzo and Taylor (2016), negatively affect their ability to access science outside of explicit instruction.

### ***Struggles Recovering From Absences***

The final theme of RQ1 is that SWD appear to struggle more in recovering from absences in secondary science classes than their typical peers. Coteachers expressed concerns that SWD were more likely to experience absenteeism, which correlates with findings by Anderson (2021). This is a significant factor for the population of SWD because while some may be suffering from health problems or be purposefully truant (Anderson, 2021), participants recognized that many SWD are also pulled from class for numerous required supports, such as physical or mental health services, outside agency supports, transition services, and team meetings. Both general and special education teachers shared experiences that SWD have difficulty catching back up from missed material without direct support, and that they tend to have a greater lack of ownership or sense of responsibility when needing to make up work. Respondents stated that SWD

were prone to giving up when faced with work to make up after they were absent from instruction. General education teachers expressed frustrations that many SWD expected their make-up work to be explicitly handed to them as opposed to looking it up for themselves, while special education teachers noted a more apathetic attitude from students who expected their missed work to be excused.

### **Themes Related to Research Question 2**

RQ2 focused on the perceived collaboration of secondary college preparatory science coteachers. Bandura (2000, 2006) asserted the significance of working together effectively towards a common goal in his theory of collective agency, which grounds this study. Collaboration is imperative to a successful coteaching relationship (King-Sears et al., 2019; Pratt, 2014; Stefanidis et al., 2019). There were two overarching themes that arose from RQ2, which describe the need for more time and increased familiarity with content and coteaching practices.

#### ***Requirement of Time and Consistency to Effectively Collaborate***

Effective collaboration results from two or more people with the desire to work together towards a common goal (Bandura, 2006). There were many categories that I compiled to develop the theme of time and consistency, indicating a complexity in this theme. Several responses suggested that coteachers require time and consistency to develop relationships conducive to an effective partnership. This sentiment reflects Pratt's (2014) framework of achieving symbiosis. Teachers who had consistent coteachers across multiple school years expressed less frustration and better relationships than those who had new partners every year. Those experiencing less consistency felt

they lacked the opportunity to develop the foundations needed to coteach more seamlessly.

Additionally, special education teachers expressed that they need more time to learn the content that they are supporting, which overlaps with the second theme that coteachers need to be equally familiar with content and coteaching approaches and aligns with Barone and Crişan's (2023) findings. Additionally, Colson et al. (2021) expressed the significance of coteachers' mutual knowledge of the content, but addressed the challenges when teaching multiple subject areas. Participants noted that once the special education teacher was comfortable and knowledgeable with the content, they were more confident to step out of the one-teach one-assist role, and content-level teachers were more comfortable with stepping back from the lead role, which Pratt et al. (2016) noted helps build parity.

Time to plan together is also crucial to effective coteaching. Challenges in secondary coplanning have been addressed for over two decades now, as described by Dieker and Murawski (2003). While respondents were passionate about the need for coplanning opportunities, they also expressed frustration about the logistics of coplanning at the secondary level, a pervasive challenge as described by Dieker and Murawski (2003) and Colson et al. (2021). Participants noted that coplanning would help plan lessons and develop the supports students need to succeed. Additionally, some general education respondents expressed a desire for time together to review student IEPs so they knew best how to support each student in the classroom. Many participants also conceded that while they knew they required additional time together, they did not have any ideas

on how to make that work with a complex secondary-level master schedule and with support teachers often having multiple partners across multiple subject areas, reflecting the challenges brought forth by Colson et al. (2021).

Connected with the challenges of achieving coplanning time is the fact that participant responses indicated special education coteachers seem to have more copartners than general education teachers do. Colson et al. (2021) posited that secondary special education teachers struggle with adequate time to learn various content areas and collaborate with their content-level teachers because of being paired with multiple partners. According to study responses, most general education teachers had one or two different coteachers within the past 3 years. In contrast, many special education teachers reported as many as 12 different general education partners in the past 3 school years, with some supporting four different subjects within the same school year. This limits the special education teacher from partnering with their coteachers and attending content-level PD sessions, aligning with the findings reported by Colson et al. (2021). Connected to the aforementioned categories is the overwhelming sentiment that coteachers indicated a desire for increased consistency in partners and the classes in which they support, expressing that more consistency would lead to more ease in collaboration and time for special education support teachers to learn the content for an increased quality of support.

#### ***Need for Familiarity With Both Content and Coteaching Approaches***

The study responses yielded two specific categories that I used to develop the fifth theme. Participants expressed that both special and general education teachers need to be familiar with the course content and with a variety of coteaching approaches to

achieve an effective partnership, a long-standing problem that is unchanged from Dieker and Murawski's (2003) study 20 years ago. Barone and Crişan's (2023) review found several studies noting the significance of the special education teacher's knowledge of content area in secondary inclusionary classes, mirroring special education teachers' feedback expressing the challenges of trying to support students in a subject area they are not familiar with. Preston-Smith et al. (2020) investigated SWDs' perceptions of coteaching in secondary science courses, and the results indicated that students felt better supported when the special education teacher was knowledgeable about the content. Additionally, general education teachers in this study noted that coteachers need to know the content to effectively run small groups or small group testing sessions, which would increase coteaching efficacy by lessening the reliance on the one-teach, one-assist approach (Preston-Smith et al., 2020). These sentiments connect to Barone and Crişan's (2023) assertion that, in order to achieve a higher level of coteaching beyond one-teach one-assist, special education teachers must be knowledgeable of the content to effectively deliver SDI in small groups or team teaching approaches.

Friend et al. (2010) described six distinct coteaching approaches, expressing that one-teach, one-assist is one of the lowest success-yielding approaches. Barron and Friend's (2025) study revealed that one-teach one-assist remains the most commonly employed approach in inclusionary classes, even though there are more effective models. Similarly, this study's findings revealed that most teachers were familiar with only one or two different coteaching approaches. While most teachers were able to express that they felt a version of team teaching is the most effective method of supporting SWD, almost

all described a version of one-teach one-assist as the model they most often used due to either a lack of knowledge or scheduling and collaboration limitations, aligning with both Barron and Friend's (2025) and Preston-Smith et al.'s (2020) findings.

### **Themes Related to Research Question 3**

I used the data from RQ3 to develop the final two themes of the study. The first theme related to RQ3 is that general and special education coteachers express a lack of preparedness to support SWD in secondary science courses. The second theme that emerged is that general and special education teachers desire ongoing training opportunities more relevant to supporting SWD in inclusionary secondary science classes. These viewpoints are crucial to informing the design of preservice training programs and in providing information for secondary school administrators to develop relevant training opportunities.

#### ***Lack of Preparedness***

Colley and Lassman (2021) explored secondary science teachers' lack of preparedness in teaching SWD, connecting with the findings of this study that both general education and special education participants expressed similar frustrations over their perceived lack of preparedness. One of the shared concerns of study participants was an overall lack of preservice classes related to teaching SWD in secondary science classes. The other major concern voiced by both general and special education teachers was that the few courses describing disabilities offered in preservice training were too textbook and should have been more hands-on.

The lack of preparedness and preservice training is well documented in the literature, with Colley and Lassman (2021) finding numerous graduate-level teacher preparation programs that did not offer science or special education classes. Chu et al. (2020) found that 83.33% of their study respondents noted no courses or only a thin overview of special education. Interview data corroborated Chu et al.'s findings, indicating an overwhelming response that there were very few classes on special education, with veteran teachers noting there were none, as inclusion did not exist when they participated in their preservice training (Dieker & Murawski, 2003; Duchaine et al., 2021). Some participants noted that the coursework they received for special education was ineffective or not memorable. Additionally, it was noted that there were no courses on coteaching at all. Other participants pointed out a lack of training at the secondary level. The data are in alignment with the literature and suggest an impact on the efficacy of secondary college preparatory science coteachers.

Additional interview data suggested that what preservice training existed to prepare teachers for supporting SWD was too theoretical and not clinical enough. Ricci et al. (2021) conducted a study on a yearlong residency program for preservice secondary math and science teachers. Their findings indicated that the year of relevant, hands-on coteaching training yielded significantly positive results; however, nearly all interview participants in this study revealed that their teacher preparation courses typically provided more definitions on what different disabilities were and generic approaches to support SWD. Many respondents expanded their responses by stating that they would have benefited from field work where they could observe coteachers supporting SWD

and responding to various challenges in real classes, supporting the findings of Ricci et al. (2021). A need for more practical preservice training aligns with the literature, where SWD report they struggle to receive the individualized support they require to succeed. For example, Johnson et al. (2022) found that secondary SWD reported that they did not receive as much direct instruction as they expected, with the coteacher most commonly modifying assignments. Similarly, Preston-Smith et al.'s (2020) findings indicated that some SWD report receiving little individualized support within the classroom setting.

### ***Desire for More Relevant Training Opportunities***

The final theme of the study revealed that coteachers desire more relevant training opportunities to better prepare them to support SWD in inclusionary secondary science classes. This theme suggests a desire to improve coteaching practices and student outcomes, indicating most participants are in the *symbiosis spin* as they are reflecting on ways to improve their coteaching (Pratt, 2014). Research supports that effective PD and ongoing training are crucial to effective coteaching, especially at the secondary level (Colson et al., 2021). Sasson and Malkinson (2021) found that teachers who participated in PD opportunities directly related to coteaching reported overall better satisfaction and increased confidence in their pedagogical knowledge. Additionally, Colson et al. (2021) asserted that though the need for PD aligned to secondary coteaching is significant for success, opportunities are especially limited in rural areas. The emotion evident in the participant responses that indicate minimal, if any, ongoing training opportunities directly related to supporting SWD in secondary science mirrors the literature.

Study participants suggested multiple ongoing training opportunities they felt would be beneficial, including exploratory science, how to manage multiple groups, how to support SWD in lab settings, how to support inquiry-based learning, how to better understand each other's roles, and how to specifically support adolescent-aged SWD. The research by Colson et al. (2021) found that PD opportunities relevant to secondary coteaching may increase teacher efficacy in the secondary cotaught classroom. Participant input on beneficial ongoing PD suggests an eagerness to improve their coteaching practices and improve student support, aligning with the existing literature.

### **Limitations of the Study**

There were times throughout the study when there were limitations to the depth of trustworthiness. One such limitation was using purposeful sampling to identify potential participants. I limited potential participants to the qualifications of coteachers of Grade 9–12 SWD with recent experience in inclusionary science classes. These specifications were necessary to capture data relevant to my narrow research focus (Ravitch & Carl, 2020), but these parameters limit the generalization from primary and middle level grades and possibly other subjects. The use of purposeful sampling and the small size of the partnering school significantly limited the participant pool, which may result in a lack of adequate data (Yin, 2017).

Additionally, this study depended on the honesty of the participants (Johnson et al., 2022). The potential for dishonesty in self-reported data can limit the trustworthiness of a study (Johnson et al., 2022). I believe that all participants were thorough and honest throughout the interviews. Facial expressions, posture, and phrases such as “should” and

“how could you,” as well as references to “less than ideal” and “just making it work,” support my belief that the participants were comfortable and honest with their responses.

My experience as a dual-qualified teacher in science and special education posed a possibility of personal bias in data analysis (Ravitch & Carl, 2020). While this is a threat to the trustworthiness of the study, there are measures that researchers can take to limit these inherent biases (Ravitch & Carl, 2020). To address my personal bias in data analysis, I maintained a reflexive journal through NVivo.

