PROMOTING DAILY LIVING SKILLS FOR ADOLESCENTS WITH AUTISM SPECTRUM DISORDERS VIA PARENT DELIVERY OF VIDEO PROMPTING ON THE IPAD

by

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A Dissertation Submitted to the Faculty of the College of Education in Partial Fulfillment of the Requirements for the Degree of Doctor of Education

Florida Atlantic University
Boca Raton, Florida
May 2015
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This dissertation was prepared under the direction of the candidate's dissertation advisor, Dr. Mary Louise Duffy, Department of Exceptional Student Education, and has been approved by the members of her supervisory committee. It was submitted to the faculty of the College of Education and was accepted in partial fulfillment of the requirements for the degree of Doctor of Education.

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ACKNOWLEDGMENTS

I would like to express my sincere gratitude for the support and guidance I received throughout this academic journey. First, I want to extend a heartfelt appreciation to my committee members for their devotion and commitment. Dr. Mary Lou Duffy, your enthusiastic and unwavering support was instrumental in helping me explore new heights and depths of my abilities. Dr. Michael Brady, your ability to make sense of the madness that is methods was invaluable. Dr. Peggy Goldstein, your insight and perspective of parenting was vital in helping me see the value in my research on a broader and richer scale. Dr. Kyle Bennett, your passion for behavior analysis was the catalyst for my pursuit of knowledge of the ABA field so I especially thank you for opening this door.

I would also like to extend a special thank you to the individuals who supported me in so many ways—Ali and Jessica, for your positive encouragement, guidance and feedback; Noelle and Kathy, for your commitment and involvement in my research; Kateri, you were the best pasta-making and shoe-tying model a researcher could ever ask for. I would also like to thank the parents and their children for their participation in my study. Your dedication to and enthusiasm for my research have encouraged and inspired me to do the best work I can.

Lastly, I would like to express my love and appreciation for my family. Thank you to my mother, Judy, and brother, Luis, for always encouraging, supporting, and believing in me. Guilherme, thank you for your enthusiasm in participating in my research and for enriching my life in so many wonderful ways. Finally, thank you to my
husband, Cassio, for your steady reassurance and confidence in me as I made my way through this journey. You are the “calm to my crazy,” and for this I am forever grateful.
ABSTRACT

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Institution: Florida Atlantic University
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Degree: Doctor of Education
Year: 2015

Autism Spectrum Disorder (ASD) affects one out of every 68 children in the United States. The disorder is characterized by persistent deficits in social communication, social interaction, and restricted, repetitive patterns of behavior, interest, or activities that together limit and impair everyday functioning. Research has shown that the use of visual resources, such as video modeling procedures, can support individuals with ASD to acquire and maintain a variety of daily living skills leading to enhanced levels of independence.

A variety of technological devices have proven to be effective and efficient tools for the delivery of videos aimed at promoting independence among individuals with ASD while reducing the need for external prompts provided by others. As technology advances, devices have become more portable and, ultimately, affordable. Parents and caregivers have not only obtained these advanced technological devices, but actively seek to become more competent in using them to assist their children with ASD in a variety of
ways. While there is ample research to support the use of portable devices to promote daily living skills for individuals with autism and other developmental disabilities, relatively few studies have examined whether parents can be trained to effectively deliver video prompting interventions through the use of mainstream devices.

The current study sought to evaluate parent fidelity of implementing video prompting procedures using an iPad tablet as taught during a behavior skills training. Procedural fidelity was assessed utilizing a multiple baseline across participants’ design to determine if their children with ASD, between the ages of 12 and 17, were able to acquire and master the steps of a targeted daily living skill. Results indicated that parents were successful in their implementation of the training procedures. Results also demonstrated that their children were able to correctly and independently complete the steps of their daily living skills with high accuracy while also self-fading the viewing of video prompts. Implications for parent training and future research are discussed.
DEDICATION

This manuscript is dedicated to my father, Luis A. Cruz, and “honorary father,”

Regino “Reggie” Cora, both of whom believed education was the key to freedom.
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VIA PARENT DELIVERY OF VIDEO PROMPTING ON THE IPAD

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CHAPTER 1: INTRODUCTION

Autism Spectrum Disorder (ASD) is a neurobiological disorder affecting 1 out of every 68 children in the United States (Centers for Disease Control [CDC], 2014). First categorized in 1943, characteristics include impairments in communication and socialization, as well as restrictive and repetitive behaviors (CDC, 2014; Kanner, 1943). When present, these impairments may hinder the individual’s ability to attain and maintain independence as an adult. Ensuring that he or she is capable of completing functional tasks with minimal or no assistance or prompting of another person can help to reduce the level of dependence for that individual and financial cost to the taxpayers (Mechling, Gast, & Seid, 2009b). Ultimately, the development of independent skills in adolescents can promote autonomy and self-determination for persons with ASD or other developmental disabilities.

Research indicates that individuals with ASD have difficulty retaining information that is presented only vocally; however, they tend to be strong visual learners. The use of visual supports to enhance instruction has yielded positive outcomes for these individuals when completing multi-step tasks independently (Mechling et al., 2009b; Riffel et al., 2005; Van Laarhoven, Kraus, Karpman, Nizzi, & Valentino, 2010; Wong et al., 2013). Specifically, video modeling (VM) has proven to be efficacious in ameliorating skill deficits that are not instinctively learned (McCoy & Hermansen, 2007).
Deemed an evidence-based practice, VM involves the learner viewing a recording of a sequence of steps in a targeted behavior or set of skills which is followed by the viewer performing that behavior (Charlop-Christy, Le, & Freeman, 2000; Plavnick, 2013). The various forms of VM have proven to be effective in teaching students with disabilities to complete steps common in functional living skills more independently, such as cooking and laundry (Mechling & Gustafson, 2008; Van Laarhoven et al., 2010). The utilization of VM procedures can also lead to faster acquisition of skills for individuals with developmental disabilities, may lead to a reduction in external prompts, and may be more cost-effective with regards to preparation of materials compared to other prompting and modeling procedures (Cannella-Malone et al., 2006; Van Laarhoven et al., 2010). Additionally, it is essential that individuals with ASD utilize more self-prompting techniques and learn to effectively self-manage for attainment and maintenance of independence and to foster generalization of these skills across settings (Mechling, et al., 2009b).

Several studies have revealed that using portable technology for delivery of videos is an effective and efficient tool that can assist in the promotion of independence while reducing the need for external prompts provided by others. Computer software programs, Personal Digital Assistants (PDAs), and mainstream devices, such as iPods, have been successfully implemented to increase the number of steps completed correctly and independently of vocational and functional living skills (Kagohara et al., 2010; Mechling et al., 2009b; Riffel et al., 2005; Van Laarhoven, Johnson, Van Laarhoven-Myers, Grider, & Grider, 2009). The majority of this research, however, has been conducted with researcher-implemented interventions. As technology advances, portable
devices become affordable. Parents and caregivers have not only attained these advanced technological devices, but actively seek to become more competent in using them to assist their children with ASD in a variety of ways (McNaughton et al., 2008).

It is evident that the acquisition of new skills for children can be enhanced by the use of technology across settings; however, since portable devices have become more mainstream and accessible, parent training to increase their ability to provide effective instruction to their child and minimize technology abandonment is critical (Brotherson, Cook, & Parette, 1996; Oliver & Brady, 2014; Parette & McMahan, 2002) Portable devices, such as the iPad tablet, and their accompanying mobile software applications (apps) have revolutionized how individuals with disabilities learn. As a result, interest in using these devices to promote skills for children with ASD has intrigued parents and caregivers. Unfortunately, while these high-tech solutions may be relatively affordable and less stigmatizing than previously used tools, they also require enhanced support to maximize parent competency in using them efficiently and effectively.

Behavioral skills training (BST) has proven to be an effective intervention for supporting individuals with disabilities acquire a variety of skills, including teaching children abduction-prevention skills and training adults to use pictures to build more effective communication (Gunby, Carr, & LeBlanc, 2010; Rosales, Stone, & Rehfeldt, 2009). Using didactic instruction, modeling, rehearsal and feedback procedures, BST has also been utilized to ensure professionals, peers, and parents can deliver interventions techniques with fidelity (Iwata et al., 2000; Mueller et al., 2003; Seiverling, Williams, Sturmey, & Hart, 2012).
Parents have been successful implementing evidence-based techniques garnered from their participation in BST packages. Multi-component training packages have helped parents become successful in applying feeding procedures to increase food consumption and decrease refusal behaviors, as well as implement procedures to promote the prevention of gun play with fidelity (Gross, Miltenberger, Knudson, Bosch, & Breitweiser, 2007; Mueller et al., 2003; Najdowski et al., 2010). To encourage the use of BST packages as components of training programs for parents, research must continue to focus on meeting family needs.

With a growing interest to use technology in the home environment, BST may be an effective intervention for increasing operational competence and confidence of parents using sophisticated devices. Studies have highlighted technology as the vessel in which to educate parents to effectively apply evidence-based procedures with their children. For example, Oliver and Brady (2014) utilized audio coaching via ear buds to teach three untrained mothers how to deliver effective prompts and praise to their children as they independently completed tasks and routines. To date, however, there is scarce evidence to indicate that parents can be trained to utilize technology as the deliverers of the intervention. With an increase of accessibility to products that can be used to ameliorate skill deficits, exploration of parent training utilizing advanced technology is critical.

The purpose of the present study was to evaluate the efficacy in training parents to deliver an evidence-based practice utilizing highly accessible, mainstream technology. The evidence-based practice included a BST package that taught parents to deliver a video prompting intervention via an iPad to promote the independent completion of steps in a targeted daily living skill for their children with ASD. The study demonstrated that
parents were able to learn how to implement a set of established procedures and enhance their technology competency which, in turn, led to an increase of independence among their children with ASD.
CHAPTER 2: LITERATURE REVIEW

This chapter provides a review and analysis of the existing literature critical in understanding the purpose of this study. The review discusses the rationale for effectively training parents to implement evidence-based interventions with their adolescents diagnosed with ASD. To understand the components and variables that were investigated, this chapter begins with an overview of ASD characteristics that can hinder independence. Then, an introduction to methods is provided in which parents historically have been included in the programming of their children to promote functional skills essential for independent living. As the literature narrows, the review highlights specific evidence-based practices (EBPs) supporting individuals with ASD that are the focus of this study. Descriptions of these practices and evidence to support more ecologically valid tools as delivery systems are then shared. A summary of the significance of this research concludes the review.

Autism Spectrum Disorder

ASD is a developmental disability that is defined in terms of qualitative impairments in social interaction and communication and behavioral challenges (American Psychiatric Association [APA], 2013). When present, these impairments may hinder an individual’s ability to attain and maintain independence as an adult. When comparing medical expenses, it has been reported that costs for children and adolescents with ASD are 4.1-6.2 times greater than for their peers without ASD (Shimabukuro, Grosse, & Rice, 2008). Maximizing the ability for an individual with ASD to complete
functional, daily tasks with minimal or no assistance or prompting of another person can reduce the level of dependence for that individual and financial cost to the taxpayers (Mechling et al., 2009b).

Even more concerning is that, as adults, individuals with autism report being highly dependent on family members or assistance program. Upon assessing various adulthood-specific measures, including educational levels, friendships, and independent living, Howlin, Goode, Hutton, and Rutter, (2004) reported that of the 68% of adults with ASD in their study having achieved some level of independent living, 46% of the respondents were rated as having a poor quality of life comprising of dependence on caregivers for financial, residential, and emotional support. Examining a broader pool of respondents, the National Longitudinal Transition Survey-2 reported that only 27.6% of adults with ASD were living independently 2 years out of high school (Newman, Wagner, Cameto, & Knokey, 2009). Ultimately, the development of daily living skills (DLS) can promote autonomy and self-determination for persons with ASD so they can increase independent living and improve quality of life.

Commonly referred to as adaptive, functional, and independent living skills, DLS are age-appropriate abilities that are used daily, and cover a wide range of skill areas that exist across settings and time periods (Partington & Mueller, 2012). Many individuals with ASD have the ability to learn new skills, including DLS, improving proficiency in living independently. Research has shown these individuals tend to be strong visual learners and have difficulty in retaining information that is presented only vocally. Specifically, the use of visual supports to enhance instruction has proven to be effective for these individuals when completing multi-step tasks (Mechling et al., 2009b; Riffel et
al., 2005; Van Laarhoven et al., 2010). It is essential that individuals with ASD utilize self-prompting techniques and learn to effectively self-manage for attainment and maintenance of independence and to foster generalization of these skills across settings (Mechling et al., 2009b).

**Early Intervention**

Autism Spectrum Disorder is typically diagnosed before the age of 3 and the impact lasts throughout a person’s life; however, a variety of interventions developed over the years have proven to be effective in ameliorating some of the deficits associated with the disability (CDC, 2014; Corsello, 2005). Evidence suggests that intensity and age at which implementation occurs can have a profoundly positive impact of skill acquisition and maintenance for children with ASD (Corsello, 2005). For example, findings by Lovaas (1987) indicated 47% of the participants receiving 40 hours a week of intensive behavioral treatment made a 31-point gain in their IQs. This seminal study paved the way for how a successful *program* is evaluated (Matson, 2007). Subsequent studies have found a positive correlation between the intensity of treatment to gains in measures of intelligence, language, and other behaviors (Corsello, 2005; McEachin, Smith, & Lovaas, 1993; Smith, Groen, & Wynn, 2000).

Additionally, evidence from a variety of studies and programs supports the notion that early intensive behavioral and developmental intervention for young children with ASD leads to better outcomes (Corsello, 2005; Warren et al., 2011). Programs, such as Walden Toddler and Early Start Denver Model, utilize behavioral or developmental approaches designed for toddlers with ASD (Corsello, 2005). More specifically,
programming utilizing methodologies rooted in Applied Behavior Analysis (ABA) continue to be researched as effective practices in promotion of skills.

Howard, Sparkman, Cohen, Green, and Stanislaw (2005) sought to compare intensive behavior analytic and eclectic early intervention treatments for young children with autism. Eclectic interventions consisted of a combination of methods and small group instruction at fewer hours per week than those receiving intensive behavior analytic intervention. Fourteen months after inception, the children receiving intensive behavior analytic treatment had higher mean standard scores across all measured areas of cognitive, language, and adaptive skills. Utilizing a randomized control trial, Dawson et al. (2010) found that 18- to 30-month-old children receiving more hours of developmental behavioral analytic therapy than the control group made significant gains in the areas of IQ, language, communication, and adaptive behavior. Two years after the intervention, the experimental group maintained its rate of growth in adaptive behavior while the comparison group showed greater delays.

While this literature supports other research that intensive, behavior analytic therapy is more efficacious than other methods, a critical component of aforementioned studies warrants further exploration. Howard et al. (2005) included parent training in basic behavior analytic strategies during intervention. Specifically, in the Howard et al. study, parents not only received basic training to enhance understanding of the strategies, they also assisted in the collection of maintenance and generalization data, met with agency staff once or twice monthly, and implemented the programs with their children outside of the intervention hours. Dawson et al. (2010) also included one or both parents during the 2-year intervention. These parents were trained by a therapist and participated
in the 2-hour sessions, which were conducted twice per day, five times per week, over the 2-year period. Parents of the children in the control group received resources and community support while parents of the treatment group received a higher degree of training.

Neither study attributed parent training as a critical feature affecting the outcomes, but rather referred back to the intensity in which the intervention package, based on behavior analytic principles, was applied. Caregivers have the potential to greatly influence the development of a child’s life; therefore, when including them in the implementation of an intervention, their impact on the successful outcomes should be further explored. This is especially critical when significant gains are acquired and maintained by the child.

**Parent-Implemented Intervention**

Parent-implemented interventions (PIIs) include programs in which parents are taught by professionals and are instrumental in carrying out part or all of a given intervention with their own child (Schultz, 2013). To be instrumental in teaching their child new skills and reducing challenging behavior(s), parents learn to deliver interventions in their home or community via methods such as didactic instruction, modeling, coaching, or performance feedback (Schultz, 2013). Based on a review of intervention practices from 1990 to 2011, PIIs have been deemed an EBP for individuals with ASD, having produced consistent positive effects among toddlers and elementary school-age learners (Wong et al., 2013). Studies also suggest that parent-training can also increase knowledge of autism, improve parent-child interaction, and reduce stress and depression among caregivers (McConachie & Diggle, 2007).
Seeking to enhance the role of parents in facilitating augmentative and alternative communication (AAC) while considering the family’s lifestyle, Stiebel (1999) trained the parents of three children with autism, ages 4 to 6, to use picture cards to communicate. Using a didactic model, parents were taught how to introduce the cards to their child during daily routines, use motivation to increase engagement, and transition into more abstract pictures as the child’s spontaneous language increased. Feedback sessions and consideration for individual family dynamics were implemented to problem-solve any particular situations impeding the increase in communication. Results demonstrated that the children were able to increase their use of pictures cards during their daily routines and parents increased the opportunities they provided their child to communicate. Both children and parents generalized their behaviors across routines and maintained them over time. Additionally, a post-intervention rating scale indicated improved parent perceptions of skills gained by their child and themselves.

Kaiser, Hancock, and Nietfeld (2000) sought to improve social communication among children with ASD by involving parents as language intervention agents. Utilizing enhanced milieu training (EMT) methodology, mothers of six children with an ASD, between the ages of 2.5 and 5 years of age, participated in training and practice sessions in a university-based clinic setting. Blending developmentally appropriate social strategies with behavioral teaching strategies, EMT builds language skills by using child interests in a natural, conversation-based environment (Wong et al., 2013). Training sessions consisted of didactic lessons, video modeling, role-playing, and video review of previously taped practice sessions. Practice sessions involved the parent carrying out the previously learned instructional strategies with their child and coaching by a parent
educator as needed. After training sessions, immediate feedback was provided to the parent. Results demonstrated that parents were able to implement EMT procedures with fidelity and also maintained and generalized some of the procedures to interactions at home with their children. Additionally, all six children increased the length of utterances made, as well as the frequency and different classes of words used. Levels were maintained during a follow-up period. In a post-intervention satisfaction survey, all parents indicated they were extremely satisfied with the intervention and suggested that future trainings include more sessions and in-home support.

Seeking to train parents of four children with autism, ages 2 to 3.5, on how to implement a joint attention intervention, Rocha, Schreibman, and Stahmer (2007) found parents were not only able to increase the rates in which their children responded to them, but these responses generalized to novel settings. The ability to attend between objects and people within a social environment is considered critical in the development of social and language development, yet children with autism often have deficits in the ability to engage in this type of joint attention (Rocha et al., 2007). Parents were trained by didactic teaching of techniques to be used and were given materials to take home for further review. Trainers coached the specific procedures to be used, modeled the techniques, and coached parents throughout their implementation of the techniques, fading the level and frequency of prompts as parents became more skilled. Results indicated parents were able to implement joint attention techniques with a high degree of procedural fidelity, and also generalized their skills from the clinic environment to the home without explicit instruction. Social validity measures indicated that parents were highly satisfied with the
training program and believed their children’s joint attention behavior improved over the course of the intervention.

