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Modeling Co-Teaching for Collaborative Proficiency

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Abstract

Co-taught lessons representing four co-teaching models (One-Teach, One-Observe; One-Teach, One-Assist; Station-Teaching; Team-Teaching) were developed and implemented by one science education faculty, one mathematics education faculty, and one special education faculty as part of the one-semester science and mathematics education coursework for K-6 preservice teachers. Procedures for implementation of the co-teaching models are described. Focus-group interview data were gathered from a purposeful sample of 10 preservice teachers to explore the participants' perceptions concerning the benefits of modeled co-teaching to their own collaborative preparation. Findings reveal that the preservice teachers viewed co-teaching favorably in terms of increasing their own knowledge of and ability to implement collaborative teaching practices.

Keywords: co-teaching, cooperative learning, teachers and teaching, teacher education, special education, teacher knowledge, special education pedagogy

Modeling Co-Teaching for Collaborative Proficiency

Improving access and support for students with disabilities within the general education curriculum is both a goal and a legislative mandate for schools and teachers. In general education classrooms, co-teaching between general and special educators can benefit all students—those with and without special needs (McDuffie et al., 2009). Equitable learning opportunities and curriculum access for all students are further promoted by co-teaching. Preparing teachers to meet diverse educational needs within the same classroom is the task of teacher preparation programs where authentic collaborative experiences must be provided to facilitate future instructional implementation (Blanton et al., 2017). As schools adopt more inclusive practices and more special needs students are placed in general education classrooms, there is an even greater need to prepare preservice teachers (PST) for teaching roles that require collaboration and co-teaching (Friend et al., 2010; Ricci & Fingon, 2018).

While the approach of combining general and special education training has shown promise in preparing PSTs for more effective inclusive practices (Gehrke & Cocchiarella, 2013; Lautenbach & Heyder, 2019; Ricci & Fingon, 2018), few university programs provide such combined training to PSTs (Allday et al., 2013; Harvey et al., 2010; Mandinach et al., 2015).
Thus, the purpose of this study was to explore the implementation of co-teaching in two redesigned science and mathematics education courses and the perceptions of PSTs concerning the benefits of co-teaching to their own collaborative preparation.

Literature review

Research on co-teaching in K-12 classrooms

Co-teaching is an instructional strategy in which two teachers, traditionally one general educator and one special educator, jointly deliver instruction to students (Friend et al., 2010). General educators bring discipline-specific (i.e., mathematics, science) expertise to the partnership, while special educators contribute expertise focused on enriching the learning experiences of individual students with disabilities (Strogilos et al., 2022).

The six models of co-teaching (Friend et al., 2010) represent various instructional arrangements to leverage the available expertise of both the general educator and the special educator. *One-teach, one-observe* involves one teacher taking the lead in delivering instruction while the other teacher observes student progress or behavior. *One-teach, one-assist* is similar in that one teacher takes the lead for instruction, but in this model, the other teacher circulates to provide support for individual students, answering questions or providing other one-on-one instructional support. *Station-teaching*, similar to learning centers, includes one station set up for student independent work, while each of the other two stations is led by one of the co-teachers. The students rotate through each station, so all benefit from the expertise of both co-teachers and are provided independent practice time as well. *Parallel-teaching* involves both co-teachers teaching the same material simultaneously to two equal groups of students, thereby increasing attention and opportunities to respond for each student. *Alternative-teaching* is similar, but instead of equal groups, one co-teacher delivers instruction to a large group of students while the other co-teacher works with a small group needing additional support. Finally, *team-teaching* involves both co-teachers interactively delivering instruction to the whole class.

According to Solis et al. (2012), co-teachers should use variations of grouping arrangements to enhance instructional design and delivery. However, research on the implementation of co-teaching in K-12 classrooms suggests that one-teach, one-observe and one-teach, one-assist are the models most commonly used in practice (Strogilos et al., 2022). While some have expressed concern that these two models may underutilize the co-teacher in the support role, the prevalence of use suggests the need to include one-teach, one-observe and one-teach, one-assist models in preservice training on co-teaching.

Research on co-teaching in university teacher preparation programs

Co-teaching has been identified as an effective teacher preparation strategy based on data collected from both PSTs and their university instructors who participated in co-teaching (Bacharach et al., 2007). The university instructors had favorable responses to co-teaching, and the PSTs, who were the consumers of co-taught instruction, reported that being exposed to two different sets of expertise and experiences on topics was beneficial. While the vast majority of teacher preparation programs claim to offer such coursework, Mandinach et al. (2015) found that instruction provided in teacher preparation programs did not reflect the recommended range of data collection techniques, with teachers frequently feeling unprepared to gather and use informal data about their students to guide their own practice.

