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EQUIPPING PARAPROFESSIONALS TO TEACH ADAPTIVE SKILLS IN SCHOOL CLASSROOM SETTINGS THROUGH EFFECTIVE USE OF PROMPTING STRATEGIES VIA TEACHER-LED INSTRUCTION

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EQUIPPING PARAPROFESSIONALS TO TEACH ADAPTIVE SKILLS IN SCHOOL CLASSROOM SETTINGS THROUGH EFFECTIVE USE OF PROMPTING STRATEGIES VIA TEACHER-LED INSTRUCTION

A DISSERTATION APPROVED FOR THE DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

BY THE COMMITTEE CONSISTING OF:

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Dedication

For Jaymee.

Acknowledgements

This entire process has been a collective, team effort on the part of so many. To Ashley – thank you for your patience, your understanding, and your companionship. To my kids – being your dad is the most rewarding (and challenging) thing I've ever done. To Stacy – thank you for your help, your kindness, and your love. To Shawna – thank you for trying your best, it was adequate. To Ashlee and Chris – thank you for your love and support. To my fellow doctoral students, colleagues, advisors, and friends – thank you. Your profound and inexhaustible camaraderie, support, trust, knowledge, insight, collaboration, and creative endeavors have truly supported me when I needed it most.

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Abstract

Teachers are frequently expected to do more with fewer resources. This challenge is intensified in rural settings, where teachers may have limited staff support, fewer training opportunities, or inadequate classroom materials. Although a plethora of research addresses teacher education and professional development strategies, few studies have examined how teacher-delivered training for classroom paraprofessionals affects outcomes. This study replicates the Brock et al.'s (2025) investigation of teacher training for paraprofessionals and its effects on the use of appropriate prompting skills. A multiple baseline across participants design was used to examine whether a functional relation exists between teachers' implementation of a coaching curriculum and paraprofessionals' adherence to prompting strategies while teaching novel skills within the classroom setting. Results demonstrated an intervention effect across all four participant triads. Participants who completed the follow-up social validity survey also rated the intervention favorably. These findings support continued use and further investigation of similar training models, particularly in rural settings.

Keywords: paraprofessionals, prompting, rural education, adaptive skills, skill acquisition, staff training, professional development

CHAPTER 1

Introduction

Skill acquisition is central to educational and behavioral practice. Students rely on adaptive and academic skills, such as reading, writing, and mathematics, as well as behavioral skills that reduce interfering behaviors such as yelling, out-of-seat behavior, or property destruction (Duncan & Magnuson, 2011). When a skill or correct response only occurs in the presence of another individual facilitating or helping to meet the desired targeted response, that assistance is referred to as a *prompt* (Leaf et al., 2010). Prompts are effective and socially significant tools for teaching novel skills that students may use across the lifespan in both simple and complex tasks (Morse & Schuster, 2004). Because prompts can strongly influence learning outcomes, their implementation requires careful attention to procedural rigor (Baer et al., 1968; Kazdin, 2014).

Many individuals are not explicitly taught how to prompt; instead, prompting practices may reflect personal learning histories and preferred learning styles (Carter et al., 2009). Although a substantial body of literature describes prompting procedures and appropriate implementation strategies (Brock & Carter, 2013; Brock & Anderson, 2021), this guidance is not consistently applied when paraprofessionals are trained in classroom settings. (Brock & Anderson, 2021). In special education, paraprofessionals frequently support instructional delivery in schools (Cole-Lade & Bailey, 2019). A paraprofessional provides instruction and support under the supervision of a licensed special education teacher (Carter et al., 2009). Despite this direct instructional role, many paraprofessionals are not required to hold a teaching license or prior experience in teaching, training or working with children (Badugela, 2025; Suter & Giangreco, 2009). Some states now require paraprofessionals to have at least two years of college education or pass a qualifying examination before working with students with extensive

support needs (McDermott et al., 2023). Even so, paraprofessionals may continue to struggle to implement interventions with fidelity and may use inaccurate, unclear, or overly corrective practices (Giangreco, 2013).

Paraprofessionals are often expected to determine the effective ways to instruct, prompt, correct, and teach novel skills with limited support (Brock et al., 2025). Although they may receive written curricula or procedural guidance, these materials often do not include didactic instruction, modeling or performance feedback on implementation (Suter & Giangreco, 2009). To frame the current study the following review addresses prompting, prompting strategies, paraprofessional education, prompt dependency, adaptive skill acquisition, behavioral skills training, socially mediated responding, and rural considerations. Building on Brock et al., (2025), this study examines teacher training for paraprofessionals and the use of prompting practices.

Prompting as an Intervention

Prompting refers to stimuli in the environment to increase the likelihood of a correct response and facilitate the acquisition of a new skill or behavior (Cooper et al., 2020). Prompts are commonly categorized as stimulus prompts and response prompts, which roughly corresponds to non-socially mediated and socially mediated prompts, respectively (Schreibman, 1975). Stimulus prompts are environmental cues that do not require another individual's presence (Cuvo et al., 1992). Examples include a sign on the door, a dotted line to help a student trace their name, or a visual schedule that is present at the top right of a student's desk. Although teachers or paraprofessionals may direct students' attention to these cues, the cues can function independently. In practice, many of these interventions are paired with the presence of a trained teacher or paraprofessional which may redirect to, gesture to, or provide opportunities for the student to engage appropriately with these prompts, but this is not required based on how they

are naturally designed. By contrast, socially mediated prompts or response prompts require the presence of another individual to deliver them (Strain et al., 1979). These prompts include gestural, verbal, physical, model, and physical prompts, among others. Both categories are widely represented in practice and in the literature (Jones & Zarcone, 2014). In classroom settings, prompting if often conceptualized primarily in socially mediated terms, especially students who are classified as having extensive support needs or otherwise engage in externalized behaviors, creating a barrier and increased difficulty towards acquiring novel skills (Belourian et al., 2022).

Because the present study focuses on paraprofessionals teaching students with extensive support needs, it emphasizes socially mediated prompting approaches, which are well represented in the literature on skill acquisition (Brock & Carter, 2017; Jones & Zarcone, 2014; Yuan, 2017;). In this study, classroom teachers deliver instructional training used to support paraprofessionals' prompting. This approach strengthens the applied relevance of the aforementioned procedures and findings.

Prevalence of Prompting for Students with Extensive Support Needs

Teacher preparation programs often introduce instructional methods that may be appropriate for different learners (Yuan, 2017). Although some training still includes non-evidence-based concepts such as learning styles, substantial research indicates that that many students with extensive support needs learn and benefit from strength-based, evidenced-based instruction (Baum et al., 2014; Wehymeyer, 2019). Effective intervention selection should account for four considerations: current evidence, student preferences, environmental context, and practitioner expertise within one's scope of competence (Chorpita et al., 2005; Reichow et al., 2008).

Prompting Pitfalls

A common concern in prompting research is the overuse of prompts which can produce *prompt dependency* (Lang et al., 2014). Prompt dependence occurs when a target behavior (e.g., writing your name on your paper, pushing in your chair when you leave your desk, raising your hand to be called upon) is observed only in the presence of a prompt. In such cases, the student shows limited independence and limited transfer of performance to naturally occurring classroom contingencies. The goal of instruction is to prepare students effectively in school, community, and adult settings. When skills are taught only under prompted conditions, instruction may fail to promote durable and generalized performance (Baer et al., 1968). For this reason, educators should monitor the amount, type, and intrusiveness of prompts used during instruction. Another concern involves consistency across paraprofessionals. When multiple paraprofessionals teach the same student using different promptings procedures across people, settings, and activities, the student may experience inconsistent contingencies and uneven progress. Differences in latency, intensity, and intrusiveness may contribute to variable levels of prompt dependency for the same target skill (Yuan, 2017).

Paraprofessional Instruction

Although IDEA (2004) requires paraprofessionals to be appropriately trained and supervised when assisting in special education services, training and supervision vary substantially across settings (Brock & Carter, 2016). These challenges may be even more pronounced in rural schools, where staff recruitment and retention are persistent concerns (Mason et al., 2020). In most states, paraprofessionals are not required to hold a teaching license and are often hired without prior experience in education (Suter & Giangreco, 2009). At the same time, schools serve increasing numbers of students with disabilities (Boyle et al., 2011),

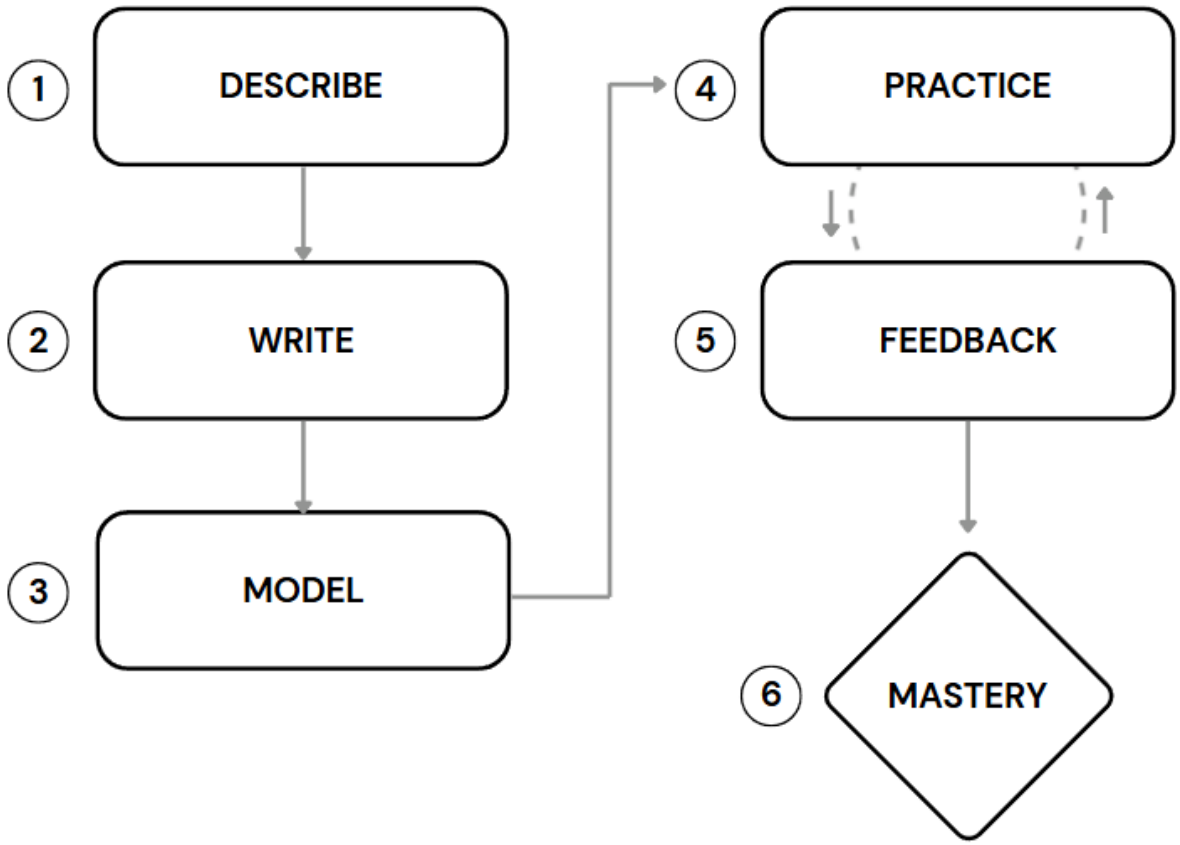
which has historically led some districts to fill paraprofessional roles with minimally prepared personnel or volunteers (Downing et al., 2000; Fisher & Pleasants, 2012; French & Pickett, 1997). As a result, onboarding and training may leave important gaps in implementation guidance, feedback and fidelity support. Under current constraints, evidence-based instructional practices for teaching novel skills may be overlooked or underemphasized due to limited time, funding, training, access, or geographic barriers.

Behavioral Skills Training

Within applied behavior analysis (ABA), Behavioral Skills Training (BST) is one of the most widely used methods for teaching new skills (Flowers et al., 2023). BST is an evidence-based, multicomponent training approach (Kirkpatrick, et al., 2019). It typically includes six-steps: (1) describe the target skill, (2) provide a written description of the skill, (3) model the skill, (4) have learner practice implementing the skill, (5) provide performance feedback, and (6) repeat practice and feedback until mastery is achieved. Although the origins of BST are discussed in different ways across the literature, foundational contributions are often traced to O'Connor and Braukmann. In 1972, O'Connor used video modeling and social reinforcement to increase children's social interactions. In 1974, Braukmann developed an instructional package that combined instruction, modeling, practice, and feedback to teach adolescents interviewing skills as part of a pre-employment training package. Figure 1 presents an overview of the BST process.