### **Recommendations**

While this study focused on secondary level SWD in science courses, several respondents noted a lack of background knowledge in science basics from middle or primary grades. Because science is a subject that builds on previously learned concepts, further research focused on younger ages could be beneficial. Expanding the research to science coteachers of middle and primary grade levels may be beneficial in examining factors related to gaps in foundational scientific knowledge among secondary SWD. Additional expanded research focused on comparing SWD lack of success in science classes to other subject areas would also help determine if struggles in science courses are disproportionate. These findings could identify specific areas of need to improve academic outcomes in the sciences.

In addition to the science-specific themes, several participants described instances where SWD refused accommodations such as small-group or pull-out testing and read-to supports, possibly indicating a desire to avoid being perceived as different from their peers, in alignment with findings by Wood and Orpinas (2021). Disability stigma is not

specific to science instruction and has implications for student learning outcomes across all academic areas (Wood & Orpinas, 2021). These findings align with previous research on disability stigma in secondary schools (Hale, 2014; Mueller, 2019; Wood & Orpinas, 2021), suggesting a continued need for schoolwide strategies that provide coteachers with new training and PD opportunities focused on ensuring students are comfortable with receiving their accommodations.

Interviewing students in this graduate level study was not appropriate, as they are considered a vulnerable population. While studies exist that indicate SWD feel they do not receive the levels of support they need (Johnson et al., 2022; King-Sears & Strogilos, 2020), the literature lacks an abundance of perspectives from secondary SWD (Connor & Cavendish, 2020; Wagner et al., 2024; Wilson & Michaels, 2006). Additional research exploring the specific perspectives and needs as identified by secondary SWD would be beneficial.

### **Implications**

This study has multiple implications for positive social change. The most noted implication is improved outcomes for SWD. When SWD can find success in academics, they are less likely to drop out of school (Duchaine et al., 2021; Wells, 2025).

Completing high school lessens the risk for SWD to experience poor postsecondary outcomes such as poverty, high-risk behaviors, homelessness, and health problems (Kamenopoulou, 2016). Greater postsecondary success for SWD could lead to positive social change through improved job opportunities, increased mental and physical health,

and an overall improved quality of life. Increased outcomes for SWD benefit all of society.

Another implication of this study may be improved job satisfaction for secondary college preparatory science coteachers. Respondents indicated high levels of frustration in their preparedness and ability to collaborate effectively to teach SWD in inclusionary secondary science classes. Both general education and special education teachers noted that when support teachers lack knowledge of the scientific content of the class, it makes it difficult to implement coteaching models more effectively than the commonly employed one-teach one-assist model. Additionally, many general education teachers expressed a lack of functional preservice training in supporting SWD in inclusionary classes, and all teachers expressed a need for more relevant ongoing training. More appropriate preservice and ongoing training may help coteachers better address the challenges they experience in the classroom, leading to reduced job frustration.

An additional implication is improved coteaching relationships. Both general and special education teachers expressed that they desire more time to plan and to develop strong partnering relationships. When coteachers are constantly being paired with different partners, they never have the opportunity to move beyond the initiation stage of Pratt's (2014) framework for achieving symbiosis. Hopefully, the results of this study can help administrators develop better techniques of pairing coteachers that will result in more consistency in partnerships, allowing them to enter the symbiosis spin and reach the Fulfillment stage of a healthy interdependence (Pratt, 2014). When more coteacher teams

can develop strong relationships, overall student, class, and school outcomes may improve.

### **Conclusion**

The purpose of this qualitative study was to explore secondary college preparatory science coteachers' perceptions of the challenges of supporting SWD in inclusionary classes. Coteaching remains the primary model of ensuring SWD receive access to the general curriculum in the LRE. My interpretation of the data is that the majority of the respondents indicated an overall positive outlook on their ability to develop effective coteaching practices and relationships; however, they expressed significant concerns over the preservice preparation and ongoing relevant training required to address the complex and numerous challenges they experience when supporting SWD in secondary science classes. Along with the detailed interpretation of the findings, I suggested recommendations and implications to provide readers with new information to help direct future training and support. I hope this information will be useful to district and building level leadership to create more relevant and robust opportunities for secondary college preparatory science coteachers to develop their relationships and efficacy.

## References

- Alnasser, Y. A. (2021). The perspectives of Colorado general and special education teachers on the barriers to co-teaching in the inclusive elementary school classroom. *Education 3-13*, 49(6), 716–729.  
<https://doi.org/10.1080/03004279.2020.1776363>
- American Psychological Association. (2020). *Publication manual of the American Psychological Association* (7th ed.). <https://doi.org/10.1037/0000165-000>
- Anderson, K. P. (2021). The relationship between inclusion, absenteeism, and disciplinary outcomes for students with disabilities. *Educational Evaluation and Policy Analysis*, 43(1), 32–59. <https://doi.org/10.3102/0162373720968558>
- Ansley, B. M., Houchins, D. E., & Varjas, K. (2016). Optimizing special educator wellness and job performance through stress management. *TEACHING Exceptional Children*, 48(4), 176–185.  
<https://doi.org/10.1177/0040059915626128>
- ASCD. (n.d.). *ESSA and accountability frequently asked questions*.  
[https://files.ascd.org/staticfiles/ascd/pdf/siteASCD/policy/ESSA-Accountability-FAQ\\_May112016.pdf](https://files.ascd.org/staticfiles/ascd/pdf/siteASCD/policy/ESSA-Accountability-FAQ_May112016.pdf)
- Babbie, E. R. (2017). *The basics of social research* (6th ed.). Cengage Learning.
- Bandura, A. (2000). Exercise of human agency through collective efficacy. *Current Directions in Psychological Science*, 9(3), 75–78. <https://doi.org/10.1111/1467-8721.00064>
- Bandura, A. (2006). Toward a psychology of human agency. *Perspectives on*

*Psychological Science*, 1(2), 164–180. <https://doi.org/10.1111/j.1745-6916.2006.00011.x>

Bandura, A. (2018). Toward a psychology of human agency: Pathways and reflections. *Perspectives on Psychological Science*, 13(2), 130–136. <https://doi.org/10.1177/1745691617699280>

Barone, C., & Crişan, A. N. (2023). Co-teaching and academic outcomes for SWD. Effective implementation strategies. *Journal of Educational Sciences & Psychology*, 13(2), 44–49. <https://doi.org/10.51865/jesp.2023.2.04>

Barron, T., & Friend, M. (2025). Co-teaching: Are we there yet? *Journal of Educational and Psychological Consultation*, 35(2), 193–218. <https://doi.org/10.1080/10474412.2024.2422895>

Billingsley, B. S. (2004). Special education teacher retention and attrition. *The Journal of Special Education*, 38(1), 39–55. <https://doi.org/10.1177/00224669040380010401>

Blackstone, A. (2012). *Principles of sociological inquiry: Qualitative and quantitative methods*. Saylor Foundation.

Booth, A., Carroll, C., Ilott, I., Low, L. L., & Cooper, K. (2012). Desperately seeking dissonance. *Qualitative Health Research*, 23(1), 126–141. <https://doi.org/10.1177/1049732312466295>

Boyle, J. R. (2021). Strategies and techniques for teaching secondary students with learning disabilities in inclusive classrooms. *Learning Disabilities: A Multidisciplinary Journal*, 26(1), 7–9.

Brieant, A., Vannucci, A., Nakua, H., Harris, J., Lovell, J., Brundavanam, D., Tottenham,

- N., & Gee, D. G. (2023). Characterizing the dimensional structure of early-life adversity in the adolescent brain cognitive development (ABCD) Study. *Developmental cognitive neuroscience, 61*.  
<https://doi.org/10.1016/j.dcn.2023.101256>
- Capin, P., Hall, C., Stevens, E. A., Steinle, P. K., & Murray, C. S. (2022). Evidence-based reading instruction for secondary students with reading difficulties within multitiered systems of support. *Teaching Exceptional Children, 56*(5), 370–385.  
<https://doi.org/10.1177/00400599221079643>
- Chase, B. L. (2024). Parents as partners: Exploring the experiences of teachers of students with disabilities. *Children & Schools, 46*(2), 75–84.  
<https://doi.org/10.1093/cs/cdae005>
- Chatzigeorgiadou, S., & Barouta, A. (2022). General and special early childhood educators' attitudes towards co-teaching as a means for inclusive practice. *Early Childhood Education Journal, 50*(8), 1407–1416. <https://doi.org/10.1007/s10643-021-01269-z>
- Chikaluma, P. H., David, O., & Nsengimana, V. (2022). Contribution of inquiry-based learning to the improvement of biology teaching and learning in Malawi community day secondary schools. *International Journal of Science, Mathematics & Technology Learning, 29*(2), 29–52. <https://doi.org/10.18848/2327-7971/CGP/v29i02/29-52>
- Chu, M. W., Craig, H. L., Yeworiew, L. B., & Xu, Y. (2020). Teachers' unpreparedness to accommodate student needs. *Canadian Journal of School Psychology, 35*(3),

210–224. <https://doi.org/10.1177/0829573520916610>

- Colley, K. E., & Lassman, K. A. (2021). Urban secondary science teachers and special education students: A theoretical framework for preparing science teachers to meet the needs of all students. *Insights into Learning Disabilities, 18*(2), 159–186.
- Colson, T., Xiang, Y., & Smothers, M. (2021). How professional development in coteaching impacts self-efficacy among rural high school teachers. *The Rural Educator, 42*(1), 20–31. <https://doi.org/10.35608/ruraled.v42i1.897>
- Connor, D. J., & Cavendish, W. (2020). ‘Sit in my seat’: Perspectives of students with learning disabilities about teacher effectiveness in high school inclusive classrooms. *International Journal of Inclusive Education, 24*(3), 288–309. <https://doi.org/10.1080/13603116.2018.1459888>
- Cook, L., & Friend, M. (1995). Coteaching: Guidelines for creating effective practices. *Focus on Exceptional Children, 28*(3). <https://doi.org/10.17161/fec.v28i3.6852>
- Cope, D. G. (2014). Methods and meanings: Credibility and trustworthiness of qualitative research. *Oncology Nursing Forum, 41*(1), 89–91. <https://doi.org/10.1188/14.onf.89-91>
- Creswell, J., & Guetterman, T. (2019). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Pearson Education.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.
- Davis, K. A., Dieker, L., Pearl, C., & Kirkpatrick, R. M. (2012). Planning in the middle: Co-planning between general and special education. *Journal of Educational and*

*Psychological Consultation*, 22(3), 208–226.

<https://doi.org/10.1080/10474412.2012.706561>

De La Paz, S., Levin, D. M., & Butler, C. (2023). Addressing an unfulfilled expectation:

Teaching students with disabilities to write scientific arguments. *Written*

*Communication*, 40(2), 448–481. <https://doi.org/10.1177/07410883221149093>

Desatnik, A., Bird, A. G., Shmueli, A., Venger, I., & Fonagy, P. (2023). The mindful trajectory: Developmental changes in mentalizing throughout adolescence and young adulthood. *PLOS ONE*, 18(6).

<https://doi.org/10.1371/journal.pone.0286500>

Dieker, L., & Murawski, W. W. (2003). Co-teaching at the secondary level: Unique

issues, current trends, and suggestions for success. *The High School Journal*,

86(4), 1–13. <https://doi.org/10.1353/hsj.2003.0007>

Drellick, A. M., Damiani, M. L., & Elder, B. C. (2024). One teach-one tech: An emerging

co-teaching strategy. *Journal of Special Education Technology*, 39(2), 298–305.

