SELF-PACED ONLINE TRAINING FOR PARAEDUCATORS
TO SUPPORT THE COMMUNICATION OF YOUNG CHILDREN
WITH COMPLEX COMMUNICATION NEEDS

A Dissertation in
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ABSTRACT

Early childhood is a time of rapid language growth for typically developing children. For many children with disabilities however, the development of language and communication skills can be challenging. Paraeducators often provide educational support to children with disabilities, especially those with complex communication needs (CCN). However, research has shown that paraeducators and other communication partners often fail to engage in behaviors that promote the communication growth of individuals with CCN. Training may be required to teach paraeducators to support the communication development of children with CCN. A single subject multiple baseline probe design was utilized with three dyads (i.e., one paraeducator and one child per dyad) to measure the effect of self-paced online training for paraeducators. The paraeducators were taught a three step procedure to promote the communication development of young children with CCN: (a) provide opportunities for communication; (b) wait for the child’s communication and; (c) respond to the child’s communication. Results of the study indicated that training increased the number of communication opportunities with wait time provided by paraeducators to young children with CCN. In addition, results indicated that all children in the study increased communication turns after paraeducators participated in the online training. It was also noted that paraeducators provided an increased number of responses to child communication turns. Results, limitations, and future research directions are discussed.
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CHAPTER ONE

Introduction and Review of Literature

Learning to communicate is an essential part of early childhood (Essa, 1996). Communication skills are required to interact with others, provide and request information, obtain needs and wants, and fulfill social etiquette (Light, 1997). Indeed it has been suggested that “communication is the essence of human life” (Article II, Section 1, USSAAC Bylaws). While most children develop effective use of speech as a powerful means of communication between the ages of one and five (Allen & Marotz, 1994; Otto, 2010), children with developmental disabilities such as autism, cerebral palsy, and Down syndrome often demonstrate significant difficulty developing the speaking skills needed for participation in society (Light & Drager, 2007). In fact, nearly half of all children in early childhood special education settings require speech and language services to assist in the development of communication skills (Dunlap, 2009). Some children who receive speech language services have complex communication needs (CCN), meaning that speech alone does not meet their daily communication needs (Beukelman & Mirenda, 2005).

Augmentative and alternative communication (AAC) systems, including the use of sign language, gestures, computers, and/or picture symbols (Glennen, 1997), can assist children with CCN in communicating with others (Light & Drager, 2007).

Learning to make effective use of AAC systems for communication requires support from communication partners (Light, 2003), and is best taught within the context of motivating, age-appropriate interactions (Merges, Durand, & Youngblade, 2005). For young children, play provides a natural, motivating context for learning
communication skills (Patterson & Westby, 1994). However, if children are to benefit from participation in these contexts, communication partners, including paraeducators who work in early childhood special education settings, need to provide appropriate supports to help children develop communication skills (Light, 2003).

This research project examined the effect of online training for paraeducators to support the communication of young children with CCN during play. Several areas of research were reviewed in the development of this research project:

- Communication development
- Augmentative and alternative communication
- Communication partners
- Play in early childhood
- Instructional considerations for communication partners
- Online learning

**Communication Development**

For most children, the development of communication skills begins in the first few weeks of life when infants learn to discriminate between speech and non-speech sounds (Warren & Rogers-Warren, 1982). At approximately 6 months of age, infants learn turn taking, eye contact, and joint attention skills (Bochner & Jones, 2008; Lahey, 1988; Otto, 2010; Warren & Rogers-Warren, 1982). At 10 to 12 months of age, infants learn cause and effect (Lahey, 1988), and learn to regulate the behavior of others (Bochner & Jones, 2008; Lahey, 1988; Warren & Rogers-Warren, 1982).
At this time, infants also learn to make reference to objects by showing, giving, or pointing at objects (Lahey, 1988).

At approximately 1 year of age, children typically speak their first words (Bochner & Jones, 2008). At first, children speak using single words only (Lahey, 1988) and may combine single words with gestures, pointing, or reaching for objects to help deliver their message (de Villiers & de Villiers, 1979). Young children may speak to protest, obtain objects, respond to others, greet people, and/or comment about objects or events (Lahey, 1988). The first fifty words used by children largely consist of the names of people and favorite foods, names and noises of animals, and words to regulate the environment such as more, no, up, and out (de Villiers & de Villiers, 1979).

During the toddler years (i.e., 1 to 3 years of age), children’s receptive language develops faster than their expressive language (de Villiers & de Villiers, 1979). However, at approximately 18 months to 2 years of age children begin to combine words to produce two to three word messages (Bochner & Jones, 2008). These messages most often include agent object combinations such as “me want” (Bochner & Jones, 2008; Lahey, 1988). By age 3 children’s messages are longer and more complex (de Villiers & de Villiers, 1979).

By the time typical children reach preschool age (i.e., 3 to 5 years of age), they can produce all the speech sounds used in English (Hart, 1982). From ages 3 to 5, preschoolers typically speak in three to five word sentences (Brown, 1973), and have an expressive vocabulary of about 2500 to 3000 words (Anglin, 1989). During preschool children also begin to learn to incorporate grammar rules into their
speech (Hart, 1982). By age 3, most children are able to use speech to express ideas, comment, and ask and answer questions (Hart, 1982). Typically developing preschoolers become flexible communicators and can use language to express the same idea in a number of ways (de Villiers & de Villiers, 1979). By age 6 typically developing children can create sophisticated multi-element phrases (de Villiers & de Villiers, 1979) and frequently speak using multi-sentence messages (e.g., “If it rains, we’ll go to the movies.”; Lahey, 1988).

**Augmentative and Alternative Communication**

Most children have use of speech as a means to express their wants and needs, share information, fulfill social etiquette, and connect socially with others (Light, 1997). However, many children with disabilities such as cerebral palsy, autism, and intellectual impairments, find speech (and communication) challenging (Light & Drager, 2007). In a study conducted by Oliver and Buckley (1994), the language development of children with Down syndrome was explored. Results from the study indicated that although children with Down syndrome utilized similar vocabulary and learned language in a similar sequence to typical children, they developed language at a slower rate when compared to typical children.

Children with disabilities may face many challenges in the development of communication skills. Children with physical disabilities may find it difficult to use gestures or facial expressions to take turns in play routines, make eye contact, and direct the attention of others (Mirenda & Mathy-Laikko, 1989). In addition, some children with disabilities may experience motor challenges that impact their oral
and vocal movements (Bradford & Dodd, 1996). This may result in an inability to speak or affect the intelligibility of their speech (Bradford & Dodd, 1996).

Children with disabilities may also have cognitive impairments, which can result in difficulty learning communication skills (Bryen & Joyce, 1985). Children with cognitive impairments often demonstrate a smaller expressive as well as receptive vocabulary (Guess & Seigel-Causey, 1988). Speech is often challenging as well and may be restricted to only a few short words or phrases for some individuals (Guess & Seigel-Causey, 1988). For these children, spontaneous generalization of learned communication skills to a variety of environments may also be difficult (Campbell, Stremel-Campbell, & Rogers-Warren, 1985).

For children who experience difficulty with speech, including those with motor and cognitive challenges, augmentative and alternative communication (AAC) can be used (Light & Drager, 2007). It has been estimated that 12% of preschoolers who receive special education services require AAC to communicate (Binger & Light, 2006). The use of AAC has been demonstrated to benefit children with physical disabilities, autism, and developmental delays (Schlosser & Lee, 2000). AAC enhances communication and language development and notably it has also been found that AAC does not inhibit the development of speech, but rather may actually enhance it (Millar, Light, & Schlosser, 2006).

Support for communication development of children with CCN should focus on the same communicative functions as spoken communication (Cress & Marvin, 2003). For children with CCN, early communication behaviors to take turns or establish joint attention are often conveyed using less formal means of AAC such as
vocalizations, gestures, body posture, and/or facial expressions. Later more sophisticated messages (e.g., requesting attention, objects, and activities) are conveyed through formal means of AAC such as picture symbols, sign, and/or computers (Mirenda, Iacono, & Williams, 1990). Later in early childhood communication for children using AAC centers around social routines where children share information and/or comment about an activity or object (Cress & Marvin, 2003). In addition, children who use AAC communicate to greet others, make choices, request attention, objects, and activities, and fulfill social etiquette (Light, 1988; Reichle, Halle, & Johnson, 1993).

Learning to use AAC systems, however, differs from learning to speak in a number of ways. First, unlike typical children who hear models of speech from their communication partners throughout the day, children who use AAC often do not observe models of the use of AAC (Light, 1997). In addition, children may not have access to their AAC system at all times, but rather have access only during structured language activities (von Tetzchner, 1996). Limited access restricts the child’s ability to expressively communicate and learn to use the AAC system (Light, 1997). The structure of AAC systems is also very different from spoken language (Light & Drager, 2007). The representation of language concepts, layout and organization, navigation, selection techniques, and output of systems all differ from speech (Light & Drager, 2007). Within the AAC system, children may also lack access to the necessary vocabulary unless vocabulary is frequently updated to represent all words the child might want to use (Beukelman & Mirenda, 2005). These differences can pose learning challenges to the child using AAC, as well as
challenges for the communication partner (Light & Drager, 2007). Development and effective use of an AAC system by a young child typically requires ongoing intervention by the child’s communication partners (Light & Drager, 2007).

**Communication Partners**

Given the differences in developing communication skills using AAC, children who use AAC must have support from their communication partners to learn communication skills (Light, 2003; Otto, 2010). Communication partners may include family members, care providers, peers, teachers, and paraeducators. In addition, communication skills are best learned in the context of naturally occurring activities in which children already participate (Romski, Sevcik, Hyatt, & Cheslock, 2002). There are a wide variety of ways communication partners can support the development of new communication skills. First, communication partners can provide numerous communication opportunities (Hanline & Fox, 1993), and provide feedback when children make use of new communication skills (Bingham, Spooner, & Browder, 2007). Providing many opportunities to practice new skills and providing feedback when the skill is used has been shown to improve learning outcomes for children in a variety of educational areas (Rosenshine & Stevens, 1986).

**Play in Early Childhood**

Play is an activity that occurs frequently in early childhood (Lear, 1990), provides a natural context for learning communication skills (Gray, 1997; Patterson & Westby, 1994), and allows motivating opportunities for young children to communicate (Cooper & Holt, 1982; DeCoste, 1997). Odom and colleagues noted
that communication interactions are most frequently observed during play activities in early childhood settings (Odom, Peterson, McConnell, & Ostrosky, 1990). In addition, the Division on Early Childhood, a branch of the Council for Exceptional Children, encourages early childhood educators to provide play routines that are structured to promote social interaction and the development of communication skills (Sandall, McLean, & Smith, 2000).

Although play is widely recognized as an optimal time to engage children in learning new skills, developing play opportunities can be difficult for children with physical and cognitive challenges (Brodin, 1999). In order to best support language development during play activities, communication partners may need to structure the physical environment to aid participation (McEvoy & Odom, 1996). For example, the environment should be structured to allow the child to focus on the play activity. In addition, partners should ensure proper positioning of the child (i.e., child’s body is properly supported and they can reach the activity; McEvoy & Odom, 1996). It has also been noted that, children with disabilities may not participate during play or other activities if they have become passive due to learned helplessness (Seigleman, 1975).