Figure 1

Behavioral Skills Training Procedure



Rural-Specific Implications

Rural communities often have less access to mental health and educational resources than urban communities (Berry & Gravelle, 2013; Rude & Miller, 2018). As a result, difficulties related to staffing and training may be especially pronounced in rural schools serving students with educational support needs. Teacher-led training for paraprofessionals in rural settings may be constrained by the feasibility of in-person coaching, the cost of ongoing professional development, and limited access to expert support. Brock et al., (2025) found that even when evidence-based interventions were effective, implementation often still depended on support from an external researcher or consultant for many prompting skills. Equipping classroom teachers to provide ongoing, in vivo training to paraprofessionals may reduce these barriers and

improve sustainability. Accordingly, the single case research design used in the present study is intended to identify an effective and feasible intervention for a rural setting.

Replication in Special Education Research

Although replication studies account for less than half of one percent (0.5%) of articles in special education journals, they remain essential to the development of the field (Coyne et al., 2016). Direct replication typically preserves both methodology and analysis across studies. In special education, however, direct replication is less common because participant characteristics and applied settings often differ across investigations (Gesel & Lemons, 2020). Therefore, a replication study must identify which features in the original study are retained and which are modified. The present study replicates Brock et al., (2025) by examining prompting strategies, their implementation, and the conditions under which they were effective. It also extends the original study by collecting data in a rural setting and by gathering social validity from both teachers and paraprofessionals at the conclusion of the study.

More specifically, this study builds on Brock and Carter (2016) and Brock et al., (2025) by applying a single-case research design in an elementary school setting to evaluate the applicability of an evidence-based practice in a rural context (Horner et al., 2005). The study is intended to meet accepted standards for rigor and validity in single-case research standards (Kratochwill et al., 2010) while generating findings that may support research-to-practice efforts in special education (Jameson et al., 2025).

Purpose of the Study

The primary purpose of this study is to strengthen the connection between research and practice in special education services delivered in a rural school. Given current rural educational needs (Rude & Miller, 2018), the policy context surrounding services for students with

disabilities (Darling-Hammond et al., 2017), and the increasing number of students who require specialized instruction (Brock et al., 2025). Special education teachers need practical and scalable ways to improve paraprofessional training. Strengthening teachers' ability to train and support paraprofessionals may improve the quality and consistency of classroom instruction. By reducing barriers to high-quality training in resource limited rural schools, this work may improve instructional effectiveness and increase students' access to meaningful skill acquisition.

Prompting is a foundational intervention for skill acquisition within the classroom setting. A structured curriculum that teachers can use to paraprofessionals may improve the consistency and quality of prompting practices. Although paraprofessionals are widely recognized as needing additional training, single-event workshops alone are generally insufficient to prepare them to deliver high-quality instruction (Brock & Carter, 2013).

The final purpose of the study is to address the needs of rural learners and schools. Rural communities face additional barriers related to training opportunities, ongoing professional development, staff development, and access to qualified trainers creating a substantial gap between need and feasibility (Marano et al., 2020). Because Brock et al., (2025), did not directly assess rural sites, an important aim of the present study is to examine whether those findings are replicated in a rural context.

Research Questions

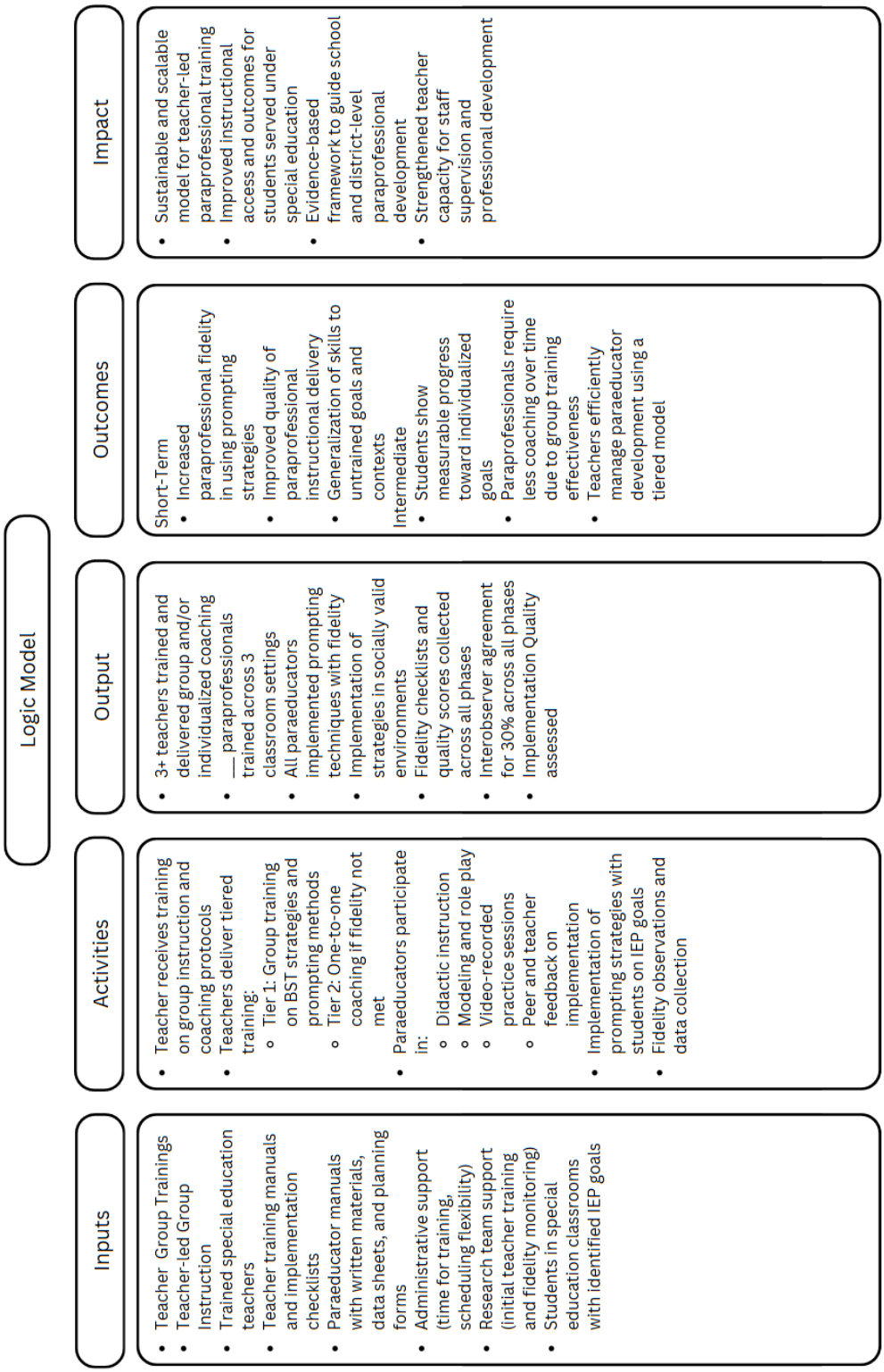
To evaluate the effectiveness of the intervention, the following research questions are addressed and updated from the previous study for replication purposes:

1. Does a functional relation exist between teacher-implemented tiered training on paraeducator adherence to prompting strategies with students in a rural special education classroom?

2. How does paraeducator-led prompting quality change after receiving intervention as measured through maintenance phases and social validity survey results?

Figure 2

Logic Model



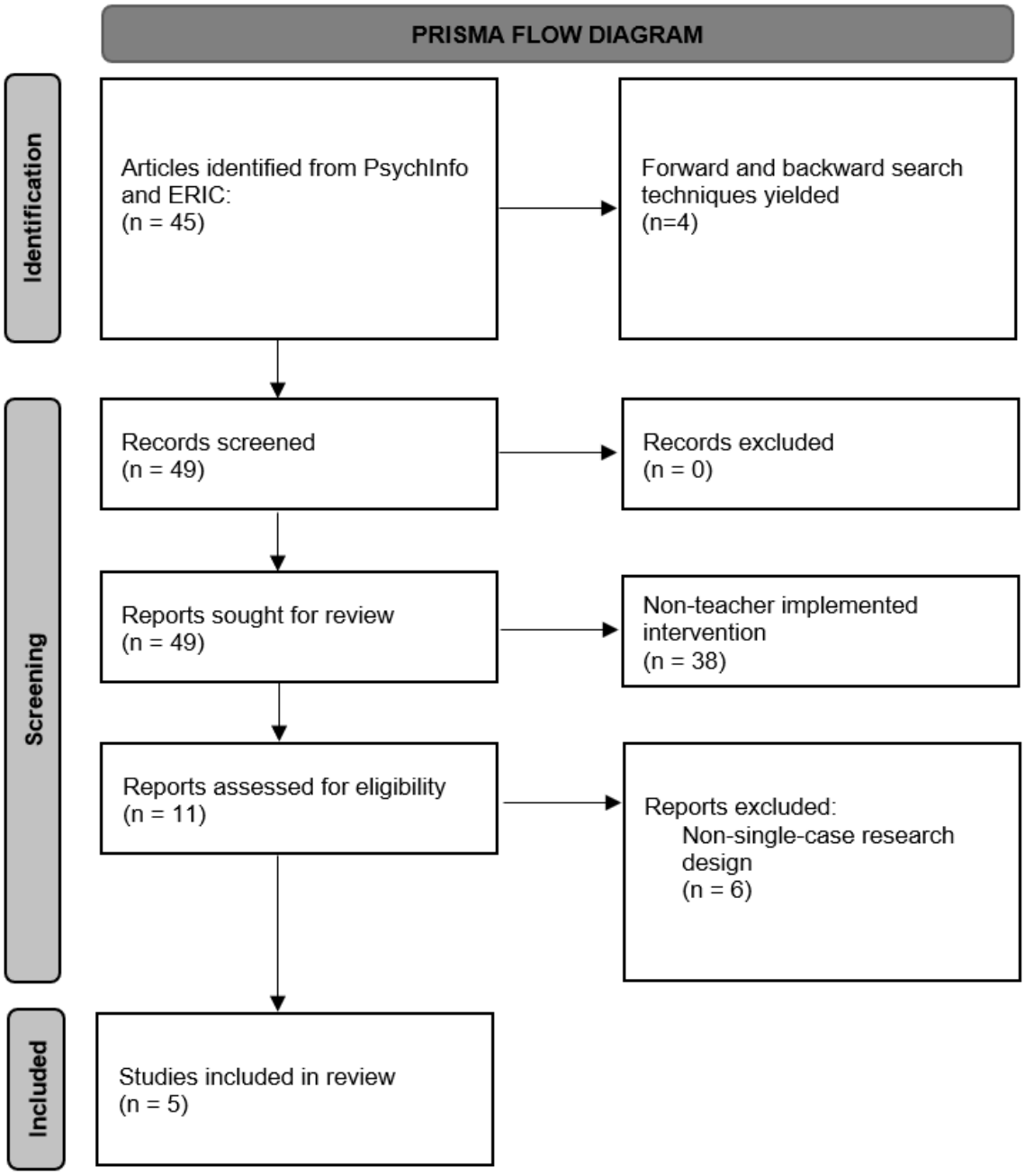
CHAPTER 2

Review of Literature

A scoping review was completed after reviewing the systematic reviews completed by Brock and Carter (2013) and Brock and Anderson (2021). The purpose of the scoping review extends these findings by examining studies published from 2014 – 2025 and removing duplicates identified in the 2021 review. The search was conducted in PsychInfo and ERIC to remain consistent with the prior review. The independent scoping review yielded 45 articles published between 2014 and 2025. Forward and backward search procedures, in addition to two systematic reviews, identified four additional studies after duplicate removal. Of these 49 studies, 11 examined teacher-delivered training for paraeducators; however, only five articles involved teachers providing instruction to paraeducators using a single-case multiple-baseline design. The search was conducted in November of 2025. Additional systematic and quality reviews were identified for recent years (Borosh et al., 2023); however, the six studies identified in that review were excluded as they focused exclusively on Augmented and Alternative Communication (AAC) training. Each of the five articles is described in detail, followed by structured summary of the scoping review using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) (Tricco, 2018) guidelines.

Figure 3

PRISMA Flow Diagram



Review of the Updated Literature

Andzik and colleagues (2021) examined the effects of special education teacher-delivered behavioral skills training (BST) on paraeducator implementation of an intervention for a student with autism who used an AAC device to communicate. This study aligns closely with Brock et al., (2025) because the special education teacher functioned as the trainer, the intervention was implemented in a school-based setting, a single-case design was used, and paraeducator fidelity served as the dependent variable. The rationale for the study was that paraeducators frequently implement interventions but often report being undertrained. (Andzik et al., 2021). The authors also emphasized that most prior training models were reliant on outside researchers or specialized personnel as the de-facto trainers, a concern identified in earlier literature (Brock & Carter, 2013b). Andzik and colleagues further noted a dearth of research demonstrating how teachers use BST to train paraeducators while concomitantly evaluating socially valid outcomes after intervention. Although research indicates that paraeducators can be effective interventionists for students with intellectual and developmental disabilities when properly trained (Brock & Anderson, 2021), much of this literature focuses on communication skills acquisition rather than prompting or adaptive skill development.