<https://doi.org/10.1177/01626434231177869>

Drew, S. V., Olinghouse, N. G., & Faggella-Luby, M. (2020). Reconceptualizing

instruction for writing in science using the WIS co-planning tool. *Teaching*

*Exceptional Children*, 52(4), 210–221.

<https://doi.org/10.1177/0040059919878669>

Duchaine, E. L., Reynosa, R. J., & Garza, R. (2021). Secondary mathematics and science

teachers prepared for inclusion. *Learning Disabilities: A Contemporary*

*Journal*, 19(2), 103–126.

- Eddy, C. L., Herman, K. C., & Reinke, W. M. (2024). Stress management programs for special education teachers. *Journal of Emotional and Behavioral Disorders*, 32(2), 72–80. <https://doi.org/10.1177/10634266241234917>
- Erickson, F. (2012). Qualitative research methods for science education. In B. Fraser, K. Tobin, & C. McRobbie (Eds.), *Second international handbook of science education* (Vol. 24, pp. 1451–1469). Springer. [https://doi.org/10.1007/978-1-4020-9041-7\\_93](https://doi.org/10.1007/978-1-4020-9041-7_93)
- Every Student Succeeds Act (ESSA). (n.d.). *Every Student Succeeds Act (ESSA)*. Retrieved December 31, 2024, from <https://www.everystudentsucceedsact.org/>
- Francisco, M. P. B., Hartman, M., & Wang, Y. (2020). Inclusion and special education. *Education Sciences*, 10(9). <https://doi.org/10.3390/educsci10090238>
- Friend, M., Cook, L. H., Hurley-Chamberlain, D., & MEd, C. S. (2010). Co-teaching: An illustration of the complexity of collaboration in special education. *Journal of Educational and Psychological Consultation*, 20(1), 9–27. <https://doi.org/10.1080/10474410903535380>
- Gilmour, A. F., Sandilos, L. E., Pilny, W. V., Schwartz, S., & Wehby, J. H. (2021). Teaching students with emotional/behavioral disorders: Teachers' burnout profiles and classroom management. *Journal of Emotional and Behavioral Disorders*, 30(1), 16–28. <https://doi.org/10.1177/10634266211020258>
- Green, A. L., McKenzie, J. A., Lewis, T. J., & Poch, A. L. (2021). From NCLB to ESSA: Implications for teacher preparation and policy. *Journal of Disability Policy Studies*, 32(3), 204–211. <https://doi.org/10.1177/1044207320945397>

- Hale, C. (2014). Urban special education policy and the lived experience of stigma in a high school science classroom. *Cultural Studies of Science Education, 10*(4), 1071–1088. <https://doi.org/10.1007/s11422-013-9548-x>
- Hamilton-Jones, B. M., & Vail, C. O. (2014). Preparing special educators for collaboration in the classroom: Pre-service teachers' beliefs and perspectives. *International Journal of Special Education, 29*(1), 76–86.
- Herman, K. C., Sebastian, J., Eddy, C. L., & Reinke, W. M. (2023). School leadership, climate, and professional isolation as predictors of special education teachers' stress and coping profiles. *Journal of Emotional and Behavioral Disorders, 31*(2), 120–131. <https://doi.org/10.1177/10634266221148974>
- Heslop, C., Burns, S., & Lobo, R. (2018). Managing qualitative research as insider-research in small rural communities. *Rural and Remote Health, 18*(3), 250–254. <https://doi.org/10.22605/RRH4576>
- Hester, O. R., Bridges, S. M., & Rollins, L. H. (2020). 'Overworked and underappreciated': Special education teachers describe stress and attrition. *Teacher Development, 24*(3), 348–365. <https://doi.org/10.1080/13664530.2020.1767189>
- Hyrkäs, K., Appelqvist-Schmidlechner, K., & Oksa, L. (2003). Validating an instrument for clinical supervision using an expert panel. *International Journal of Nursing Studies, 40*(6), 619–625. [https://doi.org/10.1016/s0020-7489\(03\)00036-1](https://doi.org/10.1016/s0020-7489(03)00036-1)
- Individuals with Disabilities Education Act. (2022, November 7). *About IDEA - Individuals with Disabilities Education Act*. <https://sites.ed.gov/idea/about->

[idea/#IDEA-History](#)

- Jackson, K., & Parker, L. (2023). Building resilience: Strategies to combat burnout and attrition in new special education teachers. *Journal of Special Education Preparation, 3*(3), 56–70. <https://doi.org/10.33043/JOSEP.3.3.56-70>
- Jafree, S. R., Burhan, S. K., & Mahmood, Q. K. (2023). Predictors for stress in special education teachers: Policy lessons for teacher support and special needs education development during the COVID pandemic and beyond. *Journal of Human Behavior in the Social Environment, 33*(5), 615–632. <https://doi.org/10.1080/10911359.2022.2077498>
- Jensen, F. E., & Nutt, A. E. (2015). *The teenage brain: A neuroscientist's survival guide to raising adolescents and young adults*. HarperCollins.
- Johnson, T. M., King-Sears, M. E., & Miller, A. D. (2022). High school coteaching partners' self-efficacy, personal compatibility, and active involvement in instruction. *Learning Disability Quarterly, 45*(2), 96–107. <https://doi.org/10.1177/0731948720919811>
- Jones, N., & Winters, M. A. (2024). Are two teachers better than one? The effect of coteaching on students with and without disabilities. *Journal of Human Resources, 59*(4), 1180–1206. <https://doi.org/10.3368/jhr.0420-10834r3>
- Jurkowski, S., Ulrich, M., & Müller, B. (2020). Co-teaching as a resource for inclusive classes: Teachers' perspectives on conditions for successful collaboration. *International Journal of Inclusive Education, 27*(1), 54–71. <https://doi.org/10.1080/13603116.2020.1821449>

- Kaiser, K. (2009). *Protecting respondent confidentiality in qualitative research*. *Qualitative Health Research*, 19(11), 1632–1641.  
<https://doi.org/10.1177/1049732309350879>
- Kaldenberg, E. R., Watt, S. J., & Therrien, W. J. (2015). Reading instruction in science for students with learning disabilities: A meta-analysis. *Learning Disability Quarterly*, 38(3), 160–173. <https://doi.org/10.1177/0731948714550204>
- Kaler, L., Markham, J., & Jones, N. D. (2025). Service delivery models and outcomes for students with disabilities. *Remedial and Special Education*, 46(2), 132–146.  
<https://doi.org/10.1177/07419325241268747>
- Kamenopoulou, L. (2016). Ecological systems theory: A valuable framework for research on inclusion and special educational needs/disabilities. *Pedagogy*, 88(4), 515–527.
- Katsiyannis, A., Rapa, L. J., Piotrowski, J. D., & Alexandrou, E. (2025). Bullying in schools: persistent legal challenges. *Intervention in School and Clinic*, 60(3), 179–183. <https://doi.org/10.1177/10534512241287378>
- Keefe, E. B., & Moore, V. (2004). The challenge of coteaching in inclusive classrooms at the high school level: What the teachers told us. *American Secondary Education*, 32(3), 77–88. <https://www.jstor.org/stable/41064524>
- Keeley, R. (2015). Measurements of student and teacher perceptions of co-teaching models. *The Journal of Special Education Apprenticeship*, 4(1), 1–15.  
<https://doi.org/10.58729/2167-3454.1042>
- Kekeya, J. (2021). Qualitative case study research design: The commonalities and

- differences between collective, intrinsic and instrumental case studies. *Contemporary PNG Studies*, 36, 28–37.
- King-Sears, M. E., Stefanidis, A., Berkeley, S., & Strogilos, V. (2021). Does co-teaching improve academic achievement for students with disabilities? A meta-analysis. *Educational Research Review*, 34(1).  
<https://doi.org/10.1016/j.edurev.2021.100405>
- King-Sears, M. E., Stefanidis, A., & Brawand, A. (2019). Barriers to the implementation of specialized reading instruction in secondary cotaught classrooms: An exploratory study. *Teachers and Teaching: Theory and Practice*, 25(4), 434–452.  
<https://doi.org/10.1080/13540602.2019.1627311>
- King-Sears, M. E., & Strogilos, V. (2020). An exploratory study of self-efficacy, school belongingness, and co-teaching perspectives from middle school students and teachers in a mathematics co-taught classroom. *International Journal of Inclusive Education*, 24(2), 162–180. <https://doi.org/10.1080/13603116.2018.1453553>
- Kloo, A., & Zigmond, N. (2008). Coteaching revisited: Redrawing the blueprint. *Preventing School Failure*, 52(2), 12–20.  
<https://doi.org/10.3200/PSFL.52.2.12-20>
- Lambert, M. (2012). *A beginner's guide to doing your education research project*. SAGE.
- Lannin, A., Van Garderen, D., Abdelnaby, H., Smith, C., Juergensen, R., Folk, W., & Romine, W. (2024). Scaffolding learning via multimodal STEM text sets for students with learning disabilities. *Learning Disability Quarterly*, 47(2), 97–109.

<https://doi.org/10.1177/07319487231187637>

Lawrent, G. (2024). Sources of teacher efficacy related attributes alongside Bandura's perspectives. *Journal of Education*, 204(1), 3–12.

<https://doi.org/10.1177/00220574221094238>

Leko, M., Wilkins, I. E., Davis, T., Dieker, L. A., & Liu, S. (2024). Special educator shortages: Surveying the landscape and strategizing solutions. *Journal of Special Education Leadership*, 37(1), 15–25.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. SAGE Publications.

Losinski, M., Sanders, S., Parks-Ennis, R., Wiseman, N., Nelson, J., & Katsiyannis, A. (2019). An investigation of co-teaching to improve academic achievement of students with disabilities: A meta-analysis. *Journal of the American Academy of Special Education Professionals*, 149–170.

Mason, L. H., & Hedin, L. R. (2011). Reading science text: Challenges for students with learning disabilities and considerations for teachers. *Learning Disabilities Research & Practice*, 26(4), 214–222. <https://doi.org/10.1111/j.1540-5826.2011.00342.x>

Maxwell, J. A. (2013). *Qualitative research design: An interactive approach*. SAGE.