In a descriptive study conducted by Light, Collier, and Parnes (1985a), eight children who used AAC ages 4 to 6 participated in play interactions with their primary caregiver. Children in the study used a variety of means to communicate. Each child had a communication board with Blissymbols, and children also communicated using vocalizations, gestures, and eye gaze (Light, Collier, & Parnes, 1985c). Results of the study indicated that primary caregivers dominated
communication interactions taking, on average, twice as many communication turns as the children (Light et al., 1985a). Typically children only responded to communication opportunities when they were obligated to do so (Light et al., 1985a). In the study, children communicated most often to request an object/action, request attention, confirm or deny, provide information, express themselves, and clarify (Light, Collier, & Parnes, 1985b). It was also noted in the study that it was difficult for the children to both play and communicate at the same time due to their motor challenges (Light et al., 1985a). However, subsequent research indicates that adults can encourage participation of children with physical disabilities during play when they provide support to help children learn play (Brodin, 1999) and communication skills (Hanline & Fox, 1993).

In a study conducted by Douglas and colleagues (2011), paraeducators were taught to support the communication of young children who used AAC during play activities. Results of the study indicate that training to paraeducators increased the number of communication opportunities offered by paraeducators. In addition, children also showed an increase in communication turns after paraeducators participated in the training.

**Instructional Considerations for Communication Partners**

Although there is clear recognition of the importance of partner behaviors, it has been noted that communication partners often engage in behaviors that limit communication opportunities (Light et al., 1985a; McNaughton & Light, 1989). Behaviors of concern may include dominating the communication interaction, asking primarily closed questions (Kent-Walsh & McNaughton, 2005; Light et al.,
1985a), and failing to recognize communication attempts (Mirenda et al, 1990).

Therefore, communication partners may require training to learn how to support the communication of young children with CCN (Light, Parsons, & Drager, 2002; Schlosser et al., 2000). Researchers have stated that training communication partners is essential to successful acquisition and use of an AAC system to support communication (Blackstone, 1990; DeCoste, 1997; Fletcher, 1997).

**Training communication partners.** Many researchers have emphasized the importance of training communication partners and have given suggestions about how training should be provided (Blackstone, 1990; DeCoste, 1997; Fletcher, 1997). Granlund and colleagues (1992) indicated training to communication partners is most effective when skills are taught through the use of models and role-play. Additionally, researchers have noted that communication partners should set goals (Bailey, 1987), practice skills, and receive feedback (Bartlett, 1983). Kent-Walsh and McNaughton (2005) suggested a model for communication partner instruction based on a strategy instruction model by Ellis and colleagues (1991). In the communication partner instruction model, an initial measure of communication skills is taken and commitment to participate in training is obtained. Then, the communication strategy is described and a method is provided to help the communication partner remember the steps of the strategy. Next, the strategy is demonstrated and communication partners are given opportunities to practice the strategy and receive feedback. Finally, a post-test measure is taken to ensure the strategy is implemented and generalization of the strategy to other settings is demonstrated.
Several research studies have made use of the steps included in the communication partner instruction model proposed by Kent-Walsh and McNaughton (2005). Binger and colleagues (2010) and Douglas and colleagues (2011) each conducted studies where paraeducator training was conducted following the recommendations of Kent-Walsh and McNaughton (2005). The results by Binger and colleagues (2010) indicated that all paraeducators implemented the strategies taught during training, and children increased the use of multi-symbol messages. In the study by Douglas and colleagues (2011) all paraeducators implemented the strategies taught during training and the two of three children in the study increased the number of communication turns taken. Additionally, a literature review of paraeducator communication training programs conducted by Douglas (2011) indicated that effective trainings provided to paraeducators included many components of strategy instruction as suggested in the Kent-Walsh and McNaughton model (2005).

**Training paraeducators.** Use of paraeducators in educational settings has increased dramatically in recent years (French & Pickett, 1997) and is especially common in early childhood settings (Hadadian & Yssel, 1998). Paraeducators are individuals who work in school settings under the supervision of a certified teacher (No Child Left Behind Act of 2001). Hofmeister (1993) noted that approximately 80% of services for students with disabilities are provided by paraeducators. As such, paraeducators are key communication partners of children with CCN (Binger et al., 2010).Paraeducators’ roles are also expanding (French, 1996) and now often include teaching communication skills (Carroll, 2001), including use of AAC under
the supervision of a certified teacher (Swengel & Marquette, 1997). In fact, in a study by Kent-Walsh and Light (2003), general education teachers noted that paraeducators are a crucial part of the team for children who use AAC.

Despite the increasing roles of paraeducators, researchers have noted that paraeducators often receive only limited training and often are not prepared to support the communication development of children with CCN (Giangreco, Broer & Edelman, 2002). In a study by Kent-Walsh and Light (2003), it was additionally noted by general education teachers that lack of skills by paraeducators was often a barrier to providing effective instruction. In a survey of paraeducators, paraeducators indicated that they needed more systematic, structured training to perform their jobs effectively (Riggs & Mueller, 2001). In addition, training in learning how to provide support for the development of communication skills by children was listed as a high priority by paraeducators (Riggs, 2001). When the Council for Exceptional Children created the paraeducator standards they also emphasized the importance of providing paraeducators with training to support the communication development of young children (see Council for Exceptional Children, 2004).

Some additional challenges have been noted when working with paraeducators and should be considered when providing training to paraeducators. First, paraeducator positions have been noted to have high turnover rates (Giangreco, Edelman, Broer, & Doyle, 2001). In a study conducted by Tillery and colleagues (2003), nearly half of paraeducators surveyed remained in their position as a paraeducator less than five years. As a result of high turnover, frequent training
opportunities may be necessary as new staff are hired, or as individuals change placements and work with other children (Calculator & Luchko, 1983). In addition, paraeducators often do not have funded in-service training days like other educational staff so scheduling training may be challenging (Carroll, 2001).

Researchers have made several recommendations regarding paraeducator training and providing training to adult learners in general. Adult learners, including paraeducators, often come with a strong background of personal and professional experiences and have individual areas of strength and weakness (Miller & Stayton, 1996). As a result, training should be individualized and focus on skills that will be valued by the paraeducator (French, 2003; Harchik, Sherman, Hopkins, Strouse, & Sheldon, 1989; Miller & Stayton, 1996). In addition, the content of the training should incorporate the practical needs of the paraeducator and build on already existing experience (French, 2003; Harchik et al., 1989). Training provided to paraeducators should also involve self-reflection so paraeducators become actively involved in assessing their own progress and achievement of desired goals (Fazey, 1993). In addition, as adult learners, paraeducators often have many responsibilities (e.g., family, friends, jobs, community obligations) so training should be flexible and consider time limitations (French, 2003; Wlodkowski, 1990).

As discussed by Kent-Walsh and McNaughton (2005) and reinforced in literature in the area of paraeducator training, training to communication partners, including paraeducators, should draw upon research on effective instruction generally and may include many components. First, paraeducators should be provided with instruction that is clear and well described (French, 2003; Kent-
Walsh & McNaughton, 2005). Next, paraeducators should receive a clear model or demonstration of skills that are taught (French, 2003; Kent-Walsh & McNaughton, 2005). After receiving a demonstration of the skills, paraeducators should be given the opportunity to practice the skills (e.g., through role play and with the person they support) and receive feedback (French, 2003; Kent-Walsh & McNaughton, 2005; Saloviita & Lehtinen, 2001). Feedback can occur through self-evaluation (Morgan & Ashbaker, 2001), or by using a coach (e.g., teacher supervisor; French, 2003). In addition, paraeducators should be taught to use skills in a wide variety of settings and situations to aid with generalization of trained skills (Kent-Walsh & McNaughton, 2005).

While there are many ways that communication partners can support the communication development of children, researchers have identified three key skills that are important for supporting the communication development of children with CCN. First, paraeducators should provide many opportunities for communication during the play activity (Fox, Dunlap, & Philbrick, 1997). Communication opportunities can be provided by asking children questions, commenting about what is happening, and allowing children to make choices (Downing, 2005; Light & Drager, 2010; Otto, 2010). By providing many opportunities for communication, paraeducators encourage children to become more active participants in communication interactions (Light et al., 1985a).

When paraeducators increase the number of communication opportunities, young children are more likely to take additional communication turns. In a study by Binger and colleagues (2010), communication training to paraeducators resulted
in more opportunities for communication and an increase in children’s use of multi-symbol messages during storybook reading. Similarly, Douglas and colleagues (2011) found that paraeducators who were provided communication training increased the number of communication opportunities they offered to children, and in turn two of three children also increased the number of communication turns taken.

In addition to providing opportunities for communication, paraeducators should consider how children with CCN will respond. This may include ensuring the child has access to an AAC system (Cress & Marvin, 2003; Light & Drager, 2010). Communication is often multi-modal (e.g., use of objects, gestures, sign), so the child should have access to all means required to convey a message (Blackstone & Hunt-Berg, 2003; Light et al., 1985c). Participation for children using AAC may also be enhanced by making adjustments to the AAC system (Johnson, Ingelbret, Jones & Ray, 2006). However, decisions regarding AAC systems for young children are typically made with a team of professionals with a speech language pathologist and special education teacher as key members of the team rather than by one individual (Bailey, Stoner, Parette, & Angell, 2006). Paraeducators may not have the independent authority to make changes to the system (e.g., add vocabulary), but should consider whether the child has physical access to an AAC system (Fallon, Light & Paige, 2001).

After providing an opportunity for communication, paraeducators should pause and wait for the child to respond (Downing, 2005; Klein, Cook, & Richardson-Gibbs, 2001; Light & Drager, 2010; Otto, 2010). Waiting allows the child to process
information, helps the child recognize that it is their turn to communicate, and provides the child time to formulate a response (Downing, 2005; Light & Drager, 2010). Binger and colleagues (2010) recommended that paraeducators wait five seconds after providing a communication opportunity to ensure the child has enough time to respond. A study by Lee, O’Shea, and Dykes (1987) supported the recommendation of a five second wait time when they noted that children with disabilities responded more frequently when five seconds were provided rather than one second. If paraeducators do not provide enough wait time, communication may be discouraged (Otto, 2010).

Lastly, paraeducators should respond to communication attempts by children with CCN (Allen & Hart, 1984; Cress & Marvin, 2003; Snell, 2002; Snyder & Sheehan, 1996; Zangari & Kangas, 1997). When partners do not respond to the communication attempts of children, children may become disinterested, withdrawn, or engage in challenging behaviors (Light & Drager, 2010; Mirenda, 1997). In addition, responding to communication increases the motivation of the child (Beukelman & Mirenda, 2005) and encourages further communication participation (Gray, 1997). Bingham and colleagues (2007) conducted a study in which they observed that when paraeducators increased their responsiveness to communication attempts by children who used AAC, the children in turn increased their participation in the interaction and their use of AAC.

Clearly there are a wide variety of skills that could be addressed in training communication partners. However, in this study a decision was made to first focus on providing opportunities, waiting, and responding with the goal that other skills
(e.g., modeling the use of the AAC system, modeling the use of specific language structures) could be introduced later to communication partners after mastery of initial skills was achieved.