The study examined the effects of teacher-delivered BST on paraeducator implementation and the subsequent effects of paraeducator implementation on student imitation of the targeted skill (Andzik et al., 2021). The study used a multiple-probe-across-participants design with three para-educators and included generalization across settings with a one month maintenance follow-up. Internal validity was strengthened through the staggered introduction of the independent variable and stable responding across baseline conditions. External validity was supported by variation in paraeducator experience, with one participant reporting two years of

experience and another reporting more than 17 years, as well as differences in prior exposure to prompting and AAC-related instruction. The student was a 10-year-old with autism whose primary instructional goal was the initiation of communication without adult-mediated prompting. The study took place in a self-contained special education classroom and involved both naturalistic and structured instructional contexts.

Consistent with recent recommendations for promoting generalization, fidelity was required to be maintained and measured at 100% (Wong et al., 2022). During implementation, prompting followed a least-to-most hierarchy, beginning with a 3-5 second delay and progressing to gestural, verbal, and modeled prompts to evoke the terminal response (Andzik et al., 2021). Treatment fidelity was supported through a checklist system, a mean interobserver agreement (IOA) score of 96% and social validity measures that included both Likert-type ratings and qualitative feedback. Results indicated a strong functional relation among teacher-delivered training, paraeducator fidelity of implementation, and increased student independent initiation using the AAC device.

One limitation involved internal validity, as the teacher delivering the training had advanced preparation and prior exposure to BCBA coursework. As a result, replication by teachers without similar backgrounds may yield weaker fidelity outcomes unless additional support or follow-up training is provided. External validity was also limited because the study involved a single student in one classroom and relied on a highly competent teacher trainer. In addition, follow-up data were limited to one month which restricted conclusions regarding long-term maintenance and more socially meaningful indicators of change across the school year.

Brock and Carter (2016) evaluated the efficacy of special education teachers who were tasked with training paraprofessionals to implement peer support arrangements in middle school classrooms. The authors noted that although students with severe disabilities are often physically included, they frequently remain socially isolated from same-aged peers, suggesting that peer interaction does not emerge without structured support (Brock & Carter, 2016). A similar and continued finding was noted in the reliance of researchers implementing the interventions in that they were measuring or seeking to modify without teacher-implemented strategies taking place. This issue is particularly important because training models that depend on researchers as the primary trainers are less scalable and less sustainable for practitioner-led implementation. The findings of the study also found that teacher training frequently relied on intensive coaching models, which may not be feasible across all settings or personnel contexts (Brock & Carter, 2016). These same gaps were identified within Brock et al., (2025) and in the most recent systematic review that was identified which incorporated special education teacher-delivered training for paraeducators (Borosh et al., 2023).

The three areas of research that were identified for study were identifying if teacher-delivered professional development would improve paraprofessional fidelity, if peer support arrangements improve student outcomes, and if the training was identified and perceived to be feasible and socially valid. Compared with Andzik et al., (2021), these questions extended by expanding feasibility, acceptability, and outcomes across multiple students. The study used a multiple-probe-across-participants design with four groups. Each group included a student, paraprofessional, and special education teacher. The study was conducted in middle school classrooms. The study met internal validity standards through the staggered introduction of the intervention across all four participant groups. This design demonstrated replication across

participants, clear phase contrast, and the strategic sue of coaching sessions to strengthen participant performance.

Participants represented a broad range of experience, spanning 2 to 14 years, and had varied educational backgrounds. The special education teachers also varied considerably within their experience, with one teacher reporting three years of experience and another reporting 29 years in the field. The study presents a strong case for socially valid outcomes and ecological validity across multiple real-world classrooms (Brock & Carter, 2016). The intervention consisted of a teacher-delivered professional development package that included an initial two-hour training, video modeling, on-site coaching, and performance feedback. Although the intervention did not fully align with the evidence-based practice of BST, it incorporated several overlapping elements, including modeling, feedback and guided practice. The pre-training component also included a 4.5-hour one-to-one orientation session for each participant, which may be difficult to replicate in rural districts or in settings where teachers have limited access to professional development opportunities. The intervention implemented by paraeducators involved establishing peer support arrangements. Specifically, paraeducators were responsible for recruiting peers, training those peers, facilitating peer interactions with students, and fading adult support to promote student independence. This intervention included multiple components and several areas of data collection, including the frequency of paraeducators facilitation behaviors as well as social interactions, academic engagement, and proximity to peers. Feasibility and social validity data were also collected, including teacher and paraprofessional perceptions of both the study and the intervention overall (Brock & Carter, 2016).

Key findings from the Brock and Carter's study (2016) included increased facilitation across all paraprofessional participants. Additionally, 75% of the students demonstrated

increased peer interaction and all students maintained academic engagement. A strength of the study was the realistic implementation within natural classroom routines embedded across various classroom settings. However, a significant limitation was the heavy, front-loaded researcher support to teachers, combined with the need for ongoing coaching during implementation. These findings suggest that although the intervention demonstrated feasibility across settings, increased complexity also increased the degree of researcher involvement required to maintain effectiveness. Accordingly, the findings support the importance of identifying targeted behavior-specific outcomes that can be addressed through efficient interventions while positioning special education teachers as the primary instructional agents within their classrooms. Major implications for practice included reducing teacher training burden, simplifying intervention models, increasing independent teacher implementation without intensive researcher preparation, and improving teachers' ability to train paraprofessionals effectively.

Brock and Carter (2016) provided rigorous experimental evidence supporting the feasibility and effectiveness of special education teachers delivering structured professional development to paraprofessionals to support implementation of peer-support arrangements in inclusive classrooms. Overall, the study reinforces the broader finding that when paraprofessionals receive adequate training through practices such as didactic instruction, video modeling, and performance feedback, they can implement complex and socially meaningful peer-mediated interventions with fidelity for students with moderate to severe disabilities in inclusive settings. However, compared with studies that involve fewer dependent measurement and less complex intervention models, this study highlights that greater intervention complexity is associated with increased time and resource demands for both researchers and participants.

Mason and colleagues (2019) examined the effects of teacher-implemented coaching with performance feedback on paraeducators' accuracy in data collection as part of student on-task behavior. The study met the previously identified inclusion criteria because it utilized special education teachers as the trainers or coaches within the classroom setting and measured paraeducator performance as the dependent variable. The study was also conducted using a single-case research design (Mason et al., 2019).

A central premise of Mason et al. (2019) was that data-based decision-making is fundamental to special education practice. However, although paraeducators are frequently assigned to collect these data, they often receive minimal training and may, therefore, collect inaccurate data. The study examined the practice of teacher-as-coach models and potential to extend training beyond the intervention implementation to also include data collection accuracy (Mason et al., 2019). Broadening the applicability and validity of data fidelity is critical for internal validity of education decisions as well as the practice of implementing behavior analytic practice in general (Cooper et al., 2020). The study examined whether teacher-delivered coaching and feedback improved paraeducator accuracy when using momentary time sampling (MTS) procedures and whether those improvements maintained after the coaching ended (Mason et al., 2019).

To evaluate these questions, the study used a multiple-probe-across-participants design that included three paraeducators and two teachers (Mason et al., 2019). The setting was consistent across participants, with all procedures conducted in a self-contained autism classroom. Measurement frequency was determined a priori and collected twice per week. Several features strengthen internal validity, including the staggered introduction of the intervention across participants, repeated baseline measurement demonstrating relatively stable

responding with minimal trend, and replication of effects across participants following the introduction of the independent variable. The study included two teachers, both of whom were early-career professionals with two and three years of experience, respectively. The three paraeducators demonstrated greater variability in experience and prior training exposure, ranging from six months to 15 years of experience. The researchers also explained that their decision to move away from group-oriented professional development and instead emphasize one-to-one training was supported by prior research indicating that group training rarely produces sustained improvements in performance (Schepis et al., 2003; Tate et al., 2005).

The intervention consisted of embedded 10-minute sessions conducted twice per week until 80% accuracy was achieved across three sessions. The authors did not clarify whether this criterion referred to three consecutive data collection sessions or three total sessions above 80% accuracy. Neither interpretation aligns with current literature recommending 100% mastery criterion (Wong et al., 2022). However, the criterion was applied systematically and consistently across participants and phases, which supports the study's internal validity. Coaching sessions followed a structured protocol in which the paraeducator and teacher reviewed goals, examined performance data, provided supportive and corrective feedback, engaged in problem solving as needed, developed an action plan, and scheduled the next session (Mason et al., 2019). These practices aligned closely with the practice-based coaching and performance feedback literature (Snyder et al., 2015), although they do not fully reflect the BST model used in other studies.

Preparation was similar to that used in other studies, as Mason and colleagues implemented a 1-hour researcher-led training that included modeling, role-play, and feedback practice prior to the study. This training duration was notable shorter than the training reported by Brock and Carter (2016). The targeted skills for paraeducators training were accurate data

collection using momentary time sampling with 10-second intervals within 5-minute sessions (Mason et al., 2019). Accuracy was reported as the percentage of agreement between the paraeducators and the researcher, who collected data simultaneously to evaluate data collection fidelity. This emphasis on measurement fidelity, rather intervention delivery, distinguishes the study from others in literature (Andzik, 2021; Brock & Carter, 2016). IOA data were calculated using the point-by-point agreement method and averaged 93% overall; the average percentage of agreement between the researcher and the paraeducators was measured at 89% (Mason et al., 2019). Maintenance data were collected for up to two months post intervention. This represented the longest interval between intervention and final data collection among studies reviewed and suggested that the intervention may have supported durable performance while reducing susceptibility to observer drift (Cooper et al., 2020). Visual analysis also indicated consistent responding over time, suggesting strong maintenance without continued coaching and the potential for sustained generalization of the trained skill.

The researcher identified several limitations, including a potential threat to internal validity due to reactivity, as paraeducators may have altered their behavior because they knew they were being observed during the data collection session. Another limitation was that data were collected only in self-contained classrooms (Mason et al., 2019). The researchers recommended examining data-collection systems other than MTS to strengthen findings related to paraeducator performance, data-fidelity, and maintenance outcomes (Mason et al., 2019). A major implication of this study is that teachers efficiently coach paraeducators on data collection within brief, 10-minute planned sessions and improve their accuracy, with effects lasting up to two months.

Mason and colleagues extend the literature on teacher-delivered professional development by demonstrating that coaching with performance feedback is an effective, sustainable, and valid method for improving paraeducators' accuracy using MTS procedures. Unlike other studies that primarily focus on intervention implementation, this study emphasized measurement fidelity, which is essential for data-based decision making in special education (Mason et al., 2019). In addition to improving measurement fidelity, Mason and colleagues demonstrated sustained adherence to these procedures despite using a less resource-intensive training model. Their findings suggest that coaching may be an efficient method for maintaining performance and promoting durable skill use over time. Mason et al. (2019) highlight the critical role of coaching as a mechanism for sustaining paraeducator performance and make a strong case for integrating coaching with initial skill acquisition models to maximize both time efficiency and long term effectiveness.

Similar research was conducted by Scheeler et al. (2018), who examined the use of bug-in-ear (BIE) coaching to provide immediate feedback to paraeducators working with students with autism. The purpose of the Scheeler study was to evaluate the effects of the teacher-delivered immediate performance feedback via (BIE) technology on paraeducators' use of contingent specific praise in autism support classrooms (Scheeler et al., 2018). This study is similar to previous research in that it uses the special education teacher as the primary trainer of the paraprofessionals while also implementing a real-time coaching model that distinguishes it from previous studies. The study also primarily focuses on instructional behavior rather than intervention fidelity (Andzik et al., 2021) or data collection accuracy (Mason et al., 2019).

A central issue in the study was that paraeducators were responsible for delivering the majority of instruction in the autism support classrooms (Scheeler et al., 2018). Although

teachers were responsible for student outcomes, they reported little prior training in supervision or in training paraprofessionals within classroom settings (Scheeler et al., 2018). Scheeler and colleagues also noted that teachers spend only 7% of their time supervising paraeducators, despite recognizing supervision as an important and necessary responsibility (Giangreco & Broer, 2005). This constraint has been repeatedly identified in the literature as a barrier to implementation and procedural fidelity (Borosh et al., 2023). The researchers identified a need for an efficient, embedded supervision model that could serve as an alternative to the delayed feedback and traditional 'sit and get' models commonly utilized (Scheeler et al., 2018). The study introduced in-the-moment feedback delivered during instruction to provide immediate corrective feedback. The primary research question examined whether BIE coaching was perceived as acceptable and practical for teachers and paraeducators working in natural classroom environments.

The study used a multiple-baseline-across-participants design that included four paraeducators and two teachers. All data were collected in an autism support classroom across elementary and middle school settings, including BIE coaching (Scheeler et al., 2018). Session using the bug-in-ear coaching protocol lasted approximately 10-20 minutes, suggesting that the intervention could be embedded within existing classroom routines and schedules while maintaining relatively low initial training demands (Brock & Carter, 2016). Internal validity was strengthened through staggered introduction of the independent variable across participants and replication of effects across all four participants. Effect size was calculated using Tau-U. Tau-U was 1.0 for each participant, indicating a strong intervention effect for both the percentage and rate of behavior-specific praise (Scheeler et al., 2018).