According to Harvey et al. (2010), faculty noted that all of the PSTs participating in an introductory special education course and relevant field experiences were provided opportunities

for collaboration and cross-disciplinary learning. Special education faculty were in strong agreement that a collaboration course was offered to special education PSTs, while elementary education and curriculum and instruction faculty indicated less agreement that their PSTs were offered access to such a course. Responses from all participants indicated inconsistent access to courses that were taught across programs or in an interdisciplinary manner. Moreover, 70% of all participants reported that their programs offered no teacher-education co-taught classes but identified that such a course (co-taught by general education and special education faculty) would be beneficial to their development as inclusive teachers.

Further examining the state of inclusion coursework offered to PSTs in elementary teacher education programs in colleges and universities, Allday et al. (2013) identified elementary teachers as needing a "wide range of skills and dispositions" (p. 301), including skills in collaboration and differentiating instruction, to effectively support the diverse group of learners they encounter in their general education classrooms. Findings indicated that only 6% of the teacher education programs represented required a course on collaboration. The average amount of coursework dedicated to collaboration between general education and special education teachers was less than 0.3% of the overall course load for elementary PSTs. Moreover, coursework dedicated to inclusion or differentiated instruction accounted for an average of only 1.9% of elementary PSTs' overall course load.

In a similar study, Gehrke and Cocchiarella (2013) explored aspects of teacher-preparation coursework and field experiences related to PSTs' ability to support inclusion in practice. While the majority of participants reported being able to identify characteristics of inclusion in an academic sense (i.e., the definition of the structure of inclusion presented in a textbook), approximately half reported receiving instruction on how to implement inclusion practices in a classroom. Results indicated that PSTs were concerned with developing the skills to implement inclusion rather than simply knowing the textbook definition. Furthermore, PSTs found that engaging in collaborative learning activities was essential to improving comprehension of inclusion and gaining practical implementation strategies. According to findings that are consistent with Arndt and Liles (2010), university coursework frequently leaves PSTs with a "separate spheres" framework that does not integrate general and special education. To give PSTs real-world collaborative experiences, more opportunities for collaboration are suggested, as well as modeled co-teaching.

Ricci and Fingon (2018) and Yopp et al. (2014) also noted the value of providing opportunities for PSTs to engage in co-teaching experiences. Ricci and Fingon (2018) explored co-taught sessions within two teacher preparation courses on reading/language arts instruction in which general and special education faculty delivered content while modeling the process of co-teaching. A culminating activity for the PSTs was a lesson planning assignment in which partners co-planned differentiated reading instruction that could be delivered to diverse learners in K-12 classrooms. Data revealed that the co-taught sessions increased PSTs' knowledge, practical information from both a general and special education perspective was shared, and the overall delivery of content was effective. A significant increase in the PSTs' perceptions of their own collaboration skills from the beginning to the end of co-taught instruction was also noted.

In order to improve PSTs' capacity to support conceptual understanding of mathematics topics through co-teaching, Yopp et al. (2014) used co-teaching in a secondary mathematics teacher preparation program to train mathematics PSTs for middle or high school positions in high-need urban schools. The majority of PSTs found co-teaching to be an effective model for enhancing their own teaching of mathematics, which led to better learning experiences for students. The PSTs identified other ways in which participating in co-teaching prepared them for their own classrooms, including being better prepared to work collaboratively with paraprofessionals, special educators, and other general educators across content areas. In addition, a high percentage of PSTs reported success with implementing the one teach, one observe (90%), and one teach, one assist (100%) models of co-teaching.

In summary, research suggests that university teacher-preparation faculty can implement co-teaching to improve the readiness of PSTs to deliver effective collaborative instruction that better addresses the needs of students with disabilities accessing the general education curriculum. Further, consideration of how university co-teaching is implemented and PSTs' perceptions of that implementation are necessary for effective use of the co-teaching strategy.

Context of the study

The K-6 program in this study is unique as the PSTs are prepared, through coursework and field experiences, for general education and special education settings. In an effort to better prepare elementary PSTs to plan and implement integrated Science, Technology, Engineering, and Mathematics (STEM) education, the mathematics and science methods of instruction courses were revised to include integrated mathematics and science pedagogy using four of Friend et al.'s (2010) six co-teaching models.