**Online Learning**

Like other adult learners, paraeducators may prefer learning new skills in a training environment in which instruction is individually paced, and in which the training is provided at a convenient time and location (Lewis, 1990). Online learning environments are one means of providing training that appears well suited to the needs of paraeducators and other adult learners. Online learning is defined as the use of internet-based technologies to enhance knowledge and performance of learners (Rosenberg, 2001). Online learning has been described as a good match for adult learners because it is individually paced and can provide a flexible learning environment where paraeducators can complete training at a pace that benefits their learning and at times that are convenient (Huang, 2002). In addition, online learning can help reach groups who have specific needs (Collins, Schuster, Ludlow, & Duff, 2002), or individuals who live across large geographic locations, who otherwise may not be able to meet together. In addition, online learning can be designed so the learner is provided with multiple video models of target behaviors (Whalen, Massaro, & Franke, 2009). Online learning can also provide a means for learners to be actively involved in the learning process, interact with the learning materials, and be provided with multiple checks for understanding (Bills, 1997; Lebel, Olshtain & Weiss, 2005).
Given the characteristics of adult learners and paraeducators, several considerations should be made when designing online training for paraeducators. First, training should be structured to minimize the complexity of the task being learned (van Merrienboer, Kirschner, & Kester, 2003). Second, the online environment should be structured to ensure that learners master material presented (Lim, 2004) rather than simply scanning through materials. These goals can be accomplished by providing scaffolded supports in the online environment where models, prompts, questioning, and feedback are utilized to provide support and feedback to learners as they master content (van Merrienboer et al., 2003). In many training situations, learners also are provided with expert feedback on their performance of a skill. In this study, learners were provide with feedback on their analysis of video case studies, but were not directly observed or given feedback on their performance of the target skill.

Research Questions

Children frequently interact with paraeducators. However, many paraeducators have not received training to know how to best support the development of communication skills by children with CCN. There is a clear need to identify instructional interventions for paraeducators that are effective, efficient (for both paraeducators and the instructor), and socially valid. This study used a single subject multiple baseline design across three dyads (i.e., one paraeducator and one child per dyad) to answer the following research questions: (a) What is the effect of online training to paraeducators on the number of communication opportunities with wait provided by paraeducators during play activities with children with CCN;
(b) What is the effect of online training to paraeducators on the number of communication turns taken by children with CCN during play?; and (c) What is the effect of online training to paraeducators on the number of responses to children by paraeducators during play?

In addition to the three research questions listed, supplementary measures were taken to determine the maintenance and generalization of dependent variables, as well as the social validity of the online training. Generalization data were collected during art or storybook reading sessions during baseline and maintenance. Maintenance data were collected to determine the impact of the intervention on dependent variables over time. Finally, social validity measures were taken in the study to determine the perceived effectiveness of the online instruction by paraeducators.
CHAPTER TWO

Method

Research Design

A single subject multiple baseline probe design (Holcombe, Wolery, & Gast, 1994) was utilized in this study across three dyads (i.e., one paraeducator and one child with CCN per dyad) to measure three dependent variables. The primary dependent variable for the study was the number of communication opportunities with wait provided by paraeducators to children with CCN during a play activity. Two secondary dependent variables were also measured in the study. The first was the number of communication turns taken by the children with CCN. The second was the number of responses provided by paraeducators to the child.

The study consisted of three phases: baseline, training, and maintenance. During baseline paraeducators participated in play sessions with children while data were collected on the dependent variables. After a stable baseline for the primary dependent variable was established for the first paraeducator (i.e., less than 25% variability for number of communication opportunities with wait provided by paraeducators for three or more consecutive data points and a downward or stable trend; see McReynolds & Kearns, 1983) training was started. Training was conducted online and each paraeducator participated in training independently. Paraeducators remained in training until they had completed all training modules, and demonstrated an increase of at least 25% in communication opportunities with wait provided to the target child during a practice play session (see Kent-Walsh, 2003). After the first paraeducator completed training and maintained performance
for at least three sessions during maintenance, the next paraeducator (i.e., Dyad B) entered training. This pattern continued until all paraeducators completed training.

During the study, data were also collected for generalization. Paraeducators were asked to pick either storybook reading, or an art project as a generalization activity. One generalization session was conducted in baseline and one in maintenance. Depending on the paraeducator’s initial selection, the same type of activity was used in both baseline and maintenance sessions for generalization (i.e., storybook reading or art).

**Setting**

The study was conducted at early childhood centers in Central Pennsylvania in three separate classrooms. Two of the classrooms were Headstart classrooms where both children with and without disabilities received early childhood educational services (i.e., Dyad A and C). The other setting, for Dyad B, was an early childhood center that utilized reverse inclusion where children without disabilities served as peer models for children with disabilities (Schoger, 2006). Based on the preferences of administrators at the early childhood centers, sessions for Dyad A and C were conducted in the classroom setting and sessions for Dyad B were conducted in a therapy room at the center. Because of breaks in the school schedule for Dyad C, two sessions (i.e., 5 and 13) were conducted outside of the school setting, at another early childhood center with which the child was familiar, with parental and paraeducator approval. These sessions were conducted in a therapy room at the center.
Participants

Three paraeducators and three children with CCN participated in this study. Paraeducators were in dyads with the child they supported (i.e., one paraeducator and one child). In order to form a dyad for this study, consent was obtained for both the paraeducator and the child with CCN. Consent was obtained for four dyads, although only three completed the study. Increases in other work activities prevented the fourth paraeducator from participating in the research study.

Selection criteria. Directors of early childhood programs in Central Pennsylvania were contacted and spoke with speech language pathologists who provided services at early childhood centers to identify potential participants for this study. Directors and speech language pathologists were asked to nominate paraeducators who (a) provided assistance to a child age 3 to 6 who had CCN (i.e., speech alone did not meet daily communication needs); and (b) worked in an early childhood setting. Nominated paraeducators were approached in person and invited to participate in the study. After consent was obtained from the paraeducator, a letter was sent home to the parent/guardian of the child they supported inviting the child to participate in the study. Children were eligible for the study if (a) they were 3 to 6 years of age; (b) they received services from a speech language pathologist in the preschool setting; (c) speech alone did not meet the child’s daily communication needs; and (d) they required AAC and/or frequent prompting from others to communicate. A determination regarding eligibility was made based on reports gathered from early childhood center directors, speech
language pathologists (i.e., completion of Communication and Language Skills Questionnaire), parents, and classroom teachers.

**Background information.** Before the start of the study, paraeducators and the parents of child participants completed demographic questionnaires to gather background information about participants (see Appendix A, B). For paraeducators, information was gathered about the age of the paraeducator, years of experience, and education. For children, information was gathered about the child’s age, disability, and communication skills. In addition to the questionnaires completed by paraeducators and parents, the speech language pathologist providing services to each child participant completed a Communication and Language Skills Questionnaire (see Appendix C). Student files were also reviewed to gather background information on present levels of performance and educational goals. Pseudonyms are used throughout to protect the identity of all participants.

**Dyad A (Tara and James).** Tara, age 20, had earned a high school diploma. She had two years of experience working with children with disabilities, and two years experience working in her current preschool setting. She had been working with James for almost a year at the start of the study. Prior to the start of the study, Tara received approximately 40 hours of training through her preschool agency in behavior management, social emotional development, health and safety, and the classroom curriculum utilized by the agency.

James was five years, four months old at the start of the study. He was diagnosed with autism by a psychologist when he was three years old. His vision and hearing were reported to be within normal limits. At the start of the study, the
speech language pathologist for James reported that he understood and followed most directions that were part of the classroom routine (e.g., “Go to the art center”). He also responded to and recognized his name. In addition, when prompted (e.g., shown an object), he could state the name of many objects, the names of his family members, and the names of many animals. He was also able to follow simple one step directions (e.g., “Put the puzzle away.”), and would typically respond to simple questions (e.g., “What color of paper do you want?”) in a variety of classroom situations although he often required multiple prompts to respond. James struggled most in the area of expressive communication. However, he was able to communicate using two to three word messages with speech and gestures (e.g., saying “I want” while pointing to a desired toy, saying “There Miss ___” while pointing to teacher/therapist). In addition, James often required prompts and/or highly motivating activities to communicate.

In addition to speech, James frequently used gestures and/or objects to convey messages. When James communicated to express his wants and needs, he typically used speech and handed objects to his communication partner (e.g., “I want open” while handing packaged food to his partner). In the area of social closeness, James would typically make eye contact with his partner and/or provide an object of interest to initiate social interaction. James struggled with communication most in the areas of social etiquette and sharing information. He required prompting to fulfill all social etiquette routines (e.g., a teacher tells him “say thank you”), and he did not share information with others. Communication goals for James included
working on increasing his expressive vocabulary and answering who, what, where, and when questions.

In the area of cognitive development, James was able to match items when provided with a target item and two to three choices. He also could state the names of most letters of the alphabet when shown the letter. Educational goals included increasing his attention span. In the area of social development, James rarely initiated social contact with his peers and usually did not make eye contact with peers. However, if adults first greeted him, he would make eye contact and greet the adult (e.g., “hi”). James also received occupational therapy services at the early childhood center. In the area of fine motor skills, James was working on his writing grasp, learning to trace letters, learning to write his name legibly, and working on cutting skills.

**Dyad B (Rebecca and Hannah).** Rebecca, age 21, was a college student studying biology. She had been working with Hannah for 2 weeks at the start of the study and had no prior experience working with children with disabilities. She received 2 hours of training at the start of her employment that included basic information about the IEP, supporting therapy goals, and expected responsibilities as a paraeducator. In addition, she talked informally with therapists to learn how to best support Hannah.

Hannah was four years old at the start of the study. She was diagnosed with a developmental delay in cognition and gross motor skills. Hannah was also diagnosed with a moderate bilateral hearing impairment (55 dB unaided) and wore hearing aids, which were reported to provide correction to the mild hearing
impairment level (30 dB aided). Her vision was reported to be within normal limits. In the area of receptive communication, Hannah responded when her name was called, and would look for family members when their names were mentioned. However, she was unable to follow most simple directions (e.g., “give me the block”) or provide names for most objects using speech or sign. Expressively Hannah communicated using sign language, by reaching for or looking at objects, and through gestures. Hannah’s speech language pathologist reported that Hannah had been observed to produce up to ten signs, but only made use of a few signs on a regular basis (i.e., eat, drink, up). Hannah’s spoken language was rarely understood. Hannah primarily looked at or reached for objects, and signed (e.g., eat, up) to express her wants and needs. In order to express social closeness, Hannah would grab her partner, vocalize, smile, or laugh. Hannah did not communicate to share information or to fulfill social etiquette. Educational goals for Hannah included goals to increase her use of sign during structured play and to learn a wider range of communicative functions (i.e., protest, request).

In addition to receiving speech services at the early childhood center, Hannah also received occupational and physical therapy. Her team was also working on developing cognitive and social skills. In the area of cognitive and social development, Hannah engaged in parallel play with peers (e.g., played with blocks next to a peer but did not interact with the peer). Educational goals included encouraging Hannah to play with toys functionally, (e.g., roll a car across the floor rather than hitting two cars together) and to interact with peers more often. In the area of gross motor development, Hannah was learning to “combat crawl”, walk
with support, kneel, and stand for a couple of seconds independently. In the area of fine motor development, Hannah was learning to grasp objects, weight bear on her arms, and place objects in containers.

**Dyad C (Linda and Jack).** Linda, age 53, held a Master’s degree in counseling psychology. She had 18 years of experience supporting children with disabilities and had worked for about a year in the current preschool setting. Prior to the start of the study, Linda had attended approximately 20 hours of training to learn sign language, and four hours of online training regarding her student’s AAC device. She also talked informally with therapists to learn how to best support Jack.