Najdowski et al. (2010) taught the mothers of three children with autism, between the ages of 2 and 4 who were being treated for extreme food selectivity and exhibiting severe problem behaviors associated with demands, to implement strategies for requesting new or non-preferred food items. Training included a review of the procedures, provided in written form, then modeling by the researchers of these procedures with the mothers. Afterward, researchers modeled child behaviors with the mothers, who were able to practice the feeding procedures. During intervention sessions with the children, trainers provided coaching to the mothers as needed or when they asked questions. Using differential reinforcement of alternative behaviors (DRA) procedures, in combination with other strategies, mothers were able to significantly reduce inappropriate mealtime behaviors and increase frequency of taking bites of non-preferred food items with their children. The behaviors maintained and generalized during follow-up phases. All mothers demonstrated almost perfect levels of procedural integrity across experimental phases and post-treatment satisfaction scores indicated they were satisfied with the intervention.

In addition to ensuring procedural fidelity and collecting social validity data, these studies have all utilized methodologies utilized by trained professionals and deemed effective in promoting positive outcomes for individuals with ASD. Parents were taught the interventions and successfully implemented EBPs such as a picture exchange (PE) communication system, naturalistic environment teaching, joint-attention-symbolic play instruction, and DRA (Najdowski et al., 2010; Rocha et al., 2007; Stiebel, 1999). The
benefits to educating and training parents to implement these evidence-based strategies to support their children are far-reaching. In addition to home-based training being more cost-effective, increasing time spent in the child’s natural environment might result in greater generalization than if treated in a community or clinical setting, spaces in which children do not typically engage in many of the targeted behaviors (Kaiser et al., 2000; Najdowski et al., 2010). Additionally, while each of these studies led to positive outcomes for involved participants, the target population of children were of 6 years of age or younger. Therefore, future research should include training parents of children with ASD who are older and in need of skill acquisition essential for the development of independence with interventions aimed at the inclusion of EBPs.

**Evidence-Based Practices**

Following a rigorous process, reviews conducted by the National Standards Project (NSP) at the National Autism Center and the National Professional Development Center on ASD (NPDC) have each yielded over 20 intervention practices deemed effective in supporting individuals with ASD. Reviews by those national entities included group and single case design studies published in peer-reviewed, English language journals and followed a systematic process for evaluating evidence (Wong et al., 2013).

In conducting a comprehensive review of the educational and behavioral literature targeting characteristics and symptoms associated with ASD published between 1957 and 2007, the NSP identified 11 practices as established and 22 practices as emerging treatments, meaning there was some evidence to support the use but not enough to meet their established criteria (Wong et al., 2013). The NPDC conducted a literature review of autism-related articles published between 1997 and 2007. After content analyzing and
categorizing the intervention methodologies, 24 intervention practices met the criteria for evidence-based (Wong et al., 2013). In comparing the results of these two reports, findings were similar as many of the EBPs identified by the NSP and NPDC overlapped. Therefore, to broaden and update their previous 10-year review, the NPDC conducted a subsequent literature review to include publications from 1990 to 1996 and 2008 to 2011 (Wong et al., 2013).

Focusing primarily on research whose outcomes were associated with the core characteristic of ASD across a variety of settings, 27 specific interventions met criteria and were identified as evidence-based. These practices include interventions and strategies that are rooted in ABA (e.g., reinforcement, prompting), assessment and analytic techniques guiding intervention selections (e.g., task analysis), and delivery methods all deemed efficacious (e.g., PII, VM, TAI; Wong et al., 2013). Findings indicated that most EBPs resulted in skill development across multiple areas with research utilizing prompting, reinforcement, technology, time delay, and VM leading to the most dispersed outcomes (Wong et al., 2013). While many EBPs extend across age ranges and outcomes, results also indicated that most of the research was conducted with children under 15 years of age with many of the identified practices, such as naturalistic intervention and PII, associated with learners in the young age ranges (Wong et al., 2013).

While the areas of social, communication, and challenging behaviors were mentioned in the majority of publications, other frequently affected areas were also explored. For example, 77 of the 456 studies meeting criteria demonstrated positive outcomes on appropriate play behaviors, 67 indicated improvements in school readiness
skills, and 58 resulted in increased performance on academic tasks (Wong et al., 2013). Adaptive skills which enhance independent living and personal care were also cited in 55 studies as having been positively affected by the implementation of EBPs, such as PII, technology-aided instruction and intervention (TAII), and VM (Wong et al., 2013).

**Technology-Aided Instruction and Intervention**

When the implementation of any electronic device, applications, or network is intentionally used to support the goal or outcome for a student, this practice is defined as TAI (Wong et al., 2013). A broad range of devices, programs, and instructional procedures for using technology have been utilized to increase/maintain and improve skills for individuals with ASD (Choi, O’Reilly, Sigafoos, & Lancioni, 2010; Wong et al., 2013).

One type of TAI that supports children with developmental disabilities to develop speech and language at a functional level associated with their typically developing peers, even with intensive therapy (Choi et al., 2010; Kagohara et al., 2010). The use of AAC devices can support some of these individuals in developing more appropriate means of expression through various modes, such as speech-generating devices (SGD) and PE systems. SGDs are computer-based devices that often use visual icons displayed in combination with a synthesized speech output (Kagohara et al., 2010).

Utilizing prompting procedures and progressive time delays, Choi et al. (2010) successfully teach four children, between the ages of 6 and 9 with developmental disabilities, how to use an AAC device to appropriately request and reject. Utilizing a variety of AAC devices, including SGDs and PEs, each child used was able to not only request and reject missing and wrong items appropriately, as well as to re-request an item
after rejection. These skills generalized to two untrained activities and were maintained during a 5-week follow-up.

In a similar study, Kagohara et al. (2010) used differential reinforcement and delayed prompting procedures to teach a 17-year-old to use his iPod and communication app, Proloquo2Go, to initiate the request of desired items. Initially, the student had failed to use the iPod and app efficiently as a SGD, and staff had attributed the lack of acquisition to poor motor skills. However, after individualized training, which included shaping the form his behavior, he was able to initiate requests without prompting. This study highlights the importance of identifying individual needs prior to implementation of higher levels of technology. Additionally, with up to one-third of all assistive technology devices discontinued once they are taken home, training is critical to minimize technology abandonment (Starble, Hutchins, Favro, Prelock, & Bitner, 2005).

Increasing independence is often an area of focus when targeting skill development among individuals with ASD, and TAI has proven to be effective in supporting acquisition of skills across a variety of ages and environments. For example, personal digital assistant (PDA) devices have been found effective in increasing a variety of behaviors among school-aged students. Mechling et al. (2009b) sought to measure the percentage of steps in multiple cooking recipes performed by 16- and 17-year-old high school students with ASD utilizing a PDA with picture and video prompts and voice over. Results indicated that all three students in Mechling et al.’s (2009b) study adjusted to using the PDA and increased the number of steps performed correctly. In addition, students began to self-fade the level of prompting required to complete the steps. Post-study measures assessing social validity indicated that, while not all the students
preferred the PDA, they all did choose more advanced technology for viewing the recipes over a printed picture cookbook.

In a similar study, Mechling and Savidge (2011) sought to determine if a PDA would result in an increase of tasks completed independently by three middle school students with ASD compared to a picture-based task strip. Findings indicated that students were able to increase the number of tasks completed between transitions and maintain more independent levels upon return to the task strip. In addition, one student began to self-fade the use of more intrusive prompt levels. Social validity findings also reported that each of the students indicated a preference to using the PDA for task completion over the task strip.

Research targeting post-secondary settings and behaviors has also included the use of TAIi in the promotion of independence for adults with ASD. Using covert audio coaching (CAC), Bennett, Brady, Scott, Dukes, and Frain (2010) found that adults with ASD were able to increase their work performance within a vocational setting with the delivery of discreet performance feedback via an earpiece. Specifically, existing work skills improved for all participants with an increase in accuracy and fluency for each job task. These skills maintained after removal of the earpiece deeming this type of TAIi as effective and durable.

As evidenced, TAIi has proven to be successful when implemented by the researchers; however, it is also important to consider the more direct impact that caregivers and related professionals have on persons with disabilities. Training of these individuals to deliver technology-based interventions can also produce positive outcomes. For example, Goodman, Brady, Duffy, Scott, and Pollard (2008) were able to train novice
special education teachers to increase their rate and accuracy in delivering and clarifying a question, reacting to the student response with reinforcement and correction, and adjusting the pace of instruction if needed (a process known as a Learn Unit). This training was conducted by implementing bug-in-ear technology, in the form of an ear bud, which allowed the researcher to coach and provide corrective feedback to the teacher as instruction occurred. While rate and accuracy of complete Learn Units delivered increased, the increases also maintained when the coaching prompts were faded. Similarly, Oliver and Brady (2014) utilized audio coaching via ear buds to teach three untrained mothers how to deliver effective prompts and praise to their children. Results indicated all three mothers were able to deliver prompts and praise and, as a result, their children showed a substantial increase in their engagement and completion of independent tasks and routines. Subsequently, as children displayed more independent levels of performance during generalization phases, parents reduced their levels of prompting.

These research findings support the notion that TAIi, supplemented with immediate and specific feedback, can be effective in shaping the behavior of professionals and caregivers as well as produce positive outcomes for the target population. While third-party training involved more advanced technology, such as a bug-in-ear device, empirical evidence supporting the systematic implementation of the iPad as an intervention is scarce (Cardon, 2012). Including more ecologically valid tools, such as the iPad, can help increase engagement and enhance the ability of the learner to increase his or her independence. It should also be noted that adolescent participants reported a preference of these advanced devices over other more basic tools, such as
printed pictures represented in cookbooks and task strips (Mechling & Savidge, 2011). Therefore, it is critical that professionals and caregivers be given the opportunity to learn how to use and implement these more cutting-edge tools so they can be better equipped in promoting independence and engagement among their students and children.

**Video Modeling**

For almost five decades, the research on modeling a desired behavior delivered in the form of video has proven to be efficacious across populations and environments (Charlop-Christy et al., 2000; McCoy & Hermansen, 2007; Thelen, Fry, Fehrenbach, & Frautschi, 1979). One of the earliest studies to demonstrate modeling as an effective treatment found that 3- to 5-year-olds were able to reduce avoidance behaviors related to interactions with dogs after observing a graduated series of videos in which exchanges with and emotions relative to dog encounters were modeled with progressive intimacy (Bandura & Menlove, 1968).

Rooted in the belief that if an individual is able to observe the consequences of behaviors exhibited by others, social learning theory assumes there will be an increase in the likelihood of the observer to behave in a manner that will lead to more reinforcing consequences for him or herself (Bandura, 1969). The ability to learn through observation has strengthened the support for the application of social learning principles in community-based settings, such as schools. For example, in the 1980s there was an increase in video-based technologies supplementing instruction for individuals with hearing impairments, cognitive disabilities, and physical needs (Browning, Nave, White, & Barkin, 1985; Dillingham, Roe, & Roe, 1982). Since observation is an important element in the learning process for individuals with autism, antecedent interventions such
as VM, which have theoretical roots in the social learning theory, have proven to be effective in ameliorating skill deficits that were not instinctively learned (McCoy & Hermansen, 2007; Quill, 1997).

Video modeling is an EBP that involves the learner viewing a recording of a targeted behavior or set of skills and then performing that behavior (Bellini & Akullian, 2007; Charlop-Christy et al., 2000; Plavnick, 2013). Additionally, interventionists are able to remove elements of the modeled behavior that were irrelevant to the target behavior allowing the learner to focus on its essential features (Bellini & Akullian, 2007). The various forms of VM include basic, self, point-of-view, and video prompting. Basic VM is the most researched form and involves recording someone, other than the learner, demonstrating the target skill whereby video self-modeling (VSM) involves recording the learner demonstrating the target behavior accurately and independently (Charlop-Christy et al., 2000; Cihak, Fahrenkrog, Ayres, & Smith, 2010; Lasater & Brady, 1995; Plavnick, 2013; Reamer, Brady, & Hawkins, 1998). Point-of-view VM, also known as subjective viewpoint, involves recording from the perspective of what the learner will see when he or she performs the task, but without showing the entire person who is modeling the behavior (Canella-Malone et al., 2006; Hine & Wolery, 2006). Whereas other VM procedures require the learner to view the entire sequence of behaviors before performing them, video prompting involves breaking the behavior down into steps that the learner views and performs sequentially and has proven to be successful in skill development (Banda, Dogoe, Matuszny, 2011; Canella-Malone, et al., 2006; Van Laarhoven et al., 2009).
To clarify further, video prompting is a video modeling procedure that allows the learner to view the targeted skill in segments, rather than in its entirety, before completing the observed step. That is, the target skill is task analyzed and video segments are created for each step of the task analysis. The learner then views the segment before completing the modeled step. The segments for this instructional sequence can be made by recording them separately or by splicing the video of the entire demonstrated skill into the number of steps outlined in the task analysis. The nature in which video prompts are created allows for basic, self, or point-of-view video modeling procedures to also be utilized. Research has been conducted to determine the effectiveness of video prompting as an intervention as well as efficiency in creating and implementing this type of VM procedure compared to other visual support systems.

In comparing the effectiveness of video prompting as an intervention, several studies have suggested it can lead to faster acquisition of skills than other prompting and modeling procedures for individuals with developmental disabilities (Canella-Malone et al., 2006). Mechling and Gustafson (2008) compared the effectiveness of printed photographs and video segments on the independent completion of cooking-related tasks for six high school students with autism. Using pictures found in cookbooks designed for nonreaders, corresponding video prompts with narration, were created for each task step. Although each student increased the percentage of steps completed independently and correctly, growth was more rapid and mean performance was greater for each student when viewing the video prompts.

Similarly, Van Laarhoven et al. (2010) compared the effectiveness of picture and video prompts in teaching two adolescents to complete steps in two different independent
living tasks. Tasks that did not share common features but were of similar difficulty were chosen and picture and video segments were created for each step in their respective sequence. Using modeling and direct instruction, the researcher taught participants to use the picture booklet and navigate the PowerPoint presentation on a laptop until they could operate both systems correctly and independently. Both students demonstrated a greater increase in independent responding with the video prompting condition and were able to maintain these gains 6 weeks post-study. Additionally, fewer external prompts were required for task completion when viewing the video segments. Perhaps more surprising, when calculating each participant’s growth and the cost of minutes required to make the instructional materials, video prompting was found to be substantially more efficient than picture prompting.

In another comparison between visual supports to enhance independence, Canella-Malone et al. (2006) measured acquisition rates for two DLS when instruction included VM and video prompting procedures. Six adults with developmental disabilities viewed two tasks composed of 10 steps each that were either presented by video in their entirety or in segments. The strength of video prompting in teaching the two tasks was clearly evident in the rapid skills acquisition for each participant. In fact, VM was shown to be generally ineffective with most participants only completing 30–40% of the steps correctly. Since adaptive skills involve the completion of several sequential steps, a video prompting procedure has proven to be efficacious in teaching learners how to successfully complete related tasks.

These studies demonstrate that the use of video prompts can be cost and time efficient; however, the delivery mode of the instruction continues to advance. In
particular, more interventions have included the use of portable devices to deliver the video instruction. From DVDs (Mechling, Gast, & Gustafson, 2009a), laptop computers (Cannella-Malone et al., 2006; Van Laarhoven et al., 2010), PDAs (Cihak et al., 2010; Mechling et al., 2009b; Mechling & Savidge, 2011), to iPods (Bereznak, Ayres, Mechling, & Alexander, 2012; Kagohara et al., 2010; Van Laarhoven et al., 2009), the benefits of compact and transportable devices are far-reaching. In addition to their portability, they are more customizable and affordable than previously used devices (Bereznak et al., 2012; Cihak, Kessler, & Alberto, 2007). Since video instruction can be provided in natural environments, consideration of ecologically valid tools as a delivery system should be made to increase motivation and engagement of participants.

With the advancement of technology leading to more developed computer-based devices, it is not surprising that research assessing the efficacy of the various formats of VM for individuals with developmental disabilities continues to evolve within the literature. Many handheld devices, such as Samsung’s Android cellphone and Apple’s iPod media player, iPod Touch, iPhone, and iPad, are developed with universally designed features that include both visual and auditory prompting systems which promote independent responding by its user. Furthermore, these products are commercially available thus making them more affordable and less stigmatizing than products made specifically for individuals with special needs, which are not mass-produced.

As intervention delivery systems, iPods and iPad have been effective when integrated into teaching programs for individuals with developmental disabilities (Kagohara et al., 2013). In a systematic review conducted by Kagohara et al. (2013), instruction and training utilizing iPods or iPads for delivery of picture or videos were
largely successful in promoting skills within academic, employment, leisure, and transitioning domains. For example, Van Laarhoven et al. (2009) explored whether an iPod for delivery of video prompts would reduce the number of prompts, increase independent responding, and be used independently by an individual with moderate disabilities. Using modeling, guided practice, and rehearsal trials, the participant learned to operate the iPod, as well as access and navigate the video segments independently. Subsequently, he was able to complete the steps of three tasks with a high degree of independence while significantly reducing the percentage of prompting for task completion and using iPod. The participant, his mother, and employers all reported being extremely satisfied with the effectiveness of the iPod, thus adding to the value and social validity of these devices.

Research addressing the application of the iPod or iPad to teach DLS, however, is scant. Seeking to determine if adolescents can learn to use a mainstream device as self-prompting to learn and complete vocational and DLS, Bereznak et al. (2012), provided training on an iPhone to three individuals with varying degrees of autism. Instruction occurred in the school setting where students were taught independent living and vocational skills. Videos were made using point-of-view modeling with each task step constituting one segment of the video. Each prompt began with a single word to describe the step that would be played and was accompanied by audio narration of the action being described. A stop sign visual with audio support signified the end of the segment. Only two of the three participants were successful in learning to activate the video and press pause at the end of each segment due to fine motor impairments; however, all the students completed the step that was just viewed for three tasks with a high degree of
degree of fidelity. Feedback from participants and family members indicated the iPhone was an acceptable and desirable tool for use. While the iPhone is considered a portable device, its access and use relies on a phone contract and monthly fees for access to the Internet. Devices, such as the iPad, do not require monthly subscriptions for these services; therefore their usability has broader implications for parents and caregivers.

With an increase in accessibility to personal devices, such as the iPad, training for caregivers is critical. More research is essential to determine if portable, consumer-friendly devices can be used to successfully deliver EBPs, such as video prompts, to promote independence among individuals with ASD, specifically adolescents.