One-teach, one-observe

The one-teach, one-observe co-teaching model was demonstrated during an integrated science and mathematics lesson on camouflage and fraction number sense. The science and mathematics faculty worked together to accomplish the "one-teach" part of the model, and the special education faculty the "one-observe" part of the model. The lesson began with a prompt from the math educator, "Have you ever worn camouflage?" with PSTs placing sticky notes on a large one-factor Venn Diagram. The mathematics educator then engaged students in discussion comparing the fraction of students who reported having worn camouflage before and those who had not, asking such questions as "How might the fractions have been different if we were in a different region of the country or in a more urban setting versus rural?" The science educator then provided an in-depth treatment of camouflage, focusing on different modes of camouflage (ex., color, pattern, texture) that creatures use to both protect themselves from predators and improve their predatory abilities.

The special educator engaged in active observation of both the PSTs and the instructors while the science and mathematics educators were providing content instruction. Modeling how a co-teacher can observe their own colleague to obtain valuable data for reflecting on and improving instruction, the special educator recorded frequency counts, first of the types of questions the science educator asked the PSTs and second of the frequency with which PSTs were given opportunities to respond (OTR). To take frequency count data on the type of questions asked, the

special educator first identified four categories of questions: yes/no, short answer (e.g., 1- to 3-word response), extended short answer (e.g., 1-2 sentence response), and open-ended answer (any extended response of more than two sentences). Next, the special educator, sitting in the back of the room, noted the time and began recording with tally marks every time the science educator asked one of the four types of questions. This was all done inconspicuously, so the PSTs were not aware that the special educator was doing anything more than casual observation of the class. A similar procedure was followed for the observation of OTR provided by the mathematics educator. First, the special educator identified the back row of PSTs as a targeted group that may not receive the same OTR as others in the class. In doing this, the special educator modeled how a co-teacher could record and use observational data to compare OTR provided to a specific targeted group of students, such as students with an IEP, students with a communication goal, students at risk for failure, etc. Again, the special educator sat in the back of the room and appeared to casually observe classroom activities. The time was noted, and the special educator recorded tally marks every time the mathematics educator called on a preservice teacher in the back row or a preservice teacher sitting elsewhere in the class.

Having already modeled the collection of frequency (or event-recording) data, the special educator next modeled duration recording in his observation of the PSTs. First, the special educator recorded duration data for PSTs accessing personal devices during science instruction. The special educator identified one row of PSTs as a representative sample, noted the time, and then began observation. The special educator was positioned at the back of the classroom and chose a row of PSTs that could be observed accurately and inconspicuously. Cell phones and laptop computers were the two primary device types that PSTs were seen using, and the duration of time that PSTs accessed the devices was recorded in seconds and minutes.

The concept of duration recording was also modeled through a hands-on activity in which PSTs had to camouflage small pieces of paper using color and/or texture before pasting them in the classroom for their peers to find within a set amount of time. This more interactive lesson allowed the special educator to model observing behavioral data on a particular target preservice teacher. The special educator identified interpersonal communication as the target behavior and recorded duration data for any time the target preservice teacher conversed with a peer or peers. Duration data were categorized based on the number of words spoken (1-3 words, 4-12, 13-30, 31+). A comparison student (preservice teacher) was chosen, and duration data were collected in the same way for this preservice teacher to establish a point of reference against which the data collected from the target student (preservice teacher) could be evaluated (Lee et al., 2020). In order for the demonstration to be useful for class discussion, the special educator chose a particularly quiet student to be the target student and a particularly gregarious student as the comparison. Note that this was done for purposes of demonstration, and the PSTs were told that choosing a typical rather than an exceptional comparison student may be preferred in practice.

After gathering information from teachers and the PSTs through observation, the special educator addressed the PSTs to explain what had been modeled. The special educator engaged the PSTs in a brief discussion of the six models of co-teaching (Friend et al., 2010), emphasizing the prevalence of the one-teach, one-assist and the one-teach, one-observe models and the importance of active observation when utilizing those models in particular. A discussion on active observation, including various types of data recording strategies, followed. In order to give

the PSTs an authentic example of how to gather such data and how instruction can be informed by reflecting on that data, the special educator was able to present the real observational data that was captured during the instructional activities.

One-teach, one-assist

The one-teach, one-assist co-teaching model was demonstrated during a hands-on learning activity called "Birds and Worms" appropriate for 3rd-grade students. The science and mathematics educators worked together to accomplish the "one-teach" part of the model, and the special education educator modeled the "one-assist" part of the model. The Birds and Worms activity began with the PSTs being divided into teams of six. In each of three rounds, the "Birds" (PSTs) took turns to find "Worms" (e.g., marshmallows, toothpicks, dog food) representing various levels of camouflage scattered in a predesigned area outdoors that included both a grassy area and a flower bed area with pine straw. Each round was restricted to a one minute in which all team members had to find a worm or not. At the end of each round, the PSTs recorded data on the number of worms of each type they had found (including no worm found). After all three rounds were completed, those data were used to create and compare fractions using fraction strips and a number line.