McClain, M. B., Golson, M. E., & Murphy, L. E. (2022). Executive functioning skills in early childhood children with autism, intellectual disability, and co-occurring autism and intellectual disability. *Research in Developmental Disabilities*, 122, Article 104169. <https://doi.org/10.1016/j.ridd.2021.104169>

- McDermott, R., & Hatemi, P. K. (2020). Ethics in field experimentation: A call to establish new standards to protect the public from unwanted manipulation and real harms. *Proceedings of the National Academy of Sciences of the United States of America*, *117*(48), 30014–30021. <https://doi.org/10.1073/pnas.2012021117>
- McGuire, S. N., & Meadan, H. (2022). General Educators' perceptions of social inclusion of elementary students with emotional and behavioral disorders. *Behavioral Disorders*, *48*(1), 16–28. <https://doi.org/10.1177/01987429221079047>
- McLeskey, J., Waldron, N. L., & Redd, L. (2014). A case study of a highly effective, inclusive elementary school. *Journal of Special Education*, *48*(1), 59–70. <https://doi.org/10.1177/0022466912440455>
- Mercera, G., Vervoort-Schel, J., Offerman, E., Pronk, S., Wissink, I., & Lindauer, R. (2024). Prevalence of adverse childhood experiences in adolescents with special educational and care needs in the Netherlands: A case-file study of three special educational and care settings. *Journal of Child & Adolescent Trauma*, *17*, 541–554. <https://doi.org/10.1007/s40653-024-00613-w>
- Messer, D., Kearvell-White, J., Danielsson, H., Faulkner, D., Henry, L., & Ibbotson, P. (2022). The structure of executive functioning in 11 to 14 year olds with and without special educational needs. *British Journal of Developmental Psychology*, *40*(3), 453–470. <https://doi.org/10.1111/bjdp.12418>
- Mueller, C. (2019). Adolescent understandings of disability labels and social stigma in school. *International Journal of Qualitative Studies in Education*, *32*(3), 263–281. <https://doi.org/10.1080/09518398.2019.1576940>

- National Center for Education Statistics (2023). *Report on the condition of education 2023*. <https://nces.ed.gov/pubs2023/2023144.pdf>.
- Next Generation Science Standards. (n.d.-a). *Read the standards*. Retrieved December 31, 2024, from <https://www.nextgenscience.org/search-standards>
- Next Generation Science Standards. (n.d.-b). *Understanding the standards*. Retrieved December 31, 2024, from <https://www.nextgenscience.org/understanding-standards/understanding-standards>
- Pesonen, H., Rytivaara, A., Palmu, I., & Wallin, A. S. (2021). Teachers' stories on sense of belonging in co-teaching relationship. *Scandinavian Journal of Educational Research*, 65(3), 425–436. <https://doi.org/10.1080/00313831.2019.1705902>
- Pianta, R. C., & Hamre, B. K. (2009). Conceptualization, measurement, and improvement of classroom processes: Standardized observation can leverage capacity. *Educational Researcher*, 38(2), 109–119. <https://doi.org/10.3102/0013189x09332374>
- Pratt, S. M. (2014). Achieving symbiosis: Working through challenges found in co-teaching to achieve effective co-teaching relationships. *Teaching and Teacher Education*, 41, 1–12. <https://doi.org/10.1016/j.tate.2014.02.006>
- Pratt, S. M., Imbody, S. M., Wolf, L., & Patterson, A. J. (2017). Co-planning in co-teaching. *Intervention in School and Clinic*, 52(4), 243–249. <https://doi.org/10.1177/1053451216659474>
- Preston-Smith, S., King-Sears, M. E., Evmenova, A. S., & Baker, P. H. (2020). What do high school students think about coteaching in science classrooms? *Learning*

*Disabilities: A Multidisciplinary Journal*, 25(1), 29–43.

<https://doi.org/10.18666/LDMJ-2020-V25-I1-10107>

Ravitch, S. M., & Carl, N. M. (2020). *Qualitative research: Bridging the conceptual, theoretical, and methodological* (2nd ed.). SAGE Publications, Inc.

Ricci, L. A., Persiani, K., Williams, A. D., & Ribas, Y. (2021). Preservice general educators using co-teaching models in math and science classrooms of an urban teacher residency programme: Learning inclusive practices in teacher training. *International Journal of Inclusive Education*, 25(4), 517–530.

<https://doi.org/10.1080/13603116.2018.1563643>

Richardson, R. C. (1998). Inclusion then and now. *Kappa Delta Pi Record*, 34(2), 49–51.

<https://doi.org/10.1080/00228958.1998.10518725>

Rizzo, K., & Taylor, J. (2016). Effects of inquiry-based instruction on science achievement for students with disabilities: An analysis of the literature. *Journal of Science Education for Students with Disabilities*, 19(1), 1–16.

<https://doi.org/10.14448/jsesd.09.0001>

Rodgers, W. J., Weiss, M. P., & Ismail, H. A. (2021). Defining specially designed instruction: a Systematic literature review. *Learning Disabilities Research and Practice*, 36(2), 96–109. <https://doi.org/10.1111/ldrp.12247>

Rönn-Liljenfeldt, M., Sundqvist, C., Ström, K., & Korhonen, J. (2024). Students' perceptions of co-teaching in the general classroom. *European Journal of Special Needs Education*, 39(2), 1–16. <https://doi.org/10.1080/08856257.2023.2215008>

Rubin, I. S., & Rubin, I. S. (2012). *Qualitative interviewing*. SAGE.

- Ruble, L., McGrew, J., Fischer, M., Findley, J., & Stayton, R. (2023). School and intrapersonal predictors and stability of rural special education teacher burnout. *Rural Special Education Quarterly*, 42(3), 124–135.  
<https://doi.org/10.1177/87568705231180885>
- Russo-Campisi, J. (2017). Evidence-based practices in special education: Current assumptions and future considerations. *Child & Youth Care Forum*, 46(2), 193–205. <https://doi.org/10.1007/s10566-017-9390-5>
- Rytivaara, A., Pulkkinen, J., & de Bruin, C. L. (2019). Committing, engaging and negotiating: Teachers' stories about creating shared spaces for co-teaching. *Teaching and Teacher Education*, 83, 225–235.  
<https://doi.org/10.1016/j.tate.2019.04.013>
- Sabnis, S., Newman, D. S., Whitford, D., & Mossing, K. (2023). Publication and characteristics of qualitative research in School Psychology journals between 2006 and 2021. *School Psychology*, 38(5), 330–336.  
<https://doi.org/10.1037/spq0000548>
- Sasson, I., & Malkinson, N. (2021). Co-teaching-based professional development: Self-efficacy, attitudes toward the profession, and pedagogical practices. *Journal of University Teaching and Learning Practice*, 18(6), 82–100.  
<https://doi.org/10.53761/1.18.6.7>
- Siegel, D. J. (2014). *Brainstorm: The power and purpose of the teenage brain*. Scribe Publications.
- Simons, H. (2009). *Case study research in practice*. SAGE.

- Skerrett, A. (2010). Of literary import: A case of cross-national similarities in the secondary English curriculum in the United States and Canada. *Research in the Teaching of English, 45*(1), 36-58. <https://doi.org/10.58680/rte201011647>
- Solis, M., Vaughn, S., Swanson, E., & Mcculley, L. (2012). Collaborative models of instruction: The empirical foundations of inclusion and co-teaching. *Psychology in the Schools, 49*(5), 498–510. <https://doi.org/10.1002/pits.21606>
- Steele, M. M. (2004). Teaching science to students with learning problems in the elementary classroom. *Preventing School Failure: Alternative Education for Children and Youth, 49*(1), 19–21. <https://doi.org/10.3200/psfl.49.1.19-21>
- Steele, M. M. (2007). Methods and strategies: Science success for students with special needs. *Science and Children, 45*(2), 48–51. <https://www.nsta.org/journals/science-and-children/science-and-children-october-2007/methods-and-strategies-science>
- Stefanidis, A., King-Sears, M. E., & Brawand, A. (2019). Benefits for coteachers of students with disabilities: Do contextual factors matter? *Psychology in the Schools, 56*(4), 539–553. <https://doi.org/10.1002/pits.22207>
- Stroupe, D., & Hancock, J. F. (2022). Examining mentor teachers' critical pedagogical discourses and participation in an era of changing science standards and pedagogies. *Teaching and Teacher Education, 109*. Article 103558. <https://doi.org/10.1016/j.tate.2021.103558>
- Suryani, A. (2013). Comparing case study and ethnography as qualitative research approaches. *Jurnal Ilmu Komunikasi, 5*(1), 117–127. <https://doi.org/10.24002/jik.v5i1.221>

- Swanson, L. H., & Bianchini, J. A. (2014). Co-planning among science and special education teachers: How do different conceptual lenses help to make sense of the process? *Cultural Studies of Science Education*, 10(4), 1123–1153. <https://doi.org/10.1007/s11422-014-9582-3>
- Taherdoost, H. (2022). What are different research approaches? Comprehensive review of qualitative, quantitative, and mixed method research, their applications, types, and limitations. *Journal of Management Science & Engineering Research*, 5(1), 53–63. <https://doi.org/10.30564/jmser.v5i1.4538>
- Taylor, J., Rizzo, K., Hwang, J., & Hill, D. A. (2020). A review of research on science instruction for students with autism spectrum disorder. *School Science and Mathematics*, 120(2), 116–125. <https://doi.org/10.1111/ssm.12388>
- Terceño, E. M. G., & Greca, I. M. (2023). Teaching science to students with special educational needs: a systematic review of science teaching-learning approaches in regular and special education settings. *International Journal of Science Education*, 45(12), 969–989. <https://doi.org/10.1080/09500693.2023.2179377>
- Tufford, L., & Newman, P. A. (2012). Bracketing in qualitative research. *Qualitative Social Work*, 11(1), 80–96. <https://doi.org/10.1177/1473325010368316>
- Tuffour, I. (2017). A critical overview of interpretative phenomenological analysis: A contemporary qualitative research approach. *Journal of Healthcare Communications*, 02(04). <https://doi.org/10.4172/2472-1654.100093>
- Wagner, M. L., Cosand, K., Zagona, A. L., & Malone, B. J. (2024). Students' perceptions of instruction in co-teaching classrooms: A systematic literature review and

thematic analysis. *Exceptional Children*, 90(3), 313–330.

<https://doi.org/10.1177/00144029231220303>

Watson, S., & Bell, J. (2022). Accommodating visually impaired students in secondary science. *The Science Teacher*, 90(2), 40–49.

<https://doi.org/10.1080/00368555.2022.12293737>

Wells, M. B. (2025). Supporting students with disabilities: discrepancies in educational outcomes and the need for comprehensive postsecondary support. *Discover Education*, 4(1). <https://doi.org/10.1007/s44217-025-00758-2>

Wexler, J. (2021). Improving instruction in co-taught classrooms to support reading comprehension. *Intervention in School and Clinic*, 56(4), 195–199.

<https://doi.org/10.1177/1053451220944212>

Wexler, J., Kearns, D. M., Lemons, C. J., Mitchell, M., Clancy, E., Davidson, K. G. V., Sinclair, A. C., & Wei, Y. (2018). Reading comprehension and co-teaching practices in middle school English language arts classrooms. *Exceptional Children*, 84(4), 384–402. <https://doi.org/10.1177/0014402918771543>

Wilson, G. L., & Michaels, C. A. (2006). General and special education students' perceptions of co-teaching: Implications for secondary-level literacy instruction. *Reading & Writing Quarterly*, 22(3), 205–225.

<https://doi.org/10.1080/10573560500455695>

Wood, C., & Orpinas, P. (2021). Victimization of children with disabilities: coping strategies and protective factors. *Disability & Society*, 36(9), 1469–1488.

<https://doi.org/10.1080/09687599.2020.1802578>

Yin, K. (2017). *Case study research: Design and methods* (6th ed.). SAGE.

Zamkowska, A., Pilgrim, M., & Hornby, G. (2025). Co-teaching: Review and guidelines for practice. *Preventing School Failure Alternative Education for Children and Youth*, 1–7. <https://doi.org/10.1080/1045988x.2024.2404404>

## Appendix A: Individual Interview Questions for Special Education Teachers

### **Research Question 1**

1. What challenges have you experienced related to overall academic performance for students with disabilities in cotaught inclusive science classes?
2. What behavioral challenges have you experienced when teaching students with disabilities in cotaught inclusive science classes?
3. What social-emotional challenges have you experienced when teaching students with disabilities in cotaught inclusive science classes?
4. What challenges related to inquiry-based learning have you experienced when teaching students with disabilities in cotaught inclusive science classes?
5. What challenges related to the lab setting have you experienced when teaching students with disabilities in cotaught inclusive science classes?
6. What other challenges have you experienced when teaching students with disabilities in cotaught inclusive science courses?