**Behavior Skills Training**

To support parents and caregivers to become more competent delivery agents of service, training packages should be carefully planned so components are likely to lend themselves to the most successful outcomes possible. Behavioral skills training (BST) packages consist of methods that have proven to be effective in promoting new skills across various disabilities (Fetherston & Sturmey, 2014; Mueller et al., 2003). First, *instruction* is delivered using verbal and written materials to enhance teaching (i.e., didactic methods). Next, researchers *model* the steps of the target intervention. Modeling can be done in vivo or with the use of video demonstrations. Participants are then given the opportunity to *practice* implementing the steps and provided with immediate *feedback* on their performance. The objective of a BST package is to ensure participants acquire a robust skill set building their capacity of teaching an intervention to another individual.
Utilized individually or jointly, methods such as didactic instruction, modeling, behavioral rehearsal, and immediate verbal feedback, have all proven to be effective in teaching professionals, students, and peers accurate implementation of various well-established interventions (Mueller et al., 2003). For example, Iwata et al. (2000) found that undergraduate students who participated in role-playing during training, a form of behavioral rehearsal, were able to conduct simulated functional analyses with very high degrees of fidelity. Combining instruction, feedback, rehearsal and modeling components, Sarakoff and Sturmey (2004) were successful in training teachers to deliver discrete trial teaching procedures to their students with autism. Jostad, Miltenberger, Kelso, and Knudson (2008) also utilized a package consisting of instruction, modeling, rehearsal, and feedback to teach peers of 6- and 7-year-olds to acquire safety skills when encountering firearms. Each of these studies was conducted with participants with varying degrees of ages, abilities, and relationships to individuals with disabilities across a variety of settings, including home, school, and clinics, and were all successful in maintaining high levels of procedural integrity after the intervention condition ended.

There is also evidence to support training packages as effective in promoting skill sets for parents implementing EBPs to ameliorate skill deficits and to promote appropriate behaviors among their children with autism and other developmental disabilities. Food selectivity and refusal are common feeding problems associated with children with ASD and, for over two decades, multi-component training packages have aimed at enhancing parental skills to implement treatment procedures addressing associated challenges (Mueller et al., 2003; Seiverling et al., 2012). Seiverling et al. (2012) used modeling, rehearsal, and feedback to successfully train parents to apply
feeding procedures that included introduction of a new food, requesting the child to take a bite, and appropriate responding to a child’s refusal behaviors.

Unintentional harm and death are unfortunate results for any child who has not been adequately trained to respond to dangerous situations. Behavioral skills training packages have been used to teach parents to educate their children how to respond to encounters with guns (Gross et al., 2007). Parents have also demonstrated capacity to teach their children to respond to possible abduction situations in home and community settings with high degrees of fidelity (Beck, Miltenberger, & Ninness, 2009). Researchers in both studies also reported increases in skills sets among the child participants indicating that parents can be effective agents in teaching potentially life-saving techniques.

Seeking to determine which strategies are necessary to include in a training package to promote high degrees of procedural fidelity, Mueller et al. (2003) evaluated the components of two studies that enhanced implementation skills of behavioral feeding protocols. The first study investigated treatment integrity after a BST package was used to teach parents via instruction, modeling, and rehearsal. The second study evaluated the effectiveness of only the instruction and modeling components to determine if fewer components could produce comparable levels of treatment integrity in the first multi-component study. Researchers discovered that both training packages resulted in parents implementing procedures with high degrees of fidelity. They also concluded that, while the presentation of all components may not be necessary to promote skills and may be more time and cost-effective for clinical settings, at minimum verbal instruction and one other procedure must be included to promote high levels of treatment integrity. It may
also be necessary to add components as interventions are evaluated until treatment
integrity reaches optimal levels (Mueller et al., 2003).

If seeking to teach parents to implement procedures in a more unstructured setting
(such as the home environment), the design of a BST package might include all four
components to measure and establish initial success. Additionally, with immediate
feedback being more efficacious in promoting more effective outcomes, this approach
should be utilized for parents during BST and following each session during intervention
(Scheeler, Ruhl, & McAfee, 2004). Utilizing these components for training, the current
study aimed to determine whether parents are capable of implementing procedures with
their children that utilize EBPs delivered with a popular, mainstream device.

**Research Questions**

This study sought to answer the following questions:

1. Can parents be effective delivery agents of evidence-based interventions
   utilizing advanced, mainstream technology?

2. Does parent delivery of a video prompting intervention using an iPad increase
   the accuracy of steps in a daily living skill completed correctly and independently by
   their children with autism spectrum disorder?

3. If so, do these skills maintain upon removal of the intervention?

**Chapter Summary**

Research has shown that individuals with ASD tend to be strong visual learners
and have difficulty in retaining information that is presented only vocally. As a central
feature of an intervention, technology can support the acquisition of skills for learners
with ASD and related developmental disabilities, and bring forth several important
considerations. First, interventions utilizing advanced technologies require explicit, systematic instruction. Additionally, whether implementation of technology is directly implemented by a researcher or with a trained caregiver, attention to the specific intervention must be made based on the learning and performance needs of all participants. Finally, supportive training programs should be created to enhance participants’ current abilities while meeting target goals.

Second, the use of ecologically valid tools (such as the use of an iPad) to deliver empirically validated interventions, such as video prompts, can play a significant factor in the training, building, and maintenance of DLS. Portable devices, such as the iPad, have revolutionized how individuals with disabilities can be taught. These devices are not only more stimulating in their presentation, portable in their construction, and flexible in their customizability, their accessibility in the mainstream culture makes them more affordable and less stigmatizing than previous devices designed for individuals with special needs. Parents and caregivers are accessing them with the hope they can be used effectively when building functional skills for their children. As researchers, it is our responsibility to provide the training and supports needed to minimize the abandonment of potentially life-changing devices.

Finally, and perhaps most importantly, PII are EBPs that, with professional training, can lead to these caregivers teaching new skills and decreasing challenging behaviors. Research has demonstrated that with systematic instruction and immediate feedback found in BST packages, parents and professionals can learn to deliver interventions with high degrees of fidelity. Empowering parents by increasing their technological competency and becoming skilled interventionists can also lessen the strain
of financial costs commonly associated with clinically-based therapies. Additionally, with an abundance of research targeting early childhood intervention, parents of adolescents are in need of research exploring how they can directly implement EBPs to support their children in building more independent living skills.
CHAPTER 3: METHOD

From the review provided in Chapter 2, the importance of teaching parents and caregivers to deliver EBPs, such as video prompts, through advanced, mainstream devices, such as the iPad, has been explained for its impact in developing independence in completing steps of a DLS for adolescents with ASD. In this chapter, a description of the methods including an overview of participant recruitment and setting characteristics is provided followed by a description of the tasks. Next, procedures for data collection and interobserver agreement are described. Finally, a review of the design used in the study is explained.

Participants

Participants in this study included three parents who expressed a desire to teach their child with ASD to independently complete a DLS using videos for modeling of the steps. To qualify for participation in this study, parents participated in a pre-study interview assessing prerequisite skills and targeted child’s needs (see Appendix A). The following criteria were required for parent participation in the study:

1. Interest in using videos to teach their child;

2. Desire to teach a DLS to their child that they have not tried to teach or have been unsuccessful in teaching in the past;

3. Agreement to refrain from teaching the child the skill outside of intervention sessions;
4. Willingness to attend a one-day training at the university campus;

5. Willingness to allow the researcher to collect data and provide feedback in their homes;

6. Knowledge in navigating an iPad (i.e., swiping, pinching, opening and closing apps, using home key); and

7. Ability to speak and understand English proficiently.

Child participants were between 12 and 17 years of age, resided with their parents in the same county as the University and were and are registered constituents of the University’s Center for Autism Related Disabilities (CARD). To qualify for participation in the study, these children needed to demonstrate deficits in completing a DLS independently within the home and live with at least one parent or guardian. Pulling from parent responses from the interview, an array of DLS was reviewed with each parent for selection of the target skill to be taught to their child. Criteria for child participation included:

1. A formal diagnosis of an ASD (such as Autism, Asperger’s, or Pervasive Developmental Disorder, Not Otherwise Specified) received from a relevant licensed professional such as a psychologist, psychiatrist, or medical doctor;

2. No reports of problem behaviors involving verbal or physical aggression or property destruction;

3. A low percentage of accurately completed steps on the targeted DLS; and

4. No previously demonstrated mastery of the targeted skill.

Participation was voluntary and consent (see Appendix B) and assent forms (see Appendix C) were obtained by parent and child participants before the start of the study.
Individuals who met eligibility criteria were selected regardless of race, gender, or socioeconomic status. All participating families were of Caucasian descent. Table 1 summarizes participant characteristics. Pseudonyms are used.

Table 1

*Participant Characteristics*

<table>
<thead>
<tr>
<th>Child (gender &amp; age)</th>
<th>Parent and age</th>
<th>Parent’s highest level of education</th>
<th>Diagnosis</th>
<th>Target daily living skill (DLS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jimmy, male</td>
<td>Mother</td>
<td>Master’s</td>
<td>PDD-NOS</td>
<td>Making a bed</td>
</tr>
<tr>
<td>12 yrs. 11 mo.</td>
<td>44 yrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bonnie, female</td>
<td>Mother</td>
<td>Bachelor’s</td>
<td>ASD Level 1</td>
<td>Cooking pasta</td>
</tr>
<tr>
<td>13 yrs. 11 mo.</td>
<td>50 yrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrie, female</td>
<td>Mother</td>
<td>Doctorate</td>
<td>Autism</td>
<td>Tying shoes</td>
</tr>
<tr>
<td>17 yrs. 1 mo.</td>
<td>54 yrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Jimmy’s mother selected making a bed as his target skill due to her unsuccessful attempts at teaching this skill for approximately one year prior. Although she had utilized other visual supports (such as pictures) to teach Jimmy to complete other skills, she had never used the iPad. She owned an iPhone and was fairly proficient in navigating and utilizing its various features and functions (i.e., recording, playing back, and auxiliary features to rewind and forward through playback). Jimmy actively used the iPad to view videos for pleasure and play various academic and other games; however, he had never used it to watch videos to learn tasks or skills. He was also proficient in using video playback and could identify the functions of the symbols associated with these features.

Bonnie’s mother was teaching Bonnie how to become more self-sufficient but had not instructed her using videos. She owned an iPhone but was proficient only in the basic
calling, emailing, and photo/video features (i.e., recording and playing back). Bonnie used her personal iPhone to watch video tutorials to learn various skills, such as how to apply makeup. She was a competent user of the iPhone demonstrating she could access various features within the iPhone as well as during video playback. She enjoyed eating pasta regularly, so *making pasta* was selected by Bonnie as the preferred DLS for this study.

Carrie’s mother owned an iPhone, but was not an avid iPad user. She used her iPhone to perform basic tasks such as making phone calls, checking email, and taking photos. She had attempted to teach Carrie to tie her shoes since she was 7-years-old so *tying shoes* was selected as her DLS for this study. Carrie used the iPad regularly to watch cartoons and play skill-building games, and was able to navigate the iPad at a fairly proficient level (i.e., appropriately utilize playback features to raise the volume, rewind, or forward while watching videos). She often engaged in nonfunctional verbalizations from scripted lines she heard from videos she had viewed.

The researcher, a doctoral student in Exceptional Student Education and a Board Certified Behavior Analyst, served as developer and trainer of the BST package. The researcher was also responsible for collecting data and providing feedback to participating parents immediately before and after each session. To address any questions or concerns the child may have had regarding the presence of the researcher in their home, they were informed that she was from the university and would be visiting often over the next few weeks to help their parent or caretaker.
**Task Selection**

A three-step process was used to identify potential DLSs for this study. This process included:

1. Skills were nominated by parents or caretaker;
2. The targeted DLS was determined based on importance as discussed between researcher and parent; and
3. The researcher observed the child participant engage in the selected DLS to confirm inability to complete (below 50% correct and independent completion of steps).

The selected DLS for Jimmy was making his bed. His mother often asked him to make his bed each morning, but this was not a consistent part of his routine. He was observed performing this skill prior to baseline and demonstrated consistent problems with accuracy.

Bonnie’s targeted skill was making pasta. She requested to eat pasta several times per week, and her mother made it for her. At times, Bonnie assisted her mother in making pasta but had never made it on her own. She was observed making pasta prior to baseline and her performance indicated a high degree of dependency on her mother’s guidance and prompting to complete the task safely, accurately, and in its entirety.

Tying shoes was the selected DLS for Carrie. Carrie did not prefer sneakers with Velcro fasteners and instead enjoyed wearing those with shoelaces. Several times throughout the day, the adults in Carrie’s life would tie her sneakers for her, which included double knotting the laces. She was observed prior to baseline and clearly demonstrated the inability to complete the final half of the steps for both sneakers with accuracy.
The selected DLSs were task analyzed for each participant using various resources, as well information derived from discussions with the parent assessing how the child was previously taught to perform the selected skill (Cooper, Heron, & Heward, 2007; Durante, n.d.). Duration of sessions varied according to the task that was selected for each child participant due to some skills requiring more steps than others for some children. The task analyses are detailed in Table 2.
### Table 2

**Task Analyses of Targeted Daily Living Skills**

<table>
<thead>
<tr>
<th>Jimmy making a bed</th>
<th>Bonnie making pasta</th>
<th>Carrie tying shoes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Remove everything from on top of the bed.</td>
<td>1. Wash hands with soap and water. Then grab a medium-sized pot and a measuring cup.</td>
<td>1. Pick up right lace with right hand.</td>
</tr>
<tr>
<td>2. Place sheet on bed and bring the top of the sheet to the headboard.</td>
<td>2. Place pot on burner of stove, pour 2 cups of water into pot, and place lid on pot.</td>
<td>2. Pick up left lace with left hand.</td>
</tr>
<tr>
<td>3. Straighten right corner of flat sheet to foot of bed.</td>
<td>3. Locate correct knob for burner. Push &amp; turn the knob to the left until it is marked on high.</td>
<td>3. Cross laces to make an X.</td>
</tr>
<tr>
<td>4. Straighten left corner of flat sheet to foot of bed and smooth wrinkles.</td>
<td>4. Get a wooden mixing spoon and your choice of pasta.</td>
<td>4. Fold lace on right side through hole using the right hand and pull tight.</td>
</tr>
<tr>
<td>5. Place duvet cover on bed and bring the top of the cover to the headboard.</td>
<td>5. Pour 2 cups of pasta into a measuring cup.</td>
<td>5. Make a loop with the left lace pinch it with the thumb and index finger.</td>
</tr>
<tr>
<td>6. Straighten right corner</td>
<td>6. When water starts to boil, lower the temperature of the burner by turning the knob to the number 5.</td>
<td>6. Make a loop with the right lace, pinch it with</td>
</tr>
<tr>
<td></td>
<td>7. Take off the lid and put to the side. Slowly pour pasta into pot.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Using the wooden mixing spoon, touch the bottom of the pot and stir the pasta twice making figure 8’s with your spoon.</td>
<td></td>
</tr>
<tr>
<td>Step</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>of duvet cover to foot of bed.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Straighten left corner of duvet cover to foot of bed and smooth wrinkles.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Place both sleeping pillows at the top of the bed.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Place both bigger, decorative pillows on top of the sleeping pillows.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Place both smaller square pillows on top of the big decorative pillows.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Spread heavy blanket on bed by laying it straight and flat.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Set the spoon on the holder and set your timer for 2 minutes.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Get a strainer and place it in the sink.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>When timer rings, using the mixing spoon, touch the bottom of the pot and stir the pasta twice making figure 8’s with your spoon.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Set the spoon on the holder and set your timer for 2 minutes.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Get 5 items: salt, pepper, shredded cheese, grated cheese, and choice of sauce or butter.</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>When timer rings, using the mixing spoon, touch the bottom of the pot and stir the pasta twice making figure 8’s with your spoon.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Set the spoon on the holder and set your timer for 2 minutes.</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Get 3 items: a bowl, a fork, and a tablespoon.</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>When timer rings, using the mixing spoon, touch the bottom of the pot and stir the pasta twice making figure 8’s with your spoon.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Cross the laces to make an X.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Fold the lace on the right through the hole using the right hand.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Pull both laces tight.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Repeat with other shoe. Pick up right lace with right hand.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Pick up left lace with left hand.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Cross laces to make an X.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Fold lace on right side through hole using the thumb and index finger.</td>
<td></td>
</tr>
</tbody>
</table>
12. Fold heavy blanket in half by bringing the bottom up to match the top.
13. Fold in half again by bringing the right side over to match the left side.
14. Place blanket at the bottom end of the bed.
15. Make a loop with the left lace, pinch it with the thumb and index finger.
16. Cross laces to make an X.
17. Fold lace on right side through hole using the right hand.
18. Pull both laces tight.

18. Turn off the stove by turning the knob all the way to the right until the knob clicks.
19. Take the pot to the sink and slowly pour out all the pasta and water into the strainer.
20. Place the pot on the counter, pour the pasta back into the pot, and place pot on the stove.
21. Put one tablespoon of shredded cheese into the pot. Then, put in one tablespoon of sauce or butter. Finally, add 2 shakes of salt* & 2 shakes of pepper*.
22. Stir with the mixing spoon until well blended.
23. Slowly pour your pasta into your bowl. Shake grated cheese* on top and enjoy!

*: optional
Setting

This study took place in the community and homes of the parent-child participants. First, a training package consisting of didactic instruction, modeling, behavioral rehearsal, and feedback was provided individually to each parent participant. The purpose of this training was two-fold: to understand how to navigate the video prompts, and to deliver appropriate feedback to the child. First, two of the three parent participants were taught to teach their children to navigate the video segments. To tie her shoes, Carrie needed to use both of her hands to hold the shoe laces; consequently, she did not have access to the video prompts. Therefore, this parent was only trained to navigate the video segments. Then, parents were instructed on how and when to reinforce or provide corrective feedback during the child’s completion of the sequence. Participant instruction was provided in a one-to-one setting at the University and conducted in the course of one day.

The target DLS determined the location of the intervention within the home for each child. For example, Jimmy was learning how to make his bed, so the intervention was delivered in his bedroom. Bonnie’s intervention took place in her kitchen. Carrie’s intervention primarily took place in her dining room or her couch in the living room before tying her shoes.

Materials

The researcher prepared all materials for the BST package. First, a Microsoft PowerPoint presentation was created to describe the purpose and rationale of the study, outline intervention procedures, and guide instruction during the training. Parent participants were given this presentation in the form of a guide, which was theirs to keep.
Video segments from a webinar created by *Special Learning, Inc.* demonstrating and highlighting evidence in the use of video prompting as an effective treatment intervention augmented this portion of the training (LaMarche, 2012).

To enhance the modeling component of the BST, the researcher developed videos demonstrating a parent implementing the training procedures with an adolescent child. Videos simulations were created with participants not directly involved in the study. These simulations were also used for training of the data collector. Videos were recorded on an iPad 3G then transferred and saved to a MacBook Pro for viewing by parents and data collector.

The video prompt segments were created by the researcher using an iPad 3G then transferred to the *Picture Scheduler* app on the same iPad (Jankuj, 2013). First, the researcher recorded each of the steps in the task analysis in a subjective point-of-view. For videos to be viewed by male participants, skills were demonstrated using a male’s hands. A female’s hands modeled the steps in the skill sequence for videos to be viewed by female participants. Narration corresponding to the steps in the task analysis was added to each video segment during the recording. The video segments were then transferred to the *Picture Scheduler* app. To minimize the possibility of child participants reading the instructions prior to watching the segments, each video segment was labeled according to the step number of the task analysis it represented. For example, the first step in the “Making a Bed” task was to remove everything from on top of the bed. The video segment demonstrating this step was labeled “1.” Video segments were then placed within a folder labeled specifically for that target skill.
To further understand the impact of the study from the perspective of the parent, social validity measures were also evaluated. While it is important to understand how interventions are effective and generalizable, the social impact of the procedures should also be assessed (Baer, Wolf, & Risley, 1968; Wolf, 1978). Wolf (1978) emphasized that it is important that specific behavioral goals are desired by society, treatment procedures are seen as acceptable by the consumer and family members, and that consumers’ satisfaction of all results are assessed to best understand if the program was truly helpful. Therefore, to measure parent perceptions of the training components and their effects on the family, measures were developed by the researcher and implemented pre- and post-intervention (see Appendix D). Video recordings were also made to assess levels of satisfaction of the child participations. These reflective statements were edited and compiled into one video using iMovie 9.0.