Jack was five and a half years old at the start of the study. He was diagnosed with a developmental disability, and gross motor delay. Educational records noted he also had a hearing impairment (i.e., profound loss in his left ear, moderate loss right ear) and wore hearing aids to improve his hearing. In addition, he had a visual impairment, which was reported to be corrected with glasses. In the area of receptive communication, Jack’s responses were often inconsistent. However, when partners provided both speech and sign, Jack often responded to his name by looking at his partner. He also responded to the names of familiar objects, and the names of some animals by either reaching for the object or animal mentioned or signing the name of the object or animal. When engaged in a motivating play activity (e.g., Mr. Potato Head), Jack often responded to simple one-step directions (e.g., “Put it away”).

Jack communicated using sign language, pictures, voice output devices, speech approximations, gestures, and facial expressions. His speech therapist
reported that his speech was very difficult for others to understand. Jack’s expressive communication was often inconsistent and dependent on his motivation for the activity as well as his motivation to interact with the communication partner. At times he would communicate to express his wants and needs by looking at objects, pointing to pictures, handing objects to his partner, and using a computerized AAC system or sign language. Jack did not communicate to share information, or to express social closeness. Occasionally Jack would sign “thank you” as a form of social etiquette, but he also used the sign inappropriately. For example, he often signed “thank you” when he greeted people. Jack typically required multiple prompts from others to respond to communication opportunities. In the area of communication, Jack’s IEP goals included learning to answer questions, make eye contact, identify objects, direct activities, wait his turn, participate in conversation, and make requests.

In addition to receiving hearing and speech services at the early childhood center, Jack also received occupational and physical therapy. His team was also working on developing social skills. In the area of social development, Jack was learning to establish and maintain social contact with his peers. In the area of gross motor development, Jack was working on maintaining balance, jumping, and stepping over obstacles. In the area of fine motor development, Jack was learning to cut paper, and trace with a writing utensil.

**Procedures**

This study was conducted in three phases: baseline, training, and maintenance. Each dyad participated in all phases of the study.
Baseline. In baseline, paraeducators and children were observed during at least five play interactions and one generalization session. Play and generalization sessions were analyzed to determine baseline levels for the dependent variables for the study (i.e., number of communication opportunities with wait provided by paraeducators, number of communication turns taken by children with CCN, number of responses by paraeducators). Dyads remained in baseline until stability for the primary dependent variable (i.e., communication opportunities with wait provided by paraeducators) was established (i.e., less than 25% variability for number of communication opportunities with wait provided by paraeducators for three or more consecutive data points and a downward or stable trend).

Training. Training was completed online using materials developed with Adobe Captivate software (Adobe Systems Incorporated, 2010). Training was password protected to ensure experimental control and limit the likelihood of diffusion. Prior to training, paraeducators completed a pre-training questionnaire with open-ended and yes/no questions (see Appendix D). The questionnaire was designed to ensure paraeducators had the required technology and skills to complete the training. Through completion of the questionnaire, all paraeducators indicated they had the required technology and skills to complete the training. When paraeducators started the training phase of the study, they were provided a binder of training materials (i.e., instructions, training notes, and practice papers to memorize the mnemonic; see Appendix E, F, G). The same training materials were also accessible online where the training was located. During the training, paraeducators independently completed five modules online. As part of training
each paraeducator completed a series of questions at the end of each module (see Appendix F). The questions addressed memorization, recognition, and application of the strategy (Kent-Walsh & McNaughton, 2005). In addition, the questions directed paraeducators to identify the use of the strategy in videos of adults playing with young children. During training, paraeducators created a plan for application of the strategy to their target child. At the end of each module, the completed questions were then emailed to the researcher for review to ensure acquisition of key skills in training. Any errors were reviewed within 24 hours with the paraeducator via email.

After the five modules were successfully completed, paraeducators participated in a practice play session with their target student. The play session was conducted in the same manner as baseline play sessions. However, paraeducators were (a) observed by the instructor and (b) given an opportunity to ask questions after the play session to clarify how to implement the strategy. After the play session, the paraeducator completed a reflection (see Appendix H). The reflection made use of a Likert scale where they could note their use of each step of the strategy during the play session (i.e., Provide opportunities for communication, Wait for child’s communication, Respond to child’s communication) and indicate desired changes for future play sessions. Table 1 provides details about the training content, format, and approximate time required to complete each training module.

Training content. The content of training was driven by research in the area of early childhood development and communication. Additionally, training content
<table>
<thead>
<tr>
<th>Module</th>
<th>Training content</th>
<th>Training format</th>
<th>Time</th>
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| Module 1 | • Introduction and rationale for strategy  
• Description and video demonstration of PoWR strategy  
• List of strategy steps | • Online webcast with embedded videos  
• Training notes | 10 min. |
| Module 2 | • Test of PoWR strategy mnemonic memorization  
• Description and demonstration of *Provide opportunities for communication*  
• Identification of strategy step in videos | • Online webcast with embedded videos  
• Training notes | 15 min. |
| Module 3 | • Description and demonstration of *Wait for child’s communication*  
• Identification of strategy step in videos | • Online webcast with embedded videos  
• Training notes | 10 min. |
| Module 4 | • Description and demonstration of *Respond to child’s communication*  
• Identification of strategy step in videos | • Online webcast with embedded videos  
• Training notes with questions | 12 min. |
| Module 5 | • Use of strategy together  
• Practice reflections | • Online webcast with embedded videos  
• Training notes with questions | 15 min. |
| Play session | • Practice play session to implement PoWR strategy  
• Completion of a reflection after session | • 15 min play session with question time at end | 15 min. |
was based on research in the area of communication partners as summarized by Light and Drager (2010). Paraeducators were taught the PoWR strategy. Step one, *Provide opportunities for communication*, included teaching paraeducators to provide multiple communication opportunities to their target child by asking questions, commenting about the activity, and providing choices (Fox et al., 1997). During the second step, *Wait for child's communication*, paraeducators learned to wait for at least five seconds after offering a communication opportunity so the child had adequate time to respond (Downing, 2005; Klein et al., 2001; Otto, 2010). The final step, *Respond to child's communication*, taught paraeducators to respond verbally or by providing a requested item when the child communicates, even if the communication is unclear (Allen & Hart, 1984; Cress & Marvin, 2003; Snell, 2002; Snyder & Sheehan, 1996; Zangari & Kangas, 1997). If the child did not communicate after five seconds, the paraeducator was taught to provide another opportunity for communication.

**Instructional Strategies.** Training was created following the recommendations of Kent-Walsh and McNaughton (2005) for communication partner instruction, and was adapted for use in an online environment. The training included adaptations to the eight instructional stages outlined by Kent-Walsh and McNaughton (2005); pretest and commitment to instructional program, strategy description, strategy demonstration, verbal practice of strategy steps, controlled practice and feedback, advanced practice and feedback, posttest and commitment to long-term strategy use, and generalization of targeted strategy use. All steps of the model were conducted online with the exception of the pretest (e.g., baseline play
sessions), commitment (i.e., obtained first when paraeducator consented to participate in the study and again when paraeducators accessed online materials), post test (e.g., maintenance play sessions), and generalization (e.g., generalization sessions). Training utilized a webcast format where paraeducators watched a series of instructional presentations. The online environment was structured to provide scaffold supports with models, prompts, questions, and feedback (van Merrienboer et al., 2003) and was structured to ensure learners mastered materials presented (Lim, 2004). Training also provided video examples, written scenarios to apply concepts, tests to ensure mastery of the strategy, and application exercises to promote generalization of learned strategies to the target child. In addition, scaffolded supports (i.e., feedback, expert responses, review, and application) were built into the training to ensure paraeducators received support as they learned and applied the strategy with practice scenarios (see Brandt, Farmer, & Buckmaster, 1993). However, unlike traditional strategy instruction, feedback was not provided in person given the online nature of the training.

Training format. Paraeducators completed five modules of training online (see Table 1). Modules varied in length from 10 to 15 minutes. Each module included notes, which provided multiple choice, fill in the blank, and open-ended questions that were asked during training modules (see Appendix F). Paper copies of notes were provided to paraeducators at the start of training and were also available online. Paraeducators were prompted throughout the modules to stop the session and respond to questions. Completed notes for each module were emailed by paraeducators to the researcher for review to ensure acquisition of key skills in
training. Any errors were discussed with the paraeducator via email within 24 hours.

The modules included the following components: (a) PowerPoint slides accompanied by narration from the instructor; (b) brief video clips embedded into the presentation of paraeducators using the target skills with a young child with CCN; (c) quiz questions to confirm knowledge of the strategy steps; and (d) application activities in which paraeducators were directed to consider the application of the strategy for children viewed in video clips, and for their target child. The first module introduced paraeducators to the PoWR strategy (Provide opportunities for communication, Wait for child’s communication, Respond to child’s communication). The training began with a PowerPoint presentation narrated by the researcher describing the importance of communication, and briefly detailing reasons young children communicate. Next, the PoWR strategy was introduced and information on the benefits of learning and using the PoWR strategy were provided. Then each step of the strategy was briefly discussed including a definition of each step and a video illustrating the use of the PoWR strategy by a paraeducator with a young child. The module ended with a review of the steps where paraeducators were asked to recall the steps discussed and list them in their notes. Finally, paraeducators were encouraged to memorize the strategy before beginning the next module. The first module took approximately 10 minutes to complete.

The second module began with a quick review of the PoWR strategy steps discussed in the previous module using a PowerPoint presentation and narration from the instructor. Then a test was conducted to ensure memorization of the
PoWR strategy mnemonic where paraeducators filled in the blanks to list the steps of the PoWR strategy in their Module 2 notes. Paraeducators were instructed to stop the session, review, and return to retake the test if they were not successful in listing the PoWR strategy steps. After successful test completion, the first step of the strategy, *Provide opportunities for communication*, was discussed. First a description of the step was provided. This included directing paraeducators to ask questions, provide choices, and comment about what is happening when interacting with their target child. Then a brief description of the use of AAC was provided, including a description of different types of AAC systems. During this time paraeducators were prompted to identify the AAC system currently used by their target child and encouraged to provide the AAC system so their target child would be able to communicate. Next a video illustration of a paraeducator using the first step of the strategy with a young child was shown. Following this video the paraeducator was then directed to identify the use of the first step of the strategy in another video of an adult and a young child playing. Numbers appeared on the screen as the video was shown and paraeducators were directed to list the number displayed on the screen in their notes when the step was used. At the end of the session the strategy step was reviewed using a PowerPoint presentation and narration from the instructor. Then paraeducators answered questions in their notes about how to use this step with their target child. At the end of the session, Module 2 notes were emailed to the instructor (researcher) and were then reviewed by the instructor for accuracy.
During the third module the second step of the strategy, *wait for child’s communication*, was described using a PowerPoint presentation with narration from the instructor. Then the step was demonstrated through a short video of a young child and paraeducator playing. The instructor then discussed the use of the target strategy in the video. Next, the paraeducator identified the use of the second strategy step, in two videos of young children and adults playing, by listing the number displayed on the video when the step was shown in their notes. Then, paraeducators completed two scenarios to indicate how they would wait for communication from a child they saw in earlier videos after they offered a choice, or asked a question during a play activity. Finally, paraeducators completed questions in their notes about how they would apply the step with their target child (e.g., “How long should you wait for your child to communicate?”), and why providing wait time is important (i.e., “Why is it important to wait for your child to communicate?”)

The fourth module began with a PowerPoint presentation with narration from the instructor and a description of the final step of the strategy, *respond to child’s communication*. Then a short video clip was shown of a paraeducator responding to a young child’s communication. Next, paraeducators identified use of the step in two video examples by listing the number that appeared on the screen when the third step of the strategy was used. Then, paraeducators responded to two scenarios of children shown in earlier videos and described how they would respond to the child’s communication mentioned in that scenario. Next, paraeducators answered questions about responding to the child’s communication
in their notes (e.g., “What does it mean to respond to the child’s communication?”).