### **Research Question 2**

1. Describe coteaching approaches that you are familiar with.
2. Describe the most common coteaching approaches that you and your coteacher(s) have implemented in inclusive college preparatory secondary science classes.
3. Describe your perceptions of the efficacy of the coteaching approaches you and your coteacher(s) most frequently use.
4. Describe your typical role as a special education teacher in college preparatory inclusionary science classes.

5. Describe your perceptions of teacher parity within college preparatory inclusionary science classes.
6. Please describe your compatibility with your coteacher(s).
7. How many different coteachers have you worked with in this school year? In the past 2 school years? In the past 3 school years? Describe how multiple coteaching partners may affect your ability to collaborate with your coteachers.
8. Describe the time taken and process you use to plan with your coteacher(s).
9. How does the availability or lack of availability of common planning time affect the efficacy of coteaching students with disabilities in inclusionary science classes?

### **Research Question 3**

1. Describe your experience in your teacher preparation program as related to supporting secondary students with disabilities in inclusionary science classes.
2. Describe your knowledge of the curricular content for each of the branches of science that you have supported SWD.
3. Describe the professional development opportunities directly related to supporting students with disabilities in secondary inclusionary science classes you have received.
4. What could make you feel more prepared to support students with disabilities in the inclusionary secondary science classroom?
5. What additional professional development opportunities, focused on coteaching, do you believe would be beneficial for secondary science coteachers?

### **Closing**

1. Is there anything you would like to add?

## Appendix B: Individual Interview Questions for General Education Teachers

### **Research Question 1**

1. What challenges have you experienced related to overall academic performance for students with disabilities in inclusionary science courses?
2. What behavioral challenges have you experienced when teaching students with disabilities in inclusionary science courses?
3. What social-emotional challenges have you experienced when teaching students with disabilities in inclusionary science courses?
4. What other challenges have you experienced when teaching students with disabilities in inclusionary science courses?

### **Research Question 2**

1. Describe coteaching approaches that you are familiar with.
2. Describe the most common coteaching approaches that you and your coteacher(s) have implemented in inclusionary science classes.
3. Describe how effectively you and your coteacher(s) collaborate to provide instruction and support for students with disabilities.
4. Describe your perceptions of the special education teacher's role in inclusionary secondary science courses.
5. Describe your compatibility with your coteacher(s).
6. How many different coteachers have you worked with in this school year? In the past 2 school years? In the past 3 school years? Describe how multiple coteaching partners may affect your ability to collaborate with your coteachers.

7. Please describe the time taken and process used to plan with your coteacher(s).
8. How does the availability or lack of availability of common planning time affect the efficacy of coteaching students with disabilities in inclusionary science classes?

### **Research Question 3**

1. Describe your experience in your teacher preparation program as related to supporting secondary students with disabilities in inclusionary science classes.
2. Describe your knowledge and level of comfort in supporting SWD in cotaught secondary classes.
3. Describe the professional development opportunities directly related to supporting students with disabilities in secondary inclusionary science classes you have received.
4. What could make you feel more prepared to support students with disabilities in the inclusionary secondary science classroom?
5. What additional professional development opportunities, focused on coteaching, do you believe would be beneficial for secondary science coteachers?

### **Closing**

1. Is there anything you would like to add?

## Appendix C: Initial Letter of Invitation

Dear [Colleague's Name],

I hope this message finds you well! As you know, I am pursuing my doctoral studies, and I am moving on to the research phase of my capstone. I am excited to share that my dissertation research focuses on the perceptions of general and special education teachers regarding the challenges of teaching inclusive secondary college preparatory science courses.

Your expertise and experience teaching and supporting our students with disabilities in science classes make you an invaluable voice for this project. The goal of this study is to explore and highlight the realities educators face in inclusive science classrooms, with the hope of identifying meaningful strategies to address these challenges.

Participation will involve a private semistructured interview and should take approximately sixty minutes. Your input will remain confidential, and all findings will be shared in a way that protects your identity.

I would be honored to have you as part of this study. If you're interested, please let me know by [date to be determined]. Feel free to reach out with any questions or concerns—I'm happy to provide additional details.

Thank you for considering this opportunity to contribute to research that could ultimately benefit both educators and students.

Warm regards,

Jennifer Wilson

[email address redacted]

## Appendix D: Screening Questions

1. In your teaching experience, have you taught science as a general education or special education teacher in an inclusionary cotaught class within the past 5 years?
2. Have you taught science in an inclusionary setting as a general education to special education teacher at the secondary level for at least one year?
3. What is the best method of contact to follow up with interview(s)?

## Appendix E: Survey/Interview Validation Rubric for Expert Panel

**Survey/Interview Validation Rubric for Expert Panel - VREP©**  
By Marilyn K. Simon with input from Jacquelyn White

<http://dissertationrecipes.com/>

Criteria	Operational Definitions	Score				Questions NOT meeting standard (List page and question number) and need to be revised. Please use the comments and suggestions section to recommend revisions.
		1=Not Acceptable (major modifications needed)	2=Below Expectations (some modifications needed)	3=Meets Expectations (no modifications needed but could be improved with minor changes)	4=Exceeds Expectations (no modifications needed)	
		1	2	3	4	
<b>Clarity</b>	<ul style="list-style-type: none"> <li>The questions are direct and specific.</li> <li>Only one question is asked at a time.</li> <li>The participants can understand what is being asked.</li> <li>There are no <i>double-barreled</i> questions (two questions in one).</li> </ul>					
<b>Wordiness</b>	<ul style="list-style-type: none"> <li>Questions are concise.</li> <li>There are no unnecessary words</li> </ul>					
<b>Negative Wording</b>	<ul style="list-style-type: none"> <li>Questions are asked using the affirmative (e.g., Instead of asking, "Which methods are not used?", the researcher asks, "Which methods <i>are</i> used?")</li> </ul>					
<b>Overlapping Responses</b>	<ul style="list-style-type: none"> <li>No response covers more than one choice.</li> <li>All possibilities are considered.</li> <li>There are no ambiguous questions.</li> </ul>					
<b>Balance</b>	<ul style="list-style-type: none"> <li>The questions are unbiased and do not lead the participants to a response. The questions are asked using a neutral tone.</li> </ul>					
<b>Use of Jargon</b>	<ul style="list-style-type: none"> <li>The terms used are understandable by the target population.</li> <li>There are no clichés or hyperbole in the wording of the questions.</li> </ul>					

*Note.* Survey/Interview Validation Rubric for Expert Panel (VREP©). From Survey/Interview Validation Rubric for Expert Panel, by M. K. Simon, with input from J. White, 2011, dissertationrecipes.com. Copyright © 2011 by Marilyn K. Simon. Reprinted with permission of the author.

## Appendix F: Participant Responses Related to Theme 1

Subcategory	Participant response
Literacy	<p>“And part of that is the reading level that we’re required to use... Versus the reading level of actual students.”</p> <p>“The reading level of the of like a science standardized test is really a reading test overall, because they might know the material, but they can't explain it because it the question is written at a level that is way above them.”</p> <p>“You have so many kids with that limited reading proficiency and vocabulary, and then they are in a science class, and they refuse their accommodations. It’s just so hard.”</p> <p>“Not understanding the vocabulary.”</p> <p>“The other huge barrier I think they have is their basic reading.”</p> <p>“They struggle with reading and so much of scientific wording and language is it's so content-specific. And like, if they're a kid that doesn't have that strong foundation and like, prefixes, they're like, I don't even know what this word means, let alone, like, how to answer the questions.”</p> <p>“I think the biggest challenge is honestly, reading levels.”</p> <p>“But when they have to read something and then I'm like, alright, what do you think? It's that part that is really hard because they either have trouble actually reading the words or maybe they're OK with, like figuring out what the words are, but they're not comprehending it.”</p> <p>“Some sciences, Earth science, biology. They're very language heavy. They're very academic vocabulary heavy.”</p> <p>{Lab Context} “They don’t want to sit to read instructions.”</p> <p>{Lab Context} “You [students] didn't have somebody telling you the directions. So you had to be able to read to a level of detail. You had to be able to follow your own steps and have that organizational bit. And then, so you would have people getting lost, just from that... not being able to follow a set of instructions”</p> <p>{Lab Context} “The students really struggle with reading directions, and then of course, sometimes don’t even pay attention to verbal instructions. And that can be just dangerous.”</p>
Math	<p>“And sometimes in the physical sciences, it's a language barrier with mathematics.”</p> <p>“And that I've seen many times over the years. It's just a... it's a major challenge for the students with math disabilities, math skills were like something that they struggled with.”</p> <p>“You know, in science, there's a there's a fair amount of math, and even just basic math, basic computation, adding, subtraction, those skills were difficult. So, you know, that is something that I watched kids like when we're learning the periodic table, and maybe they had a hard time adding and subtracting within 10. And now I want them to apply this concept to, you know, a very, very small, abstract idea, and like, they're still struggling over here to do, like, 10 minus 6, to count protons or electrons, you know.”</p>

Subcategory	Participant response
Recall of information	<p>“And then you have your Earth science, your physical science, and your chemistry. They're very math heavy.”</p> <p>{Lab Context} “They don't have the confidence to be able to use the materials in a science lab, weighing something or measuring something even, even realizing, like, well, I need to use the inches or the millimeter side the metric system, as opposed to the inches side of the ruler.”</p> <p>“And we have a lot of issue with recall. Like even within a school year. In even from the beginning of a unit to the end of a unit and I noticed... I'm going to say... That even this year that from the beginning of the unit to the end of the unit. They'll forget information that they've been taught. And then let's say in unit two when they have to recall information from unit one. There's that... there's a disconnect and they seem to just forget the information that they've learned.”</p> <p>“They have trouble recalling information.”</p> <p>“And by the time we are ready to move on, they have forgotten from the beginning of the year and can't build or connect.”</p> <p>“Or, even if they were successful, in middle school science, and even learned the foundation, you know, part of the disability might have not allowed them to retain all of that information.”</p> <p>“So, I think a big problem in students with disabilities in secondary school is the background knowledge which is very quickly lost, so you have to reteach a lot of the basics before you can move forward on the more intense topics.”</p>
Background knowledge	<p>“It's really hard just to keep moving forward when you're always having to take that step back. And, Oh, what did we do last class?”</p> <p>“Also, not knowing background knowledge. Not having yeah, not understanding background knowledge on what we were talking about”</p> <p>“Their lack of prior knowledge was one of the biggest struggles because science builds so much, uhm, and it builds on a foundation, like maybe in middle school, they, they might have failed science class, right? So, like, they never actually had that information.... but they were still passed along.”</p> <p>“So, like, the students needed, uhm, a review of the prior knowledge, a review of the foundation before we were able to keep going.”</p> <p>“They struggle so much internally and so many are so smart, but maybe they are in a homeless situation or a foster situation and then they move a lot and have all these holes.”</p> <p>“Yeah, so that, and a lot of them want to do it or something they find interesting, but they don't have whatever background knowledge they need to be able to.”</p> <p>{Lab Context} “They don't know graduated cylinder versus a test tube versus a beaker and so I think sometimes they might kind of shut down.”</p> <p>{Lab Context} “Sometimes they don't even want to engage in the lab at. Um, whether or not we're walking through a class or we're walking individually and because maybe some of it is the lack of background</p>

Subcategory	Participant response
	knowledge again by their junior year if they've not had experience using different types of lab equipment.” {Lab Context} “They don’t know how to use the tools and the equipment.”