**Behavioral Measures**

**Independent variable.** The independent variable for this study was the parent delivery of the BST procedures. These procedures consisted of two measures referred to as Set 1 and Set 2. The Set 1 BST procedures included several components such as teaching parents how to access and open the app, navigate the video prompts, open and activate Guided Access, provide a verbal request to the child, and direct him/her to play and watch the video before making a request to complete the demonstrated step. Then, for each step of the task analysis, the parent was instructed on how to respond to her child’s behavior (Set 2 procedures). This included providing positive reinforcement in the form of praise or a gesture after a successful completion of the step or providing error correction in the form of a statement (such as, “That’s not right. Watch the video again.”)
after an incorrect completion of the step. Additionally, parents also were taught to respond to two incorrect step completions, which included obstructing the child’s view and completing that step before directing the child to view the video segment for the next step. The researcher provided parents with feedback on procedural implementation immediately following each session. This feedback was reviewed again at the beginning of the next session.

**Dependent variables.** To address Research Question 1 (whether parents can be effective delivery agents of evidence-based interventions utilizing advanced, mainstream technology), percentage of the procedures (as instructed during their BST sessions) delivered correctly by parents also can be presented as the first dependent variable. To address Research Question 2 (whether parent delivery of a video prompting intervention using an iPad increases the accuracy of steps in a daily living skill completed correctly and independently by their children with ASD) and Research Question 3 (if increased, whether accuracy maintains), the second dependent variable is child-focused. That is, the second dependent variable is percentage of the task analysis steps the child participant completed correctly and independently. Specifically, *correct* was defined by the completion of that step as demonstrated in the video prompt. *Independent* was defined by the child’s ability to correctly complete the step without receiving verbal, physical, or gestural guidance during their completion of that step. During intervention sessions, independence also included viewing the video prompts on the iPad. Each parent-child dyad had a number of steps specific to the targeted DLS for the child; therefore, data for all families were reported as percentages.
**Data collection.** The researcher video recorded each session. Following each session, the researcher viewed the recording and child and parent responses were recorded simultaneously for each step of the child’s task analysis (see Appendix E). To determine percentage of accuracy in parent implementation of training procedures, two sets of responses were measured. First, the parent’s ability to access, open, and activate the video was assessed. The parent then gave a verbal request to complete the targeted skill. These responses were categorized as Set 1. For Jimmy and Bonnie, the parents directed their child to play and watch the video prompt before completing the step if the child did not initiate this independently. Direction to play the video could include verbal, gestural, or physical guidance. Due to the nature of tying shoes requiring the consistent use of both hands, Carrie’s mother played the video segments for her.

The parent then requested that the child complete the step he/she watched. Completion of these Set 1 procedures was indicated with a *Yes*, *No* or *N/A* if that response was not applicable. For example, if the child pressed play after being given the verbal instruction, then the parent did not need to prompt playing of the video and that Set 1 procedure would be marked as *N/A*. Additionally, if the child began to complete the step without the parent instructing him/her to, then giving verbal instruction to complete the step would not be necessary.

After the child’s completion of each step, the parent’s response to the child’s behavior was marked to assess the fidelity in which parents implemented the training procedures. If the parent provided positive reinforcement for a correctly completed step, *Sr+* was marked. If the parent provided error correction for a step completed incorrectly, *EC* was marked. If the child incorrectly completed the step after a second attempt and the
parent obstructed the view of the child before completing the step for him/her, then this
response was marked as OC. Each BST procedure implemented correctly by the parent
was totaled, divided by the total number of child responses those procedures could have
been implemented with, and multiplied by 100 for a conversion into percentage of
procedures implemented correctly. For example, total number of reinforcement
statements or gestures were totaled and divided by total number of steps completed
correctly by the child. Additionally, the total number of error corrections made by the
parents was divided by the total number of errors made by the child and multiplied by
100 for a percentage conversion.

Additional parent responses were also measured to guide pre- and post-session
feedback and also collected to allow a more thorough analysis of the interobserver
agreement data (see end of section). For example, if the parent provided verbal, physical,
or gestural guidance to the child during step completion or did not give any response after
completion, G and NR were marked respectively. Each of these responses was totaled and
divided by the total number of child responses. This value was then multiplied by 100 for
a conversion into percentage of these responses implemented. If the parent exhibited an
incorrect response to the child behaviors, (i.e., praise for an error or correction for a
correct response) IC was recorded indicating an incorrect response by provided.
Additionally, if the parent did not obstruct the child’s view after the second incorrect
response, an E was recorded indicating an error in parent implementation of the training
procedure to obstruct the child’s view and complete the step. Each of these responses was
tallied, divided by the total number of child responses those procedures should have been
provided for, and divided by 100 for a percentage conversion. All parent responses were recorded during baseline, intervention, and maintenance phases.

To measure completion of steps in the DLS, data were collected on each child’s response for each step as indicated in the task analysis. If the child completed the step correctly and independently, a “and I were marked respectively. If he/she viewed the video segment in its entirety prior to completing the step, VP was also recorded. If the child made an error or gave no response, an E or NR was marked and he/she had the opportunity to complete that step again. After a second error, the child’s view was obstructed and the parent completed the step. The steps completed both correctly and independently in the first attempt were divided by the total number of steps in the task analysis and multiplied by 100 for a conversion into percentage of steps. These measures were completed during baseline, intervention, and maintenance phases.

To determine the percentage of steps in which child participants viewed video prompts, the total number of steps in which video prompts were viewed in their entirety were totaled then divided by the total number of steps completed by the child. This number was multiplied by 100 for a percentage conversion. Because the child participants were only able to view the videos during the intervention, these measures were taken during the intervention condition only.

**Parent satisfaction surveys.** To measure parent perceptions of the intervention, social validity measures were implemented utilizing pre- and post-intervention surveys. The surveys were a revision to those used in a previous study the researcher conducted in which parents were trained to use an iPad and a communication app with their children.
with ASD. The previous study’s survey was a modification of the Teacher Technology Survey developed by Marlar et al. (2007).

The Technology Use & Training Survey: Parent Perspective, developed for this study, consisted of pre- and post-intervention measures across several categories. Both surveys consisted of eight items representing one of two categories of likely parent reactions: iPad Confidence and Opinions and Attitudes Regarding Child’s Use of an iPad. The iPad Confidence category consisted of three items summarizing the parent’s ability to use the iPad with her child. The second category consisted of five items measuring the parent’s beliefs regarding her child’s ability to use the iPad. The post-intervention survey consisted of an additional third category, Opinions and Attitudes Regarding Training. This category was made up of 12 items representing parent opinions and attitudes of the training components. The post-intervention survey also consisted of a seven-item ranking of the training components.

In addition to the categories measuring confidence, beliefs, and opinions of the training, each survey also contained open-ended questions. The pre-intervention survey consisted of one open-ended question evaluating parents’ expectations of participating in the study. The post-intervention survey included four open-ended questions assessing personal experiences and any further thoughts parent participants may have had regarding the training.

Parent participants completed the pre-intervention survey at the start of the BST, prior to commencement of the training. Post-intervention surveys were given to parents after the second maintenance session and retrieved during the final maintenance session. During this final session, child participants were video recorded sharing their thoughts.
and reflections regarding participation in this study. To ensure clarity and understanding of all statements and questions, the surveys for this study were piloted with three parents. Revisions were made based on the reactions and understanding of these parents. A summary of the social validity instrument is found in Table 3.

Table 3
*Summary of the Social Validity Instrument: Technology Use & Training Survey: Parent Perspective*

<table>
<thead>
<tr>
<th>Category</th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>iPad Confidence</td>
<td>3 items assessing confidence</td>
<td>3 items assessing confidence</td>
</tr>
<tr>
<td>Opinions and Attitudes Regarding Child’s Use</td>
<td>5 items assessing confidence</td>
<td>5 items assessing confidence</td>
</tr>
<tr>
<td>Opinions and Attitudes Regarding Training</td>
<td>N/A</td>
<td>12 items assessing confidence</td>
</tr>
<tr>
<td>Rating Protocol for Category Statements</td>
<td>4-point Likert</td>
<td>4-point Likert</td>
</tr>
<tr>
<td>Open-ended Questions</td>
<td>1 item assessing expectations of participating</td>
<td>4 items assessing experiences and thoughts regarding training</td>
</tr>
<tr>
<td>Training Components</td>
<td>N/A</td>
<td>7-item ranking</td>
</tr>
</tbody>
</table>

**Procedures**

**Phase 1: Pre-baseline visits.** The researcher visited homes to familiarize herself with the participating families and their home settings. During the initial visit, the researcher provided participating parents with a selection of DLSs derived from the interview guide. In collaboration with the researcher, parents selected a target DLS for intervention. Selection of the skill was based on the following criteria: (a) the skill may or
may not have been previously attempted to be taught by the parent, (b) the child could not perform the skill independently, and (c) the skill was performed as part of the typical home routine. During this phase, consent and assent forms were reviewed and signed by all participants. Parent participants also completed the pre-intervention survey during this phase.

**Phase 2: Task analysis and training materials.** After confirming the selection of the DLS for each child participant, the researcher customized the task analyses data sheets for each child participant. She then video recorded and uploaded the accompanying video prompts for each step of the task analyses to the Picture Scheduler app (Jankuj, 2013). Additionally, the researcher finalized the BST package materials, including the presentation (see Appendix F), video simulations, and practice data collection sheets. This phase took approximately two weeks to complete.

**Phase 3: Baseline.** To determine each parent’s ability to implement Set 1 and Set 2 procedures, at least three baseline probes were conducted. The number of baseline probe measures was selected to minimize sensitivity that may arise during the parent assessment. Training on the use of the iPad and video prompts had not been provided at this point; however, the video prompts were created and installed on the iPad. Parents were informed of and shown the specific iPad to be used during this research and the iPad was placed within reach of the parents. If they asked to use it, they were told they could. This was allowed to measure parents’ baseline on accessing iPad features such as opening and accessing Guided Access. However, the child could not be given any instruction to play or watch a video prior to completion. The reason for this was two-fold: (a) introduction to and teaching of accessing the video prompt was a component of the
BST package which had not yet been provided, and (b) the child’s baseline measures relied on the absence of the videos and iPad.

To determine each child’s ability to complete steps of the targeted DLS correctly and independently, at least three baseline probes were conducted. These data were collected after the parent had provided a verbal instruction to complete the skill. Completion of the skill steps without any verbal, physical, or gestural guidance from the parent was video recorded on an iPad 2G and transferred to a MacBook Pro. The researcher observed the recordings at a later time and both parent and child responses were recorded on the task analysis data collection sheet.

**Phase 4: Behavioral skills training.** After stable baseline was indicated for each child participant, parents individually attended a one-day BST held at the University. The training comprised four components—didactic instruction, modeling, rehearsal, and feedback—aimed at ensuring parents implement the training procedures with their children with high degrees of fidelity.

During the *didactic instruction* portion of the training, parent participants received a Parent Guide outlining the procedures to be used in the study (Part One), management features of the iPad (Part Two), and procedural steps for responding to their child’s correct and incorrect responses (Part Three; see Appendix G). The researcher reviewed the contents of Part One using lecture and video examples to supplement the lesson. These supports were compiled from peer-reviewed articles, as well as from online and webinar resources. Benefits for supporting adolescents with ASD were discussed and research was shared highlighting successful implementation of BST with non-clinically based personnel, such as parents and educators. The purpose of this introduction was to
acclimate participants to the training components and to clarify why this method was selected for this study.

In Part Two of the training, parents learned to access and play the video prompts on the iPad (i.e., find the video within the assigned folder in the app and open it), open and activate Guided Access (i.e., triple-click home key and press start), deliver instruction to their child to complete a targeted DLS (e.g., “Jimmy, make your bed, please”), instruct their child to play and watch the video on the iPad (i.e., “Touch the screen to play the video and watch”), and then give their child a verbal instruction to complete the step just viewed (i.e., “Now you do it”). Initially, the parent immediately directed the child to view the video segment, constituting a 0-second time delay; however recent studies have demonstrated that implementing a constant time delay procedure has been effective in increasing compliance behaviors for children with various disabilities (Miles & Wilder, 2009; Sarokoff & Sturmey, 2004; Van Laarhoven et al., 2009). Therefore, the 0-second time delay was in place for five consecutive sessions, after which, if the child had not already commenced task completion, the parent would implement a 5-second time delay between the presentation of the demand to complete the task and the request to play and watch the video segment on the iPad.

Parents were then instructed how and when to provide positive reinforcement or error correction feedback during their child’s completion of the steps of the DLS. Verbal and physical praise were used to reinforce correctly completed steps and instruction to watch the next video segment was provided (for example, “That was awesome!” or thumbs up followed by “Watch the next video”). Selection of reinforcer statements and gestures were discussed and compiled with each parent to ensure the typography of
reinforcement was as typical of the family’s customs as possible. To establish reinforcement criteria, parents were instructed to provide reinforcement for the first and last correctly completed steps of the task analysis. They were also instructed to reinforce any three correctly completed steps in between the first and final step.

If a child made an error during completion of the step, the parent provided an error correction statement (for example, “That’s not right. Play and watch the video again”). Then, she instructed her child to complete the step again after viewing the video segment (i.e., “Now you do it”). If a second error was made, the parent was instructed to obscure the view for the child (i.e., tell him to turn around or physically turn him around) and complete the step for the child. Then the parent was instructed to tell the child to access the next video in the sequence of steps (i.e., “Play the video to watch what comes next”).

Next, parents were introduced to Guided Access, an iPad feature essential for delivering the video prompts with minimal distractions. The main purpose of Guided Access is to restrict the user from escaping an app when pressing the home key. This limited the child’s ability to press the home key to get out of the Picture Scheduler app, which contained the videos (Jankuj, 2013). Live demonstrations by the researcher and step-by-step guidance during participant practice provided parents with the opportunity to learn how to enable Guided Access. An overview of the lesson concluded the instructional portion of the training.

The modeling portion of the BST consisted of video simulations demonstrating a parent implementing the training procedures with their child. Parents viewed two simulations, one demonstrating the targeted DLS selected for her child and the other a
non-targeted skill. Simulations demonstrated a parent asking a child to complete a task while utilizing the iPad to deliver the video prompt and proceeding through the sequence of steps highlighting prompting, correction, and feedback procedures. Completion of the steps in the task analyses for each viewed simulation was completed with the participants. The purpose of this modeling component was to familiarize parents with the data collection procedures that would take place in the home. Parents then were asked to share some possible behaviors their child might exhibit during their implementation of the video prompt. The researcher modeled possible techniques to address those situations.

Finally, each parent participant was provided with the opportunity to rehearse intervention procedures with the researcher and other parent participants. Rehearsal included practicing the navigation of the iPad, enabling Guided Access, accessing the video, and responding to possible behaviors their child may exhibit as imitated by the researcher. Immediate feedback was shared with the participants during their behavioral rehearsals. All questions or concerns were clarified throughout the training. The duration of each BST session varied for each parent ranging from approximately 2.5 to 4 hours.

A separate training session was conducted for the data collector. The components of the task analyses were reviewed with the observer. The rationale for training the data collector prior to implementation of the intervention was to ensure she understood how to collect data on both the parent and child participants. The video prompt simulations created by the researcher for parent training were used with the data collector as practice. This training was conducted within the course of one day.

**Phase 5: Intervention.** Intervention was comprised of parent implementation of the training procedures and child participants completing each step of the task analysis.
with the use of the iPad to view the video prompt. After each session, immediate feedback was provided to parents highlighting correct responses and troubleshooting areas needing improvement. This feedback was reviewed prior to beginning the next session. For one parent (Jimmy’s mother), this general feedback was customized (starting on Session 10) to include prompts specific to task steps (smoothing wrinkles; identifying top of sheet). All sessions were recorded on a second iPad and saved to password-protected folders on the researcher’s MacBook Pro and a Toshiba Canvio Connect Portable Hard Drive. The researcher observed the recordings at a later time and both parent and child responses were recorded on the task analysis data collection sheet.

**Phase 6: Maintenance.** After three consecutive sessions with 85% or higher correct and independent responding on task completion by Jimmy and Bonnie, intervention was withdrawn. To assure mastery for shoe tying, intervention was withdrawn for Carrie after three consecutive sessions with 100% correct and independent responding. Maintenance probes for both parent and child participants were conducted once a week for the following three weeks.

To determine if parent skills maintained, measures on Set 1 (as appropriate to the condition) and Set 2 procedures were recorded. To determine if child participants could correctly and independently complete the steps of the targeted DLS, data were collected on the child’s ability to complete the DLS after being requested to do so by their parent. Correct and independent responding was marked if an appropriate response was provided without any guidance from the parent. Access to the iPad was removed during this phase to determine the level of mastery in skills without viewing the videos as compared to baseline and intervention conditions.
Experimental Design

A multiple baseline across participants design was utilized to determine if parent delivery of the TAI and VM interventions increased the accuracy of steps in a DLS completed correctly and independently by their children with ASD. The design consisted of three conditions including baseline, intervention (parent procedural fidelity and child completion of steps in a DLS), and maintenance (three weekly probes following three consecutive data collection sessions meeting mastery criteria). To demonstrate experimental control, the intervention was systematically introduced to one parent-child dyad at a time while the remaining participants remained in baseline (Gast, 2010). A series of baseline probes was conducted prior to the introduction of the independent variable (i.e., BST and parent implementation of procedures).

Observer Training and Interobserver Agreement

Point-by-point agreement was used to determine the interobserver agreement (IOA) for parent implementation of the BST procedures, as well as auxiliary responses as outlined on the data collection form (Kazdin, 1982). To determine IOA on correct and independent responses for each child participant, data were collected on their behaviors for each step of the task analysis. The researcher and a second observer collected IOA data independently. The observer was trained to collect data before the study began and practiced data collection utilizing the video simulations created for the BST package. Practice data collection took place until at least 85% agreement on each code was reached. Using video recorded sessions within baseline, intervention, and maintenance conditions, the observer used the same data collection sheets as the researcher to measure the parent’s implementation of procedures and child’s completion of the task analysis.
steps. The researcher and observer independently scored the data while watching each session only once.