During the activity, the special educator circulated among groups to actively assist PSTs by re-explaining rules, answering questions about the activity, checking to ensure that data were recorded correctly, etc. The special educator also modeled how an assisting co-teacher could fulfill an important role in behavior management during such an activity in an elementary class. Upon returning to the classroom at the completion of the activity, the science and mathematics educators taught interactively, each making content connections. The mathematics educator guided the PSTs through representing the number of "found worms" as a fraction, first visually through the use of fraction strips and then numerically with fraction notation. The science educator used questions such as, "Why do you think a large fraction of marshmallows were found so quickly?" and "What might explain why a small fraction of toothpicks were found despite their light color?" to integrate the science concept of camouflage with the exercises in representing fractions.

The special educator then led the PSTs in a discussion on differentiated instruction and what part of the activity might be amended to better facilitate learning for all students, providing an example of considering the number of "worms" provided, which would ultimately become the denominator of the fractions. If the teacher wished the students to make their own fraction strips (as was done in the modeled activity), then a denominator such as 4 or 8 would allow students to simply fold their strips in half to create accurate fractions, whereas a denominator of 6 would be more difficult for students to represent accurately and could lead to misconceptions regarding equivalent fractions. The special educator discussed providing explicit science instruction emphasizing aspects of camouflage other than color since those other aspects of camouflage (texture, pattern, shape) were what the PSTs had demonstrated less familiarity with during class discussion. The special educator also pointed out how human behavior exhibited by the PSTs during the activity (e.g., purposely trying to find the most difficult or well-camouflaged worms) could impact the demonstration of how camouflage affects animals in a predator- prey relationship in nature. The special educator encouraged the PSTs to explicitly teach any core concepts that PSTs were expected to gain from the hands-on activity, rather than relying solely

on implicit exposure to those concepts through participation in the learning activity alone and also discussed instances where misconceptions may have occurred.

Team-teaching

The team-teaching model was demonstrated during a lecture on standards and learning progressions at the elementary level. All three faculty (mathematics, science, and special education) led whole-group instruction together, offering various perspectives on standards and learning progressions (Friend et al., 2010). The mathematics educator emphasized how mathematics skills and concepts build upon each other and how teachers need to give attention to background knowledge and pre-requisite skills to increase access and facilitate success for all students. Attention was also given to the importance of developing a conceptual understanding of mathematics rather than focusing primarily on procedural fluency with rote computations.

The science educator noted the spiral nature of science standards where students may work on the same general standard across several grades, but their understanding of the topic would become more complex and nuanced over time. An example that the science educator in the current study used was the pollution and contamination of water sources. For younger elementary students, the teacher's goal may be simply to introduce students to the idea of polluted water sources and establish the understanding that pollution can travel from one location to impact another. For older students, concepts such as measuring the pH of soil and water and mapping those data would represent a more complex learning activity related to the same general standard explored in younger grades.

The special educator extended the mathematics discussion to include background knowledge and pre-requisite skills. The special educator offered a competing perspective on the balance between conceptual understanding and procedural fluency by reminding the PSTs of the importance of explicit instruction for students with disabilities (Lee et al., 2020). Specific features of explicit instruction that facilitate positive learning outcomes for students with learning disabilities include modeling the steps for solving problems, sufficient practice opportunities, ongoing feedback, use of various visuals and work examples, and explicit strategy instruction (Lee et al., 2020). As the use of math manipulatives was a key feature of the mathematics educator's discussion in the current study, Satsangi et al.'s (2018) description of the successful integration of math manipulatives and explicit instruction for students with disabilities offers insight into how the PSTs might accomplish explicit instruction in their own classrooms.

The special educator transitioned the PSTs from the discussion of the spiral nature of science standards to a discussion of alternate achievement standards for students with disabilities. Federal legislation provides that states may assess students with significant cognitive disabilities using alternate achievement standards. Alternate achievement standards are based upon general education standards for each subject but are modified based on the learning needs of cognitively disabled students who are persistent low performers even when provided high-quality instruction. The special educator discussed challenges related to reliance on alternate achievement standards, including a lack of access to functional skills for severely disabled students who may then be underprepared for post-secondary independent living outcomes.

Station-teaching

The station-teaching co-teaching model was demonstrated during a feedback session in which the elementary PSTs received guidance and instruction on how to properly create an integrated STEM five-day lesson plan utilizing principles of Universal Design for Learning (UDL). Universal Design for Learning (CAST, 2018) offers guidelines for teachers to incorporate into their lesson plans to increase access for students with and without disabilities across three areas: representation (offering multiple and flexible ways of representing content to students), engagement (using various means to motivate students and increase engagement in learning tasks), and action and expression (varying how students can communicate their learning and express what they know).