## Appendix G: Participant Responses Related to Theme 2

Subcategory	Respondent quotations
Self-Directed Learning	<p><i>“They don’t like that the answers aren’t just right there in a chunk of text. They get so...I don’t know, like caught up and just being right and that they don’t want to get the beginning wrong, right? So... So I think with the inquiry-based, it’s really just being willing to try ask questions.”</i></p> <p><i>“Inquiry-based learning was typically just... it’s kind of a higher level of learning where we want to kind of not force feed the kids information, and we kind of want them to discover it on their own. And it can be really challenging, because many students just are of the mindset in their experience in in the classroom of ‘Just tell me what I need to know. What Why are you making me, giving me this rigmarole run down this path, and I have to find out for myself. You’re the teacher. Do your job.’”</i></p> <p><i>“So I mentioned that the students have- have trouble recalling prior knowledge and since they can’t recall prior knowledge they can’t think to that deeper depth- the depth that the inquiry requires because the inquiry requires them to not only ask questions but to dig deeper and again when you’ve got the abstract [course redacted] stuff and- and getting them to have their own independent thoughts.”</i></p> <p><i>“And especially kids, if there are kids with learning disabilities, who are, who are, who are uncomfortable in that classroom with the content to begin with. It makes it much more uncomfortable when you start inquiry-based learning.”</i></p> <p><i>“Kids are in an age where information is right there directly at the fingertip. With the quick search of a Google, I’m not saying that they’re really good at determining reliable sources or reliable information. But we are with a generation of kids who haven’t had to explore, they haven’t had to learn on their own. They haven’t had to dig deep for answers.”</i></p> <p><i>“So, you get to inquiry-based learning and I feel like they don’t know how to question. They don’t know how to make up their own ideas. They don’t know... How to inquire? They want that instant gratification. They want to be spoon fed. And some of them want to try to memorize what they’re spoon fed.”</i></p> <p><i>“Inquiry learning a lot of times would feel like such an uphill battle, where we it would be that a lot of time was wasted and spent redirecting. Like I felt like every, not every group, but more than we could handle, more than I could handle by myself, or me and another person. It was like they needed an adult with them to keep them on task with inquiry-based learning.”</i></p> <p><i>“A lot of the students overall struggle with it at first, but most of the gen ed kids do pick it up. It’s a lot more difficult for a lot of the students with disabilities. They need that explicit step-by-step. They’ve learned how to look back for the answers and how to memorize things, but to make up your own ideas, that’s just really hard.”</i></p>

---

Higher order processing skills	<p><i>“we’re asking a much higher level of thought to be taught”</i></p> <p><i>“And they don’t know how to infer about things”</i></p> <p><i>“It’s the higher level, higher order thinking questions.”</i></p> <p><i>“They don’t engage, and it’s challenging and frustrating because again they just want to be spoon-fed the information, they want to memorize it.”</i></p> <p><i>“And like it... it’s just, it’s just some kids just hit a wall and say, ‘Look, just, what do I need to memorize? And what do... What’s the shortcut? How do I get an A in this process?’ And I say, ‘No, I want you guys to have fun. I’ve spent a lot of time and I put this amazing lesson together. And once you read this, and I want you to explore this, and I want you to talk to each other about how these variables might come together.’”</i></p> <p><i>“They really struggle with the freedom of developing their own ideas and thoughts. They want the information right there. They want to find it right in the text. And then they don’t want to have to connect any ideas to anything. They struggle with those higher level thinking skills.”</i></p> <p><i>“They struggle with understanding the ideas and things that they cannot see it’s really hard to think that extra abstract and ask questions.”</i></p> <p><i>“I think that when kids with disabilities as a whole, or even just teens as a whole, are asked like an abstract idea, and they’re like, solve this and figure it out. They struggle, and they struggle with the struggle, and then that makes them even more frustrated, because, like, this is hard, how to, like, go about hard and problem solving strategies.”</i></p> <p><i>“What are you going to do with that data once you have data once you have it? So, collecting the data, looking at the data, but extrapolating, what that could possibly mean is, is a huge leap for them.”</i></p> <p><i>[Lab Context] “The other one is keeping kids on task. Because once they say it’s a multiple part project, they’ll do 1 little thing, and then they think they’re done. And I’m like, ‘no, this is a multi step thing that you got to do the next step’ and then they get frustrated because they’re like ‘this is too much work.’”</i></p>
Behavioral dysregulation	<p><i>“It’s really hard to get kids to focus.”</i></p> <p><i>“But as I said, if they are ones who need that quiet that focus and can’t have distractions? Those are the ones they struggle, or my extreme ADHD kids trying to get them to focus.”</i></p> <p><i>“Just being very distracted and kind of mentally all over the place”</i></p> <p><i>“They just can’t sit still in their seat. They just have, you know, some ADHD, and just really need to get up and move constantly and just pick on, you know, the kid beside him.”</i></p> <p><i>“They... like not being able to remain in their seats...”</i></p>

---

---

*{Lab Context}* "I also had kids one of the years I co-taught I did an egg drop experiment, and we had we had the eggs in plastic bags because the custodians didn't want to clean up yolk and this and that and I remember giving very specific instructions about handling their things and I had a kid who smashed an egg before we had even started anything."

*{Lab Context}* "Using materials appropriately because there might be some impulsivity issues. ADHD issues. Movement just sometimes it's the... It is a safety concern. You know, being in the lab and having things out. Because while it's nice to have all the materials out in front of a student, it's not all... you can't always do that, especially if you don't want something to be mixed with something else too early."

*{Lab Context}* "Even something like a ruler. Like I used to have rulers that were nice wooden ones with the metal [insert]. So, you get that really nice edge, but a lot of students like to... A lot of students like to play with whatever's out, and they pull that metal edge out, and now they have something a little more serious than a ruler to play with. So now we have plastic ones."

*{Lab Context}* "So my labs that we do like the physical hands-on labs, I try to make as simple as possible because (snicker)... I don't trust them with more advanced things... like at the end of the class, the amount of things that have to pick up because they have snapped pencils in half or they're crumbling up paper... it's like how, if I can't trust you with a piece of paper to turn into me for me to be able to like, legibly read this, how am I going to give you like all this glassware, or these chemicals, or solutions that like you're not supposed to drink, but who knows?"

*{Lab Context}* "We can't go to the lab because so and so is throwing this, and so and so can't sit in their chair right. And so and so is doing this. So yeah, the lab, I'm, like, very hesitant on unless it's like something very simple, like a water lab where the worst thing we do is put food coloring in the water."

*{Lab Context}* "You have the lack of responsibility and you have the typical high school kid horseplay and in a lab setting that can get really dangerous."

*{Lab Context}* "You know, you can do the in-class labs like the bubble soap labs for doing a cell in biology. Worst case scenario, somebody spills a pan of bubble soap water and hopefully nobody slips on it before a custodian can mop it up."

*{Lab Context}* "Yeah, they would, you know, they would break something or use something inappropriately, and they would have to sit out of the lab."

*{Lab Context}* "...but then you throw in things that are hazardous and people that get distracted, and they are curious, and they want to try their own experiments, and their own stuff. And then it starts to get dangerous."

---

Emotional  
dysregulation

"They get frustrated easily."

"They were in moments of frustration, rather than being personal, it was more they were frustrated that they were struggling."

"[in the] the moments where there's behaviors, he was frustrated but just school in general overwhelms them."

---

---

*"They're just overwhelmed."*

*"Maybe if you want to put it down to the kids with disabilities, like everybody has stress, but maybe they, they sometimes couldn't, like, were more sensitive to it. That emotional regulation piece was missing, but I feel like they just always didn't have the bandwidth to deal with life's bumps."*

---

**Defiance or  
noncompliance**

*"Students that are like overtly defiant and yelling, interrupting. You know, disobeying every... every rule that there is. So whether that's oppositional defiance or having a bad day and they need to let it out."*

*"Well, defiance, from, you know, I had a student rip up their assignment, throw it on the floor before, and throw a calculator across the room."*

*"Acting out in class, the classic disruption, disturbance, interruption..."*

*"And I've had a few one or two kids who kind of get a bit verbally combative again talking about behaviors. I was thinking about how sometimes they'll kind of verbally challenge us on the work they need to do or redirection or things like that."*

*"A lot of disruption. Like they'll talk to each other or they'll talk over myself or my co-teacher or they'll kind of disrupt like whether it's during whole group time or small group time."*

*"...the classic disruption, disturbance"*

---

## Appendix H: Participant Responses Related to Theme 3

Subcategory	Respondent quotations
Inability to catch up	<p data-bbox="537 401 1409 533"><i>“When the spec ed students are out so much and miss so much class, they do take so much longer to bounce back than most of the general ed students. They come back, and they see where the rest of the class is and they feel defeated before they even attempt to catch up. They say they can’t do it, so why even bother.”</i></p> <p data-bbox="537 562 1409 764"><i>“The kids even missing a day is a lot to miss with especially with some of the inquiry-based curriculum we’ve used in the past because if you miss a day you might have missed the planning for the lab that we’re getting ready to do, or you might have missed the background information to plan the lab that we do, or you might have missed the review for the test that we’re about to take. Anything like that.”</i></p> <p data-bbox="537 793 1409 863"><i>“When you’re missing pieces of that puzzle, it’s hard to jump in and do the next thing if you don’t have that previous knowledge or information.”</i></p> <p data-bbox="537 892 1409 1094"><i>“And then they struggle with the makeup work. Because they need the support. They need the guidance to get through it and they weren’t there to get through it and we’ve moved on and who is going to provide them that support now? Who’s going to get them caught up? How do they... How do we get them caught up? And so, then they just want to give up because it kind of piles up on them and they feel already defeated and they feel like they can’t do it.”</i></p> <p data-bbox="537 1123 1409 1220"><i>“Absences, yeah, catching back up, especially in a science setting, when you have labs and the material you do one day builds on the from the day before. Is cumulative. If attendance was poor, they never caught back up.”</i></p> <p data-bbox="537 1249 1409 1304"><i>“And, like, we haven’t even talked about absenteeism, like, not being in school, and then you miss a day, and then you’re making up work.”</i></p>
Lack of ownership or responsibility	<p data-bbox="537 1310 1409 1583"><i>“Uhm... and then... there are the struggles when students are absent, and they’re already behind when they’re here. So many don’t take ownership at all for their makeup work. I mean, this is high school. I am not going to hold your hand and send you home with a dozen copies of your makeup work. When you’re out, you’re expected to look online and see what you missed and come back to school prepared. But they don’t. And then they’re another day, or even another week behind. And then we’re in a lab or getting ready to take a test and they have absolutely no idea what’s going on.”</i></p> <p data-bbox="537 1612 1409 1709"><i>“And it feels like they expect you to just excuse it all, but then they aren’t getting any of the content and how can that just become a passing grade and course credit?”</i></p> <p data-bbox="537 1738 1409 1835"><i>“Attendance is a big issue in our school and many kids feel like they don’t have to make up things when they come back or they don’t put the effort in when they come back. You know and especially as juniors like when you are absent you</i></p>