An agreement for data collection on parent was indicated when both observers recorded whether the parent implemented the procedures. Additionally, an agreement was recorded if both the researcher and data collector marked the same type of response the parent provided during the child’s completion of the steps in the corresponding task analysis step. An agreement for child responses was recorded when both observers indicated the child did or did not respond independently and correctly, watched the video prompt in its entirety, made an error, or did not respond at all. IOA was calculated by dividing the number of steps that both observers recorded in agreement by the total number of agreements plus disagreements and then multiplying by 100. IOA was calculated for 31% of the total sessions for both parent and child participants. Agreement for total responses given by Jimmy’s mother was 83%, Bonnie’s mother, 83%, and Carrie’s mother, 85%. Agreement for total responses for each child participant was 94% for Jimmy, 90% for Bonnie, and 93% for Carrie. A summary of the results of individual mother and child codes is presented in Tables 4 and 5.
Table 4

*Interobserver Agreement Results for Individual Parent Codes*

<table>
<thead>
<tr>
<th>Condition</th>
<th>S-I</th>
<th>Sr+</th>
<th>Sr+ criteria</th>
<th>EC</th>
<th>OC</th>
<th>E</th>
<th>G</th>
<th>IC</th>
<th>NR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>100%</td>
<td>N/A</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>100%</td>
</tr>
<tr>
<td>Range</td>
<td>100%</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>84%</td>
<td>73%</td>
<td>80%</td>
<td>75%</td>
<td>100%</td>
<td>N/A</td>
<td>76%</td>
<td>100%</td>
<td>87%</td>
</tr>
<tr>
<td>Range</td>
<td>57 – 100%</td>
<td>67 – 100%</td>
<td>0 – 100%</td>
<td>50 – 100%</td>
<td>100%</td>
<td>33 – 100%</td>
<td>100%</td>
<td>0 – 100%</td>
<td></td>
</tr>
<tr>
<td><strong>Maintenance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>100%</td>
<td>67%</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
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<td>80%</td>
</tr>
<tr>
<td>Range</td>
<td>100%</td>
<td>67%</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>80%</td>
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*Note.* Codes for data collection are as follows: S-1 (Set-1), Sr+ (Positive Reinforcement), Sr+ (Met reinforcement criteria), EC (Error Correction), OC (Obstruct view & Complete step), E (error Correction), G (Guidance), IC (Incorrect response), NR (No response).
Table 5

*Interobserver Agreement Results for Individual Child Codes*

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<th>Independent</th>
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CHAPTER 4: RESULTS

The results of this study are presented in three sections. First, the data to address Research Question 1, “Can parents be effective delivery agents of evidence-based interventions utilizing advanced, mainstream technology?” are provided. This is followed by data addressing Research Questions 2 and 3, “Does parent delivery of a video prompting intervention using an iPad increase the accuracy of steps in a DLS completed correctly and independently by their children with ASD? If so, do these skills maintain upon removal of the intervention?” Finally, a summary of the parent participants’ feedback on the perceived social validity of the study’s components is provided.

Parent Delivery of the Intervention

Set 1 implementation. To determine if parents can effectively deliver evidence-based interventions utilizing advanced, mainstream technology (i.e., Research Question 1), fidelity of the implementation of the procedures taught to them is measured by two sets of variables. The first of the data is referred to as Set 1 and consists of the preparation needed prior to introducing the video package (i.e., parent implementation of Set 1 intervention procedures). This included (a) accessing the app and opening the video prompt, (b) opening and activating Guided Access, (c) providing a verbal instruction to their child, and (d) instructing him/her to play and watch the video prompt before (e) requesting completion of the demonstrated step.
Set 1 directions included the provision of a verbal cue by each parent to the child to begin performing the DLS. Therefore, one of the five Set 1 procedures was expected to be delivered each time the child was asked to begin. To interpret whether the BST procedures were implemented with high fidelity, this means that an expected pattern during baseline would see the parents accomplishing a maximum 1 of 5 steps ($M = 20\%$). During intervention and maintenance conditions, a high fidelity implementation would see the parents performing 5 of 5 steps as required for the condition ($M = 100\%$). The results for implementation of Set 1 responses for all parents are summarized in Table 6.

![Table 6](image)

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<td>50 – 100%</td>
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</tr>
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</table>

*Note.* N/O indicates no opportunity was provided to implement procedure because the child began completing the task before her mother could ask.
During Jimmy’s baseline sessions, Jimmy’s mother delivered 20% of the Set 1 responses. When intervention was introduced on Session 4, Jimmy’s mother implemented 75% of the Set 1 procedures as needed for this condition on the first two intervention sessions. Starting on the third intervention session, and for the subsequent 15 days of intervention, she produced 100% of the Set 1 responses needed for this condition. During Jimmy’s three follow-up sessions, his mother produced 100% of the Set 1 responses needed.

During Bonnie’s baseline sessions, Bonnie’s mother delivered an average of 15% of the Set 1 procedures. When intervention was introduced on Session 5, Bonnie’s mother implemented 97% of the procedures as needed for this condition throughout the intervention phase. During Bonnie's three follow-up sessions, Bonnie came into the kitchen and began completing her targeted skill shortly after the arrival of the researcher. Thus, her mother did not produce any of the Set 1 responses.

During Carrie’s baseline sessions, her mother delivered 16% of the Set 1 responses. When intervention was introduced on Session 6, Carrie’s mother implemented 50% of the Set 1 procedures as needed for this condition on the first intervention sessions. For the subsequent three intervention sessions, she implemented 75% of the procedures. For the remaining 13 intervention and maintenance sessions, she implemented Set 1 procedures with 100% fidelity as needed for these conditions.

**Set 2 implementation.** Implementation of Set 2 procedures includes each parent’s response to her child as he/she worked through the task analysis for their respective DLS. The parents implemented the training procedures based on the performance of their child on the task analysis. This included providing positive
reinforcement, error correction, obstructing the child’s view before completing the step, and meeting the reinforcement criteria. Results for Set 2 responses are summarized for each parent in Tables 7, 8, and 9.

Table 7

*Percentage of Implementation of Set 2 Procedures for Jimmy’s Mother*

<table>
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<th>Maintenance</th>
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<td></td>
</tr>
<tr>
<td>Obstruct View &amp; Complete</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>N/A</td>
<td>50%</td>
<td>N/O</td>
</tr>
<tr>
<td>Range</td>
<td></td>
<td>0 – 100%</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* N/O indicates no opportunity was provided to implement procedure because the child did not make any errors.
Table 8

Percentage of Implementation of Set 2 Procedures for Bonnie’s Mother

<table>
<thead>
<tr>
<th>Parent</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinforcement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>5%</td>
<td>45%</td>
<td>28%</td>
</tr>
<tr>
<td>Range</td>
<td>0 – 20%</td>
<td>27 – 67%</td>
<td>10 – 39%</td>
</tr>
<tr>
<td>Met criteria</td>
<td>N/A</td>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td>Error Correction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>2.5%</td>
<td>46%</td>
<td>0%</td>
</tr>
<tr>
<td>Range</td>
<td>0 – 5%</td>
<td>0 – 100%</td>
<td>0%</td>
</tr>
<tr>
<td>Obstruct View &amp; Complete</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>N/A</td>
<td>N/O</td>
<td>N/O</td>
</tr>
<tr>
<td>Range</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* N/O indicates no opportunity was provided to implement procedure because the child did not make any errors.
Table 9

*Percentage of Implementation of Set 2 Procedures for Carrie’s Mother*

<table>
<thead>
<tr>
<th>Parent</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Error Correction</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>Reinforcement</td>
<td>0%</td>
<td>36%*</td>
<td>11%*</td>
</tr>
<tr>
<td>Range</td>
<td>0%</td>
<td>11 – 86%*</td>
<td>6 – 22%*</td>
</tr>
<tr>
<td>Met criteria</td>
<td>N/A</td>
<td>11%*</td>
<td>0%*</td>
</tr>
<tr>
<td>Error Correction</td>
<td>0%</td>
<td>87%*</td>
<td>N/O</td>
</tr>
<tr>
<td>Range</td>
<td>0%</td>
<td>0 – 100%*</td>
<td></td>
</tr>
<tr>
<td>Obstruct View &amp; Complete</td>
<td>N/A</td>
<td>50%</td>
<td>N/O</td>
</tr>
<tr>
<td>Range</td>
<td>0 – 100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. N/O indicates no opportunity was provided to implement procedure because the child did not make any errors.

* includes sessions with probes with new sneakers.

With regards to Set 2 procedures, Jimmy’s mother did not deliver any positive reinforcement or error corrections to Jimmy during baseline. Due to reinforcement criteria and obstructing view procedures being introduced during the BST, these measures were not applicable during baseline. Of the 20 total intervention and maintenance sessions for Set 2, she reinforced his correct responses an average of 46% during intervention and 24% during maintenance conditions. Jimmy’s mother met the reinforcement criteria for 13 of the 20 intervention and maintenance sessions ($M = 65\%$). Of the 50 errors made by Jimmy, his mother provided error correction on 30 ($M = 60\%$).
Of the five occurrences in which Jimmy incorrectly completed a step twice during intervention and maintenance conditions, Jimmy’s mother correctly obstructed his view and completed the step three times ($M = 60\%$). She provided physical hand-over-hand guidance for the other two occurrences. With regards to responding to a second error made by Jimmy, his mother implemented the training procedure with a higher than average degree of fidelity. Jimmy did not make any errors during the maintenance condition; therefore, his mother did not have the opportunity to implement any error correction or view obstruction procedures.

In examining the delivery of Set 2 procedures, Bonnie’s mother correctly delivered an average of 5% positive reinforcement and 2.5% error correction procedures to Bonnie during baseline. During intervention and maintenance conditions for Set 2, Bonnie’s mother reinforced her correct responses an average of 45% during intervention and 28% during maintenance. She met the reinforcement criteria for 3 out of the 9 total intervention and maintenance sessions ($M = 33\%$). Of the 21 errors made by Bonnie during intervention and maintenance conditions, her mother corrected 6 ($M = 29\%$). Data were not collected on obstructing the view during baseline since that procedure was taught after the BST; however, Bonnie never made more than one error on any step during intervention and maintenance conditions. Therefore, her mother did not ever have to implement this procedure.

With regards to Set 2 procedures, Carrie’s mother did not deliver any positive reinforcement or error corrections to Carrie during baseline. She did, however, incorrectly respond to 7 of the 90 total steps completed by Carrie ($M = 8\%$). Each of these incorrect responses was a reinforcement praise provided by Carrie’s mother for
steps completed incorrectly by Carrie. After the BST was introduced, she correctly delivered an average of 36% positive reinforcement during intervention sessions, which included seven practice probes with new sneakers. Of the 39 errors made by Carrie during intervention, her mother correctly implemented error correction procedures for 34 ($M = 87\%$). Of the eight occurrences during the intervention condition in which Carrie incorrectly completed a step twice, her mother correctly obstructed her view and completed the step four times ($M = 50\%$). She provided hand-over-hand physical guidance for completion of the step for the other four occurrences. During the maintenance condition, which included three practice probes with the new sneakers, she correctly provided positive reinforcement at an average of 11%. Carrie did not make any error during maintenance; therefore, her mother did not have the opportunity to implement error correction procedures.

**Summary of Parent Implementation**

Upon examining the data regarding the implementation of Set 1 procedures as prescribed, Jimmy’s mother participated with a high degree of fidelity throughout intervention and maintenance conditions. She implemented Set 2 reinforcement and error correction procedures with moderate to high degrees of fidelity during intervention; however, she delivered reinforcement at a low percentage during maintenance. She also met the reinforcement criteria with a fairly high degree of fidelity during intervention but low degree during maintenance.

Throughout intervention and maintenance conditions, Bonnie’s mother had low to moderate degrees of fidelity implementing Set 2 BST procedures, but high degrees of
implementation for Set 1 procedures. She met reinforcement criteria on an average of 50% during intervention and not at all during maintenance ($M = 0\%$).

Carrie’s mother implemented the training procedures with a fairly low degree of fidelity when providing reinforcement but high degree for error correction throughout intervention and maintenance conditions. She did not meet the reinforcement criteria during maintenance and met it three times out of 27 sessions, which included 10 practice probes ($M = 11\%$).

**Effect of Intervention on Mastering Daily Living Skills**

To address whether parent delivery of video prompts on an iPad led to an increase of the child’s accuracy in completing a DLS (i.e., Research Question 2), each child participant’s performance on their task analysis is presented in Figure 1. Figure 1 also addresses Research Question #3 which examines if skills maintained upon removal of the intervention. These two sets of findings follow.
During baseline, Jimmy’s correct and independent performance was low and stable ($M = 14\%$). Of the 14 steps in the task analysis for making his bed, Jimmy consistently was able to complete the same two steps, which involved placing both sleeping pillows at the top of the bed, followed by placing both, bigger decorative pillows on top of the sleeping pillows. Jimmy’s intervention began on Session 4. During his first
six intervention sessions, Jimmy showed a slow and steady increase in accuracy. This was followed by a 3-day drop when his accuracy decreased to 43% for each session. (This occurred when Jimmy’s mother introduced the customized prompts which, by definition, reduced the opportunity for his independent responding.) Beginning with Session 13, he continued on a steady increasing trend correctly and independently completing 93% of the task analysis on Session 15. However, on Sessions 16 and 17, Jimmy dropped to 71% completion. Jimmy met criteria for mastery during the subsequent three intervention sessions and continued to exceed 85% correct and independent performance throughout the maintenance phase.

Bonnie’s baseline was characterized as low and stable, never exceeding more than 22% of the steps for making pasta. When intervention was implemented on Session 5, Bonnie’s correct and independent completion of the steps increased for two sessions, dropped during Session 3, then jumped at the fourth session where she maintained mastery and met criteria. During three post-intervention follow-up probes, Bonnie’s performance varied slightly (74%–91%) but remained higher than her initial baseline performances.

Carrie’s performance during baseline can be described as moderate and stable. She was able to consistently complete 8 of the 18 steps of her task analysis to tie her shoes. Intervention was introduced in Session 6 and Carrie maintained a steady increasing trend through Session 11. After a drop in correct and independent completion of steps during Step 12, Carrie was introduced to a new pair of sneakers on Session 13. Probes were conducted on the second pair of sneakers following each intervention session with the original sneakers. These data are represented in Carrie’s graph. Data for
the original sneakers indicate mastery was met on Session 14, followed by a steady declining trend for the subsequent two sessions, ending with criteria for mastery being met and maintained for the remaining intervention and maintenance sessions. The probes for the new sneakers indicate a high and steady trend beginning on Session 14, with mastery being met on Session 19 and sustained throughout maintenance.

**Social Validity of iPad Intervention**

In addition to the parent and child data on the efficacy of the experimental intervention, data were also collected from each parent on the perceived social validity of the intervention, impact of using technology with the child, and nature of the training and its components. These items were represented across three categories: iPad Confidence, Opinions and Attitudes of Child Using the iPad, Opinions and Attitudes Regarding the Training. Measures were translated into Likert-type values corresponding to response choices. To clarify, Strongly Agree = 4, Agree = 3, Disagree = 2, and Strongly Disagree = 1. These data are reported in Table 10.
Pre-training survey results indicate parents varied in their confidence in general iPad use ranging from one parent not having confidence in her skills \((M = 2)\), another having some confidence \((M = 3)\), and the third having great confidence \((M = 4)\). Post-training survey results demonstrate that those parents who had not described having high levels of confidence in the pre-training survey reported an increase in confidence of utilizing the iPad (30%).

In assessing parents’ opinions and attitudes of their child’s use of the iPad, there was minimal change in both pre- and post-training with regards to their positive comments (5.4%). All agreed/strongly agreed that their child benefited from receiving the
visual support from the iPad ($M = 4$) and that it could be used to increase their child’s engagement and motivation ($M = 3.9$). They also all strongly agreed that their children were more knowledgeable in using the iPad than they are ($M = 4$).

Regarding their opinions and attitudes on the impact of the training provided by the researcher, post-training results indicate parents reported positive/strongly positive outcomes. Each parent reported feeling comfortable during the training and that the researcher respected the goals they had for their child ($M = 4$). Parents agreed/strongly agreed they were satisfied with the iPad training they received ($M = 4$) and that the training increased their knowledge of the iPad ($M = 3.7$). All parents strongly agreed that the training enhanced their skills as a parent, helped their child become more independent in completing the targeted skill, and that they would recommend the training to other families with similar needs ($M = 4$). The results from each item of the social validity survey can be found in Table 11 in Appendix H.

In addition to the social validity ratings, each parent also provided anecdotal responses to a series of open-ended questions. In the pre-training survey, each parent responded to a question assessing what she was hoping to learn from participating in this study. One parent commented she wanted to become more familiar with the iPad, another wanted to learn how to transfer the teaching application for other future tasks, and the last parent wanted to help her child become more self-sufficient.

With regards to the post-intervention survey’s first open-ended question about the training, one parent noted that the pre- and post-session feedback were the most helpful. In response to the second open-ended question regarding least preferred aspects of the training, one parent responded that the least preferred component was the frequency of
the intervention sessions, one parent responded and reported the least preferred component to be the frequency of the intervention sessions, while another parent stated “It was all so invaluable!” With regards to the third open-ended question, which asked about unaddressed aspects of the training, only one parent commented and stated “None.” The final question asked parents to make additional comments about their experience in the training. One parent reported she was amazed at how quickly her child mastered making his bed. One parent did not respond to any open-ended questions in the post-training survey.

To determine if the training met the parents’ initial expectation as expressed in the pre-intervention survey, individual emails were sent to each parent. The email reminded parents of what they had written, asked them to report if participation in the study helped meet those goals, and to state why or why not. The parent who wanted to become more familiar with the iPad stated the following:

Yes I am quite comfortable with the iPad. But the most important thing this experience has taught me was how much of a visual learner [Carrie] is. She really has difficulty with verbal commands, so language must be a huge task to master. It is quite sobering to think you understand your child's disability but when you (a parent) work towards one goal, like we did, the frustration is quite overwhelming, which is why I end up abandoning trying to teach.

The parent who reported she wanted to teach her child to become more self-sufficient sent the following response:

Last week, I was at a basketball game and [Bonnie] called “Mom, can I make some pasta?” My initial reaction in my head was ‘EEEEKKKK!! NO!’ Stove and me not home. Not good. BUT…I said YES!!! And guess what? She did it and the house didn’t burn down!!

Finally, the parent who wanted to learn how to transfer the teaching application to other future tasks wrote:
The skills used for bed making are not transferrable to other tasks but I would like to learn how to use the app to make customized tasks that [Jimmy] specifically needs to work on.

With regards to reports of the training components via a ranking scale, two of the three parents found the behavioral rehearsal and pre- and post-session feedback to be the two most beneficial components of the training. These parents also reported finding the two least beneficial components of the training to be the parent guide and background information/rationale of the intervention. The third parent did not rank any of the components but noted they were all equally important.
CHAPTER 5: DISCUSSION

The first purpose of this study was to determine whether parents could effectively implement evidence-based interventions as taught during a BST package. To restate, TAIi and VM were the EBPs targeted during training and delivered by parent participants via an iPad (Wong et al., 2013). These interventions were selected because they have proven to be effective in supporting the acquisition of skills among individuals with ASD across a variety of ages and environments (Bereznak et al., 2012; Canella-Malone et al., 2006; Wong et al., 2013). Additionally, parents were taught how to respond to their child’s behaviors during the completion of a target DLS. That is, they were taught when to deliver positive reinforcement and error correction, procedures that have been well-established in ABA as effective for promoting new functional behaviors and decreasing those deemed inappropriate or ineffective (Cooper et al., 2007).