Teacher experience (*n*=2) ranged from 5 to 10 total years, whereas paraeducator experience was more variable, ranging from 0 to 28 years (Scheeler et al., 2018). This variability in experience was similar to that reported in previous studies (Andzik et al., 2021; Brock & Carter, 2016, Mason et al., 2019). The study also operationally defined what constituted a correct feedback response. This feature has received limited attention in prior literature and was defined as feedback delivered within 3 seconds of a behavior occurring (Scheeler et al., 2018). Feedback was also organized and systematic as teacher would use predetermined phrases rather than novel statements when delivering BIE feedback to paraeducators (e.g., "Good specific praise", "Be specific"). The overall training requirement was lower than that reported in others, with the initial training capped at 15 minutes between the teacher and the paraeducator (Brock & Carter, 2016; Scheeler et al., 2018). The target behavior was measured by calculating the percentage of statements that were behavioral rather than generic, as well as the total rate per minute of utilization of behavior-specific praise.

Across the study, Tau-U indicated an extremely strong effect and IOA averaged 92% during baseline and 97% during intervention (Scheeler et al., 2018). Procedural fidelity was measured, and high social acceptability was reported by both teachers and paraeducators through a six-item questionnaire (Scheeler et al., 2018). One limitation of the study was that maintenance data were collected for only one participant, limiting the demonstration of sustained effects across participants. Visual analysis of the maintenance data also suggested a downward trend and lower level of performance relative to intervention sessions (Scheeler et al., 2018). These findings further support an emerging pattern in that skill acquisition through BST (Andzik et al., 2021), performance refinement (Mason et al., 2019), and real time behavior shaping through

immediate feedback (Scheeler et al., 2018) may all serve as effective training mechanisms for improving paraprofessional performance.

Scheeler and colleagues provide compelling and strong evidence for the effectiveness of immediate, targeted feedback delivered through BIE coaching by special education teachers to improve paraprofessionals instructional practices. The study further demonstrates that real-time feedback can produce meaningful improvements in contingent specific praise (Scheeler et al., 2018). Within the broader literature synthesized by Brock and Carter (2013b), Brock and Anderson (2021), and Borosh et al., (2023), this study contributes evidence that skill addressing the barrier of limited teacher instructional time by embedding the intervention directly into natural instruction.

The final study included in the review was conducted by Wermer and colleagues (2018). The study evaluated the efficacy of a teacher-delivered training package designed to teach a paraprofessional to implement AAC support strategies, including prompting, for a student with autism and complex communication needs (Wermer et al., 2018). This study is notable because it included a component analysis to identify which intervention elements produced the strongest behavioral change for both the paraeducator and the student. (Wermer et al., 2018). The identified behavior for the study was a perceived lack of initiation for communication without structured support in the form of adult prompting. Prior to the study, the paraprofessionals had been responsible for supporting communication initiation but had received minimal prompting or AAC-specific training (Wermer et al., 2018).

The literature gaps identified by Wermer and colleagues (2018) involved determining which specific strategies were most effective for increasing the independent communication while also addressing the field's over-reliance on researcher-delivered training. This concern has

consistently been identified through previous studies (Andzik et al., 2021; Brock & Carter, 2016; Mason et al., 2019; Scheeler et al., 2018). The study examined whether teacher-delivered training improved paraeducator implementation of opportunities to respond, opportunities to initiate, least-to-most prompting, and the rate of student communication increased across the introduction of each strategy (Wermer et al., 2018).

Wermer and colleagues (2018) used a multiple-baseline-across-behaviors design involving one teacher, one paraprofessional, and one student diagnosed with autism spectrum disorder. The study took place in a private specialized school serving students ages 3-16. Notably, all data were collected during snack time (Wermer et al., 2018), which may limit generalization beyond contexts involving primary reinforcers and may reduce transfer to socially mediated contexts (Cooper et al., 2020). The teacher was early career with 2 years of experience and some experience and some prior coursework involving AAC use. The paraprofessional had 2.5 years of experience and reported minimal AAC related training, totaling 4 hours. The student was a 7-year-old with comorbid intellectual disability and autism spectrum disorder who demonstrated severe communication delays (i.e., $<1^{st}$ percentile), indicating high support needs and comparatively low communication skills (Wermer et al., 2018).

The training components included didactic instruction, modeling, role-play and performance feedback, closely aligning with the BST model widely reported in the literature (Borosh et al., 2023). Initial training lasted 10-20 min per strategy across three separate strategies, resulting in 30-60 minutes of total instruction, excluding follow-up coaching or additional training sessions. This duration is generally consistent with literature suggesting training effects are often observed following approximately 1 to 2 hours of instruction before intervention implementation (Brock & Carter, 2013b, Brock & Anderson, 2021, Borosh et al.,

2023). Reliability data indicated 94%. Agreement was 96% for opportunities to respond, 86% for opportunities to initiate, 94% for least-to-most prompting, and 95% for the student's communication attempts (Wermer et al., 2018). Procedural integrity was assessed by a secondary observer who attended 30% of all training and feedback sessions and averaged 94% overall. These data were calculated by dividing the number of correctly implemented steps by the total number of opportunities (Wermer et al., 2018).

Key findings within the Wermer et al. (2018) indicated that paraeducator performance in opportunities to respond, opportunities to initiate, and least-to-most prompting increased across all phases. Performance improved with each successive strategy, with strongest effects observed during the least-to-most prompting phase. These findings suggest that training paraeducators to use systematic prompting strategies, particularly least-to-most prompting, may be an effective way to promote skill acquisition (Wermer et al., 2018). Maintenance data were collected across four weeks of post-training and showed relative consistency across all interventions, with the exception of the initial opportunities to respond condition, which showed a downward trend toward baseline levels (Wermer et al., 2018).

A particularly important contribution of the Wermer study was its component analysis, which indicated that least-to-most prompting produced the strongest effects on independent initiation and skill acquisition for the student with autism when compared to the other intervention components (Wermer et al., 2018). These findings support the inclusion of similar components in the present study and provide justification for the selected independent variable.

Wermer et al. (2018) provides an important extension of the paraeducator training literature by demonstrating that a classroom teacher can effectively train a paraprofessional to implement multiple, evidence-based or evidence-aligned strategies while also isolating the

relative contribution of each component through a delayed component analysis design. Using a multiple-baseline-across-behaviors design, the study established functional relation between teacher-delivered training and paraprofessional implementation across three, distinct strategies within a single investigation (Wermer et al., 2018). The data indicate that increases in paraprofessional implementation corresponded with meaningful gains in student communication, particularly during the use of systematic least-to-most prompting (Wermer et al., 2018). This study highlights the broader importance of examining differential intervention effects and underscores the value of systematic prompting for students with complex support needs (Wermer et al., 2018).

Table 1

Across-Study Comparison

Study	Training Type	Delivery	Focus	Initial Training Length	Limitations
Andzik et al. (2021)	BST	Structured (teacher-delivered)	Intervention fidelity + student AAC outcomes (no component analysis; no data fidelity focus)	~18 minutes per paraeducator	Highly trained teacher (BCBA-level exposure). Researcher-assisted feedback. Limited generalizability
Brock & Carter (2016)	Hybrid PD (modeling + coaching)	Structured + ongoing coaching	Intervention fidelity + social outcomes (peer interaction; no data fidelity; no component analysis)	~2 hours (paras) + ~4.5 hours (teacher prep)	High training burden. Researcher-supported teacher training. Complex intervention limits scalability. Limited maintenance data
Mason et al. (2019)	Coaching + Performance Feedback	Ongoing coaching (teacher-delivered)	Data fidelity – MTS accuracy (no intervention implementation; no component analysis)	~1 hour teacher training	Limited to one data system (MTS). No student outcomes. Potential observer reactivity
Scheeler et al. (2018)	Immediate Feedback (BIE)	Real-time (in-the-moment)	Instructional behavior fidelity (specific praise) (no data fidelity; no component analysis)	~10–15 minutes	Limited maintenance data. Possible reactivity to BIE. Autism-only settings
Wermer et al. (2018)	BST + Performance Feedback	Structured + feedback	Component analysis – OTR vs. OTI vs. LTM + student AAC outcomes (not data fidelity)	~10–20 minutes per component (OTR, OTI, LTM)	Student outcomes are not experimentally controlled. Context-specific (snack time). Complexity of multi-component intervention

Building on the focused synthesis of these five experimental studies, the broader literature reviewed in this chapter contextualizes and strengthens the emerging patterns related to teacher-led paraeducator training in educational settings. Across the broader body of research, consistent themes highlight the pervasive reliance on paraprofessionals to deliver instruction, along with persistent systemic deficiencies in training, supervision, and ongoing systems of support. The studies reviewed repeatedly document paraprofessionals receive minimal preparation and that special education teachers often are unprepared to supervise them effectively. When considered alongside the five studies, the literature suggests clear progression: foundational research identifies the problem of inadequate training and support structures, whereas experimental studies begin to offer evidence-based solutions, particularly through teacher-administered training models. Broader literature also underscores and identifies persistent gaps including limited attention to data fidelity, inconsistent measurement of student outcomes, and a lack of scalable, sustainable training systems. These five studies, identified through the scoping review, serve as important exemplars within a larger and evolving evidence-base that illustrates both the promise and the limitations of current practice.

Roles and Impact of Paraprofessionals in Special Education

A review of the literature demonstrates the pivotal role that paraprofessionals play in serving children in special education. As of 2013, the total number of paraprofessionals in special education (i.e., 401,285) exceeded the number of special education teachers (i.e., 370,456) (Brock & Carter, 2013b; Suter & Giangreco, 2009). This trend continued in reports, with paraprofessionals assuming increasingly broad responsibilities across settings and roles (Brock & Anderson, 2021; U.S. Department of Education, 2019). Under IDEA, paraprofessionals may provide services to students in special education when they do so under

appropriate supervision. However, many paraprofessionals function as the primary instructional personnel in special education classrooms (Giangreco & Broer, 2007; Patterson, 2006), which directly conflict with federal requirements outlined in IDEA (2004). This issue warrants careful attention because vague or undefined support structures can lead to adverse outcomes even among well-intentioned staff (Chung et al., 2019). Collectively, these findings show that the overall level of paraprofessional training, support, and effectiveness has a substantial impact on classroom performance.

Appropriately trained paraprofessionals can effectively implement instructional and behavioral strategies across communication, social, academic, and behavioral outcomes (Brock & Carter, 2013a). Even so, federal requirements make clear that paraprofessionals should work under explicit and structured supervision from a special education teacher to protect instructional quality and maintain legal compliance (IDEA, 2004).

Support for these conclusions is also evident in the updated scoping review, particularly in relation to paraprofessionals' role in data collection and decision-making processes. For example, in Mason et al. (2019) it demonstrated that paraprofessionals were responsible for collecting MTS data used to guide decision making. Similarly, Scheeler et al. (2018) showed that paraprofessional instructional behaviors, such as delivering contingent specific praise, can significantly influence the learning environment and student engagement. Collectively, these studies illustrate that paraprofessionals function not only as instructional aids, but as agents of intervention delivery, data collection, and behavior support, thereby directly influencing student outcomes across academic, social, and behavioral domains.

Evidence-Based Practices and Outcomes for Students in Special Education

Across both systematic reviews, 49 total studies were evaluated, with 13 studies by Brock and Carter (2013b) and 36 identified from Brock and Anderson (2021). Collectively, these studies documented multiple interventions that were effective when implemented by paraprofessionals in a special education setting. These intervention categories included Augmentative and Alternative Communications (AAC) systems, such as the Picture Exchange Communication (PECS) system and speech generating software, discrete trial training (DTT), time delay, visual supports, social stories, incidental teaching, pivotal response training (PRT), and prompting strategies (Brock & Carter, 2013a; Brock & Anderson, 2021).

In both reviews, outcomes were analyzed to determine the effects of paraprofessional-facilitated instruction on student performance. Of the 13 studies included in the 2013b article, 10 reported improved student outcomes, with 29 demonstrations of experimental effect out of the 35 planned opportunities (83%). The later review expanded this evidence base by identifying and categorizing 36 additional experimental studies conducted between 2012 and 2019. Of these studies, 28 used single-case research designs and four used randomized control trials. The paraprofessional instructional support strategies were associated with improved outcomes in areas such as implementation of behavior intervention plans (Courtemanche et al., 2014), use of behavior-specific praise (Scheeler et al., 2018), delivery of corrective feedback (Westover & Martin, 2014), facilitation of communication with peers through AAC devices (Andzik & Cannella-Malone, 2019; Chung & Carter, 2013; Chung & Douglas, 2015; Feldman & Matos, 2013; Kim et al., 2017; Koegel et al., 2014; Kretzmann et al., 2015), and implementation of peer-supported arrangements (Asmus et al., 2017; Biggs et al., 2017; Biggs et al., 2018; Brock & Carter, 2016; Carter et al., 2016; Huber et al., 2018)

With respect to behavioral skills training and prompting, evidence of ABA techniques, including DTT (Cardinal et al., 2017; Mason et al., 2017; McKenney & Bristol, 2017), constant time delay procedures (Brock & Carter, 2013a; Walker et al., 2019), function-based behavior intervention plans (Lloyd et al., 2015; Walker & Snell, 2017), least-to-most with praise and systematical prompt fading (Probst & Walker, 2017; Da Fonte & Capizzi, 2015; Brock et al., 2017), reinforcement learning histories with stimulus fading (Fischer et al., 2019), simultaneous prompting or errorless teaching (Britton et al., 2017; Heinrich et al., 2016), and video prompting (Seaman-Tullis et al., 2018; Seaman-Tullis et al., 2019) were ubiquitously identified.