Then the third step, *respond to child’s communication*, was reviewed by the instructor. At the end of the module the instructor reviewed the whole PoWR strategy (i.e., provide opportunities for communication, wait for child’s communication, respond to child’s communication).

In the fifth and final module, paraeducators completed three scenarios to indicate how the PoWR strategy could be used during a specific activity. The scenarios included an art activity, music activity, and play dough activity with children seen in videos from earlier Modules. During the scenarios, paraeducators completed a PoWR chart for the scenario (see Appendix F). In the first scenario, two steps were filled in and paraeducators completed the other step. The missing step was then reviewed. In the second scenario, paraeducators completed two steps independently and the missing steps were reviewed. In the third scenario, paraeducators completed all steps independently and then all steps were reviewed.

Next, paraeducators created a plan for use of the PoWR strategy with their target child. Finally, paraeducators learned how to complete PoWR strategy reflections. For each reflection, a Likert scale was completed to indicate how well each step of the strategy was implemented (see Appendix F Module 5 question 5 for scale used). In addition, questions were asked where paraeducators indicated what went well, and what could be done differently. For the first reflection, a video was shown and the instructor provided a step-by-step model of the completion of the reflection. Then a second video was shown and paraeducators practiced completing the PoWR
reflection. This completed reflection was then reviewed. This process was then repeated with one more video and reflection.

Following the completion of online training, paraeducators implemented the plan they created in Module 5 for their target student during a training play session. After this play session paraeducators completed a reflection on the session and their implementation the PoWR strategy with the target student (see Appendix H). Reflections were given to the researcher after the session. Paraeducators completed training when they demonstrated sufficient change in the primary dependent variable (i.e., at least 25% increase in communication opportunities with wait from baseline mean for at least one session). All paraeducators demonstrated a change in the number of communication opportunities with wait provided after the “in training” play session. If paraeducators had not demonstrated change during a single practice play session, additional practice sessions would have been provided to allow them to reach the desired criterion (i.e., 25% increase in communication opportunities with wait over baseline mean).

**Maintenance.** During maintenance, play sessions were again conducted to measure the dependent variables. Play sessions were conducted in the same manner as baseline play sessions. Dyads each had a minimum of five data points collected in maintenance. One session was also conducted during maintenance for the generalization activity that was chosen during baseline (i.e., art or storybook reading). For Dyad A (Tara/James), maintenance sessions were conducted 1, 2, 3, and 6 days after training was completed. Two data points were conducted 2 days after training was completed (i.e., one at the beginning of class and one at the end of
class) as school was ending and James was changing placements. Maintenance sessions for Dyad B (Rebecca/Hannah) were conducted 1, 2, 4, 7, 8, 29, and 43 days after training was completed. Maintenance sessions were conducted for Dyad C (Linda/Jack) 2, 7, 8, 9, and 13 days after training was complete.

**Measures**

Data on three measures were taken during this study. The primary dependent variable for the study included the number of communication opportunities with wait provided by paraeducators to children with CCN. Two secondary dependent variables were also taken; paraeducator responses to child behavior, and communication turns taken by children with CCN.

**Data collection.** Play sessions throughout the study were video recorded and analyzed to determine the number of communication opportunities with wait provided by paraeducators, the number of communication turns taken by children with CCN, and the number of responses to child communication turns provided by paraeducators. A video camera was mounted on a tripod and the researcher remained in the room throughout the play session to adjust the camera as the dyad moved during play. The researcher made an effort to be unobtrusive during the play sessions. In addition, the researcher did not provide instruction during play or generalization sessions, and did not initiate conversation with the child or paraeducator. Paraeducators did not initiate conversation with the researcher during play or generalization sessions. Play sessions were approximately 15 minutes in length and ended at a natural break in play activity. Play sessions were standardized for all phases of the study (i.e., baseline, training, maintenance, and
generalization) using the following procedures outlined by Douglas and colleagues (2011). To account for reactivity, the first minute of the interaction was not analyzed. Minutes two through 13 were then analyzed for dependent variables.

Procedural Reliability. Paraeducators all had access to the same content during training. In addition, to ensure completion of online training modules, emails were sent by the paraeducator to the researcher to indicate completion of each training module and included answers to questions from the module. All paraeducators sent emails with answered questions for each module. The researcher reviewed the answers to ensure mastery of the strategy steps. Any errors were discussed with paraeducators via email within 24 hours to ensure they understood the content of the training. While there are no data to provide evidence that paraeducators attended to or viewed the entire training sessions, they all had equal opportunity to view the materials. In addition, their completion of the module notes demonstrated their knowledge of the material discussed in the training (i.e., all paraeducators completed module notes with at least 98% accuracy). Procedural reliability measures were also taken during play sessions to ensure uniformity within the study (see Appendix I). A series of questions were addressed to ensure the researcher captured the play/generalization interaction appropriately (i.e., researcher had both paraeducator and child in view of the camera), and to ensure the researcher was not involved in the play/generalization session (e.g., the researcher did not remained out of play interaction). Treatment fidelity for play and generalization sessions was 100%.
**Data analysis.** In this study, videos of play sessions were analyzed using Studiocode video analysis software (Sportstec Limited, 2011). A specific coding window was developed in the program to assist coders in collecting a frequency count of communication opportunities with wait and responses by paraeducators, and communication turns taken by children with CCN. Coders followed specific coding rules and behavioral definitions established for this study when coding behaviors.

**Coding.** Data were analyzed to measure the number of communication opportunities with wait paraeducators provided, number of responses by paraeducators, and the number of communication turns taken by children with CCN during each play session. Data were coded using the following definitions. A *communication opportunity with wait by the paraeducator* included a comment, question, or choice directed to the child with wait time of at least five seconds or a response from the child before five seconds elapsed (adapted from Light et al., 1985a). A *response* by the paraeducator included acknowledgement of a communicative message (e.g., paraeducator states “oh, you want the apple” when child reaches for an apple), comment on behavior of child following a direction (e.g., paraeducator says “great job cleaning up” when child follows a direction to clean up), and/or fulfilling the intent of the message within three seconds of child behavior (e.g., child asks for play dough and paraeducator provides child with play dough; see Bingham et al., 2007). A *communication turn* by a child with CCN included a message using speech or AAC (e.g., computer system, pictures, selecting
an object when given a choice) directed to the partner with a turn ending when the child paused for three or more seconds (adapted from Light et al., 1985a).

**Inter-rater reliability.** Using the Studiocode software (Sportstec Limited, 2011) and behavioral definitions, two independent coders analyzed data from play and generalization sessions. Training was provided for inter-rater reliability until the coders reached at least 90% agreement for all dependent variables for two consecutive sessions. In addition, due to background noise in videos, transcripts were also provided for coders for all verbal behavior to aid with analysis. Transcripts were created live in the classroom as behaviors were videotaped and checked for accuracy by the coders. Any discrepancies in transcripts noted by coders were discussed until agreement was reached.

Sessions used for reliability measures were randomly selected from each phase of the study and from each dyad. Inter-rater reliability was calculated by taking the number of agreements divided by the number of agreements plus disagreements then multiplied by 100 to get a percentage of agreement (Kazdin, 1982). Inter-rater reliability was measured for 30% of the play sessions and was measured using point-by-point agreement. Inter-rater reliability averaged 91% for opportunities for communication by paraeducators (range 87% to 98%), 96% for child communication turns (range 86% to 100%), and 92% for responses by paraeducators (range 83% to 100%). When reliability agreement dropped below 90% for a behavior, coders met and the researcher provided clarification of coding rules for areas of disagreement. All disagreements were discussed until agreement was reached.
**Graph analysis.** Data were graphed and analyzed visually for level, trend, and variability (Kennedy, 2005). Data were also analyzed for percentage of non-overlapping data (PND). PND provides a percentage for data that overlap from baseline to other phases to help determine treatment effectiveness (Scruggs & Mastropieri, 1998). However, while PND is sensitive to changes in level between phases, it does not detect changes in slope (Allison & Gorman, 1993). Thus, PND should be used in conjunction with visual analysis (Parker & Hagan-Burke, 2007).

**Social validity.** Questions of social validity can include information about the impact of the intervention as perceived by the individual who received the intervention (Schlosser, 1999). In this study, a training evaluation was completed by paraeducators at the end of the study to measure the perceived impact of the training by paraeducators. The training evaluation included the following questions:

- What were some benefits of this training program?
- Is there anything you would change about the online training or the strategy you learned?
- Did you have any technical problems?
- Did you notice any changes in the communication of the child you support?
- Would you recommend this training to other paraeducators? Why or why not?
- Do you have any other comments?
CHAPTER THREE

Results

Results from this study suggest that online training to paraeducators in communication interaction skills (i.e., providing opportunities for communication, waiting for child’s communication, and responding to child’s communication) had a positive effect on the number of communication opportunities with wait provided by all paraeducators. The results of this study also indicate that following the paraeducator training, the children took an increased number of communication turns. In addition, the number of responses provided to children with CCN increased for all paraeducators.

Behaviors in Play Sessions

Following training paraeducators demonstrated an increase in the number of communication opportunities with wait provided during play sessions when compared with baseline performance. In addition, all paraeducators provided more responses to children when comparing mean levels during maintenance to baseline. When comparing baseline mean levels to maintenance mean levels, there was also evidence of a change in the number of communication turns taken by children. However, increases varied between children.

Paraeducator communication opportunities with wait. Tara, of Dyad A, in 12 minutes of interaction provided a mean of 45 communication opportunities with wait (range 37 to 57) to James in baseline (see Figure 1). Data for communication opportunities with wait in baseline were variable, however the last
Figure 1

*Paraeducator Communication Opportunities with Wait*
three baseline points were stable and a descending trend was noted. In the single play session conducted during training, Tara provided 71 communication opportunities with wait. During maintenance Tara provided a mean of 70 communication opportunities with wait (range 60 to 90). PND for communication opportunities with wait for Dyad A was 100% during the maintenance phase.

During baseline, Rebecca, of Dyad B, provided a mean of 29 communication opportunities with wait (range 21 to 35) to Hannah. During baseline, a descending trend was noted with limited variability. During the single play session conducted during training, 40 communication opportunities with wait were offered. The mean for communication opportunities with wait during maintenance was 41 (range 32 to 48). PND was 86% during maintenance for communication opportunities with wait for Rebecca.

Linda, of Dyad C, provided a mean of 27 communication opportunities with wait (range 19 to 34) to Jack during baseline. Baseline data remained stable with limited variability. No trend was noted during baseline. During the single play session conducted during training, Linda provided 46 communication opportunities with wait. During maintenance the mean was 41 (range 37 to 45) communication opportunities with wait. PND for communication opportunities with wait was 100% for maintenance.

**Child communication turns.** James, Dyad A, had an average of 20 communication turns (range 13 to 43) during baseline for play sessions (see Figure 2). During baseline, the number of communication turns taken by James was highly
Figure 2

*Child Communication Turns*
variable. During a single play session in training James took 33 turns. In maintenance, James took an average of 45 communication turns (range 35 to 57). During maintenance, data were less variable in addition to the higher levels. For James PND for communication turns when comparing baseline to maintenance was 50%.