---

*come to me for your makeup work. I don't hunt you down. I don't write you a cute little paper."*

*"I feel like students with disabilities, a lot of the times if they're absent from the class, they expect to be excused from any work that they missed, like when I say, 'Oh hey, you're missing this assignment', they just say, 'Oh, well, I was absent that day.'"*

---

## Appendix I: Participant Responses Related to Theme 4

Subcategory	Respondent quotations
It takes time and consistency to effectively work together	<p data-bbox="537 396 1398 499"><i>“Like everything's rushed, and everything is on the fly and... and people get moved in and out of positions, and that consistency that I feel like it takes time to build naturally.”</i></p> <p data-bbox="537 522 1398 583"><i>“So... when I was teaching science... You know the one-teach, one-assist... It worked, but it worked in one class better than the other.”</i></p> <p data-bbox="537 615 1398 709"><i>“You know we, the two of us, made it work. We did. It's not what I dreamed. It's not what I envisioned. And then in the other class, of course it was... it didn't work.”</i></p> <p data-bbox="537 741 1398 835"><i>“And I co taught with [name omitted] for many years, and in the beginning it was... we weren't nearly as good as we were as time went by, we just got a lot better.”</i></p> <p data-bbox="537 867 1398 1066"><i>“So I think it served a purpose and it was functional. But I absolutely think that if there had been more time to grow those relationships and to create a more solid foundation where, you know, the coteacher felt more confident in the subject matter, and everybody felt comfortable, kind of stepping up and stepping back. I think that would have been a much more effective model, not to say that it didn't work to a level.”</i></p> <p data-bbox="537 1098 1398 1266"><i>“If you if there, if admin or the scheduling process is making a lot of changes, it makes it very difficult on both the subject area teacher and the TAM teacher, because it's like you're getting thrown into a subject that you might not know, on top of all of that you're with a new person that the two of you need to figure out how to make it click.”</i></p> <p data-bbox="537 1297 1398 1360"><i>“But I think like the consistency just within either the year or the semester is like the most important as far as creating that relationship.”</i></p> <p data-bbox="537 1392 1398 1703"><i>“And I can think again, it was when I was the coteacher and it was with a teacher that was not. And this could just be me personally, because I'm such a routine person with, like the 24 hours of every single of my days. This class was did not feel routine at all. And, it made me like worrisome because I'm like, ‘Oh, man, if I come in here and I don't know, like, what the heck we're doing in the first even couple of seconds, but a couple of minutes, then I can't imagine like, how the kids are feeling.’ So then, I have to kind of wrack my brain and get caught up with like what we're doing today and then help them get to where I'm at. But if I feel like that at all, then it's probably takes 10 times as long for them.”</i></p>
Coteachers require time to coplan	<p data-bbox="537 1734 1398 1839"><i>“Because I was going to say that was, I was going to say that's my only downfall is I do not have common planning with a single coteacher. That's hard and I've got six of them.”</i></p>

---

*“So the way we’ve had to do it is just that I plan, I make the copies and my coteacher supplements when they’re in the room. But also, we’ll like modify assignments, modify grades, do the small group testing, but really the planning and prep falls down to me as the content teacher. But it’s not because I don’t want to share, it’s just.... You just can’t. Especially with our special ed teachers, with their caseload and all that. So I feel it....it works. But it could be better.”*

*“I would love to really coplan, co-grade, co-everything, but that’s just not the reality of it. We can’t. Time, scheduling or whatever. Like if I have a coteacher, you most likely won’t have the same prep. And if we do, they’re also coteaching with how many other teachers?”*

*“I’m not sure that I would say it was like highly effective. But it worked. You know, we didn’t get time to plan together.. we didn’t get time to create these robust, interwoven lessons together. So basically, given what we had... It worked.”*

*“No one ever had the chance to plan together. No matter how good you are at your job or how good you get along, it is really hard to give the kids what they really need when there is absolutely no time given for collaboration.”*

*“There was absolutely no collaboration! (chuckle). None. None at all. There wasn’t time. She was with another teacher during my planning time, and I was teaching another class during her planning time. It was absolutely impossible to collaborate together, and even on PD days, we had to do our own content-specific trainings.”*

*“But to have planning together would be super helpful, and it’d be super helpful, but I know that’s that’s kind of a difficult thing to do with every subject area teacher and every TAM teacher, but it would make a big difference. I strongly believe that.”*

---

**Multiple  
coteachers or  
classes  
complicate  
collaboration**

*“Collaboration was hard. It’s tough... there were some that really went above and beyond as content level teachers and e-mailed the whole entire week in advance, like on Friday... and the collaboration was almost completely done digitally when it was done. Because there was like there was, there was no other way. When you’re working with 2-3 other... maybe sometimes four... different people within a semester or a year, you know that you’re only going to see them for like one class period.”*

*“You never have the same prep as your coteacher if you’re teaching multiple subject areas. So planning is really difficult.”*

*“Yeah, so the planning. Again, it was just really hard. She was assigned to other teachers throughout the day. And we did not have the same planning period, so that made it really hard.”*

*“Well, how do we collaborate? Where? Which one do I collaborate with first?”*

---

---

*“And then we'd need planning with coteachers and really the only way that would be possible is, you know, if we didn't have teachers that we were assigned to like so and so and so and so across a bunch of courses. If we would just have the same coteachers as much as possible, then we could maybe have that common planning.”*

*“But I mean, how could you if you have multiple partners... multiple coteachers?”*

---

Special  
education  
teachers seem  
to have more  
copartners than  
general  
education  
teachers

**Special Education Responses:**

*“This year I have 5 [coteachers], I think last year I had 4 and in the previous years before that it was 2 or 3.”*

*“This year, I teach geometry, senior math, Earth science, physical science. This year, so four subjects this year.”*

*“Four different science teachers, and the year before at least two of them... so like, up to, like, six.”*

*“I was really lucky I had recently gotten my science certification and I think the year before they used me wisely and so I actually only had two coteachers that year. But then I did get pulled to cover another TAM class and so that would have been three. The year before that. I would have had ... 3 different teachers... content level teachers in my TAM setting. And the year before that... ummm... That one would have been... one additional .... no, two additional. And then I had one that I taught on my own. So six to seven people and my own class.”*

*“Last year? I had three, okay. And then the year before that, there were two different people. So now it's five total different people. And then thinking back, just one more. “*

**General Education Responses:**

*“I only had one coteacher per school year. I know they had other classes they supported in, but I only ever had one teacher per school year in my inclusive class.”*

*“Only one in the past three years.”*

*“This school year, just two, actually. It was one for the longest time. And that one person was being stretched with multiple classes in the same period and we hired someone else. So now it's just the second.”*

*“This school year, none. I don't have any, OK. Let's see the past two years. Last year I had one. I don't remember three years back. I think I only had one.”*

---

Coteachers  
indicate a desire  
for increased  
consistency in

*“So I mean, I know that there's going to be times where you gotta take a new placement, but I think once you find something that works, and both teachers say that it's working and working well, but you should probably try to keep that together.”*

---

---

partners and  
classes

*“Now, of course, if you can see the same people year after year, I think it would always be best that way unless there was a situation where you're like, I don't necessarily want to work with that person.”*

*“Yeah, if you had the same coteacher, you could definitely collaborate. If there's a teacher who has three TAM classes and all three TAM classes have a TAM teacher, I just don't understand why they don't have the same TAM teacher. I don't understand why there's different people going in and out.”*

*“It think if, if the collaboration between two teachers work, the admin needs to try and keep them together because it only benefits the kids, and then you have situations where teachers have to go and leave, and you have someone who can seamlessly pick up the slack when that teacher is gone.”*

*“Well, I think it goes along the lines of what I was just saying, that it takes time to build. It takes time to build that, that team model. And, you know, if you give me a new person every semester, it's it, you know, it takes, it takes time to build.”*

*“Yeah, it makes it very, very difficult when again the consistency of having the same person, at least when it was the same person, like this year to this year. Them coming into my realm, they kind of know the general vibe of things. They know how I like to, to plan my lessons and just, you know.”*

*“It helps when you know... you look at the list and you're like, oh, I have this person again. Oh great, I know that we already have experience.”*

*“And then it did help too, like, if I like, I cotaught science [with the same teacher] more than once, like one semester and then another semester. So I already did it with the teacher the previous semester. So that helped. Because, like, then I knew already, from doing it before, kind of what they were going to do. I could that help with planning? Because then I could say, okay, like, I know we're doing this, so yeah, let me modify this. Or can we make this adjustment?”*

*“And that we can work with just one coteacher as much as possible. And that we can have those common plannings and that we can have that time for collaboration and that we can work together as a single unit with a common goal of supporting these students and giving them the best education that we possibly can.”*

*“And when we are teaching with multiple, multiple people every year or year after year, different people, different settings, different content. You know, if there are three 9th grade TAM English classes. Then why isn't the same person in those three classes with that same teacher? I don't know. It doesn't make sense.”*

*“So, I feel like every time you get moved to a new class, you start from scratch.”*

---

## Appendix J: Participant Responses Related to Theme 5

Subcategory	Respondent quotations
Special education teachers need to be knowledgeable in the content	<p data-bbox="537 363 1421 604"><i>“My coteacher was simply an amazing special education teacher, and [they] did [their] job very well. And, and, while [they were] very... smart, [they were] not a content expert. It was really hard for [them] to be a lead in high school [science] on [their] own ...Before we quit trying to do the parallel teaching, we eventually just split the groups and [they] took [their] group to the library. And that helped with the noise in the room and the confusion from all the different voices, but then I wasn't there to help [them] if [they] got stuck on how to understand or approach a certain topic. It was definitely not the best situation.”</i></p> <p data-bbox="537 636 1421 972"><i>“Well, the only coteaching approach I was ever comfortable with was like true team teaching, like if you walked into the room, you couldn't tell who was the teacher, who was a special educator. I mean, I'd been in situations earlier in my career where I was treated more like a para and the helper, but it's also a challenge to find people who are certified to teach secondary science, yeah. So, I mean, that in order for me to support those kids, I also have to understand the content. I can't just go in and be like, 'Oh, I'm just gonna remove a multiple choice, you know, to modify it for you', you have to really understand it and be able to bring it down for them, or just sometimes even change the lab for them entirely in order for it to be more appropriate for their level. So, yeah, when you're modifying, you have to know it.”</i></p> <p data-bbox="537 1003 1421 1140"><i>“Even though in math you know that sort of [team] teaching you know is just absolutely perfect and it's probably the one teach one assist [in science] and probably isn't ideal.” (context: this spec ed teacher is HQ in math, but not in science, so does not know the content well enough to team teach)</i></p> <p data-bbox="537 1171 1421 1266"><i>“How will these kids benefit from a helper who doesn't understand the content, because I might not be able to break down complicated ideas for them if I don't understand them myself.”</i></p> <p data-bbox="537 1297 1421 1434"><i>“So it's, it's hugely important [referring to knowledge of content]. They [special education coteacher], otherwise, they're not doing a whole lot. They can't really do a whole lot. And so that's a big challenge is, you know.” [spec ed teacher knowing the content]</i></p> <p data-bbox="537 1465 1421 1602"><i>“And so, you have to have somebody who's willing to put in the time and learn the learn the content, and for a coteacher, a special ed co teacher who doesn't know that they're guaranteed that same placement the following year, why would they want to put the time in to learn that subject?”</i></p> <p data-bbox="537 1633 1421 1759"><i>”Probably the first semester or year, I like acted like a student. I would just... I would literally sit with the kids and they would be saying something and I would look at the kid. I'm sitting next to like 'do you know what like, I don't know what the heck they're talking about', and I would raise my hand”</i></p> <p data-bbox="537 1791 1421 1864"><i>“I feel like to go into a new science class with a new science teacher, I feel like I... I have to relearn things.”</i></p>