The updated scoping review further supports the conclusion that evidence-based practices, when implemented with fidelity by paraprofessionals, can lead to meaningful improvements in student outcomes, specifically in prompting and social interaction skills (Wermer et al., 2018; Andzik et al., 2021). In addition, peer-mediated interventions facilitated by paraprofessionals increased social interactions for students with extensive support needs (Brock & Carter, 2016).

Components of Efficacious Paraprofessional Training

Based on aggregate analysis (Brock & Carter, 2013b; Brock & Anderson, 2021), the most effective professional learning approach included modeling, implementation fidelity checklists, embedded performance feedback, role play and rehearsal, self-monitoring, and planned follow-through coaching or booster sessions. Brock and Anderson (2021) also noted increased usage of self-monitoring and fidelity checklists in more recent studies (Dib & Sturmey, 2007; Robinson, 2011) compared with earlier work (Hall et al., 1995; Martella, 1993).

These findings are supported by the updated scoping review, which showed that paraprofessionals benefited from training models that combined modeling, rehearsal (role-play),

and performance feedback, all of which are core components of behavioral skills training. These practices were consistently associated with improvements in paraprofessional performance (Andzik et al., 2021; Wermer et al., 2018). Although several studies did not explicitly label their approach as BST, they incorporated key BST components into their training procedure. Examples include the hybrid model used by Brock and Carter (2016) and the coaching framework employed by Mason et al. (2019). Performance feedback was also identified as a critical component across multiple studies. Although the delivery format varied, including immediate feedback for rapid behavior change (Scheeler et al., 2018), ongoing coaching with performance feedback was associated with strong maintenance effects (Mason et al., 2019).

Training time frames also varied widely across the literature, with some studies demonstrating effective outcomes following brief training sessions (e.g., 10–20 minutes; Andzik et al., 2021; Wermer et al., 2018), whereas others required more intensive, multi-hour training (Brock & Carter, 2016). Because this dissertation emphasizes generalizability, scalability, and equipping teachers to teach novel skills in authentic settings, it is notable that studies assessing generalization and maintenance tended to involve longer initial training periods (Brock & Carter, 2013a).

ABA-Specific Components

Modeling is a behavior change strategy in which learners acquire new skills by observing and imitating a demonstrated response (Cooper et al., 2020). Least-to-most prompting, as observed in Wermer et al. (2018) and Andzik et al., (2021), involves providing increasingly intensive support only, when necessary, thereby prompting independence by using the least amount of assistance required (Cooper et al., 2020). Behavior-specific praise, as reflected in Wermer et al. (2018), is consistent with principles of positive reinforcement and shaping through

immediate feedback. Self-monitoring, also referred to by self-recording or self-observation, is a procedure in which an individual observes and records the occurrence or nonoccurrence of their own behaviors (Cooper et al., 2020). Finally, a DTT is a structured teaching opportunity in ABA designed to evoke a specific response (e.g., "What is your name?" evoking the response of, "My name is Thorin" (Cooper et al., 2020).

Methodological Quality and Interpretations of Study Selection

Brock and Carter (2013b) synthesized 13 experimental studies in which paraprofessionals were trained to implement educational practices and prompting strategies with children in special education classrooms (*n*=6), general education classrooms (*n*=4), and schools for students with disabilities (*n*=3). Although the instructional support strategies were varied, all 13 studies described the instructional and prompting procedures used, include modeling, role-play, instructive feedback, self-monitoring, and an intervention script. The studies also identified who implemented the intervention and functioned as the trainer. In nearly all cases (*n*=12), the trainer was the researcher. Slightly fewer than half of the studies (*n*=6) provided a rationale for their training approach, and even fewer included a fidelity checklist or planning period (*n*=3) (Brock & Carter, 2013b). With respect to the instructional interventions, several studies using prompting as the primary independent variable, including prompting paired with positive reinforcement (Licciardello et al., 2008; Martella et al., 1993), time-delay prompts (McDonnell et al., 2002), social components such as social stories or facilitating social interactions (Causton-Theoharris & Malmgren, 2005; Quilty, 2007), visual support prompts (Hall et al., 1995, 1997), AAC-based prompting (Bingham et al., 2007), and ABA-based instructional strategies such as pivotal response training (PRT), discrete trial teaching, or incidental teaching opportunities (Dib & Sturmey, 2007; Gilligan et al., 2007; Leblanc et al., 2005; Robinson, 2011; & Ryan et al., 2008).

All studies as part of the scoping review used single-case research designs. These designs permit strong demonstrations of functional relations between training interventions and paraprofessional outcomes. These conclusions were further strengthened by the reporting of IOA and treatment fidelity. Several studies also included effect size calculations using Tau-U (Scheeler et al., 2018) and maintenance probes (Mason et al., 2019; Wermer et al., 2018). Despite consistently strong demonstrations of effect and fidelity reporting, the findings were limited and restricted by generalizability and continued reliance on highly trained teachers or researcher-supported implementation, both of which reduced external validity. Student outcomes were also measured inconsistently (Wermer et al., 2018; Mason et al., 2019). Wermer et al. (2018) served as a notable exception by including a component analysis to identify which specific aspect of the intervention produced the strongest effect on student outcomes.

Directions and Implications for Practice

Across the literature, a consistent theme emerged. When paraprofessionals received adequate training and had clearly defined professional roles, they implemented interventions with greater fidelity, which in turn, improved student outcomes (Brock & Carter, 2013b). However, despite increases in evidence-based prompting strategies and novel skill acquisition, most studies still relied on researchers to deliver one-to-one formats (Brock & Anderson, 2021). These findings raise important concerns regarding sustainability, scalability, and feasibility in real-world settings, where teachers are expected to assume responsibility for training and intervention implementation.

To improve long-term school capacity and sustainability, greater emphasis should be placed on embedding paraprofessional education within schoolwide professional development and teacher-led coaching systems. Future applied research should also emphasize flexible design

selection and methods of training dissemination, consistent with current practice recommendations (Jameson et al., 2025), while also involving paraprofessionals more actively in the design, selection, and evaluation of future research interventions.

Additionally, the efficiency of brief training models (e.g., Andzik et al., 2021; Scheeler et al., 2018) suggests that meaningful improvements in paraprofessional performance can be achieved within the constraints of typical school schedules. At the same time, maintenance data indicate that coaching-based models (Mason et al., 2019; Wermer et al., 2018) may require ongoing support to sustain behavior change over time. To further reduce reliance on external consultants and empower special educators and paraeducators, future research should evaluate the total time of initial training while controlling for teacher experience and baseline efficacy to determine which models can be effectively tailored to individual educator needs.

Another major implication for practice concerns rural learners and rural locations. In rural communities, additional barriers often limit training opportunities, ongoing professional development, access to resources, funding, and staff preparation (Marano, et al., 2020). Although Brock and colleagues (2025) assessed prompting strategies, implementation, and efficacy, those data were not collected in rural settings or from rural teachers and paraprofessionals. Many rural school-based programs receive substantially fewer opportunities to engage with educational research compared to their urban counterparts (Tipton & Olsen, 2018).

One of the first challenges in studying rural contents is defining what constitutes a rural setting. At present, no universally accepted definition of rural exists across governing entities or among researchers in special education (Sutter, et al., 2025). Moreover, many studies involving rural participants do not specify the delineation for their population meeting this parameter (Sutter, et al., 2025). In a descriptive study by Sutter and colleagues (2025), found that among 35

articles published in the previous four years that included rural participants, terminology varied substantially and included rural, fringe, distant, frontier, outlying town, remote, and nonmetropolitan. To promote clarity and consistency, the present study adopts the National Center for Educational Statistics (NCES) definition of rural, including categories rural fringe (less than or equal to 5 miles from an urbanized area or less than or equal to 2.5 miles from an urban cluster), distant (more than 5 but less than 25 miles from an urbanized cluster), and remote (or more than 25 miles from an urban center), which are distinguished by proximity to urbanized area and urban cluster.

Replicating these findings in rural settings is an important step toward strengthening teacher-led training and classroom effectiveness within these communities. In addition, rural-specific data are needed to support development of interventions that address persistent disparities between rural and urban areas of focus.

CHAPTER 3

Method

This study was designed as a replication and extension of procedures described by Brock and Carter, (2015) and Brock et al., (2025), with a focus on implementing a single-case research design in rural settings to evaluate the applicability of evidence-based practice procedures (Horner et al., 2005). The study was also designed to align with the recommendations for conducting single-case research designs in rural school settings, as described by Jameson et al. (2025). In addition, the study met established rigor and validity standards (Kratochwill et al., 2010) to support a meaningful replication of the existing literature and generate findings relevant to the policy and practice of rural special education (Jameson et al., 2025). In contrast to the aforementioned studies and to address limitations identified in prior research by Brock and colleagues; this study also incorporated qualitative components. Specifically, two forms of social validity data were collected during the maintenance phase of the study (i.e., social validity questionnaire, semi-structured interview).

Brock and Carter (2016) identified three components of high-quality training (i.e., modeling, accountability, performance feedback). These components were incorporated and strengthened through implementation of the full BST process, as shown in Figure 1. In addition to modeling, accountability, and feedback, the protocol included a description of the intervention and its rationale, written instruction to support adherence, and repeated opportunities to practice until mastery was achieved.

Inclusion and Exclusion Criteria

Inclusion criteria were as follows: (1) participants were employed working as special education teachers with at least two paraprofessionals assigned to their classroom, (2) participants completed an interest survey indicating their willingness to participate, and (3)

participants served one or more students with an Individualized Education Plan (IEP) for whom a needs assessment could be completed. Participants were excluded if they were not employed as special education teachers (e.g., instructional coaches, district administrators, general education teachers,) did not have access to at least two paraprofessionals in their classroom setting and did not complete both the needs survey and interest survey.

Participants

Following institutional approval and informed consent procedures, 12 participants took part in the study. These participants represented approximately 13% of the district's special education paraprofessionals and 14% of its special education teachers. Participant ages ranged from 27 to 54 years for special education teachers and from 32 to 63 for paraprofessionals. All participants identified as female. The racial and ethnic composition if the same was 75% White, 8% Asian,) and 17% Other. The most experienced special education teacher had worked in the field of 17 years; the remaining teachers had 16, 6, and 4 years of special education experience (M = 10.75). The paraprofessional participants had worked in the field for 21, 18, 4, 4, 3, 3, 1, and fewer than 1 year respectively (M = 6, Mdn = 3.50). All participants worked in a rural, public-school setting and held the role of either special education teacher or paraprofessional. Data collection and intervention occurred within rural, school-based special education classrooms.

Sampling Procedures

All participants were recruited from a rural school district in the southern United States. The sample included 12 total participants organized into four 4 triads, with each triad including one special education teacher and two paraprofessionals. Sampling was based on completed

interest and needs survey. Only four triads met all inclusion criteria and agreed to participate. Because all four triads consented to participate, all four were included in the study.

Table 2

Participant Demographic Information for Teachers

Participant	Gender	Years Teaching	Years SPED	Education	Age	Ethnicity	Grade Levels Served	Setting	Caseload Size
Teacher 1	Female	6	3	Bachelors	27	White	1 -5	Self-Contained / Functional	26
Teacher 2	Female	4	4	Masters	39	Other	Pre-K, -5	Self-Contained / Functional	49
Teacher 3	Female	16	16	Masters	40	White	Pre-K, - 6	Self-Contained / Functional	16
Teacher 4	Female	17	17	Masters	54	White	1 -5	Self-Contained / Functional	21

Note. SPED = Special Education; Pre-K = Pre-Kindergarten

Table 3

Participant Demographic Data for Paraprofessionals

Participant	Gender	Years Experience	Education	Age	Ethnicity
Paraprofessional 1	Female	18	High School diploma	63	White
Paraprofessional 2	Female	3	High School diploma	48	White
Paraprofessional 3	Female	1	High School diploma	63	White
Paraprofessional 4	Female	3	High School diploma	32	White
Paraprofessional 5	Female	4	Bachelors degree	53	White
Paraprofessional 6	Female	<1	Bachelors degree	46	Asian
Paraprofessional 7	Female	4	Bachelors degree	51	Other
Paraprofessional 8	Female	21	High School diploma	62	White

Note. Years experience reflects total time in role.

Procedures

Approval was obtained from the University of Oklahoma Institutional Review Board (IRB). The researcher established district partnership through for the Director of Special Services in a rural school district in the southern United States. The director distributed a recruitment email though the district listserv to special education teachers and their paraprofessionals. The email described the study purposes, procedures, timeline, participant expectations, and the opportunity to receive training in prompting strategies. Interested participants completed an interest survey and, if eligible, completed follow-up questionnaires. Teachers and paraprofessionals who met inclusion criteria and agreed to participate were enrolled in the study.