In modeling station teaching, two were facilitated by the science and mathematics faculty, where the PSTs could access content-specific expertise to inform their understanding of the mathematics and science standards. The PSTs were also able to receive guidance regarding the integration of science and mathematics content in their lesson. The special education faculty facilitated a third station for the PSTs to access expertise related to differentiation and UDL guidelines. Special attention was given to breaking down mathematical problem-solving procedures (e.g., scaffolded instruction) and providing students with tools to facilitate memorization (e.g., mnemonics) of science terminology. Attention was also given to creating alternative assessments that appropriately assessed content standards while reducing reading and writing demands (e.g., activity-based assessments). The fourth station was set aside for independent work, as recommended by Friend et al. (2010), where PSTs were able to develop their lesson plans aside their peers with whom they could engage in brainstorming or peer review. The PSTs rotated in groups through the four stations, experiencing the benefits of the station-teaching co-teaching model as one way by which students can access the unique expertise of separate co-teachers.

Method

In the current study, a grounded theory approach was used to explore the perceptions of PSTs regarding the benefits of exposure to modeled co-teaching in the PSTs' own preparation for providing instruction to mixed groups of general and special education students. The grounded theory approach was chosen because it offers a systematic process for collecting and analyzing qualitative data in order to explain a process, action, or interaction (Creswell, 2002) – in the case of the current study, the process of PSTs developing collaborative expertise and skills. In their foundational work on grounded theory, Glaser and Strauss (1967) note the need for gathering and analyzing actual field data from participants, and Charmaz (2006) stressed the value of participants' perceptions as authentic data needed to develop theories or explanations. Specific research questions were:

1. What were the perceptions of preservice teachers regarding the benefits of being exposed to modeled co-teaching by general education and special education faculty in teacher preparation coursework?

2. After exposure to the modeling of co-taught instruction, how do preservice teachers consider plans for teaching both general and special education students in inclusive classrooms?

Participants

Fifty-five PSTs (mostly female ~98% and Caucasian ~87%) were enrolled in a K-6 teacher education program at a moderately sized, four-year public university in an urban setting in the southeastern United States. The PSTs were enrolled in two science and mathematics elementary methods courses, a special education course, and participated in general and special education field experiences in this final semester of coursework prior to the internship. Out of the 55, ten PSTs representing a diverse sample were invited to participate in focus group interviews. These PSTs represented unique voices and personalities in their classes and demonstrated a high level of interest and effort in planning and implementing differentiated lessons. Seven of the invited PSTs agreed to participate in the focus group interviews.

Data collection

A focus group interview was arranged after the semester in which the modeled co-taught instruction was delivered to gather in-depth data on the PSTs' perception of the modeled co-teaching instruction, as well as their ideas on how they might implement such strategies in their own classrooms. This was after final grades were posted for the semester so that PSTs could speak freely without concern that their answers would impact their grades. The researchers, also the instructors who delivered the modeled co-teaching, conducted the focus group interview session that lasted approximately 30 minutes and was audio-recorded. Interview questions included queries about preservice teachers' 1) perceived benefit of being exposed to the various models of co-teaching, including specific strategies for active observation of students; 2) enhanced ability to notice positive and negative examples of collaborative strategies when participating in student-teaching or field experience opportunities; and 3) perceived readiness for implementing collaborative practices in their own classrooms. The PSTs were also asked how the modeling of co-taught instruction impacted their willingness or enthusiasm to teach in inclusive classrooms (made up of both general and special education students). Follow-up questions were asked during the interviews, as appropriate, including one specific line of inquiry that probed further on shared planning and the balance of roles between general and special education teachers.

The collection of data described above was accomplished in tandem with the collection of both quantitative and qualitative data on preservice teachers' self-efficacy for integrated STEM teaching for separate analysis. All qualitative data were collected through the focus group interview; specifically, all data analyzed for the current study came from the portion of the focus group interview that dealt directly with co-taught collaborative instruction. Field notes were used to inform the description of modeled co-taught instruction.

Data analysis

Interview data were transcribed verbatim and entered into the qualitative data management program ATLAS.ti. Data analysis began with initial line-by-line open coding, followed by axial coding by which initial codes were combined into categories and subcategories (Charmaz, 2006). Further analysis revealed subcategories related to the major or overarching categories. The

following subcategories were connected to the major category of "SPED teacher not actively involved in instruction": Lack of Content Knowledge, Challenges with Co-planning, and Lack of Personal Compatibility or Role Conflict.