---

*“So I walked in cold, and then had to build from there.”*

---

Coteachers need to be more familiar with coteaching strategies to implement effective approaches such as team teaching

*“Oh, I know there are a bunch, but we haven’t done many.” [referring to coteaching approaches]*

*“I can’t name them right off the bat, but you’ve, I mean gosh there’s any of a zillion different things” (laugh). [referring to coteaching approaches]*

*“If you’re asking me to name like name drop these things, I’m going to be on the struggle bus.” [referring to coteaching approaches]*

*“So, you’ve got the idea where the general education teacher kind of does everything in the special education teacher should (long drawn out emphasis) be (laugh), you know, moving around, walking around, working with the students. You’ve got the idea where you could have both teachers or one teacher doing things in small groups. Like if the, say the... one of the teachers pulled a small group of the lower students aside and then the other teacher was walking around with the other groups in the general population. You’ve got that. But then you’ve got the, you know, one teacher could pull the kids out completely whether it’s to teach them a lesson” [referring to coteaching approaches]*

*“Um, you could have both teachers kind of simultaneously. Again, I think there I feel like there’s a million ways that any of that stuff can happen.” (laugh) [referring to coteaching approaches]*

*“One teach, one assist. Both teach teachers take lead role. I guess that’s all there is.” [referring to coteaching approaches]*

*“Usually, my coteacher would support the students while I taught the content.”*

*“Uhm, yeah, so like I said, I would usually deliver the lesson while [they] circulated throughout the room. [They] would make sure the students were paying attention and [they] would help explain instructions and get kids going.”*

*“So, a lot of the times we’ll do... what... one teach- one assist.”*

*“In science, it’s usually one teach, one assist.”*

*“The one-teach one-assist is as far as I could tell, really, the only thing I’ve ever done in secondary science classes.”*

*“I feel like then I would lean on the coteacher to do that [support special education student needs] while I managed the rest of everybody, or try to anyway.”*

*“So you’ve got the idea where the general education teacher kind of does everything in the special education teacher should (long drawn out emphasis) be (laugh), you know, moving around, walking around, working with the students.”*

---

---

*“Ok, so the one I always kind of go to is the science teacher is the content teacher and the coteacher, the special Ed teacher team teacher, they focus on supplementing and making sure that we are hitting everyone's IP and covering that and really being just that extra bit to make sure that everyone is getting what they need in the room.”*

*“I think it was effective to a level, but I feel like it under-utilizes the second teacher in the room”*

*(Big sigh) “It works because it has to work. Because of the scheduling and the limitations placed on us”*

---

## Appendix K: Participant Responses Related to Theme 6

Subcategory	Respondent quotations
Teacher preparation programs were nonexistent or ineffective to prepare for secondary SWD	<p data-bbox="537 363 1421 428"><i>"I never had... I don't remember talking much if any on co-teaching coteaching relationships."</i></p> <p data-bbox="537 453 1052 485"><i>"I don't remember having a class that did that."</i></p> <p data-bbox="537 510 1421 575"><i>"I don't think I had any specific classes on working with students with disabilities."</i></p> <p data-bbox="537 600 1421 665"><i>"Okay, so I would say none. There is no actual class in my experience that prepared for like a coteaching environment."</i></p> <p data-bbox="537 690 1421 756"><i>"As far as like secondary level, there was, there was definitely none, nothing. There was nothing at all about high school kids with disabilities."</i></p> <p data-bbox="537 781 1421 888"><i>"Little to none. And again, it's been a while since college, but, I mean, I don't think it was its own course. I think it was probably a unit within it, if it was that. I don't remember getting a lot of training on students with disabilities, period."</i></p> <p data-bbox="537 913 1421 978"><i>"So there really wasn't coteaching for my first 20 some years. There was a special ed classroom. There wasn't inclusion."</i></p> <p data-bbox="537 1003 786 1035"><i>"There was one class."</i></p> <p data-bbox="537 1060 1273 1092"><i>"It was a long time ago and I really don't remember too much of it."</i></p> <p data-bbox="537 1117 948 1148"><i>"Like, student teaching was so short."</i></p> <p data-bbox="537 1173 1421 1281"><i>"I was definitely not really ready to handle the inclusive classes, and especially in the high school level. It was like nothing in the college courses even touched older kids. That I do remember. I just wasn't really prepared or comfortable at first"</i></p> <p data-bbox="537 1306 1421 1371"><i>"I don't feel prepared as much as it's just like 'Make this sorcery. Just learn by doing in this job'"</i></p> <p data-bbox="537 1396 1078 1428"><i>"And so, I mean, I guess I just had 0 preparation",</i></p> <p data-bbox="537 1453 1421 1518"><i>"...Which doesn't sound right, but if I can't remember, then that means that if I did have a class, it didn't do its job."</i></p> <p data-bbox="537 1543 1421 1608"><i>"There was really no such thing when I went through it, because, I mean, we may have touched, we may have touched on it briefly."</i></p> <p data-bbox="537 1633 1224 1665"><i>"So, I would say like the preparation is, yeah, it's not working."</i></p> <p data-bbox="537 1690 1421 1814"><i>"I don't feel like I've had a ton of training and preparedness like I know there's always a meeting at the beginning of the year where they're like, hey, if you have co-teaching here, talk with us a little bit. But uh. I've been trying to learn as I go with how to best teach and reach the kids..."</i></p>

---

*“But I still am not comfortable with the amount of mental health interventions that are needed and especially with deescalating a high school student.”*

---

Teacher preparation programs should be less textbook and more hands on

*“There was mostly just the textbook stuff. Like what the specific disabilities are and how they look stereotypically. You, know, this is Autism, and this is dyslexia. The real basics of what some disabilities look like and how to support them.”*

*“I took one class on students with, I don't remember what it was called, but it was like a students with disabilities class where we like we learned about ADHD, then we learned about autism, and so we learned about the different special education... um issues students have.”*

*“It was very textbook. It was very ‘here are different disabilities; here are different teaching strategies.’ It was very bland.”*

*“Just because a book says that a disability might present in a student a certain way, doesn't mean it actually will.”*

*“I mean, everyone is different and is there really a textbook to any kid with a disability?”*

*“You can't just read about a one size fits all intervention and then expect it to work on every kid. They are all different and they all respond different.”*

*“And, it was very frustrating because like what was being discussed in my classes that I was taking, it just didn't look the same as what was going on in the classroom.”*

*“I like, thought I learned something that was groundbreaking and you try to implement it in the classroom and it's like that did not go how we talked about in class.”*

*“But it would have been so much better if the learning was more situational.”*

*“Gosh, I would have learned so much more actually working with students more in my student teaching.”*

*“I would've been so much more prepared if I had seen how to support spec ed kids in person instead of just reading about it in a book. Like, they barely even talked about interventions and how to approach different situations.”*

*“Like no matter what we learned in our teacher prep program or where it was. I think we need to have the ability to sit down and do it in the here and now with the people we need to do it with. “*

*“Everything was like, theoretical too. So it wasn't like in practice other than student teaching. So in that regard, like, given an opportunity to experience co teaching, but it wasn't in student teaching that I felt like I got that opportunity to work on like, Well, how do you even coteach? Like, how do you work in a science class, secondary science classroom to provide No, I don't feel like any class outlined that on paper or in readings or in books. It was, it was just purely like*

---

---

*being in the classroom and doing it and learning from another teacher that had been doing it in practice.”*

*“There was not much I probably could have gotten out of the one little college course. Had I known, but I don't know that it was as much as I would have gotten just, you know, doing it in real life.”*

*“So experiencing typical stuff with kids with disabilities... It's stuff that I was not exposed to.”*

---

## Appendix L: Participant Responses Related to Theme 5

Subcategory	Respondent quotations
There is a lack of relevant ongoing training available related to teaching SWD in secondary science classes	<i>"ZERO. Literally zero."</i>
	<i>"None, none that was directly related. None. OK, ever."</i>
	<i>"None that I can think of that are specifically for students with disabilities."</i>
	<i>"I may be wrong, but I don't think... I just don't remember any. There probably was something. I don't know."</i>
	<i>"I can't recall things that we have done as like a either... a department or a school that's specifically related to supporting students with disabilities. It's more so like classroom management, but it's never talking specifically about students with disabilities."</i>
	<i>"Teacher preparation program... so my teacher preparation program, which was K-6, there was one special education class. So, I didn't really have anything to prepare for high school."</i>
	<i>"Hmm. Professional development. Directly related to secondary science, no. No, that doesn't exist. No."</i>
	<i>"I received none."</i>
	<i>"None, okay, none. We, typically in the science world, you know, we don't get a lot of professional development just for us anyway. I mean, even every like, generic question we get is, like, it's an English question, or it's a math question, like, I feel like we never get PD that's specific to science, yeah, and science and disabilities. No way."</i>
	<i>"So nothing ever happens for science. (laughs and pauses) PD... good science PD barely exists."</i>
	<i>"But even that, that's even all geared for the elementary kids. There's nothing that is specifically for high school students."</i>
Coteachers indicate a desire for more relevant ongoing training opportunities	<i>"Well, definitely having professional development that is specific to high school students and their developmental stage would be really helpful. And how do we support secondary students with disabilities in science? Yeah, having PD that is geared towards secondary students and high school- stuff that would give us updated and new techniques and strategies would be really helpful."</i>
	<i>"I think we could do an exploratory on science. On... you know... How to be safe? How to break groups down? How to maybe work better in splitting lab settings? How to teach kids to inquire... how to do that inquiry-based learning and how to address all of that with just high school kids with special education. High school kids, not elementary kids."</i>

---

*“How do you make them care? I guess you can't make anybody care... How do you guide them into caring, you know? Yeah, things for older kids. Older kids and... and their unique... situations. Yeah.”*

*“like a professional development that allowed them to see things through our lens and see things a little bit more through the special ed, like the student with a disability, because some are gen ed teachers, you know, might be So focused in on the content that they're trying to teach, and they're not able to really understand what their students need, or they're not able to kind of look at everything that we're juggling as special educators behind the scenes.”*

*“I think there needs to be professional development for the gen ed teachers on how to be a strong coteacher, because they have that role as well.”*

*“There needs to be, there needs to be some training for this, you know, you can't, you can't go with never have, you know, if you're a veteran teacher and you've never done co Teaching, and the principal says, Oh, you're coteaching next, you know, next half or next year for three classes.”*

*“More incorporation on how to pull the coteacher in more. But then, in order to do that, they have to be more content knowledge based. So I would guess professional development on content knowledge.”*

*“Maybe their professional development is going to be centered around a refresher course on [a specific course] so that they can be a stronger teacher.”*

*“The same professional development that the gen ed teachers get, like, I need to go and be trained on all of these things as well. But I don't think they put as much... they don't invest in much in the coteachers, because they could move year to year.”*

---