Before data collection began, participants received an overview of the study and training procedures. Following consent, each teacher attended a 30-minute orientation session with the researcher, during which study timeline, expectations, and training procedures were reviewed. Teachers also received access to training materials, including the intervention description,

written protocols, handouts, and fidelity checklists (see Figure 2). The training content introduced prompting strategies and the BST framework for improving paraprofessionals implementation fidelity in classroom settings.

Setting

The study took place in a community classified by NCES as Rural: Remote, indicating that the area is located more than 25 miles from an urban area with a population of at least 50,000. Because definitions of rurality vary across research contexts, (Hawley et al., 2016; Thier et al., 2021), the setting was described using both NCES classification and selected demographic indicators. According to the US Census Bureau (n.d.), the surrounding community was 73.3% White, 4.7% Black, 3.3% American Indian, 6.4% Asian, and 5.9% Hispanic. The poverty rate was 27.4%; and per capita income was $28,961. These indicators are relevant because they reflect the broader rural and resource-constrained context in which the study was conducted.

During the 2022 – 2023 school year, the participating district served more than 6,000 students. District data indicated linguistic and cultural diversity, including more than 40 spoken languages and students representing 50 different countries of origin. Approximately 400 students were English language learners, more than 1,100 students received special education services, and 460 students served on Section504. The district poverty rate was 33.0%, and the racial/ethnic composition was 59.2% White, 5.4% Black, 12.6% Hispanic / Latino, 5.5% American Indian, 3.9% Asian, and 13.3% identifying as two or more races. These data were obtained from the district website.

Study Setting

All data were collected onsite in the classrooms of the participating special education teachers. Initial meetings were offered individually either online (e.g., Zoom, Microsoft Teams)

or in-person based on preference and availability. Consistent with prior literature suggesting approximately 2 hours of training (Brock & Carter, 2013b), teachers were offered in-person or synchronous training. All participants selected in-person training, which was delivered by the researcher in the participants' school setting. Participants were also provided with guidance regarding appropriate training conditions, including the use of quiet space with minimal distractions.

Materials

Electronic data sheets were initially developed for participant use; however, following revisions to IRB requirements, all data were collected directly by the researcher. During in-person training, participants also received printed study materials, including an overview of the study, teacher handouts (Figure 4), quick reference sheets (Figure 5), and roleplay scenarios (Figure 6). These materials summarized the training content and could be used to support paraprofessionals as needed.

Study Design

A single case multiple-baseline-across-participants design (Ledford & Gast, 2024) was used to evaluate whether a functional relation could be established for four special education teachers and their paraprofessionals in a rural, special education classrooms. Single-subject research was selected because of its practical value for identifying evidence-based practices in special education (Ledford, et al., 2023). Because the study also sought to replicate findings by Brock et al., (2025), the multiple- baseline-across-participants design was used to strengthen external validity and examine generalization to rural settings while implementing a formalized BST model. No procedural changes occurred during the study. Each teacher participant

completed baseline, intervention, and maintenance phases, and social validity measures were collected during maintenance.

Pre-Baseline

After consent was obtained, the researcher met with each special education teacher to review the study procedures and explain how to access and complete the first two asynchronous training components which were the Description of Intervention and Written Protocol. Teachers were provided with the same BST materials that would later be shared with the paraprofessionals. Initial training emphasized accurate data collection and fidelity monitoring related to prompting strategies in classroom-based skill acquisition. Participants received stipends for their time

Before teachers began training paraprofessionals, each teacher was required to meet a 100% fidelity criterion on the researcher-delivered training related to prompting strategies and BST. Once this criterion was met, teachers received handouts and written instructions that comprised the intervention description and written protocol for use with their paraprofessionals. To identify targets, the researcher met with each teacher to select instructional goals meeting the following criteria: (1) the goal was currently listed on the student's IEP, (2) it included an objectively measurable operant response, (3) it was appropriate for prompting-based instruction, (4) it could be targeted without adding supplemental materials to the classroom, and (5) it had not yet been mastered. Baseline expectations were established a priori in accordance with What Works Clearinghouse 5.0 Standards (WWC) Version 5.0, with plans in place to address unexpected changes in baseline tend or participant adherence.

Baseline

Presentation of the intervention description and written protocol marked the beginning of baseline data collection. These materials included an overview of the prompting hierarchy, the BST process, instructional procedures, examples and non-examples, and the rationale for their use. However, baseline did not include modeling, rehearsal, or feedback components of BST. During baseline, paraeducators were instructed to review the handouts independently, and no additional support was provided. This approach allowed the researcher to isolate the effects of the full BST package when intervention was later introduced. All baseline data were collected in accordance with WWC (Kratochwill et al., 2010).

Intervention

Each special education teacher received a set of training materials, including the handouts shown in Figures 4 through 6, as well as a PowerPoint presentation describing the rationale for prompting in classroom settings. The training content covered the BST process, definition of prompts, common prompt types, examples and non-examples, and a brief content quiz. Teachers also received copies of the slides for later use with paraprofessionals, including role-play activities and additional practice opportunities.

Intervention 1 - Group Training for Paraprofessionals

Each para-educator participated in group training delivered by the corresponding special education teacher. The researcher provided materials for each training session to support adherence to the protocol and to provide assistance to teachers as needed. Training focused on prompting strategies for skill acquisition within the BST framework. During these sessions, teachers implemented the six BST steps, beginning with the two components already introduced during baseline (i.e., description, written protocol) and then proceeding to modeling, rehearsal

and feedback. The goal of group training was for each paraprofessional to reach Step 6 (i.e., mastery) by the end of the third group training session. Data were collected throughout intervention until mastery criteria were met.

Intervention 2 - Individual Coaching for Paraprofessionals

Consistent with the methodology described by Brock et al., (2025), individual coaching was provided on an as-needed basis for paraprofessionals who did not achieve Step 6 by the end of the third group training or who failed to demonstrate 100% adherence across consecutive sessions. The 100% mastery criterion was selected based on literature indicating that stricter criterion-based thresholds are more likely to support maintenance and generalization over time (Wong et al., 2022). Individual coaching targeted specific skills for individuals whom did not meet criterion and was scheduled to be delivered in a one-to-one format using the same general procedures as group training. This coaching included rehearsal, modeling, feedback, and supplemental practice as needed to support mastery. Paraprofessionals who failed to meet the 100% criterion threshold would be provided with additional coaching.

Maintenance

No training was provided during the maintenance phase. Paraprofessionals retained access to their written documentation, handouts (Figures 4-6,) training manuals, and fidelity checklists (Table 4). Maintenance conditions were otherwise identical to baseline. Probe data were collected during maintenance, along with the social validity questionnaire and semi-structured interview.

Table 4

Task Analysis Steps

For each of the following steps, indicate whether the skill was observed by writing (Yes) or (No), comments can also be left in the comment box.		
Skill	Observed (Yes / No)	Comments
Provides clear instruction		
Waits appropriate time before prompting		
Uses correct prompt hierarchy		
Uses least intrusive prompt when appropriate		
Delivers prompts *clearly* and immediately when needed		
Reinforces correct responses		
Avoids unnecessary verbal prompting		
Maintains instructional momentum		

Note. Observers recorded "Yes" if the behavior was demonstrated and "No" if not observed during the session.

Figure 4

Teacher Handout 1 - Overview of Content

Prompting in Applied Behavior Analysis – Teacher Handout

Definition of Prompting
A prompt is something present in the environment that *increases* the likelihood a student will emit a correct response. Prompts are temporary supports used during skill acquisition and must be systematically faded to promote independence.

Two Categories of Prompts
Within-Stimulus Prompts modify characteristics of the instructional stimulus itself.
Response Prompts (Socially Mediated Prompts) occur after the instruction and guide the learner toward the correct response.

Within-Stimulus Prompt Examples
- Correct answer printed larger
- Correct answer highlighted
- Correct response placed first in an array
- Increased brightness or intensity
- Arrow or visual indicator pointing to the correct answer
- Visually or manually blocking some or parts of other options

Response Prompt Types
- Physical prompts
- Gestural prompts
- Model prompts
- Verbal prompts
- Visual prompts

Prompt Hierarchies
Prompt hierarchies organize prompts from least intrusive to most intrusive or from most intrusive to least intrusive.

Least-to-Most Prompting
Independent → Verbal → Model → Gesture → Partial Physical → Full Physical

Most-to-Least Prompting
Full Physical → Partial Physical → Gesture → Model → Verbal → Independent

Prompt Fading
Prompt fading ensures the learner responds to the natural cue rather than relying on prompts.

Prompt Fading Methods
- Time Delay
- Stimulus Fading
- Prompt Intensity Fading
- Graduated Guidance

Prompt Dependency
Prompt dependency occurs when learners wait for prompts instead of responding independently. Prevent this by fading prompts systematically and reinforcing independent responding.

Figure 5

Teacher Handout 2 - Quick Reference

Prompt Hierarchy - Classroom Quick Reference

Use this hierarchy when teaching new skills. Start with the least intrusive prompt when appropriate and increase only if needed.

1. Independent - Student responds correctly without assistance.

2. Verbal Prompt - Teacher provides a hint or additional verbal cue.

3. Model Prompt - Teacher demonstrates the correct response.

4. Gestural Prompt - Teacher points, nods, or looks toward the correct response.

5. Partial Physical Prompt - Teacher lightly guides the student using physical touch.

6. Full Physical Prompt - Teacher provides full hand-over-hand assistance.

Example Least-to-Most Prompting Sequence

Instruction -> Wait -> Verbal -> Model -> Gesture -> Partial Physical -> Full Physical

Goal: Transfer stimulus control to the natural cue so the learner responds independently.

Figure 6

Teacher Handout 3 - Roleplay Scenarios

Prompting Practice - BST Role Play Scenarios

Use these scenarios to practice prompting procedures using
Behavioral Skills Training (BST):

Instruction -> Modeling -> Rehearsal -> Feedback

1. Handwashing: Student must wash hands after recess.
2. Writing Name: Student should write their name at the top of the worksheet.
3. Lining Up: Bell rings and students should line up at the door.
4. Asking for Help: Student should raise their hand to request help.
5. Packing Backpack: Student gathers materials and places them in their backpack.
6. Sight Word Reading: Student is learning to read common sight words.
7. Cleaning Up Toys: Student cleans up toys before transitioning.
8. Greeting Peers: Student practices saying hello to classmates.
9. Completing a Math Problem: Student solves a simple addition problem.
10. Following Directions: Student places a book on the shelf after instruction.

Trainer Instructions:
- Have the paraprofessional identify the SD.
- Design an appropriate prompt hierarchy.
- Practice delivering prompts.
- Provide immediate feedback and coaching.

Modeling, practice, feedback, and mastery criterion were introduced after baseline data began and the teacher-initiated intervention. Modeling corresponded to Step 3, practice to Step 4, and feedback to Step 5. Steps 4 and 5 were repeated until the paraprofessional demonstrated mastery of the prompting strategies by achieving 100% on fidelity checks, at which point the participant was classified as Step 6 (i.e., mastery).

Following mastery, data were collected on the percentage of correctly implemented prompting steps during instruction of a novel student skill. Data collection was planned to occur for a minimum of 15 data points, consistent with WWC standards requiring at least five data points per phase, per triad, to meet standards without reservation (Kratochwill et al., 2010). De-identified data were reviewed by a trained senior researcher to support adherence to study standards while protecting participant anonymity.

Social Validity

A social validity assessment was conducted during the maintenance phase to evaluate the perceived ease of implementation, feasibility, and acceptability of the intervention (see Table 5 in Chapter 4). The questionnaire assessed the social importance of the targeted behavior, the perceived usefulness of the outcomes for the classroom, the extent to which participants made progress toward independence, and the value of implementing BST practices in future instruction. Social validity data were summarized using descriptive statistics, including mean ratings across questionnaire items for both special education teachers and paraprofessionals. These data were supplemented with semi-structured interviews conducted with the special education teachers during maintenance.

Measures

Data were analyzed using a combination of visual analysis and statistical methods. Visual analysis included examination of phase level, trend, variability, and overlap, supplemented by phase means, medians, and percentages. Effect size was calculated using Tau-U (Parker, 2011). Consistent with Scruggs and Mastropieri (1998), effect sizes exceed 80% were interpreted as indicating a strong intervention effect. Percentage of non-overlapping (PND) was also considered; however, because PND has known limitations, including restricted sensitivity to across-phase variability and dependence on a single data point, Tau-U was used as the primary quantitative effect-size measure (Parker et al., 2007). IOA and interrater reliability (IRR) data were collected across 20% of all phases and analyzed using Cohen's Kappa (Cohen, 1960).

For the secondary measure of implementation quality, a 5-point Likert-type scale was used (1 = Strong Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree). These ratings were supplemented by semi-structured interview data that collected during the maintenance phase. Mean ratings and score ranges were examined alongside qualitative data reflecting participant perceptions and experiences with the intervention.