Hannah of Dyad B took an average of 2 communication turns (range 0 to 7) during baseline for 12-minute play sessions. Hannah's baseline was stable for communication turns with one high point at the end of baseline. The number of communication turns taken by Hannah was 11 during the single play session in training. During maintenance, the average number of communication turns taken by Hannah was 7 (range 2 to 11). When comparing play sessions in baseline to maintenance play sessions, PND for communication turns for Hannah was 29%.

Jack, Dyad C, had an average of 3 communication turns (range 1 to 8) in baseline. Jack's baseline was stable with limited variability. During the single play session in training he took 6 communication turns. His communication turns rose to a mean of 11 in maintenance (range 3 to 19). During maintenance data were variable. PND for the number of communication turns taken by Jack was 50% when comparing baseline with maintenance.

Paraeducator responses. Tara, Dyad A, responded an average of 23 times during baseline (range 7 to 40; see Figure 3). During the single play session in training, 42 responses were provided. During maintenance, a mean of 46 responses (range 40 to 58) were provided. During baseline and maintenance, responses were
Figure 3

Paraeducator Responses
variable, but generally mirrored child communication turns. PND for responses was 100% when comparing baseline to maintenance.

Rebecca, of Dyad B, had an average of 3 (range 0 to 8) responses during play sessions in baseline. During the single play session in training, she provided 13 responses. Rebecca provided an average of 8 (range 6 to 12) responses during maintenance. PND for responses for Rebecca was 86% when comparing baseline to maintenance.

Linda, Dyad C, responded an average of 4 (range 0 to 10) times to Jack during baseline play sessions. Linda provided 20 responses during the single play session in training. During maintenance, she provided an average of 16 responses per play session (range 10 to 20). PND for responses for Linda was 60% when comparing baseline to maintenance.

**Behaviors in Generalization Sessions**

Paraeducators also participated in an art or storybook reading activity with their target child during two generalization probes. The same type of activity (i.e., storybook reading or art) was conducted for both probes. Tara and Rebecca, of Dyad A and B respectively, chose storybook reading. Linda, Dyad C, chose art. The first probe was conducted during baseline and the second probe was conducted during maintenance (see Figure 4).

**Paraeducator communication opportunities with wait.** During baseline, Tara, Dyad A, provided 40 communication opportunities with wait to James during a storybook reading session. During maintenance, she provided 27 communication opportunities with wait. For the baseline generalization session, Rebecca, Dyad B,
Figure 4

Generalization Sessions
provided 27 communication opportunities with wait during a storybook reading session. During maintenance, the number of communication opportunities with wait provided by Rebecca rose to 33. During baseline, Linda provided 31 communication opportunities with wait during the art generalization session. During maintenance, this rose to 36 communication opportunities with wait.

**Child communication turns.** James and Hannah, of Dyad A and B respectively, participated in storybook reading for the generalization sessions. Jack participated in art during generalization sessions. During the baseline generalization session, James took 27 communication turns. During maintenance, James took 26 communication turns. Hannah took 0 communication turns during baseline and 1 during maintenance for generalization sessions. Jack took 2 communication turns during baseline and 12 communication turns during maintenance generalization sessions.

**Paraeducator responses.** Tara, Dyad A, responded 24 times during baseline storybook generalization sessions. During maintenance, she responded 42 times during storybook generalization session. Rebecca, Dyad B, responded 9 times for storybook generalization sessions in both baseline and maintenance. Linda, Dyad C, responded 3 times during the baseline art generalization session and 12 times during the maintenance session.

**Social Validity**

**Training evaluation.** Results from the training evaluation indicate that training was perceived as beneficial by the paraeducators for both their communication behaviors and the communication behaviors of the child they
**Table 2**

*Training Evaluation Responses*

<table>
<thead>
<tr>
<th>Question</th>
<th>Paraeducator A</th>
<th>Paraeducator B</th>
<th>Paraeducator C</th>
</tr>
</thead>
<tbody>
<tr>
<td>What were some of the benefits of this training program?</td>
<td>Learning how to ask more questions and wait for the child to answer and how to go about working with a child.</td>
<td>It brought to mind things I should be thinking about when playing.</td>
<td>Made me think about wait time specifically and broad definition of communication.</td>
</tr>
<tr>
<td>Is there anything you would change about the online training or strategy you learned?</td>
<td>No, I thought it was great.</td>
<td>Not particularly – it seemed a little long, but wasn't awfully long.</td>
<td>No.</td>
</tr>
<tr>
<td>Did you have any technical problems?</td>
<td>No.</td>
<td>My internet wasn't the fastest, so it took a little longer for videos to load, but it wasn't a problem.</td>
<td>No.</td>
</tr>
<tr>
<td>Did you notice any changes in the communication of the child you support?</td>
<td>I noticed if I wait he seems to react better.</td>
<td>Not particularly. We had been working on some signs in general that got a little better.</td>
<td>Yes!</td>
</tr>
<tr>
<td>Would you recommend this training to other paraeducators? Why or why not?</td>
<td>Yes, because it helps learning how to go about working with children with special needs.</td>
<td>Yes, it brings things to mind that can help.</td>
<td>Yes – time vs. benefit a plus</td>
</tr>
<tr>
<td>Do you have any other comments?</td>
<td>No.</td>
<td>No.</td>
<td>Good luck!</td>
</tr>
</tbody>
</table>
supported (see Table 2). When asked, “What were some of the benefits of this training program?” all paraeducators indicated that the training helped them learn to support their target child. Two paraeducators indicated that the training helped them to remember to wait for the child to communicate. In addition, one paraeducator indicated she learned to ask more questions. When asked, “Did you notice any changes in the communication of the child you support?” two paraeducators indicated they noticed changes with the child they supported. Tara indicated that she noticed if she waited “[James] seem[ed] to react better”. When asked, “Would you recommend this training to other paraeducators? Why or why not?” all paraeducators indicated they would recommend the training to other paraeducators. In addition, Linda reported that for the time she spent completing the training, she saw a lot of benefit.

When asked, “Is there was anything you would change about the training or the strategy that was learned?” two paraeducators indicated they wouldn’t make any changes. Tara stated that the training “was great” and that “it was a great learning experience.” One paraeducator indicated training could be a little shorter in length. When asked, “Did you have any technical problems?” all paraeducators indicated that they had no technical problems during the training.
CHAPTER FOUR

Discussion

Overall the online training used in this study appeared to provide an effective, efficient, and socially valid means of teaching paraeducators to provide communication opportunities with wait and respond to the communication of their child with CCN. All paraeducators increased the number of opportunities provided after they completed the online training (PND 86% to 100%). Increases were also noted in the secondary dependent variables. Results for paraeducators showed mean increases in the number of responses provided (PND 60% to 100%). In addition, the mean number of communication turns taken by children increased from baseline to maintenance. However, based on PND results the impact of the intervention on the number of turns taken by the child was unequivocal for two children (50%), and ineffective for one child (29%), but mean level growth between baseline and maintenance indicates an increase for the communication turns for the children. In this chapter, effectiveness, efficiency, and social validity of the online training will be discussed. In addition, limitations of this study as well as future research directions will also be discussed.

Effectiveness of Online Training

Changes in paraeducator behavior were observed as a result of the online training provided (see Figure 1, 2). Specifically, paraeducators increased the number of communication opportunities with wait provided to young children with CCN during play, and increased the number of responses provided to children with
Paraeducator communication opportunities with wait. All paraeducators showed immediate growth in the number of communication opportunities with wait when comparing the single play session during training to baseline sessions. In addition, all paraeducators demonstrated an increase in the mean number of communication opportunities with wait provided over baseline when compared with maintenance (PND ranged 86% to 100%). The growth seen during training and maintenance for paraeducators indicates that online training can be effective at improving the number of communication opportunities with wait paraeducators offer children with CCN.

When comparing maintenance to the single training session, lower levels of communication opportunities with wait were noted for all paraeducators during at least one session towards the end of maintenance (i.e., day 6 for Tara, day 8 for Rebecca, day 13 for Linda). A decline in communication behaviors of communication partners during maintenance has been noted in other studies (e.g., Halle, Baer, & Spradlin, 1981; Light, Datillo, English, Gutierrez, & Hartz, 1992). In a study conducted by Douglas and colleagues (2011), a drop in the number of communication opportunities with wait was noted for paraeducators during maintenance. However, maintenance levels in this study made only a small decline and one paraeducators increased opportunities later in maintenance. In the future, the inclusion of additional practice sessions during training may help paraeducators gain fluency and maintain higher levels of communication opportunities with wait
by paraeducators (see McReynolds & Kearns, 1983). Additionally, booster sessions when communication opportunities drop (Binger, Kent-Walsh, Berens, Del Campo, & Rivera, 2008), or self-maintenance of behaviors by paraeducators may help improve interactions by increasing the number of communication opportunities (Bingham et al., 2007).

**Child communication turns.** All children demonstrated growth when visually analyzing data and comparing mean levels of child communication turns from baseline to maintenance. Although mean levels rose in the study, when considering PND for child communication turns, there was still some overlap between the number of communication turns taken when comparing baseline and maintenance (i.e., PND James 50%, Hannah 29%, Jack 50%). In the case of James (Dyad A), low PND can be attributed to one high baseline point in baseline. The high baseline point for James included putting together several puzzles (e.g., alphabet, animal) and naming the pictures or letters before placing the pieces. Such activities, although beneficial to communication, were rare occurrences during play in his classroom as indicated by the other baseline points which were significantly lower for communication turns.

It should be noted that this intervention was primarily aimed at changing the communication behaviors of paraeducators. While it was hoped that an increase in communication opportunities with wait and responses by paraeducators would make a larger impact on the communication turns of children, it is recognized that this intervention was not directly addressed to the children. Children had only a limited amount of time in this study to react to the new expectations for
communication, which may have had an impact on the outcomes for child communication turns. In addition, a two-pronged approach to intervention where training is provided to both the paraeducator and the child as suggested by McNaughton and Light (1989), might have also resulted in greater changes in communication turns taken by children. Finally, in the study no adjustments were made to the AAC system used by the child so it is unclear if changes to AAC systems might have changed outcomes for child communication turns in the study.

Selection of inappropriate activities may have also limited the communication of children in the study. In the future, additional emphasis could be placed on selecting activities that are highly motivating to the child (Light & Drager, 2010). This in turn may impact the child’s motivation to communicate (Light, Collier, & Parnes, 1985b). However, it was hoped that the use of play as a context for communication in this study would encourage paraeducators to select activities that were motivating for the child. In the future, more explicit instruction may be necessary to help paraeducators identify what types of activities are motivating to their target student and allow for many communication opportunities (see Douglas et al., 2011).

**Paraeducator responses.** Responses provided by paraeducators also increased over baseline when compared to maintenance. When considering PND for responses in the study, the training was effective at increasing responses for two paraeducators. However, it should be noted that responses in the study generally mirrored communication turns taken by children. That is, paraeducators responded more when children took more communication turns. This explains why Rebecca
and Linda showed a smaller increase than Tara, since the children in Dyad B and C (Hannah and Jack) also showed lower levels of communication throughout the study when compared with James. Given the nature of the definition for responses in this study (e.g., acknowledgement of communicative message by the child, fulfill intent of child’s communication), one could not expect increased responses from paraeducators without an increase in communication turns from the child.