A second purpose of this study was to examine the effects of parent delivery of training procedures on children’s ability to complete the steps of a target DLS correctly and independently while viewing video prompts on an iPad. Adolescents have reported a preference in using more advanced devices over more traditional, printed materials; therefore, including ecologically valid tools (such as the iPad) might help increase engagement for adolescents when learning new skills (Cardon, 2012).
Results demonstrated that parents were able to implement the training procedures with low to moderate levels of fidelity; however, all child participants were able to demonstrate an increase in accurate and independent completion of their DLS. Furthermore, these skills were maintained for 3 weeks following the removal of the iPad intervention. These findings extend the literature that supports individuals with ASD can master steps of a skill utilizing VM procedures. This study, however, is the first to demonstrate that parents can be taught how to use the iPad to deliver video prompts to teach their adolescent children with ASD to successfully complete the steps of a DLS. These findings further support that PIIs can be a viable option for teaching adolescents with ASD to become more independent.

**Findings Related to Research Question 1**

The data from this study address the need for more efficiently administered BST packages (Gross et al., 2007). Findings validated that the use of a BST package was successful in teaching parents to effectively and efficiently utilize an advanced, mainstream, electronic device to deliver video prompts to their child (Set 1 procedures). The training on these procedures was specifically aimed at teaching the parents to prepare the iPad and the *Picture Scheduler* app for delivery of the video prompting intervention. Baseline conditions for each parent demonstrated that, although the iPad was made available, no parent tried to access it to teach their child to complete the requested DLS. The request to complete the DLS was intuitive upon cueing the child to task; therefore, each parent was able to accomplish at least one of five Set 1 procedures during baseline. This is important to consider because parents demonstrated that, after participating in the
BST, they consistently cued their children to complete the target skill and implement all other Set 1 procedures with high degrees of fidelity.

Teaching of Set 1 procedures during BST also included a process for implementing a time delay. Prior research indicated that implementing a time delay after provision of a demand by the parent and before the presentation of another request to complete a task was an effective component for increasing compliance behaviors in children with various disabilities (Miles & Wilder, 2009; Sarokoff & Sturmey, 2004; Van Laarhoven et al., 2009). To determine in compliance behaviors increased, parents of this study were informed that after five consecutive sessions they were to wait five seconds after giving the request to complete the DLS. Compliance would be determined by child participants’ responding to the request by playing the video or begin completion of the first step of the DLS without further prompts or redirection from their parents. Within the initial five intervention sessions, each child began to independently proceed to the first step without further guidance from the parent. Immediately after their parents gave the request to complete the targeted DLS, Jimmy and Carrie began to complete the first step of their tasks and Bonnie played the first video prompt. Therefore, the time delay procedure was not required because each child participant was compliant in following with the request provided by the parent. Although the immediate responses provided by the children naturally occurred within the time programmed for the delay procedure, it might be important to maintain this procedure in replication studies to reduce prompt dependency or increase compliance to task.

Parents were also successful in implementing positive reinforcement and error correction procedures taught in the BST (Set 2 procedures). For each parent participant,
the baseline conditions revealed that, even though their children made errors and completed some steps correctly, little to no error correction or reinforcement was provided to them. After participation in the BST, each parent increased her frequency of implementation of these procedures. To clarify, Jimmy’s mother increased her implementation of reinforcement and error correction from 0% during baseline to 46% and 60% respectively during intervention and maintenance conditions. Carrie’s mother also did not provide any of these procedures during baseline and increased to 36% and 87% in frequency of implementation during intervention and maintenance. Bonnie’s mother also substantially increased her frequency of implementing Set 2 procedures from baseline levels of 5% and 2.5% to 45% and 46% respectively. Although the parent participants did not reinforce every correct response nor correct every error made by their children during intervention, they all demonstrated an increase in their correct implementation of reinforcement and error correction procedures from baseline measures. Fidelity for implementing the reinforcement criteria varied among the parents ($M = 11-71\%$).

Since degrees of treatment fidelity for parent delivery of the BST procedures were less than optimal, it is important to consider the following factors. First, a consistent reinforcement schedule was not established. Parents were instructed to reinforce the first and last steps completed correctly by their children in addition to a minimum of any two steps within the task sequence. While each parent consistently provided reinforcement for the final step, meeting this criterion proved to be difficult. For example, Carrie was able to complete the first four steps of her task very quickly minimizing the opportunity for her mother to reinforce the first step. Jimmy’s mother met the reinforcement criteria but
then faded her frequency of providing praise focusing primarily on reinforcing the steps he struggled to master. It is possible that Bonnie’s mother provided more reinforcement than was recorded but due to the researcher’s positioning in the kitchen, it was difficult to clearly capture all the audio; therefore some of her praises were inaudible during playback for data collection.

While parents were instructed to provide reinforcement for correct responses, due to the reinforcement criteria protocol, reinforcement for every correct response was not required. Regardless of the low percentages in which reinforcement was delivered by the parent, each child increased the accuracy of steps completed of the target DLS without high percentages of reinforcement for steps completed correctly. Therefore, a continuous reinforcement schedule may not be warranted. Consideration should also be given to the unstructured components of the home setting, as well as parent preference in delivering reinforcement and error correction procedures that are reflective of the family dynamics. These variables can have an adverse effect on fidelity of procedural implementation, however as this study demonstrated, these consequences may not be detrimental to the learning of the child. It is evident that, despite low fidelity of parent implementation of training procedures, student achievement was high; therefore, interventions conducted outside of clinical settings and in the natural environment can be valuable and efficacious in promoting new skills.

Additionally, parents increased the scores given when rating their confidence in using the iPad and opinions and attitudes regarding their child using the iPad. With regards to measuring the training components, parents reported an overall high satisfaction ($M = 3.97$ out of 4). Responses to open-ended questions and ranking of
training components in the post-intervention survey indicated parents were satisfied with the effects of the intervention on their skills, as well as their children’s progress. They also reported the training components to be effective, with feedback and behavioral rehearsal to be the most beneficial.

These Research Question 1 findings demonstrate that a BST package consisting of instruction, modeling, rehearsal, and feedback components was successful in teaching parents to be effective delivery agents of evidence-based interventions. Recent studies utilized clinical settings to successfully teach parents to deliver a variety of procedures aimed at improving outcomes for their children with ASD. Seiverling et al. (2012) successfully trained parents to implement the steps of a feeding protocol with their children with high fidelity in a hospital-based setting. Mueller et al. (2003) provided training sessions to address food selectivity for parents in both clinic and home environments; however, only three of the nine parents received in-home training and on no more than three occasions. The current study adds to the literature because it too demonstrated that a BST training package could be delivered in an unstructured setting, such as the home environment, regularly and effectively.

Additionally, this study contributes to the literature that supports that PIIs can be effective in teaching children with ASD more appropriate and functional behaviors. Najdowski et al. (2010), Rocha et al. (2007), and Stiebel (1999) were all successful in teaching parents to implement EBPs, such as a PE communication system, naturalistic environment teaching, and joint-attention-symbolic play instruction, with high degrees of fidelity. Oliver and Brady (2014) utilized audio coaching via ear buds to successfully teach mothers to deliver prompts and praise that resulted in increased engagement and
independent task completion. These studies, however, targeted parents of young children, none older than 6 years of age. With an overabundance of research aimed at early childhood interventions, the current study targeted parents of adolescents with ASD, individuals who would be transitioning into adulthood in the near future and in need of learning more independent living skills.

Reflecting on the literature regarding TAI and VM, this study further supports that these interventions can be effective in promoting the acquisition of skills for individuals with ASD. Mechling et al. (2009a) taught three adolescents to successfully use a PDA to increase the accuracy of cooking multiple recipes and a systematic review by Kagohara et al. (2013) indicated that teaching programs utilizing iPods or iPads were largely successful in promoting skills across domains for individuals, 4 to 27 years of age, with developmental disabilities. Additionally, parents can be trained to implement these TAI with successful outcomes. Using covert audio coaching, Oliver and Brady (2014) trained parents to provide praise and prompts resulting in increased engagement and independent function by their children. The current study is the first to teach parents how to use the iPad in the home to promote DLS with their adolescents with ASD. The results indicate that, although parents implemented Set 2 procedures with low to moderate levels of fidelity, their children all significantly improved the correct and independent completion of their DLS. These results further indicate that individuals with ASD benefit from visual supports, and the opportunity to view a “perfect” model through video-based instruction may be one of the salient features that improve learning (Ayles et al., 2013; Quill, 1997).
Finally, the positive feedback reported by the parents in the post-intervention survey indicated that the study’s procedures were desirable and acceptable, further supporting the literature addressing the importance of collecting data measuring the social validity of the intervention. Parent responses confirmed that the behavioral goals were important, the treatment procedures were seen as acceptable, and there was an overall satisfaction with the results building solid cornerstones in determining the intervention to be seen as valuable for the participants (Wolf, 1978).

**Findings Related to Research Questions 2 and 3**

The results of this study demonstrated that parent delivery of a video prompting intervention produced immediate and lasting effects. In addition, each of the child participants maintained their increased percentage of accuracy after withdrawal of the intervention and during the weekly probes in the subsequent three weeks. While the iPad was made available for each parent and child participant in these follow-up sessions (as it was during baseline) none of the parent participants accessed it.

Deemed an evidence-based practice, it is not presumptuous to state that video prompting was an effective component of this study. Canella-Malone et al. (2006) found video prompting to be effective in teaching adults with developmental disabilities to successfully complete DLS, and Mechling and Gustafson (2008) were able to teach high school students with autism to increase their accuracy in completing the steps of cooking-related tasks by using video prompts. These are a few of the studies confirming that individuals with ASD can learn to accurately complete steps in a DLS. The purpose of this study, however, was not to further confirm this knowledge but to determine if parent delivery of this intervention further solidifies its efficacy.
Upon examining Jimmy’s progress, data indicated a steady but low increase in trend. During Sessions 10–13, his mother prompted Jimmy to stay focused on the video segments for the steps he continued to struggle to learn. She directed him to watch the videos in their entirety and introduced new, specific strategies (customized prompts) for Steps 2-7 before he was given the opportunity to complete them independently. This is important to note because, although he was making progress, Jimmy was self-fading from viewing video prompts in their entirety but continued to struggle with these specific steps. It is possible he may have abandoned the iPad altogether before mastering the task. Bonnie and Carrie also self-faded the video prompt viewing as the sessions continued. Parent attention to child’s needs and redirection to view the videos in their entirety was essential for the child participants to acquire the skills needed to master to steps of their respective task analyses.

While Jimmy and Carrie mastered their steps, they ultimately stopped viewing the video prompts altogether before the intervention was withdrawn. Bonnie, however, continued to watch a majority of them in their entirety. Understanding that Bonnie had deficits with retaining multi-step directions and acknowledging that her target DLS involved more responses within each step, it is not surprising she met criteria for mastery during the steps when she viewed 83%, 100%, and 70% of the video prompts in their entirety. It is also significant to note that her mother had stopped directing her to watch the entire video segments after the second intervention session, indicating that Bonnie became accustomed to watching them and preferred to view them completely before proceeding to complete the step. Bonnie requested her mother not to hold the iPad, so it was placed on the kitchen counter for the last three intervention sessions. Having the
ability to customize how each parent delivered the intervention was important because consideration was given to the different learning styles of the children allowing for accommodations of their needs.

The videos that included each child participant’s opinions and personal reflections of the project supported that the children mastered their DLS and considered the intervention as a positive experience. Jimmy reported that he liked learning about the “4-corner tug,” and that knowing how to make his bed made him “feel proud and awesome” (personal communication from Jimmy). Bonnie stated she felt better “knowing that I can actually make food that’s good besides a really bad snack” and liked “knowing she could help a lot of other people with autism and related disabilities and maybe they can learn how to make pasta, too” (personal communication from Bonnie). Carrie’s expressive communication was less than the other participants; however, she identified that being able to tie her shoes was a “good thing.”

These findings support the literature that video prompting procedures are effective in ameliorating deficit skills for individuals with ASD. The findings also demonstrate that parents can teach their adolescent children, within the natural constructs of their homes, how to utilize video prompts on handheld devices (such as the iPad), which are commercially available. Bereznak et al. (2012) used portable devices to deliver video prompts on the iPhone to successfully teach adolescent students independent and living skills, and Van Laarhoven et al. (2009) were successful in teaching an individual with moderate disabilities in high school to operate an iPod to reduce his dependence on others when viewing video prompts. Two of the three child participants in this study, however, were taught how to view and navigate the video prompts by their parents, who
maintained a role traditionally reserved for researchers. The positive responses given by the child participants supported the importance of assessing whether or not specific behavioral goals are seen as acceptable by the targeted consumers (Wolf, 1978).

**Implications of Findings**

The use of an iPad to deliver video prompts aimed at increasing the accuracy of steps completed correctly and independently by adolescents with ASD seems to be a valid and worthy intervention. Each child participant demonstrated immediate gains in the accuracy of the DLS and met criteria for mastery between 2 and 5 weeks after the intervention began. Comprehending multi-step directions given verbally can be challenging for individuals with ASD; therefore, the concrete manner in which instruction is provided through the video prompts not only enhance learning but may decrease external prompts provided by caretakers (CDC, 2014). Carothers and Taylor (2004) noted that “children with autism are more likely to have better outcome if they are able to master a variety of functional daily living skills.” Having the ability to learn new skills that can be completed independently may not only decrease dependency on others, but also help improve self-esteem, confidence, and quality of life (Ayres et al., 2013; Mechling et al., 2009b).

The tools used to deliver the video prompts should also be considered. Individuals with ASD may be cognizant of the stigma associated with various devices and, if given the opportunity, may express preference in using a more ecologically valid tool, as did the participants in the Van Laarhoven et al. (2009) study. Although the child participants in this study did not directly provide any opinions of using the iPad to learn their respective skills, anecdotal reports gathered by the researcher indicate that they had either
(a) expressed enjoying using the iPad and looked forward to using it to learn other skills, or (b) had a history of increased compliance to task when access to the iPad was used as a reinforcer.

The iPad and similar portable devices have made their way into the hands of parents seeking more feasible options to help meet the needs of their children with ASD. This study demonstrated that, if trained effectively, parents can be viable implementers in delivering EBPs that include video prompting and TAI. As Cardon (2012) reported, further empirical evidence is needed to support the systematic use of these devices with individuals with disabilities, and the findings of the current study add to the growing literature that advanced, mainstream tools can be implemented systematically and effectively.

Upon further review of the literature, previous studies were successful in utilizing parent training to increase appropriate responses in children with developmental disabilities; however, several of these studies identified much longer time periods before child participants met mastery criteria. For example, the parents that were successful in increasing the length of mean utterances in their children by implementing EMT procedures in the Kaiser et al. study (2000) participated for at least 12 weeks, and parents who learned to implement a joint attention intervention with their children were involved in 51, 20-minute sessions held over 6 weeks (Rocha et al., 2007). Additionally, training for both studies took place in clinical settings. While Mueller et al. (2003) reported that clinic-based training may be more cost-effective for clinicians, this may not necessarily be the case for families, as evidenced in the research conducted by Oliver and Brady (2014), whereby successful outcomes were facilitated by an in-home parent training.
intervention. In-home interventions therefore, should be greatly considered as they may be more accommodating for parents and promote higher levels of consistent follow-through.

In examining the results of the current study, it is also possible that, when parent training is provided primarily in participants’ natural environments, researchers may be more effective in addressing the factors impeding progress leading to mastery faster. In this study, each parent was able to weigh her child’s personal strengths and weaknesses, as well as identify factors in the home that may have been hindering learning. Feedback sessions with parents provided the opportunity to address specific needs of the child and review possible strategies to promote mastery, which may have been helpful in minimizing problem behaviors and potential abandonment of the video prompting device. Consideration must be given to the possibility that the use of video modeling procedures and advanced, technological devices, such as iPads, are only as effective as the teaching and guidance that supplements their implementation. The findings of this study support that parents are capable of delivering video-based instruction with fidelity, leading to positive outcomes for their children.

Additionally, parents may be more likely to generalize and maintain their skills, challenges that were presented in the Mueller et al. (2003) and Rocha et al. (2007). Generalization probes conducted in the home for both studies indicated a drop in treatment integrity for many of the parent participants. Starble et al. (2005) reiterated that difficulty in protecting the device and high levels of assistance required by family members to implement the device successfully are two variables to consider when addressing abandonment of technology devices in the home. Regular in-home training
that is sensitive to family cultures, customs, and needs may help minimize the potential of devices being discarded and maximize generalization effects in their use.

Limitations of Study

There are several limitations to be considered when interpreting the results of this study. To begin, the study included child participants who used an iPad regularly and were familiar with its video playback functions. It is unknown if similar results would be found with individuals with ASD who were not as proficient with navigating the iPad specifically. Also, the frequency of in-home training may not be feasible for many professionals. This researcher visited each home three to four times a week, which might not be feasible for clinical staff. Finally, researcher interference must be considered since the researcher is employed by the agency in which participants were recruited.

With regards to the BST package, several limitations must be considered. First, the training was conducted with each individual parent, which could be labor intensive for some researchers. Due to the nature of a multiple baseline design and intervention having been introduced after receiving the BST instruction, a group format for delivery of this training would not have been optimal as some parents would then have received instruction while they were still in baseline conditions. However, a group BST may be more feasible for professionals seeking to train and coach parents as part of a clinical workshop or program. Additionally, the BST included multiple components; therefore, there may have been specific procedures and strategies more directly responsible for the behavior change among the parents. It is possible that future BST packages can include less components and still achieve positive outcomes.
The video recordings of each session posed several limitations. First, awareness of being recorded and using the iPad to record the sessions may be distracting for some parent or child participants. Second, the restricted view of the recording made it difficult at times for the researcher and data collector to measure every response accurately. For example, because Jimmy’s mother sat in the room at the opposite end of the bed, it was sometimes difficult to hear everything she said, or to see gestures she provided. The researcher might hear praise that was provided in the situation but not audible on camera, thus it was not recorded. This limitation may account for the IOA data that were consistently low across the reinforcement, error correction, and guidance procedures implemented by the parent participants. Additionally, it was sometimes difficult to identify if the child viewed the video prompt in its entirety. During session recordings on the iPad, the researcher usually remained in one area of the room. This often limited the ability of seeing the child’s face; therefore, it was not always clear to the observer of the video recording if the child watched the entire video prompt. Since a whole interval recording was utilized to assess viewing of the video prompts, restrictions in recording these responses may have resulted in some of the lower IOA data reported for this coding for the child participants. A partial interval recording should be considered for future studies assessing self-fading of video prompts. Third, use of the iPad required the researcher to delete videos soon after viewing due to limited space availability. In fact, during this study the researcher had to consult with an Apple technician to troubleshoot why there was no space available even though videos had been deleted. Fourth, viewing an entire session after recording may not be an efficient technique for some researchers. Making pasta took between 20 and 25 minutes; therefore, each session involved
recording then viewing for data collection, which took approximately one hour for each session. Finally, video recordings require procedures to ensure confidentiality. The researcher had to be diligent about removing the videos from the iPad immediately after viewing them and transferred them to an external, password-protected hard drive. Sharing of videos with the data collector also required confidentiality so a Dropbox folder was created, which also had limited space requiring each video recorded session to be deleted before uploading the next. Researchers must be familiar with and knowledgeable of the implementation of password-protected devices and online software programs to ensure confidentiality when video recording participants.