Results

Initial line-by-line open coding of interview data resulted in 46 codes assigned to the qualitative data. Axial coding resulted in four main themes connected to the two proposed research questions: the ability to notice what collaborative teaching could and should look like in an inclusive classroom, active involvement of the special educator, readiness to teach students with and without disabilities in an inclusive setting, recommendations for improving collaborative preparation. In Table 1, the final coding framework is organized by theme.

Table 1
Coding framework

Final Themes	Axial Codes	Initial Codes
Ability to notice what collaborative teaching could and should look like in an inclusive classroom	● Ability to notice good and bad practices in field experience ● Knowing how SPED teacher can be actively involved	● Ability to notice in field placement ● Missed opportunities ● SPED teacher can lead a small group ● SPED teachers can and must know content ● SPED teacher should be able to teach with little notice
Active involvement of the special educator	● Content Knowledge ● Co-planning ● Role Conflict	● SPED teacher not involved ● GED teacher not willing to co-plan ● Scheduling a barrier to co-teaching ● GED vs. SPED conflict ● GED vs. SPED lack of communication ● GED vs. SPED instructional disagreements ● GED vs. SPED competence complaints ● GED vs. SPED priorities ● GED vs. SPED lack of co-planning ● GED teachers teach different ● Student confusion hurts GED/SPED relationship ● SPED teacher unethical grading ● Behavior challenges
Readiness to teach students with and without disabilities in an inclusive	● Readiness for Behavior ● Readiness for Communication	● Communication is important ● Knowing what to expect ● Knowing how to handle a situation ● Learning how to handle behavior

setting		● Identifying behaviors that need to change vs. those that do not ● Understanding each point of view - field experience ● GED vs. SPED nature of work different
Recommendations for improving collaborative preparation	● Recommending more co-teaching modeling ● Recommending more practice with content	● Seeing different co-teaching models ● Modeling better than typical instruction ● More guided practice with science and math ● More guided practice with higher order thinking ● More guided practice with technology

Research Question 1

In order to answer Research Question 1, a series of interview questions were posed to the participants in order to determine perceptions of the benefits of modeled co-teaching to their teacher-preparation experience. One main theme that emerged from participant responses indicated a perceived increase in their ability to notice what collaborative teaching could and should look like in an inclusive classroom, thus better preparing them to benefit from intense field placement experiences and eventually in their own classrooms. The PSTs also reported benefiting in terms of knowledge of co-teaching specifically.

> *I liked how we got to see the different co-teaching strategies because y'all modeled a lot of them. You know, you flipped back and forth, and then one taught and one observed, like that type of thing... So, I mean, I think that getting to see the different strategies for co-teaching really helped me and, I was more aware of it because of that.*

The PSTs recognized overarching issues that they saw in the field and believed that exposure to successful collaborative teaching between general education and special education faculty not only helped them recognize these issues but also equipped them to deal with them when they started teaching in their own classrooms.

Another main theme that emerged from the interview data was the active involvement of the special education teacher in the general education classroom. The PSTs established a standard that required general education and special education teachers to work closely with students in the classroom, utilizing instructional strategies to boost learning or encouraging participation in targeted learning behaviors to improve access to instruction. The PSTs reported that in many instances, they observed special education teachers taking a reduced role in the general education classroom.

> *I've seen a lot of missed opportunities. Like often, the special education teacher is just walking around the room, looking and watching the kids. And they could be doing so much more, in helping all the students in the class instead of just sitting there, staring at their kids.*

Three sub-themes emerged from the interview data connected to the overall theme of the active involvement of the special education teacher in the general education classroom: content knowledge, co-planning, and role conflict. In terms of content knowledge, the PSTs felt that while it may be difficult to expect the special education teacher to take the lead for whole-group instruction, it is reasonable to expect the special education teacher to be able to deliver content to a small group of students. The PSTs communicated confidence that they themselves and their future special education colleagues could prepare themselves to teach elementary-level content by reviewing materials at home or at school during allotted planning time.

When asked to explain why they believed capable special education teachers were not taking a more active role in classroom instruction, several participants identified co-planning as an important challenge, identifying the lack of common instructional and co-planning time as a challenge to special educators being more active by stating,

> *We don't have our sped teacher come in, they always just pull…. I think it would be a little bit more helpful if they could sit down and talk for more than like the 10 minutes when they go and pick up the kid and leave and prepare and everything like that together.*

Another challenge the participants identified related to co-planning was the issue of a single special education teacher having to work together with several different general education teachers who may not all teach using the same strategies and approaches.