At times in the study, paraeducator responses exceeded child communication turns. There are two reasons this occurred. First, paraeducators often responded to unclear communication turns taken by the child (i.e., communication that did not meet the definitions of a communication turn for this study, but which a paraeducator recognized as communication and responded). For example, paraeducators often responded even if the communication turn by the child was not directed at the paraeducator. Second, paraeducators often responded when the child followed a direction given by the paraeducator. However, unless following directions also included use of speech or AAC, the behavior was not coded as a communication turn for the child in the study.

**Generalization sessions.** Based on results of the study, paraeducators made generalized use of behaviors to other activities. For Tara of Dyad A, responding appeared to generalize to the reading activity, but communication opportunities with wait did not generalize. For Rebecca of Dyad B, communication opportunities with wait generalized to the reading activity, but responses were the same in both baseline and maintenance. Linda of Dyad C, demonstrated generalization of
communication opportunities with wait and responses to an art activity. For two children (i.e., Hannah and Jack) communication turns generalized to other activities.

Given the lower generalization for reading activities, perhaps generalization could be improved for paraeducators and children by including multiple exemplars in training for storybook reading activities. In a meta-analysis conducted by Schlosser and Lee (2000) it was shown that providing multiple exemplars during AAC interventions increased generalization of skills. In the future, it might also be helpful to integrate generalization activities into training practice sessions to help paraeducators increase the generalized use of communication opportunities with wait and responses, and to help children increase communication turns (see Binger et al., 2010).

**Quality of communication interactions.** Analysis in this study dealt with the quantity of behaviors by paraeducators and children with CCN. However, given that in this study paraeducator communication opportunities with wait generally exceeded child communication turns quality of communication turns might also be important to examine. Future research could examine factors related to quality. Future research examining quality of communication interactions between paraeducators and children with CCN might examine the child’s (a) ability to respond to an opportunity by the paraeducator, (b) interest in the activity, (c) comprehension of the communication opportunity, and (d) history of learned passivity.
Efficiency of Online Training

Results of this study indicated that the online training was efficient. The training required approximately 2 hours for the paraeducators to complete, and was primarily completed independently online. This can be viewed as efficient for the paraeducators in comparison to other paraeducator training programs. For example, a study by Granlund and colleagues (1992) required approximately 50 hours of communication training where a large variety of skills were taught (i.e., primary dependent variable provide communication opportunities with wait) over a year for staff members providing services to adults with communication disabilities. Another study, conducted by Bingham and colleagues (2007), required approximately 10 hours of communication training (i.e., dependent variable prompts provided and responses to requests) for paraeducators supporting children who used AAC. The training provided in this study was conducted in less time and may be a more efficient option for teaching specific communication skills to paraeducators.

Online training was also efficient for the instructor. While substantial time was required for the instructor to create the instructional package (i.e., approximately 60 hours), each paraeducator who completed the training required only 10 to 20 minutes of time from the instructor to review materials as submitted by the paraeducator. In addition, materials for this study can be reused to allow other paraeducators to receive the same training with minimal time required from the instructor. Thus, online training appears to be a promising approach to provide specific training to paraeducators.
Social Validity of Online Training

This study also provided information on social validity. Based on training evaluations completed by paraeducators, the study was perceived by participants to be an effective and efficient means to provide information on how to support children with CCN. Specifically paraeducators reported that they found the training beneficial for themselves, and noted changes in the communication of the child they supported. All paraeducators indicated they would recommend the training to other paraeducators.

This study did not address the social validity of the outcomes as perceived by teachers and/or parents of children with CCN. In the future, additional social validity measures could be taken to help determine if the outcomes from the study were perceived beneficial from other stakeholders in the study (e.g., parents, teachers). Additional social validity data may provide strength to current findings.

Limitations

Although positive results were noted in this study, several limitations were also noted. First, this study explored the impact of online training with only three paraeducators and children. As such, generalization of the possible effect of this training cannot be made to other individuals. Additional research is needed to fully understand the impact of this intervention and application to other paraeducators and children.

Another limitation of this study is that no direct assessment of current AAC or communication effectiveness was made before the start of the study. Although indirect measures were used to collect information about the communication of
each child from teachers, speech language pathologists, and parents, no direct measure was taken to determine the current communication skills of the child before the study began to ensure that the AAC system could support and enhance their participation in a play activity. However, baseline data in this study provide some information about the communication skills of children before paraeducators began online training. In future replications of this study, additional inclusion criteria regarding communication skills and AAC systems might be helpful when selecting participants. However, it is recognized that, for many young children with CCN, AAC systems are just beginning to be established (Cress & Marvin, 2003), so investigation with only young children who have well developed AAC systems may pose additional challenges and may not be representative of early childhood practices.

Several limitations were also noted regarding the training in this study. First, the training targeted a number of skills including providing an opportunity, waiting, and responding. Because several skills were taught, no determination can be made about the impact of any one component of the training on the behaviors of paraeducators and children. In addition, the training included many different instructional techniques (e.g., video models, testing of mnemonic, identification of skills in videos) over several modules. As a result, the importance of individual instructional techniques cannot be determined for this study.

Another limitation of training is that only one practice play session was conducted in the study. During the training phase of the study, paraeducators completed the online training independently, and then participated in a play session.
After the play session, paraeducators reflected on their performance based on the strategy they learned in training. Although paraeducators demonstrated significant changes from baseline during the training session and self-evaluated their performance during the session, additional play sessions during training with structured opportunities for guided self-reflection in the future might help paraeducators gain fluency of strategy skills before exiting training (see McReynolds & Kearns, 1983). Additional practice during training to gain fluency might in turn impact the long-term use of the strategy.

**Future Research Directions**

This is the first known study to address use of an online training program for paraeducators to support the communication of children with CCN. As a result, additional research is needed to add to these findings and further determine the effectiveness of online training for paraeducators. Because children with CCN make up a relatively small population dispersed over large geographic areas, it was hoped that this study might be an initial step in exploring online training options to allow more paraeducators access to trainings that help them learn to support the communication development of young children with CCN. However, further research is required to provide additional support of the findings from this study and to determine the most effective, efficient, and socially valid ways to provide information to paraeducators who support children with CCN.

Future research in the area of online paraeducator training to support the communication of children with CCN might continue to explore the (a) quality of the
play activity, (b) AAC system effectiveness, (c) maintenance of skills over time, and (d) generalization of skills across activities.

**Summary**

This study demonstrated that online paraeducator training to support the communication of young children with CCN can have a positive impact on communication opportunities with wait provided by paraeducators, communication turns taken by children, and responses by paraeducators. Future research should continue to investigate the use of online approaches as a way to train a wide variety of communication partners in a wide variety of settings.
References


14.


Giangreco, M. F., Broer, S. M., Edelman, S. W. (2002). “That was then, this is now!” Paraprofessional supports for students with disabilities in general education classrooms. Exceptionality, 10, 47-64.


Light, J., Collier, B., & Parnes, P. (1985a). Communicative interaction between young


Light, J., & Drager, K. (2010). *Early intervention for young children with autism, cerebral palsy, and down syndrome*. Retrieved February 1, 2011, from Penn State University, Department of Communication Sciences and Disorders Website: [http://aackids.psu.edu](http://aackids.psu.edu)

Baltimore: Paul H. Brookes Publishing.


& M. E. McLean (Eds.), *Early intervention early childhood special education recommended practices* (pp. 329-358). Austin, TX: Pro-ed.


Francisco: W. H. Freeman.


Sportstec Limited. (2011) Studiocode (Version 3.5.6) [video analysis software]. Wafflewood, Australia: Sportstec Limited.


Appendix A – Paraeducator Demographic Questionnaire

Your name (not be used in publications, for my reference only):

_________________________________________________________________________________________________

Your age: ___________________________  Gender: ___________________________

Years of experience supporting children with disabilities: __________________________

Years working at this preschool setting: __________________________

Highest education level obtained: __________________________

__________________________________________________________________________________
Appendix B – Child Demographic Questionnaire

Child’s name (not be used in publications, for my reference only):

________________________________________________________

Age of child (year and month):

Gender of child:

Disability: (Please list any information regarding vision, hearing, motor, and/or cognitive. For example, hearing impairment and developmental delay):

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________

Please list all ways in which you child communicates (For example: sign, speech or vocalizations, computer system, through objects, gestures, facial expressions, pictures, etc.):

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________
Appendix C - Communication and Language Skills Questionnaire

(Adapted from Benedek-Wood, 2010)

Child’s name:_________________________ Date:_________________________

Expressive Communication

1. What is the primary method(s) the child uses for communicating his/her needs and wants? (e.g., ask for something; Check all that apply, but please indicate if one method is used more often).

   ___ looking at objects   ___ pointing at pictures

   ___ gestures   ___ handing the object to you

   ___ speech

   ___ augmentative and/or alternative communication systems
       (pictures, symbols, signs, high tech systems; AAC)

Please describe a typical request (where child indicates needs and wants). Please indicate the system(s) used to make that request (please use back if necessary):

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Please list additional words, phrases, and/or sentences the child uses to communicate his/her needs and wants (please use back if necessary):

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

___ other (please explain):

________________________________________________________________________
________________________________________________________________________
2. What is the primary method(s) the child uses for sharing information? (e.g., child shows you their new shoes; Check all that apply, but please indicate if one method is used more often).

___ looking at objects    ___ pointing at pictures
___ gestures             ___ handing the object to you
___ speech
___ augmentative and/or alternative communication systems
    (pictures, symbols, signs, high tech systems; AAC)

Please describe a typical instance where the child shares information. Please indicate the system(s) used to make that request (please use back if necessary):

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

Please list additional words, phrases, and/or sentences the child uses to communicate his/her when sharing information (please use back if necessary):

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____ other (please explain):

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________
3. What is the primary method(s) the child uses for expressing **social closeness**? (i.e., gain partner’s attention for the purpose of social interaction; Check all that apply, but please indicate if one method is used more often).

   ___ looking at objects       ___ pointing at pictures
   ___ gestures                ___ handing the object to you
   ___ speech

___ augmentative and/or alternative communication systems
   (pictures, symbols, signs, high tech systems; AAC)

Please describe a typical instance where the child expresses **social closeness**. Please indicate the system(s) used during such an instance (please use back if necessary):

_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

Please list additional words, phrases, and/or sentences the child uses to communicate his/her when expressing **social closeness** (please use back if necessary):

_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

___ other (please explain):

_________________________________________________________________________
4. What is the primary method(s) the child uses for expressing **social etiquette**? (e.g. saying please and thank you; Check all that apply, but please indicate if one method is used more often).