Data collection procedures pose several limitations to this study. First, the audio and visual quality of the session recordings made it difficult to hear and see all responses provided by the parents and children. Because the data collection protocol stated each data collector could only view the video recorded sessions once, it is possible that this conservative approach hindered the ability of the data collectors to record all parent responses. A video is a permanent product that provides the opportunity to rewind and view multiple times. Future researchers should taken advantage of this and allow multiple viewings by data collectors to maximize their ability to capture all responses accurately.

Second, the angle of video recording limited the viewing of the child participants. This made it difficult to determine if the child viewed the entire video prompt. This is likely the first study to attempt to measure participant viewing of videos without the use of eye gaze technology. While it is difficult to measure this response, it is important to do so if attempting to determine self-fading behaviors with accurate duration measures.
Future researchers should find ways to investigate and measure attending or viewing of videos with less obtrusive tools.

Finally, data were collected on procedures that were taught only during the university-based BST. Procedures discussed and implemented as a result of pre- and post-session feedback, such as the provision of specific guidance procedures to address steps the child was struggling to learn, were not included in the data collection for Set 2 procedures. Additionally, some parents responded independently of the BST procedures, interjecting and providing premature guidance. Pre- and post-session feedback relied on and addressed these responses. On several occasions, the parent reported she responded as she did because she was familiar with her child’s behavior and was attempting to minimize potential problem behaviors. For example, Jimmy’s mother identified signs of frustration exhibited by Jimmy that were not visible to the researcher (i.e., sucking on the inside of his lower bottom lip). To minimize problem behaviors, she opted to provide hand-over-hand guidance when she saw these signs of frustration. This knowledge of these behaviors became a valuable component during feedback sessions in which strategies were created to address specific, challenging steps during the subsequent sessions. Since feedback is a component of a BST package, it is likely that higher degrees of treatment fidelity could have been reached if procedures implemented as a result of feedback were coded and accounted for in the Set 2 data collection.

Need for Further Research

This study demonstrated the efficacy of utilizing a BST package to teach parents how to effectively and efficiently deliver a video prompting intervention to their children with ASD. In turn, these children increased their accuracy in completing a DLS. These
positive findings support and extend previous research regarding parent implemented, technology-instruction, and VM interventions delivered in natural environments. However, additional questions regarding the effectiveness of BST packages on parent delivery of evidence-based interventions remain. The following are recommendations for future research:

1. Directly replicating this study to extend external validity of findings;
2. Assessing generalization of the study in other environments, such as leisure activities and school-based settings, with other supporting personnel, such as peers and teachers;
3. Including parents and children unfamiliar with iPads or other handheld Apple devices;
4. Including other non-Apple portable devices;
5. Conducting a component analysis to determine if the same levels of effectiveness can be reached without certain training components;
6. Including video stimulated recall in post-session feedback so parents have the ability to reflect on and examine their thought processes, behaviors, and environmental occurrences and formulate new responses;
7. Providing more immediate feedback during parent delivery of intervention procedures via CAC;
8. Teaching parents to create video prompts in addition to delivering the intervention;
9. Training adults with ASD to utilize other technology-aided instruction and VM interventions to promote independence;
10. Using less intrusive, higher quality recording materials, such as Bluetooth microphones and smaller cameras;

11. Expanding social validity measures to include more direct feedback from child participants.

While research including parent training to deliver evidence-based interventions is promising (Mueller et al., 2003; Najdowski et al., 2010), research on teaching parents in the natural environment to utilize advanced technology to promote skills in their children is lacking. This study provided valuable findings that contributed to the existing body of literature on the use of video prompting as an effective intervention to promote DLS among individuals with ASD. However, with a growing interest and increased accessibility to possess more portable devices in home environments, further research is needed to maximize the capacity of parents as effective delivery agents of EBPs utilizing advanced technology within the contexts of their homes. With adequate support and guidance, a well-trained parent can be a child’s most effective teacher for using technology to promote independence.
This research will focus on training parents to use the iPad to deliver videos to their children with Autism Spectrum Disorder. The videos will be designed to teach your child how to complete a daily living skill independently. A daily living skill refers to a basic self-care task or activity that is most often done in a person’s home, outdoor environments, or both.

1. If FAU CARD does not have a copy of your child’s diagnosis of Autism Spectrum Disorder, Autism, Asperger’s or PDD-NOS, would you be able to obtain one for me?
   Yes  No  Maybe

2. Are you interested in teaching your child how to complete a daily living skill that he/she does not already know how to do?
   Yes  No  Maybe

3. If so, what skills would you be interested in teaching your child? Has your child learned any of the skills you mentioned but just isn’t interested in doing it when asked?

                                                                                   
                                                                                   
                                                                                   
                                                                                   
                                                                                   
                                                                                   
                                                                                   
                                                                                   
                                                                                   

The videos that you will be showing your child will be displayed on an iPad. You do not need to own an iPad to participate in this research because the videos will be stored on my iPad. However, there will not be training on how to navigate an iPad, therefore you
need to know how to use one. This means you need to know how to touch the screen, swipe between pages, and access apps and the home key on an iPad.

4. Do you have any experience in using an iPad or any other iDevice, such as an iPhone or iPod Touch?
   Yes  No  Maybe

5. Does you child engage in problem behaviors related to physical or verbal aggression or property destruction?
   Yes  No  Maybe

Before the training begins, I will need to come to your home. First, we will need to select a skill that you will teach your child. Then, I will need to take data on how many of the procedure steps you already know (as well as on how many steps your child can complete of the DLS? If collecting BL simultaneously)

6. Are you agreeable to this?
   Yes  No  Maybe

The training you will participate in will consist of a few steps. First, there will be a one-day group training at FAU in Boca. This training will be held for all 4 parents that are participating in this research. The training will be approximately 4 – 5 hours long and will include instruction on how to set up the iPad and access the video, as well as coaching on what to say to your child before and after they watch the videos. You will be taught these skills using lecture, videos, and watching me model the procedures. The last half of the training will involve you demonstrating what you’ve learned by practicing the procedures with me and the other parent participants. Then, I will provide you with feedback to help make sure you are prepared to teach your child using videos on the iPad.

7. Are you comfortable with this format of training?
   Yes  No  Maybe

Then, I will bring the iPad with the video. The video segments will be created based on the daily living skill we will have assessed and agreed to beforehand. I will collect data on how you implement the steps you learned in the training. I will also collect data on how your child completes each step after watching the video segments. Immediately afterward, we will meet to discuss your performance. These sessions will be conducted 2 – 3 times per week.

8. Are you agreeable to this?
   Yes  No  Maybe
It is also important that the teaching of the skill to your child occurs only when I’m in your home. This means you will need to refrain from showing your child how to complete the task we select until I am present to collect the data.

9. Are you agreeable to this?
   Yes  No  Maybe

10. Do you foresee any concerns that may impact my ability to conduct this research? For example, are you planning any extended stay trips in the near future? Are there any language or cultural barriers that I should be aware about so that I can be better prepared to train you?
   Yes  No  Maybe

   If so, what are they?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

11. Do you have any other questions or comments for me at this time?
   No
   Yes
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
Appendix B

Consent Form

ADULT CONSENT FORM

1) **Title of Research Study:** Promoting Daily Living Skills for Adolescents with ASD via Parent Delivery of Video Prompting on the iPad®

2) **Investigator(s):** Mary Lou Duffy, Ph.D. and Elisa Cruz-Torres, M.Ed.

3) **Purpose:** The purpose of the present study is to evaluate the effectiveness in training parents to deliver an evidence-based practice using a mainstream tool highly accessible to the public and owned by many consumers. Utilizing a behavioral skills training package, parents will learn to deliver a video prompting intervention using an iPad® to promote the independent completion of steps in a targeted daily living skill for their children with ASD. The study will seek to demonstrate that parents can be trained to implement a set of established skills and increase their technological competency, which in turn will help increase independence among their children with Autism Spectrum Disorder.

4) **Procedures:**
   • As a participant, you will be involved in a study that will train you to use an iPad to deliver videos to your child so they, in turn, can learn to complete a task more independently.
   • First, I will need to visit you at home to determine your current abilities in using videos on an iPad to teach your child. I will use a data collection form to measure your responses. These visits will occur over 2 or more weeks.
   • After about 3 or 4 visits determining what steps you are able to complete, you will participate in a training where you will learn about the procedures being used in this study and watch these procedures being modeled in video simulations. At the end of the training, you will practice doing the procedures with me until you have shown you can do them correctly. So you understand how I will be collecting data, the same data collection form that I used during the visits in your home will also be used during the viewing of the video simulations and during your practice. This form will also assess your progress and indicate when you’ve mastered the procedures. This particular training will take approximately 4-5 hours and will be held at FAU.
   • Within 3 days, I will come back to your home about 2-3 times per week to see if you are able to use the procedures you learned with your child. I will use the same data collection form as previously described to measure your growth. At the end of each session, we will meet privately to review your progress and discuss any concerns you may have. I will be in your home for about an hour each time.
   • One important part of this study is that you agree you will not show your child how to complete the task without me being present.
   • You will also complete a survey, before and after the study, which will allow you to report your levels of knowledge and comfort when using the iPad to teach your child.
   • As part of this study, your child’s skills will also be measured. During the initial home visits when I will be assessing your abilities in using the videos on the iPad, I will also measure how well your child can complete the steps of the selected task. During the home visits, I will continue to measure how well you child can complete the steps of the selected with your teaching them using the videos on the iPad. The same data collection form that I use to measure your growth will be used to simultaneously measure your child’s growth.
   • I will be video recording every third session. The reason for this is to confirm that I am accurately collecting data on you and your child. Therefore, these video recordings will be seen by another data collector, whose only purpose is to measure your and your child’s progress. These videos will not be shared for any other purpose and will be kept confidential. I will use my phone to record these sessions, but after transferring them to a password-protected laptop, I will erase them from my phone to protect your confidentiality.
   • Once your child is able to complete 85% of the task steps for 3 consecutive sessions, the use of the iPad and videos will be removed. I will then come to your home at least 3 more times across 2-3 weeks to determine if you and your child have maintained the skills you both learned.

Initials

Institutional Review Board

FAU

Approved on: 07/10/2014
Expires on: 07/17/2015

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5) Risks:
There are a few potential risks associated with this study. While rare, the iPad screen is made of glass and therefore could break which could be harmful if you or your child has access to this broken glass. The iPad will be enclosed in a case that protects it and the screen reducing the chances of damage. Should damage occur, neither you nor your child is responsible for fixing the iPad.

In addition, you and/or your child may experience difficulty manipulating the device and/or the video segments and may experience feelings of frustration. To minimize this risk, as well as address any frustrations you may have, I will consult with you at the end of each session to address these areas of concern as well as any other concerns you may have.

6) Benefits:
The potential benefits to you include becoming proficient in using videos to teach your child how to complete the steps of a skill. You may also feel more confident in operating, programming, and using the iPad in a more functional way. Additionally, you may find that you do not have to prompt your child as often to complete a task he/she is expected to do regularly.

The potential benefits to your child are improvement in their daily living skills. This can help them to become more independent as they become adults which may also lead to improved self-esteem and confidence in their abilities. There may also be a reduction in problem behaviors associated with non-compliance of tasks they are expected to do regularly at home.

7) Data Collection & Storage: All the data collected will be kept confidential (private) and only the people working with this project will see your data, unless required by law. The data will be kept in a locked cabinet or password-protected computer in the investigator’s office. After 3 years, paper copies will be destroyed by shredding and electronic data will be deleted. If we publish what we learn from this study, we will use a made up name unless you give us permission.

8) Contact Information: For questions or problems regarding your rights as a research subject, you can contact the Florida Atlantic University Division of Research at (561) 297-0777. For other questions about the study, you should call the principal investigator, Dr. Mary Lou Duffy, at 561-799-8715. You can also contact the co-investigator, Elisa Cruz-Torres, at 561-235-9078.

9) Consent Statement:
I have read or had read to me the preceding information describing this study. All my questions have been answered to my satisfaction. I am 18 years of age or older and freely consent to participate. I understand that I am free to withdraw from the study at any time but will have to give back the materials if I do.

I also allow my child ______________________________________ to take part in this study.

My child can refuse to participate or stop participating at any time without giving any reason and without penalty. I can ask to have the information related to my child returned to me, removed from the research records, or destroyed.

I understand that my child and I can stop this activity at any time and no one will get upset with us. I received a copy of this consent form. As a registered constituent of Center for Autism & Related Disabilities (CARD) at Florida Atlantic University, I understand that any services I receive from CARD will not change if I choose not to participate in this study or if I choose to stop this activity. I have received a copy of this consent form.

Signature of Participant/ Parent/Guardian:___________________________ Date: ________________

Printed name of Participant: First Name ______________________ Last Name__________________________

Signature of Investigator: ____________________________________________ Date: ____________________
Appendix C

Child Assent Form

Participant Assent

Promoting Daily Living Skills for Adolescents with ASD via Parent Delivery of Video Prompting on the iPad

Researchers from FAU’s Department of Exceptional Student Education are trying to learn if teaching your mom/dad how to use videos on an iPad will help them teach you how to do a skill. You have been asked to join because you and your family receive services from my center.

If you decide to join in this study, I will come to your home to see how good you are at doing the skill that we select. After I teach your mom/dad, I will come back to your home, about 3 times a week, to see how well they can use the videos on the iPad to teach you to do the skill better. These visits will take anywhere from 30 minutes to one hour. The whole process will take about 3 months.

Sometimes I will be video recording the sessions. The purpose of this is to show those videos to another person so they can make sure I doing the right things when I am in your home. I will not share any of these videos with anyone else without the permission of you or your mom/dad.

We are doing this project because we would like to be able to teach other parents who want to use videos on the iPad with their children. We also hope we can help other children use the iPad to help them to become better at doing tasks on their own.

You do not have to be in this study if you don’t want to and you can quit the study at any time. No one will get mad at you if you decide you don’t want to participate.

Other than the researchers, no one will know how you or your family did while using the iPad. If you have any questions, just ask Mrs. Cruz-Torres whenever she is in your home.

This research study has been explained to me and I agree to be in this study.

____________________________   __________________________
First Name   Last Name

Subject’s Signature for Assent   Date

Check which applies (to be completed by person conducting assent discussion):

☐ The subject is capable of reading and understanding the assent form and has signed above as documentation of assent to take part in this study.

☐ The subject is not capable of reading the assent form, however, the information was explained verbally to the subject who signed above to acknowledge the verbal explanation and his/her assent to take part in this study.

Name of Person Obtaining Assent (Print)

Signature of Person Obtaining Assent   Date
Appendix D

Pre- and Post-Intervention Parent Satisfaction Survey/Rating Scale

Technology Use & Training Survey: Parent Perspective
Pre-Training©
Elisa Cruz-Torres, 2015

Introduction
The purpose of this survey is to gain a better understanding of iPad-related knowledge, skills, experience and needs of parents of children with autism. We hope the results of this survey help us to gain an understanding of the technologies you are comfortable with and the experiences that help you become proficient at using technology.

Instructions
Please read each statement. Mark the circle that best represents your response.

Section 1: General iPad Use
The questions in this section ask about your ability to use the iPad with your child.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using the iPad to support my child’s daily routines</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Designing activities on the iPad that will integrate technology into the home setting</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Utilizing features of the iPad that maximize my ability to properly manage the device</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Handling technical issues that may arise when using the iPad</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Section 2. Opinions and Attitudes Toward Child Using the iPad
The questions in this section ask for your honest opinions about your child’s abilities to use the iPad.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>That using the iPad will increase my child’s engagement in learning new skills</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My child is more knowledgeable than I am when it comes to using the iPad</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My child is more motivated to follow through with non-preferred tasks if the iPad is involved</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Access to the iPad helps my child to engage in higher levels of learning</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My child benefits from receiving the visual supports that the iPad can provide</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Technology Use & Training Survey: Parent Perspective Pre-Training© Elisa Cruz-Torres, 2015

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What I hope to learn from participating in this study:

Thank you for your participation in this survey!
Introduction
The purpose of this survey is to gain a better understanding of iPad-related knowledge, skills, experience and needs of parents of children with autism. As the lead investigator, I hope the results of this survey help me to gain an understanding of the technologies you are comfortable with and the experiences that help you become proficient at using technology.

Instructions
Please read each statement. Mark the circle that best represents your response.