> *I think there were four different teachers who did math and science, … and each one of them did it in a different way, so the sped teacher is just behind them trying to be like, ok, I have to know all these different ways and what child is learning this way and I have to explain it to them this way. And sometimes, the kids get confused… and they're against one another if everyone is confused and just kind of doing their own thing.*

In suggesting that lack of instructional consistency and planning can lead to teachers being "against one another," the quote above introduces the final sub-theme of role conflict. The modeled co-teaching coursework in which the PSTs participated left them with an expectation that both general and special education teachers should understand and respect each other's roles in educating students with disabilities. Considering that the PSTs were being exposed to an inclusive model of general and special education collaboration in their university coursework, the PSTs expected general and special educators to hold a common expectation for student work and achievement. While certain accommodations and modifications would be made for certain students, and while instruction would be differentiated to meet the diverse learning needs of students with and without disabilities, the common goal for all students is content mastery. Both general and special education educators should work to cultivate conducive classroom behavior and effective instructional engagement from all students so that optimal learning outcomes can be achieved. Some of the participating PSTs were disappointed that general and special education co-teachers seemed to be somewhat inconsistent regarding the goals and expectations for students with disabilities. This lack of agreement would sometimes manifest in students with disabilities being tossed back and forth between the general educator and the special educator, with the learning outcomes of the students being lost in the shuffle.

One area where this role conflict seemed particularly apparent was assessment. One participant shared, "The sped teachers get more upset about the academic, like if [the general education teachers] don't test them the first time and you just immediately send them to me." The participant described a problem of the special educators sometimes feeling like their general education colleagues were not putting forth a good-faith effort to work with special education students and instead just sending them to the special educator.

> *General ed teachers against sped teachers. General ed teachers are complaining you're not teaching this to them like I am, you're not testing them, or you're not doing it fast enough, like, where's my test I had last week, I need to turn in grades. And sped teachers are like you could've done the first test in your room.*

Another participant shared an example of how role conflict between general and special educators resulted in improper assessment of a student with disabilities, "…[the general educator] would send a retest to the special education room, and the special ed teacher would just put a 70 on it and send it back."

Not all the participants observed such a high level of role conflict between general and special education teachers. One participant explained that while there was some conflict in terms of academic expectations, most of the disagreements were small and manageable by stating, "It's not like they're really against each other, it's just like little griping things."

Research Question 2

In order to answer Research Question 2, the participating PSTs were asked how exposure to the modeling of co-taught instruction impacted their plans or perceptions of teaching both general and special education students in inclusive classrooms. The PSTs were somewhat tempered in their response to this question, but all expressed some level of confidence in their ability to teach students with and without disabilities in an inclusive setting. When asked if they would consider pursuing a position as a special educator in the elementary school, few responded positively, but none ruled out teaching special education.

This kind of back and forth regarding behavior and classroom management was also noticed, as stated by one participant, "And then [students with disabilities] had behavior issues in the gen education classroom, and then [the general educators] would just send out their inclusion kids to the resource room if they were acting out, to do their work in there." From a different perspective, another participant noted,

> *It would be a little bit more understanding if the gen ed teacher is exasperated when you have a handful of students who are acting up and you're just trying to teach everyone. It's a lot easier in the sped room … You can give them that individual attention. They can't go jump off the wall because there's only like three other kids there. So it would make me a little bit more understanding towards gen ed teachers.*

When asked what more could be done to prepare future teachers to teach students with and without disabilities in an inclusive classroom, one participant suggested more practice with creating differentiated lesson plans stating, "I think that we should do more practice." Another

participant emphasized the need to become more familiar with instructional strategies for teaching various science and mathematics concepts, as well as opportunities to practice using specific resources that could be helpful for students with and without disabilities by adding, "Like, how would I do a higher-end question for a [student on a lower grade level]? And different things like that. Also, I think incorporating technology more."

Overall, the participants communicated that more collaborative experiences in their coursework where they could work with both content-area methods faculty and special education faculty would be beneficial. The ability to access content-area expertise of mathematics and science education faculty, and then be able to discuss implementation of specific differentiation strategies and use of specific resources with the special education faculty was a valuable experience. All PSTs felt that creating more effective inclusive practices could be achieved by integrating general and special education training in their teacher preparation program.

Discussion

This study explored the implementation of modeled co-teaching by special education and general education university faculty, and the perceptions of participating PSTs regarding the benefits of their own collaborative preparation for teaching students with and without disabilities. The PSTs were exposed to co-taught instruction structured according to four of Friend et al.'s (2010) six co-teaching models (one-teach, one-observe; one-teach, one-assist; station-teaching; team-teaching). Both the one-teach, one-assist and the one-teach, one-observe models have been identified as the most commonly utilized co-teaching models, however researchers have expressed concern that these two approaches often result in the special education co-teacher functioning in a support role rather than as an actively contributing co-teacher (Johnson et al., 2022). Because reduced involvement of the special education co-teacher limits the effectiveness of co-teaching, it is imperative that the implementation of co-teaching (particularly in these commonly used models) be accomplished through the active involvement of both co-teachers.