___ looking at objects ___ pointing at pictures

___ gestures ___ handing the object to you

___ speech

___ augmentative and/or alternative communication systems
  (pictures, symbols, signs, high tech systems; AAC)

Please describe a typical instance where the child expresses **social etiquette**. Please indicate the system(s) used during such an instance (please use back if necessary):

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

Please list additional words, phrases, and/or sentences the child uses to communicate his/her when expressing **social etiquette** (please use back if necessary):

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

___ other (please explain):

_________________________________________________________________

_________________________________________________________________
5. Which of the following best describes the child’s natural speech?
   ____ easy for everyone to understand
   ____ difficult for unfamiliar communication partners to understand
   ____ difficult for unfamiliar and familiar communication partners to understand
   ____ almost never understood by others

6. Which of following statements best describes the child’s reaction to his/her natural speech?
   ____ is easily frustrated when not understood
   ____ does not seem aware of speech/communication problem
   ____ tries to say sounds or words more clearly when asked
   ____ will attempt to use an alternative form of communication if the original method fails (e.g., child reverts to using a picture to communicate when you do not understand what he/she says)
   ____ other:
   ________________________________________________________________

7. What are your primary concerns regarding the child’s speech, language, and/or communication skills? (Please use other side to complete response if necessary).
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
Receptive Communication

8. Which of the following do you think the child understands?
   
   ___ his/her own name   ___ family names
   ___ names of people   ___ names of animals
   ___ names of objects   ___ names of body parts
   ___ conversational speech   ___ simple questions
   ___ simple directions   ___ complex directions
   ___ one-step directions   ___ three-step directions
   ___ two-step directions   ___ more than three-step directions

9. Please list the words, phrases, and/or sentences the child understands (please use the other side if necessary):
   
   _______________________________________________________________________________________
   _______________________________________________________________________________________
   _______________________________________________________________________________________
   _______________________________________________________________________________________
   _______________________________________________________________________________________

10. Please list the conditions when the child best understands language. This may include settings, people, activities, and/or materials (e.g., materials that may augment understanding such as pictures):
   
   _______________________________________________________________________________________
   _______________________________________________________________________________________
   _______________________________________________________________________________________
   _______________________________________________________________________________________
   _______________________________________________________________________________________


Appendix D - Pre-training Questions

How familiar are you with computers (specifically email and using the internet)?

Have you ever sent an email with a document attached?

Do you have a computer you can use that has high-speed internet access?

Do you feel you will need support to complete an online training?
Appendix E - Training Instructions

The online training is located at: (provided)

The training requires internet access (high speed) and a computer that has email access. When you go to the website you will see the following page:

The training is 5 modules. You can access the training Modules by clicking on the links under training sessions. Start with Module 1 and proceed in order until you have completed Module 5.

To access each module you will need a password. The password for each module is listed below as well as the approximate time it will take to complete the module.

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Approximate time to complete</th>
<th>Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>10 min</td>
<td>(provided)</td>
</tr>
<tr>
<td>Module 2</td>
<td>15 min</td>
<td>(provided)</td>
</tr>
<tr>
<td>Module 3</td>
<td>10 min</td>
<td>(provided)</td>
</tr>
<tr>
<td>Module 4</td>
<td>12 min</td>
<td>(provided)</td>
</tr>
<tr>
<td>Module 5</td>
<td>15 min</td>
<td>(provided)</td>
</tr>
</tbody>
</table>

On the website there are also materials for you to use during training (listed under training materials). Most of the training materials will be explained during Module 1, with the others explained in later modules.

You will also get emails related to the modules (labeled by module number). The emails will have questions embedded in them. Keep the email notes open while you are doing each module. After you complete each module, please email me the completed emails with questions answered before you move on to the next module.

If you have questions or problems during training please email or call me. Please complete Modules 1-5 by: (date provided as agreed upon with paraeducator)
Appendix F - PoWR Training Notes

Supporting the Communication of Young Children

Notes

Participant Name: __________________________________________

Module 1 - PoWR

1. What does PO stand for? Provide ______________ for communication.
   a. Objects
   b. Opportunities
   c. Oranges
   d. Order

2. What does W stand for? ______________ child’s communication
   a. Write down
   b. Wear
   c. Wait for
   d. Wonder about

3. What does R stand for? ______________ child’s communication
   a. Respond to
   b. Remember
   c. Be Ready for
   d. Redo

4. List the steps for PoWR
   Po -
   W -
   R -
Module 2 - Po - Provide opportunities for communication

1. What is the strategy that can be used to help support the development of communication for children. Please provide the 4-letter name of the mnemonic and list the name of each step.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. How does your child communicate?

3. During which instance (1, 2, or 3) did I provide an opportunity for Cooper to communicate?
   a. 1
   b. 2
   c. 3
   d. none of the above

4. During which instance (1, 2, or 3) did Melissa provide an opportunity for Courtney to communicate?
   a. 1
   b. 2
   c. 3
   d. none of the above

5. How would you provide many opportunities for communication to Courtney while playing kitchen?
6. How would you provide many opportunities for communication to Cooper while playing construction trucks?

7. How might you offer opportunities for communication to your child?

8. How do you provide opportunities for communication?

9. Why is it important to provide many opportunities for communication?

Module 3 – W- Wait for child’s communication

1. During which instance did I wait for Cooper to communicate?
   a. 1
   b. 2
   c. 3
   d. none of the above

2. During which instance did Melissa wait for Courtney to communicate?
   a. 1
   b. 2
   c. 3
   d. none of the above
3. How long does your child usually take to respond to communication?

4. Pick an activity and think about how you would wait for your child's communication during that activity.

5. After providing an opportunity for communication, how long should you wait for your child to communicate?

6. Why is it important to wait for your child to communicate?

Module 4 – R- Respond to child’s communication

1. During which instance did Melissa respond to Courtney’s communication?
   a. 1
   b. 2
   c. 3
   d. none of the above

2. During which instance did I respond to Cooper’s communication?
   a. 1
   b. 2
   c. 3
   d. none of the above
3. What should you do when your child communicates?

4. Pick an activity and think about how you would respond to your child’s communication during that activity.

5. What does it mean to respond to the child’s communication?

6. Why is it important to respond to the child’s communication?

Module 5 - PoWR

1. Think about Cooper. What would PoWR look like for him during an art activity where you are painting? Fill in the blank space below:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Po</td>
<td>Provide lots of opportunities for communication. Comment about what you are painting, ask questions, and provide him with choices – like what colors to use, what to make, and more.</td>
</tr>
<tr>
<td>W</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>Respond when Cooper communicates. Then start the process over again by providing another opportunity for communication.</td>
</tr>
</tbody>
</table>
2. Think about Courtney. What would PoWR look like for her during a singing activity? Fill in the blank spaces below:

<table>
<thead>
<tr>
<th>Po</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Wait for at least 5 seconds for Courtney to communicate.</td>
</tr>
<tr>
<td>R</td>
<td></td>
</tr>
</tbody>
</table>

3. Try this one on your own. Think about Noah. What would PoWR look like for him during an activity where you are playing with play dough?

<table>
<thead>
<tr>
<th>Po</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td></td>
</tr>
</tbody>
</table>

4. Now complete the chart for your child. Select an activity your child enjoys. What would PoWR look like for your child during that activity?

<table>
<thead>
<tr>
<th>Po</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td></td>
</tr>
</tbody>
</table>
5. Sarah and Cooper Reflection

Po – Provide opportunities for communication

<table>
<thead>
<tr>
<th>A lot less</th>
<th>A little less</th>
<th>Just right</th>
<th>A little more</th>
<th>A lot more</th>
</tr>
</thead>
</table>

|-------------------|-------------------|-------------------|-------------------|-------------------|

W – Wait for child's communication

<table>
<thead>
<tr>
<th>A lot less</th>
<th>A little less</th>
<th>Just right</th>
<th>A little more</th>
<th>A lot more</th>
</tr>
</thead>
</table>

|-------------------|-------------------|-------------------|-------------------|-------------------|

R – Respond to child’s communication

<table>
<thead>
<tr>
<th>A lot less</th>
<th>A little less</th>
<th>Just right</th>
<th>A little more</th>
<th>A lot more</th>
</tr>
</thead>
</table>

|-------------------|-------------------|-------------------|-------------------|-------------------|

What went well?

What would you do differently?

6. Tami and Noah Reflection

Po – Provide opportunities for communication

<table>
<thead>
<tr>
<th>A lot less</th>
<th>A little less</th>
<th>Just right</th>
<th>A little more</th>
<th>A lot more</th>
</tr>
</thead>
</table>

|-------------------|-------------------|-------------------|-------------------|-------------------|

W – Wait for child's communication

<table>
<thead>
<tr>
<th>A lot less</th>
<th>A little less</th>
<th>Just right</th>
<th>A little more</th>
<th>A lot more</th>
</tr>
</thead>
</table>

|-------------------|-------------------|-------------------|-------------------|-------------------|
**R – Respond to child’s communication**

A lot less  A little less  Just right  A little more  A lot more

|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|

What went well?

What would you do differently?

7. Courtney and Melissa Reflection

**Po – Provide opportunities for communication**

A lot less  A little less  Just right  A little more  A lot more

|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|

**W – Wait for child’s communication**

A lot less  A little less  Just right  A little more  A lot more

|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|

**R – Respond to child’s communication**

A lot less  A little less  Just right  A little more  A lot more

|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|

What went well?

What would you do differently?
### Appendix G – PoWR Mnemonic Memorization Materials

<table>
<thead>
<tr>
<th>Po</th>
<th>Provide opportunities for communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Wait for child’s communication</td>
</tr>
<tr>
<td>R</td>
<td>Respond to child’s communication</td>
</tr>
</tbody>
</table>

Po – Provide opportunities for communication

W – Wait for child’s communication

R – Respond to child’s communication
Appendix H - Paraeducator PoWR Reflection

PoWR Reflection

Child’s name: ___________________________  Date: ______________________
Activity: ______________________________________________________________

Po – Provide opportunities for communication
A lot less     A little less     Just right     A little more     A lot more
|------------------|------------------|------------------|------------------|------------------|

W – Wait for child’s communication
A lot less     A little less     Just right     A little more     A lot more
|------------------|------------------|------------------|------------------|------------------|

R – Respond to child’s communication
A lot less     A little less     Just right     A little more     A lot more
|------------------|------------------|------------------|------------------|------------------|

What went well?
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

What will you do differently next time?
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
### Appendix I- Treatment Fidelity for Play Sessions

Key: + = researcher followed protocol; - = researcher did not follow protocol

| Video ID: ____________________ | Coder: ____________________ |

**Procedures**

- Researcher videotaped paraeducator and child during a play or generalization (storybook reading or art) interaction  
  - ______
- Researcher had both paraeducator and child in view of the camera  
  - ______
- Researcher remained out of play interaction  
  - ______
- Researcher did not initiate conversation with paraeducator or child during play/generalization session  
  - ______
- If asked a question by the paraeducator researcher deflected question (e.g., did not provide instruction about how to play)  
  - ______
- Researcher provided no prompts to paraeducator during play/ generalization session  
  - ______

Total: __________/6
Vita

Sarah Nathel Douglas

**Education**

2011  Doctor of Philosophy in Special Education  
      The Pennsylvania State University  
2007  Master of Education in Special Education/Assistive Technology  
      Northern Arizona University  
2003  Bachelor of Science in Elementary and Special Education  
      Northern Arizona University

**Publications**

Douglas, S. N. (in preparation). *Teaching paraeducators to support the communication of individuals who use augmentative and alternative communication: A literature review.*


**Presentations**

Douglas, S. N. (2011, August). *Effective strategies to teach skills to students with severe and multiple disabilities.* Invited presentation at the Paraeducator Conference, Bellefonte, PA.

Douglas, S. N. (2011, January). *Teaching paraeducators to support the communication of children who require AAC during play interactions.* Poster accepted for presentation at the ATIA Orlando annual conference, Orlando, FL.


Douglas, S. N. (2009, November). *Training paraeducators to support the communication of individuals with complex communication needs.* Poster accepted for presentation at the 32nd Annual Teacher Education Division of the Council for Exceptional Children Conference, Charlotte, NC.

**Professional Experience**

2008-2011  The Pennsylvania State University, Graduate Assistant, Practicum Supervisor, Teaching Assistant  
2004-2008  Flagstaff Unified School District, Flagstaff, AZ, Teacher, Students with Multiple and Severe Disabilities  
2003-2004  Flagstaff Unified School District, Flagstaff, AZ, Teacher, Students with Learning, Developmental, and Emotional Disabilities