Section 1: General iPad Use
The questions in this section ask about your ability to use the iPad with your child.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am confident in my skills of...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using the iPad to support my child’s daily routines.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Utilizing features of the iPad that maximize my ability to properly manage the device.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Handling technical issues that may arise when using the iPad.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Section 2. Opinions and Attitudes Toward Child Using the iPad
The questions in this section ask for your honest opinions about your child’s abilities to use the iPad

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>That using the iPad will increase my child’s engagement in learning new skills.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My child is more knowledgeable than I am when it comes to using the iPad.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My child is more motivated to follow through with non-preferred tasks if the iPad is involved.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Access to the iPad can help my child to engage in higher levels of learning.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My child benefits from receiving the visual supports that the iPad can provide.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Section 3. Opinions and Attitudes About This Training
The questions in this section ask for your honest opinions about the components of this training and the investigator. This information will be used to guide future trainings.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>This training was sufficiently tailored to my family’s needs.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I felt comfortable during the training.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The investigator who administered this training was knowledgeable about how to best teach me.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>This training was relevant to my family’s needs.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The training respected the goals I have for my child.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>This training increased my knowledge of the iPad.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The investigator administered this training in a sensitive and respectful manner.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I am satisfied with the iPad training I received.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The training enhanced my skills as a parent.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I would recommend this training to other families with similar needs.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel the investigator provided the most effective training possible.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>This training has helped my child become more independent completing the targeted skill.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Please rank the following training components in order of most (1) to least beneficial (7):

- Background knowledge/rationale of the interventions (e.g., research on behavioral skills training and video prompting)
- iPad Management Features (Guided Access)
- The video simulations (shown during the initial training)
- Behavioral rehearsal (practice during the initial training)
- The Parent Guide (printed manual provided after initial training)
- Pre-session feedback (prior to each session beginning)
- Post-session feedback (after each session)
<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there any other aspects of the training you found helpful? If so, what are they?</td>
<td></td>
</tr>
<tr>
<td>What parts of the training do you like least?</td>
<td></td>
</tr>
<tr>
<td>Do you have any questions that weren’t addressed after participating in the training?</td>
<td></td>
</tr>
<tr>
<td>Would you like to say anything else about your experience in this training?</td>
<td></td>
</tr>
</tbody>
</table>

Thank you for your participation in this survey!
Appendix E

Data Collection Form

Observer’s Name: ______________________________ Family: _________________________
Session Number: _____________ Date: ___________________________

Parent Response- Set 1

<table>
<thead>
<tr>
<th>Accesses and opens video</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opens and activates Guided Access</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>Provides verbal instruction</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>Waits 5 seconds*</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>Guides child to play and watch video</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>Gives verbal instruction to complete step</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Child Task Analysis / Parent Response- Set 2

<table>
<thead>
<tr>
<th>Step</th>
<th>Child</th>
<th>Parent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st attempt</td>
<td>2nd attempt</td>
<td>3rd attempt</td>
</tr>
<tr>
<td>C</td>
<td>I</td>
<td>E</td>
</tr>
<tr>
<td>C</td>
<td>I</td>
<td>E</td>
</tr>
<tr>
<td>Sr+</td>
<td>EC</td>
<td>G</td>
</tr>
<tr>
<td>C</td>
<td>I</td>
<td>E</td>
</tr>
<tr>
<td>Sr+</td>
<td>EC</td>
<td>G</td>
</tr>
<tr>
<td>C</td>
<td>I</td>
<td>E</td>
</tr>
<tr>
<td>Sr+</td>
<td>EC</td>
<td>G</td>
</tr>
<tr>
<td>C</td>
<td>I</td>
<td>E</td>
</tr>
<tr>
<td>Sr+</td>
<td>EC</td>
<td>G</td>
</tr>
<tr>
<td>C</td>
<td>I</td>
<td>E</td>
</tr>
<tr>
<td>Sr+</td>
<td>EC</td>
<td>G</td>
</tr>
<tr>
<td>C</td>
<td>I</td>
<td>E</td>
</tr>
<tr>
<td>Sr+</td>
<td>EC</td>
<td>G</td>
</tr>
</tbody>
</table>

Key for Child and Parent:
C = correct, Sr+ = positive reinforcement, I = independent, E = error, EC = error correction, VP = used video prompt, G = guidance during step completion, NR = no response, IC = incorrect response, OC = obstructed view and completed step, E = error.
<table>
<thead>
<tr>
<th>Step 9:</th>
<th>Child</th>
<th>C I E VP NR</th>
<th>Parent</th>
<th>Sr+ EC G IC NR</th>
<th>Sr+ EC G IC NR</th>
<th>OC E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 10:</td>
<td>Child</td>
<td>C I E VP NR</td>
<td>Parent</td>
<td>Sr+ EC G IC NR</td>
<td>Sr+ EC G IC NR</td>
<td>OC E</td>
</tr>
<tr>
<td>Step 11:</td>
<td>Child</td>
<td>C I E VP NR</td>
<td>Parent</td>
<td>Sr+ EC G IC NR</td>
<td>Sr+ EC G IC NR</td>
<td>OC E</td>
</tr>
<tr>
<td>Step 12:</td>
<td>Child</td>
<td>C I E VP NR</td>
<td>Parent</td>
<td>Sr+ EC G IC NR</td>
<td>Sr+ EC G IC NR</td>
<td>OC E</td>
</tr>
<tr>
<td>Step 13:</td>
<td>Child</td>
<td>C I E VP NR</td>
<td>Parent</td>
<td>Sr+ EC G IC NR</td>
<td>Sr+ EC G IC NR</td>
<td>OC E</td>
</tr>
<tr>
<td>Step 14:</td>
<td>Child</td>
<td>C I E VP NR</td>
<td>Parent</td>
<td>Sr+ EC G IC NR</td>
<td>Sr+ EC G IC NR</td>
<td>OC E</td>
</tr>
</tbody>
</table>

Met minimum reinforcement criteria: YES / NO
Appendix F

Training PowerPoint Slides

Part 1
An Explanation of the Techniques

What is BST?
- Behavioral Skills Training (BST) utilizes a combination of verbal and visual instruction, modeling, rehearsal, and/or feedback to teach participants how to implement procedures
- Objective: ensure participants acquire a set of strong skills building their capacity of teaching an intervention to another individual

What the Research Shows
- Teachers have been taught to improve their delivery of instruction
- Undergraduate students have been taught to deliver ABA practices
- Peers have been taught to teach safety skills
- Parents have been taught to how to increase appropriate behaviors

What is a Video Modeling / Prompting?
- Basis on social learning theory
- Uses video recording and display equipment to demonstrate a targeted behavior or skill
- One of 4 video modeling procedures:
  - basic video modeling, video self-modeling, point-of-view/subjective modeling, and video prompting

Research
- Effective for individuals with various ability levels from early childhood to adult
- Wide variety of skills taught across home and community settings:
  - communication
  - social
  - academic/cognition
  - functional living
  - play
  - appropriate behaviors
Benefits

- Can lead to faster acquisition of skills
- May be more "cost-effective" and efficient than other procedures
- Can reduce financial cost to taxpayers
- Increase independence of learner
- Enhance quality of life for learner

The Future is Here

New, more advanced mainstream devices put the ability to create and use video modeling procedures in your hands

Advantages:
- increased leisure skills
- increased independence
- age-appropriate
- social acceptability
- access to immediate reinforcement
- increase peer interaction
- increased communication and socialization

What Does It Look Like?

Part 2

iPad Management Features

Guided Access

- Restricts access for a user
  - can not escape out of an app using the home key
  - can limit access within an app

Turning On Guided Access

Settings       General       Accessibility       Guided Access
1. Turn Guided Access on
2. Set a passcode
3. Guided Access is now activated
Activating Guided Access

- Open any app
- Triple-click your home key
- If given a menu, select Guided Access
- Press Start
  *can select certain areas within app to restrict access by drawing a circle around those areas

Deactivating Guided Access

- Triple-click your home key
- Enter your passcode
- Press End

Part 3
Teaching Your Child

Targeted Skills in Training

- Access video prompts
- Activate Guided Access
- Make a request
  - Teach your child how to play the video segments
  - Provide reinforcement and/or corrective feedback

Time to Practice!
Using the iPad to Deliver Video Prompts to Your Child

A Guide for Parents

Elisa Cruz-Torres, M.Ed., BCBA
Florida Atlantic University
Department of Exceptional Student Education

Parent Name ______________________________________________________________
Child Name ______________________________________________________________
Targeted Skill ______________________________________________________________

Using the iPad to Deliver Video Prompts to Your Child: A Parent Guide© Elisa Cruz-Torres, 2015
Introduction

This manual has been created as part of a study aimed at teaching you how to deliver video prompts on an iPad® to your child so they can learn to independently complete a daily living skill. The purpose of this manual is to highlight the components of the training session so that you have an understanding of the study and the procedures. During this training session, you will participate in the following:

Part 1: Overview of the techniques used in this study along with video demonstrations
Part 2: Review of the steps of a management feature of the iPad
Part 3: Outline of the procedures for using the video prompts and the iPad

What you can expect:

This training session will use verbal and visual instruction to help you learn how to use videos with your child so that he/she can complete the selected daily living skill as correctly and independently as possible. To enhance this instructional portion of the training session, you will view videos demonstrating the delivery of video prompts targeting a variety of skills to an adolescent.

This manual is for you to keep.
You are encouraged to ask questions and take notes.
Part One

Behavioral Skills Training

Behavioral skills training (BST) utilizes a combination of verbal and visual instruction, modeling, rehearsal, and/or feedback to teach participants how to implement procedures. The objective is to ensure participants acquire a set of strong skills building their capacity of teaching an intervention to another individual. Research shows that BST packages have been effective in:

- enhancing teacher instruction;
- teaching undergraduate students to deliver interventions;
- guiding peers to teach safety skills;
- and educating parents to increase appropriate behaviors among their children.

Video Prompting

Video prompting (VP) is one form of video modeling, which is a research practice that has proven to be effective in promoting a variety of skills for individuals with disabilities. Based on the social learning theory, VP provides the viewer with the ability to learn through the observation and consequences of others. The assumption is that there will be an increase in the likelihood that the learner will imitate the behaviors observed because it will lead to more reinforcing consequences for him/herself.

Videos of the demonstrated behavior or skill are recorded and then viewed. There are four video modeling procedures:

- basic video modeling: someone else is demonstrating the target behavior or skill
- video self-modeling: the learner is engaging in the target behavior or skill
- point-of-view: the video is recorded from the perspective of the learner
- video prompting: the behavior is broken down into steps and represented into video segments; each segment is viewed and the step is completed before viewing the next
Video prompting has proven to be effective for individuals with various ability levels from early childhood to adult. Communication, social, play, functional living, and appropriate behavior skills have all been taught across home and community setting using VP. Some other benefits that researchers have found in using VP are:

- can lead to faster acquisition of skills;
- may be more “cost-effective” and efficient than other procedures;
- can reduce educational/financial cost to taxpayers;
- increase independence of learner;
- and enhance quality of life for the learner.

New, more advanced and mainstream devices, such as the iPad, put the ability to use video modeling procedures in your hands. Some of the advantages include:

- increased leisure skills
- increased independence age-appropriate
- increased peer interaction
- increased communication and socialization
- socially acceptable
- access to immediate reinforcement

Let’s take a look at some video prompting examples.  
(Presented by Special Learning:  www.special-learning.com)
Part Two

iPad Management

Guided Access is a feature that is included on all iDevices (iPhone, iPad, and iPod Touch) with iOS 6 or newer. When activated, Guided Access will prevent the user from using the home key to escape out of an app and can also limit access within an app.

To turn on Guided Access, follow these steps:
1. Select “Setting”
2. Select “General”
3. Select “Accessibility”
4. Select “Guided Access”
5. Turn Guided Access on
6. Set a passcode (I recommend a different passcode than the one you may use to lock your iDevice.)

To activate Guided Access, follow these steps:
1. Open any app
2. Triple-click your home key
3. If given a menu, select Guided Access
4. Press start (“You can also restrict access to certain area within the app by drawing a circle around those areas before pressing start.)

To deactivate Guided Access, follow these steps:
1. Triple-click your home key
2. Enter your passcode
3. Press end

You will now practice turning on and activating Guided Access.
Part Three

Intervention Procedures

Before we begin the training, let’s take a look at the steps involved in the intervention. During each session with your child, you will:

1. Access the video prompts
2. Activate Guided Access
3. Look at your child and make a request
4. Teach your child how to play the video segments
5. Provide reinforcement and/or corrective feedback depending on your child’s responses

Let’s take a look at each of these steps in more detail.
Preparing the iPad

1. Access and open the video.
2. Open and activate Guided Access.

Steps for using the video prompts with your child

1. Make a request or demand by saying:

2. After the first 5 sessions, you will wait 5 seconds.
3. Guide ______________________ to play and watch the video. (Say, “Touch the screen to play the video and watch.”)

*Initially, your child may not know how to play the segments in the app nor know how to make the screen bigger so you may need to show them how.

4. If ______________________ does not play the video within 15 seconds of telling him/her to play the video or does not play the video correctly, you can:
   ____ point to the iPad
   ____ move their hand to touch the iPad
5. After he/she has watched the video segment, provide a direction to complete the step (such as, “Now you do it.” or “Your turn.”)

How to provide positive reinforcement or corrective feedback

A. If ______________________ completes the step correctly (as shown on the video; may watch more than one segment if learning is occurring), provide positive reinforcement.

Personalized positive reinforcement gestures or statements:

__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________

VIDEO PROMPTING
Say “Play the next video segment.” Again you may point or guide their hand to play the video segment.

B. If ________________________ completes the step incorrectly, provide error correction.

Incorrect responses include:
• does not respond within 10 seconds after watching the video
• completes the step incorrectly or out of sequence

Say “That’s not correct. Play and watch the video again.”

Prompt him/her to complete the step after watching the video (i.e., “Now you do it.”)

Provide reinforcement if the step is completed correctly during the second attempt.

Say “Play the video to watch what comes next.”

Repeat steps 4 & 5 until the end of the sequence of steps is completed.

C. If ________________________ completes the step incorrectly a second time, block his/her view and complete the step.

Say “Play the video to watch what comes next.”

Repeat steps 4 & 5 until the end of the sequence of steps is completed.

This concludes the instructional portion of this training session. Next, you will view some video simulations demonstrating these procedures. Finally, you will have the opportunity to practice delivering these procedures.
Appendix H

Table 11 *Survey Responses for Likert-Type Statements for Individual Parents*

<table>
<thead>
<tr>
<th></th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Jimmy’s Mother</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Section 1: General iPad® Use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident in my skills of…</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Using the iPad to support my child’s daily routines</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2. Utilizing features of the iPad that maximize my ability to properly manage the device.</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>3. Handling technical issues that may arise when using the iPad.</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Section 2: Opinions and Attitudes Regarding Child’s Use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe…</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. That using the iPad will increase my child’s engagement in learning new skills</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2. My child is more knowledgeable than I am when it comes to using the iPad.</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>3. My child is more motivated to follow through with non-preferred tasks if the iPad is involved.</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Access to the iPad helps my child to engage in higher levels of learning.</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5. My child benefits from receiving the visual supports that the iPad can provide</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>
Section 3: Opinions and Attitudes Regarding Training

1. This training was sufficiently tailored to my family’s needs. N/A 4

2. I felt comfortable during the training. N/A 4

3. The investigator who administered this training was knowledgeable about how to best teach me. N/A 4

4. This training was relevant to my family’s needs. N/A 4

5. The training respected the goals I have for my child. N/A 4

6. This training increased my knowledge of the iPad. N/A 4

7. The investigator administered this training in a sensitive and respectful manner. N/A 4

8. I am satisfied with the iPad training I received. N/A 4

9. The training enhanced my skills as a parent. N/A 4

10. I would recommend this training to other families with similar needs. N/A 4

11. I feel the investigator provided the most effective training possible. N/A 4

12. This training has helped my child become more independent completing the targeted skill. N/A 4
Section 1: General iPad® Use

I am confident in my skills of…

1. Using the iPad to support my child’s daily routines  3  4
2. Utilizing features of the iPad that maximize my ability to properly manage the device.  3  4
3. Handling technical issues that may arise when using the iPad.  3  3

Section 2: Opinions and Attitudes Regarding Child’s Use

I believe…

1. That using the iPad will increase my child’s engagement in learning new skills  4  4
2. My child is more knowledgeable than I am when it comes to using the iPad.  4  4
3. My child is more motivated to follow through with non-preferred tasks if the iPad is involved.  4  4
4. Access to the iPad helps my child to engage in higher levels of learning.  4  4
5. My child benefits from receiving the visual supports that the iPad can provide  4  4
### Section 3: Opinions and Attitudes Regarding Training

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. This training was sufficiently tailored to my family’s needs.</td>
<td>N/A</td>
<td>4</td>
</tr>
<tr>
<td>2. I felt comfortable during the training.</td>
<td>N/A</td>
<td>4</td>
</tr>
<tr>
<td>3. The investigator who administered this training was knowledgeable about how to best teach me.</td>
<td>N/A</td>
<td>4</td>
</tr>
<tr>
<td>4. This training was relevant to my family’s needs.</td>
<td>N/A</td>
<td>4</td>
</tr>
<tr>
<td>5. The training respected the goals I have for my child.</td>
<td>N/A</td>
<td>4</td>
</tr>
<tr>
<td>6. This training increased my knowledge of the iPad.</td>
<td>N/A</td>
<td>3</td>
</tr>
<tr>
<td>7. The investigator administered this training in a sensitive and respectful manner.</td>
<td>N/A</td>
<td>4</td>
</tr>
<tr>
<td>8. I am satisfied with the iPad training I received.</td>
<td>N/A</td>
<td>4</td>
</tr>
<tr>
<td>9. The training enhanced my skills as a parent.</td>
<td>N/A</td>
<td>4</td>
</tr>
<tr>
<td>10. I would recommend this training to other families with similar needs.</td>
<td>N/A</td>
<td>4</td>
</tr>
<tr>
<td>11. I feel the investigator provided the most effective training possible.</td>
<td>N/A</td>
<td>4</td>
</tr>
<tr>
<td>12. This training has helped my child become more independent completing the targeted skill.</td>
<td>N/A</td>
<td>4</td>
</tr>
</tbody>
</table>
Carrie’s Mother

**Section 1: General iPad® Use**

I am confident in my skills of...

1. Using the iPad to support my child’s daily routines  2  4

2. Utilizing features of the iPad that maximize my ability to properly manage the device.  2  4

3. Handling technical issues that may arise when using the iPad.  2  4

**Section 2: Opinions and Attitudes Regarding Child’s Use**

I believe...

1. That using the iPad will increase my child’s engagement in learning new skills  3  4

2. My child is more knowledgeable than I am when it comes to using the iPad.  4  4

3. My child is more motivated to follow through with non-preferred tasks if the iPad is involved.  3  3

4. Access to the iPad helps my child to engage in higher levels of learning.  3  4

5. My child benefits from receiving the visual supports that the iPad can provide  3  4
Section 3: Opinions and Attitudes Regarding Training

1. This training was sufficiently tailored to my family’s needs. N/A 4

2. I felt comfortable during the training. N/A 4

3. The investigator who administered this training was knowledgeable about how to best teach me. N/A 4

4. This training was relevant to my family’s needs. N/A 4

5. The training respected the goals I have for my child. N/A 4

6. This training increased my knowledge of the iPad. N/A 4

7. The investigator administered this training in a sensitive and respectful manner. N/A 4

8. I am satisfied with the iPad training I received. N/A 4

9. The training enhanced my skills as a parent. N/A 4

10. I would recommend this training to other families with similar needs. N/A 4

11. I feel the investigator provided the most effective training possible. N/A 4

12. This training has helped my child become more independent completing the targeted skill. N/A 4
Appendix I

Florida Atlantic University Institutional Review Board

DATE: July 18, 2014
TO: Mary Lou Duffy
FROM: Florida Atlantic University Social, Behavioral and Educational Research IRB

IRBNET ID #: 619608-1
PROTOCOL TITLE: [619608-1] Promoting Daily Living Skills for Adolescents with ASD via Parent Delivery of Video Prompting on the iPad

PROJECT TYPE: New Project
ACTION: APPROVED
APPROVAL DATE: July 18, 2014
EXPIRATION DATE: July 17, 2015
REVIEW TYPE: Expedited Review
REVIEW CATEGORY: Expedited review category # B7

Thank you for your submission of New Project materials for this research study. The Florida Atlantic University Social, Behavioral and Educational Research IRB has APPROVED your New Project. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

- This study is approved for a maximum of 10 subjects.
- It is important that you use the approved, stamped consent documents or procedures included with this letter.
- **Please note that any revision to previously approved materials or procedures, including modifications to numbers of subjects, must be approved by the IRB before it is initiated.** Please use the amendment form to request IRB approval of a proposed revision.
- All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All regulatory and sponsor reporting requirements should also be followed, if applicable.
- Please report all NON-COMPLIANCE issues or COMPLAINTS regarding this study to this office.
- Please note that all research records must be retained for a minimum of three years.
- **This approval is valid for one year.** A Continuing Review form will be required prior to the expiration date if this project will continue beyond one year.

If you have any questions or comments about this correspondence, please contact Elisa Gaucher at:

Institutional Review Board
Research Integrity/Division of Research
Florida Atlantic University
Bldg. 80, Rm. 106
Boca Raton, FL 33431
Phone: 561-297-0777

* Please include your protocol number and title in all correspondence with this office.

This letter has been electronically signed in accordance with all applicable regulations,
and a copy is retained within our records.
REFERENCES


doi:10.1177/10883576040190020501


doi:10.1023/A:1005635326276


doi:10.1177/1098300709332346

prompting system. *Research in Developmental Disabilities*, 28, 397–408. doi:10.1016/j.ridd.2006.05.003


doi:10.1177/1088357608324713