Variables

Independent Variable

The independent variable consisted of teacher-delivered BST focused on prompting strategies and included both group training and individualized coaching. The training package involved six steps: (1) description of the intervention (2) written task analysis and protocol (3) modeling, (4) practice, (5) feedback, and (6) mastery. Steps 1 and 2 were introduced during baseline, whereas Steps 3 through 6 were implemented during intervention. Individualized instruction was planned to be utilized for paraprofessionals who routinely scored below the a

priori determined criterion-level adherence of 100% of steps completed correctly for at least two consecutive data recording sessions in keeping with the mastery criterion identified through best practices for increased generalization over time (Wong et al., 2022).

Dependent Variable

Three dimensions of implementation were measured, including adherence to prompting steps, calculated as the percentage of correctly implemented steps during each session; implementation quality, scored on a 5-point scale (see Table 5); and participant perceptions, which were collected through semi-structured interview protocol. Although data collection was initially intended to be completed by special education teachers, subsequent IRB modifications required the researcher to collect 100% of the implementation data. Two trained peer experts completed IRR coding for 20% of all data across conditions (Kratochwill et al., 2010). Maintenance probes were also conducted to evaluate whether treatment integrity was sustained over time.

Summary

This study used a multiple-baseline-across-participants single case design to examine the effects of teacher-delivered BST on paraprofessional implementation of prompting strategies in rural special education classrooms. Data sources included implementation quality, and social validity measures. Procedures were designed to balance methodological rigor with feasibility in authentic rural school settings, Results will be presented in the following chapter.

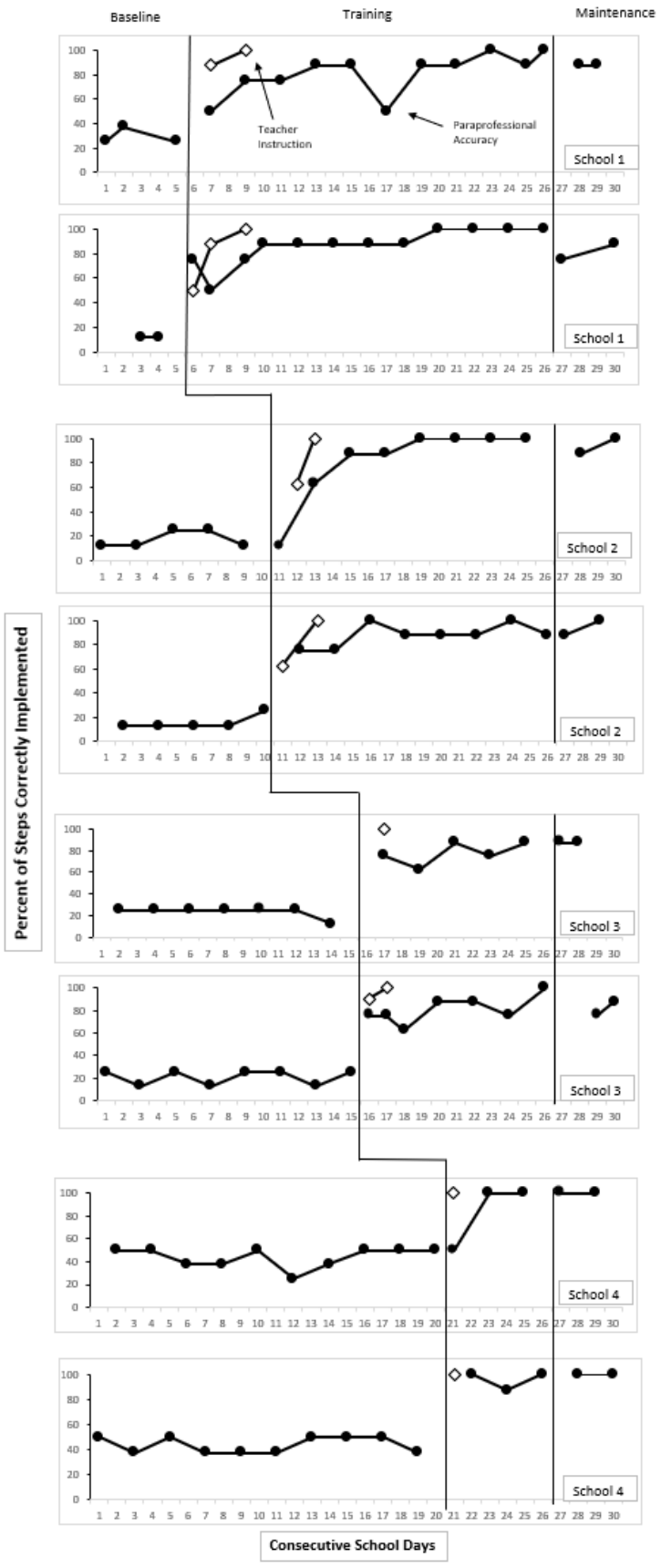
CHAPTER 4

Results

A single-case multiple-baseline-across participants-design was used to evaluate the effects of a teacher-led training model on paraprofessionals implementation fidelity when using prompting strategies to teach skills in classroom settings. The primary outcome measure was the percentage of prompting steps implemented correctly by paraprofessionals while teaching a novel skill in the classroom. Due to IRB modifications, the researcher collected all study data directly. This included implementation data gathered in classroom settings, as staff-reported fidelity data were not approved as routine classroom practice. Data were collected across three phases consisting of baseline, intervention, and maintenance which were established a priori. The four triads, including two paraprofessional graphs for each school site, were delivered in a staggered sequence according to the multiple-baseline design. Figure 7 displays multiple-baseline data across participants.

Figure 7

Results of Participant Correct Responses


Baseline
Training
Maintenance
Teacher Instruction
Paraprofessional Accuracy
School 1
School 1
School 2
School 2
School 3
School 3
School 4
School 4
Percent of Steps Correctly Implemented
Consecutive School Days

Initial analysis of the data was conducted through visual inspection. All four school sites demonstrated clear improvement across the course of the study. School site 1 showed the greatest variability during baseline; however, an immediate increase in correct implementation was observed following the introduction of the intervention. School site 1 also required more training opportunities than the other participants, with four training sessions needed to reach the 100% fidelity criterion. Maintenance data for school site 1 began at a lower level than intervention performance but remained above 85% for the final three maintenance sessions. Tau-U analysis indicated a strong intervention effect for school site 1 ($\tau = 1.00$), reflecting complete nonoverlap between baseline and intervention phases.

School site 2 demonstrated relatively stable baseline responding and a less immediate intervention effect than the other participants, including an initial decrease in the first intervention data point. School site 2 required three training sessions to achieve 100% on the fidelity checklist and they maintained implementation above 85% shortly thereafter. School site 2 demonstrated the strongest immediate visual effects in the study, increasing from a stable baseline average of approximately 25% to above 80% following intervention. Maintenance data for school site 2 remained consistent with intervention-phase levels and reached 100% during the final three maintenance sessions. Tau-U for Participant 2 was .89, reflecting substantial nonoverlap between baseline and intervention phases.

School site 3 required two training sessions to achieve 100% on the fidelity measure, with the first score falling short of criterion because of a single error. School site 3 demonstrated a stable baseline and a consistent upward during intervention. During maintenance, school site 3 remained consistent with intervention-phase person and averaged above 80% correct across the

four observations. Tau-U for Participant 3 was 1.00, indicating complete non-overlap between baseline and intervention phases.

School site 4 demonstrated comparatively high baseline implementation, consistently scoring at or above 50% before receiving instruction or training. School site 4 achieved 100% on the fidelity checklist after the first training session, and paraprofessional implementation also reached 100% shortly thereafter. These high implementation levels were maintained throughout the maintenance phase. Although school site 4 began with a substantially higher baseline than the other participants, the Tau-U of .91 still indicated a strong intervention effect with minimal overlap.

Tau-U analyses across participants indicated strong intervention effects. School sites 1 and 3 demonstrated complete nonoverlap between baseline and intervention phases ($\tau = 1.00$), while school sites 2 and 4 also showed strong effects ($\tau = .89$ and $\tau = .91$, respectively), indicating substantial improvements following intervention (Parker et al., 2011).

Interrater reliability was calculated for 20% of observations within each phase, consistent with What Works Clearinghouse 5.0 Standards (2020). Interrater reliability was calculated using Cohen's Kappa. Two trained peer reviewers independently double-scored selected classroom observations by the researcher. Using the following formula: $\kappa = \frac{Po-Pe}{1-Pe}$; whereas K is Cohen's Kappa, P_o acts as our observed agreement, and P_e is our expected chance agreement. The observed agreement of P_o is calculated by dividing the total agreement, including both observers indicating the behavior occurred and both observers indicating the behavior did not occur by the total number of observations, also including when one observer would indicate the behavior occurred and the other did not with this formula: $P_o = \frac{(Both\ Yes) + (Both\ No)}{(Both\ Yes) + (Obs\ 1\ Yes\ /\ Obs\ 2\ No) + Obs\ 2\ No\ /\ Obs\ 2\ Yes) + (Both\ No)}$. The P_e of chance agreement was

calculated using the previous formula and combining the totals for each rater divided by the total number of ratings squared. Interpretations and findings based on the aforementioned were taken from the following guidelines: 0.81-1.00: indicating almost perfect agreement, 0.61-0.80: showing substantial agreement, 0.41-0.60: showing moderate agreement, 0.21-0.40: indicating fair agreement, 0.00-0.20: proposing slight agreement, and <0.00: indicating poor agreement (Cohen, 1960). Observed agreement was measured at 97.98%. Cohen's Kappa was computed to account for chance agreement, yielding $\kappa = .96$ (Cohen, 1960).

In addition to implementation data, two forms of social validity data were collected from participants. The first measure was a social validity questionnaire using a 5-point Likert-type scale (1 = Strong Disagree, (2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree) for both special education teachers and paraprofessionals. The purposes of this questionnaire was to assess participants' perceptions of the implementation's feasibility, usefulness, and acceptability for future implementation by teachers and paraprofessionals. Mean questionnaire responses ranged from 4.0 to 5.0, indicating generally favorable perceptions of the intervention (see Table 5 and 6). Items receiving mean scores of 4.0 were generally those related to classroom benefit and paraprofessional outcomes, whereas items scored at 4.5 or 5 tended to reflect perceptions of support and responsiveness. These findings suggest that participants valued not only the training itself, but also the support and collaborative relationships associated with the intervention process. These findings were further elaborated through the second social validity measure, the semi-structured interview. 100% of special educators completed the survey (Table 5) along with 62.5% of paraprofessionals completing the survey (Table 6).

Table 5

Social Validity Questionnaire – Teachers (n=4)

Question	Mean Response (1-5)
The content of the study, including the training were meaningful to the needs of my classroom	5
My questions or concerns were answered in a prompt manner by the researcher	4.5
I feel I have benefited from my participation in this research	4
My paras within my classroom have benefitted from their participation in this research	4
I believe my students within my classroom will benefit from their indirect participation in this research	4.5
My understanding of prompting and how to fade prompts has improved from my participation in this research	4.5
I recognize the importance of tracking prompts and having my staff aware of what prompts they are using when working with students	4
I felt strongly supported during the majority of the study with my work with the researcher	5
I plan to use the materials and information included in the study as part of my routine classroom practice and training moving forward	4.5

Table 6

Social Validity Questionnaire – Paraprofessionals (n=5)

Question	Mean Response (1-5)
The content of the study, including the training were meaningful to the needs of my classroom	4.4
My questions or concerns were answered in a prompt manner by the researcher	4.6
I feel I have benefited from my participation in this research	4.4
My other paras within my classroom have benefitted from their participation in this research	4.4
I believe the students within my classroom will benefit from their indirect participation in this research	4.4
My understanding of prompting and how to fade prompts has improved from my participation in this research	4.2
I recognize the importance of tracking prompts and having my staff aware of what prompts they are using when working with students	4.6
I felt strongly supported during the majority of the study with my work with the researcher	4.6
I plan to use the materials and information included in the study as part of my routine classroom practice and training moving forward	4.6

Semi-Structured Interviews

Special education teachers also completed a semi-structured interview (Figure 8) to share their perceptions and experiences related to the study. Responses were anonymized and were not linked to individual participants. The interview protocol was administered by two expert peers with BCBA certification and prior experience towards completing qualitative coding. The researcher was provided with only the final de-identified transcript. This procedure was approved by the IRB to support candid participant responses and reduce potential response bias associated with direct interviewing by the primary researcher. Interview data provided additional information regarding participants' experiences and perceptions of the study.

Figure 8

Semi-Structured Interview Questions – Special Education Teachers

Open-Ended Interview Questions for Post-Study (Semi-Structured Interview Protocol)

1. What were your overall thoughts and feelings towards the study and having the researcher join your classroom?
2. Can you tell me about your experience with providing prompts to students in your classroom?
3. What prior training have you completed to help you better prompt students in the past?
4. Prior to receiving this training, if you had a student repeatedly needing help, how would you help them gather independence?
5. What factors have you experienced that empower you within your classroom with respect to training?
6. What about this training do you believe you will be able to 'take with you' and use moving forward?

Interviewers were permitted to ask follow-up questions as needed to clarify or expand participant response. The four major themes that emerged from the interview data were perceived support and collaborative problem solving, increased awareness and precision in prompting practices, importance of practical, applied, and visual training methods, and the need for consistency with training communication and ongoing training.