At the end of the semester in which the modeled co-taught instruction was delivered, focus group interview data were collected from participants and analyzed for emergent themes. Four main themes were extracted from the transcribed interview data (ability to notice what collaborative teaching could and should look like in an inclusive classroom, active involvement of the special educator, readiness to teach students with and without disabilities in an inclusive setting, recommendations for improving collaborative preparation) that provided insight regarding the research questions guiding the study.

After being exposed to modeled co-teaching, the participating PSTs shared that they had a better understanding of what collaborative teaching could and should look like and that they felt better prepared for engaging in collaborative teaching once they entered their own classrooms. This is in line with findings from previous research (Bacharach et al., 2007; Gehrke & Cocchiarella, 2013; Ricci & Fingon, 2018) indicating preservice teachers' perceptions and knowledge about collaboration and co-teaching increase as a result of being exposed to modeled co-teaching delivered by university faculty. Gehrke and Cocchiarella (2013) distinguished between textbook knowledge of inclusive practices as opposed to practicable and implementable expertise. Participants in their study reported learning "…a simple, generic definition of inclusion" but not

learning "…how to set up a successful inclusion model" (p. 211). Additionally, the PSTs noted that they received little guidance or modeling from the practicing teachers in their field placements of inclusive practices. Therefore, the results obtained in this study show that PSTs gained a better ability to notice what collaborative teaching could and should look like in an inclusive classroom from exposure to modeled co-teaching.

Another connection between the current study and Gehrke and Cocchiarella's (2013) findings is the active involvement of the special education teacher in the general education setting. Gehrke and Cocchiarella reported that when asked about their field placements, some of the PSTs revealed that what they observed in their field placements did not reflect an effective collaborative effort between general and special educators. These participants characterized the role of the special educator as pulling students with disabilities out of the general education setting to be serviced in the resource room, often going to take tests. Some other participants reported more positive observations, including general and special educators spending time together to adjust lesson plans and make curricular modifications for students with disabilities.

In the current study, some PSTs were satisfied with the collaboration they observed between general educators and special educators, but in many instances, it was reported that the special education teachers were less actively involved in the general education classroom. The reduced role of the special educator was connected to three areas of challenge: content knowledge, co-planning, and role conflict. Co-planning and role conflict seemed to be the main areas that the PSTs connected to the underutilization of the special educator. In terms of co-planning, it was noted that often, a single special education teacher needed to collaborate with several different general education teachers who utilized different instructional strategies and approaches. One participant concluded that the general educator in her field placement did not value making time to collaborate with the special educator when preparing instruction. Such a difficulty was discussed by Johnson et al. (2022), who suggested that in some cases, the active involvement of the special educator may largely be determined by the willingness of the general educator to collaborate. By emphasizing the instructional needs of students with disabilities and raising concerns about how those needs can be successfully met without the special educator's active involvement, the researchers noted the underutilization of special education services.

Implications for practice

The finding that PSTs perceived gains in their understanding of collaborative teaching and their ability to implement collaborative teaching in their own classrooms due to exposure to modeled co-teaching, supports the pursuit of such an approach in practice in more teacher preparation programs. Further, some of the negative data participants reported while observing collaborative efforts in elementary schools might be avoided with greater attention to collaborative instruction in teacher preparation coursework. Increasing modeled co-teaching by teacher educators would also demonstrate responsiveness to previous research, also pointing to the benefits of such instruction to collaborative practice (Ricci & Fingon, 2018; Yopp et al., 2014).

Attention to all six models of co-teaching (Friend et al., 2010) is desirable, as is discussion of how different models fit specific instructional contexts. Based on previous research identifying the prevalence of the one-teach, one-assist, and one-teach, one-observe models and the inconsistent involvement of the special educator in classroom instruction Johnson et al. (2022), it

may be desirable to include modeling of active observation techniques by special education faculty, similar to the approach taken in the current study. Intentional and explicit modeling of data collection techniques (e.g., frequency, duration, intensity, latency) and instruction on analyzing such data would be responsive to previous research indicating elementary teachers perceive deficits in these areas (Mandinach et al., 2015).

Finally, when considering implications for practice, it must be noted that participants in the current study called for more practice with content-specific instructional strategies effective for students with and without disabilities. Participants emphasized the special benefits of bringing together the knowledge of special education faculty with content-area experts who are familiar with particular differentiation tactics and resources. Providing PSTs with instruction in differentiation through authentic instructional experiences may facilitate greater generalization of these skills to the classroom than when such concepts are taught exclusively within the confines of special education coursework.

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