When breaking down the first theme examining perceived support and problem solving through collaboration, multiple participants described the training as providing meaningful support and opportunities for collaboration. Participants characterized the researcher's presence as collaborative and supportive, noting that it fostered reflective dialogue and shared problem

solving rather than the evaluative oversight to which they were accustomed. Participant X emphasized the emotional and collaborative benefit, stating, “this is a very emotional job that can be exhausting. So just having someone to bounce ideas off of for me was good.” Participant X described the experience as entirely positive, stating, “I felt that it was only helpful… I liked the information and everything that was shared.” This was reinforced by Participant X who stated, “I didn’t find it intrusive, I thought it was helpful.”

The second theme was increased awareness and precision in prompting practices. Participants consistently reported that the training improved their understanding and implementation of prompting hierarchies, particularly by drawing attention to previously overlooked steps in instructional sequences. Having the systematic process was helpful to Participant X, stating, “usually we would skip around [prompts], from the easiest one to a harder one, but we would miss the ones in the middle.” The same participant further stated, “after following the training and trying it, it’s worked really well… the modeling has helped us gain independence a lot faster.” Another participant shared that, “the modeling was very beneficial, modeling, modeling, modeling, and then you do the gradual release for [the paras] to take over.”

The third theme was importance of practical, applied, and visual training methods. Participants described the hands-on, applied training formats, modeling in particular, role-play, and visual supports as especially useful and preferred. Participants expressed this was greatly preferred over the traditional standard lecture formats they were accustomed to. Participant X highlighted this preference with, “I like videos that I can see, rather than sitting somewhere and just listening to somebody talk… [the] role-play scenarios… that was really helpful!” Participant X indicated their strong preference for the visuals and hand-outs with, “I literally have his little hierarchy hung up so we’re all reminded of it!” Participant X also expressed joy related to the

visual hierarchies and hand-outs stating, “the printed information… I put it in [a notebook]… for any new paras… it explains everything.”

The fourth theme was the need for consistency with training, communication and ongoing training. This theme related to communication with their paraprofessionals, how to remain consistent through training, and the preference for ongoing, deeper learning over time. Participant X stated, “a big thing is just how to communicate with paras… what level of prompting they’re at… consistency is the key and emotions will hinder that.” Participant X stated, “people are at different levels of prompting… at the same time in the same space… that’s awkward to navigate and it’s helpful having something to reference.” With respect to ongoing training, Participant X shared, “I probably would have liked to have extended it… maybe even go a little deeper… what’s the next step always.” These four identified themes provide additional data in the form of social validity and feasibility. Based on the findings from the semi-structured interviews, the study was well received by the participants.

Research Question 1

The first research question examined whether a functional relation existed between teacher-implemented tiered training and paraeducator adherence to prompting strategies in a rural special education classroom. The results indicate that a functional relation was supported. Visual, quantitative, and qualitative data suggest that the intervention was associated with increased implementation fidelity among both teachers and paraprofessionals alike in this context. For Triad 1, the teacher required four training opportunities to achieve 100% on the fidelity checklist. Although criterion was not met after the initial training, the paraprofessionals correct responding increased above baseline levels and continued to improve across the study, reaching 100% by the 20th data point. Triad 2 demonstrated a less immediate response to the intervention, as the first

intervention data point remained comparable to baseline. After repeated exposure to the training protocol, however, performance increased and the participant reached 100% correct after six intervention sessions. These gains were maintained throughout the intervention phase and remained at 100% during the final maintenance observation.

Triad 3 demonstrated the strongest immediate response to the intervention. The participant required only two opportunities to reach 100% fidelity, and paraprofessional performance increased rapidly to above 85% correct. Although only one observation reached 100% correct, performance remained stable at or above 85% through the maintenance phase.

Triad 4 entered the study with the highest baseline performance of all participants, with scores that were nearly twice as high as those of the other participants before exposure to the independent variable. Triad 4 achieved 100% on the fidelity checklist after one training opportunity, and paraprofessional reached 100% correct within two observations. These levels were maintained throughout both the intervention and maintenance phases.

All participants met fidelity standards as part of the group coaching intervention, no paraprofessional participants required individual coaching sessions. Criterion was met for each paraprofessional participant during intervention phase, and none were provided the one-to-one coaching as part of the study.

Research Question 2

The second question addressed how paraprofessional prompting quality changed following intervention, as reflected in maintenance data and social validity outcomes. Maintenance data indicated that elevated levels of implementation were sustained during maintenance phase All participant groups had relatively high levels of adherence following the withdrawal of active training. Social validity results further indicated that participants viewed the

intervention positively, felt supported throughout the process, and intended to use aspects of the training in their future classroom practice.

CHAPTER 5

Discussion

The study examined whether a functional relation could be established between teachers' exposure to a training protocol and paraprofessional adherence to prompting procedures used to teach skills in classroom settings. The findings supported the proposed functional relation.

Interpretation of Findings

These findings support and extend the results reported by Brock et al., 2025, who found tiered training delivered to special education teachers was both effective and feasible for supporting teacher-led group training of paraeducators. The present study replicated those findings across four triads and three schools. Brock et al., 2025 also found that teacher-delivered tiered training enabled paraeducators to implement systematic prompting strategies with fidelity. A similar pattern was observed in the present study across all four participant groups. Brock et al., (2025) additionally reported student progress toward individualized goals. In the present study, the researcher collaborated with special education teachers in relation to student goals; however, IRB constraints did not permit the collection of student outcome data. Although prompting fidelity was measured and improved to criterion levels, no direct student data were collected. This limitation should be considered when interpreting the findings.

Brock et al., (2025) identified several limitations, including non-steady baseline responding for two of the nine paraeducators. In contrast, the present replication did not reveal notable level changes or trend concerns during baseline. Brock et al., (2025) also noted variability in student baseline data; because student data were not collected in the present study, that limitation could not be directly examined. The third limitation reported by Brock et al., (2025) involved the collection of fewer maintenance data points than originally planned. In the present study, data collection decisions and phase changes were planned a priori, including those

related to maintenance. All maintenance data were collected in accordance with the planned study procedures. Brock et al., (2025) also identified social validity data as a limitation. Accordingly, one major extension of the parent study was the inclusion of social validity data collected through both Likert-type ratings for both paraprofessionals and special education teachers in addition to semi-structured interviews. These data added qualitative depth to the findings and provided additional evidence regarding the feasibility and acceptability of the intervention in rural classroom settings.

Overall, the findings indicate the intervention was associated with improved implementation across the participating teacher-paraprofessional triads. The teacher participants, who also completed the social validity measures during maintenance, reported favorable perceptions of the intervention and indicated that they were likely to continue using aspects of the training in their classroom settings with current and future staff. The semi-structured interview further suggested that participants viewed the training as meaningful and useful within their classroom contexts. Across interviews, participants described the intervention as meaningful, socially valid, and positively received.

Quantitative analyses indicated strong intervention effects across all four participant groups. Visual analysis indicated clear and immediate improvements in implementation following introduction of the intervention. These improvements were sustained improvements during the intervention phase and remained elevated during the brief maintenance period. Tau-U analyses also indicated strong intervention effects. Triad 1 and 3 demonstrated no overlap between baseline and intervention phases ($\tau = 1.00$), whereas Triad 2 and 4 showed strong effects ($\tau = .89$ and $\tau = .91$, respectively), indicating substantial improvements following intervention (Parker et al., 2011). Although all implementation data were collected by the

researcher, quality and reliability were supported though interrater reliability checks on 20% of data points across baseline, intervention, and maintenance phases. This procedure aligned with What Works Clearinghouse 5.0 Standards (2020) and helped strengthen confidence in the accuracy of the findings (Kratochwill et al., 2010). Interrater reliability was calculated using Cohen's kappa. Observed agreement was 97.98%, and Cohen's kappa was $\kappa = .96$, indicating almost perfect agreement (Cohen, 1960).

Findings Supported by Existing Literature

Several aspects of the present study were consistent with prior research and helped evaluate the existing literature. For example, maintenance phase follow-ups were also included in Andzik et al., (2021). Similarly, the present study included maintenance probes to examine whether intervention effects persisted beyond active training. Variation in paraprofessional experience, also reported by Andzik et al., (2021) and Brock and Carter (2016), was similarly observed in the present sample, where paraprofessional experience ranged from fewer than 1 year to 21 years.

Similar to Andzik et al., (2021) and Brock and Carter (2016), the present study incorporated both Likert-type measures and qualitative interview data to examine participant, perceptions, feasibility, and overall social validity. Brock and Carter (2016) also highlighted reliance on external researcher support as a limitation. Although the original design of the present study intended for teachers to collect data on both their paraprofessionals and students, IRB requirements resulted in the researcher collecting all data directly while teachers remained responsible for training paraprofessionals. Another important distinction from Brock and Carter (2016) was the reduction in coaching time. Whereas their model involved extensive one-to-one

coaching, the present study used shorter training durations while still producing strong implementation and maintenance outcomes.

Mason et al. (2019) emphasized the importance of accurate paraeducators data collection. In the present study, this emphasis was reflected in the use of fidelity checklist and self-monitoring opportunities embedded within the training protocol, although these data were not analyzed directly by the researcher due to IRB constraints.

Pre-baseline preparation in the present study was more similar to the Mason et al. (2019) than to Brock and Carter, particularly in its shorter training duration. As Mason et al. (2019), reactivity remained a possible limitation because the researcher was present during all observations and collected all implementation data.

Scheeler et al. (2018) provided support for structured coaching as a practical response to the limited time teachers typically spend supervising paraeducators. The present study was similarly designed with school-based time constraints in mind and incorporated flexible supports such as handouts, training materials, and quick reference sheets that teachers could use efficiently in practice. Tau-U was also used in the present study, consistent with Scheeler et al. (2018), to provide an effect size estimate alongside visual analysis.

Wermer et al., (2018) emphasized the value of component-level analysis and found that least-to-most prompting was associated with the strongest effects for both paraprofessional implementation and student outcomes. Although student outcomes were not measured in the present study, similar instructional logic was incorporated through the use of least-to-most prompting and other socially mediated prompting procedures, which were associated with strong implementation outcomes.

Implications for Practice

One of the central implementation barriers addressed in this study involved the unique constraints associated with rural educational settings. Rural communities often have reduced access to educational resources compared with urban communities (Berry & Gravelle, 2013; Rude & Miller, 2018). These conditions can make staff training more difficult in schools with significant needs. The present study attempted to address these barriers by preparing special education teachers to function as the primary trainers of paraprofessionals within their classrooms. This approach reduced dependence on external consultants and may offer a more feasible model for rural settings. As findings provide preliminary support for this model through converging visual, quantitative, and qualitative data. One practical implication is that special education teachers may be able to retain the training materials and skills needed to orient and support newly assigned paraprofessionals within their classroom and, potentially, within their schools. Future research should examine whether this training model can be extended to other school-based personnel, such as instructional coaches, or embedded within broader district professional development systems.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the researcher was present for all data collection sessions, which may have altered typical classroom routines. This level of researcher presence may have contributed to reactivity among students, teachers, and paraprofessionals. Although repeated exposure may have reduced some reactivity, it is not possible to determine the extent to which observation influence participant behavior. Future studies should consider collecting data on each paraprofessional individually to better isolate participant-level effects.

Relatedly, perceptions of support and social acceptability may have been influenced by the researcher's consistent present in classrooms. If researcher contact had been limited to training sessions and interrater reliability observations, participants may have reported different levels of support and acceptability. Future research should examine whether the amount of researcher contact influences social validity ratings or participants' perceptions of support.

A final strength and limitation should be noted together; unlike Brock et al., (2025), the present study included two forms of social validity data. Although this strengthens interpretation of acceptability and feasibility, the limited sample size still constrains the extent to which those perceptions can be generalized. of the intervention compared to previous implementation.

Future Research

Future research should extend this work by examining whether the teacher-led training model can be sustained beyond the initial cohort. For example, researchers might investigate whether special education teachers who complete the interventions can subsequently train additional paraprofessionals and achieve similar implementation outcomes. Such research could include newly hired paraprofessionals within the same classroom or additional paraprofessionals in adjacent classrooms to examine whether the training effects generalize across staff and settings.

Future studies might also examine a broader train-the-trainer model in which special education teachers, instructional coaches, special education directors, or behavior support personnel are trained to implement the intervention with subsequent cohort groups.

Conclusion

The study was designed to address the research-to-practice gap related to evidence-based promoting procedures in rural special education settings. By combining teacher-delivered

structured training, measurement of implementation fidelity and quality, and social validity assessments, the study contributes to the emerging literature on scalable paraprofessional training practices rural settings while maintaining the rigor expected in single-case research.

Based on visual, quantitative, and social validity data collected, the intervention appears feasible, acceptable, and associated with improved implementation. Teachers reported feeling supported throughout the intervention, and paraprofessionals demonstrated improved adherence to prompting procedures. Overall, these findings suggest that when teachers are provided with structured support, resources, respect, and opportunities for practice, they may be able to train paraprofessionals effectively within authentic classrooms environments.

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