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Examining the effectiveness of using an iPad-based video modeling plus video prompting package to teach conversation skills to children with Autism Spectrum Disorder (ASD)

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EXAMINING THE EFFECTIVENESS OF USING AN IPAD–BASED VIDEO MODELING PLUS VIDEO PROMPTING PACKAGE TO TEACH CONVERSATION SKILLS TO CHILDREN WITH AUTISM SPECTRUM DISORDER (ASD)

An Abstract of a Dissertation

Submitted

in Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

Approved:

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Dr. Frank Kohler, Chair

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ABSTRACT

The purpose of this study was to examine the effectiveness of an iPad-based video modeling plus video prompting package to teach conversational skills to students with autism. A single subject multiple baseline across four children with autism design was used. Two typically developing children were involved to fulfill the video modeling and video prompting roles. Videos were created of peer models answering questions and responding to comments in complete sentences. On the videos, the questions and comments were asked by actual teachers and the peer models answered and provided comments in complete sentences in order for the target children to observe and imitate. Data was collected during teacher led discussion in a variety of experimental phases (baseline, video modeling, video modeling plus video prompting 1, video modeling plus video prompting 2, video modeling plus video prompting 3). Results suggest that a video modeling plus video prompting package was partially effective to improve the conversational skills for the four children with autism. However, all four students required a modified intervention package in order to perform the desired conversational skills during group instruction. Finally, the teachers indicated positive perceptions of the intervention at the end of the study.

Keywords: Autism spectrum disorder, modeling, communication and language skills, asking and answering.

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DEDICATION

I humbly dedicate this dissertation:

To my dearest parents, Mansour and Saud, I know how much pain you felt when I was far away from you, I had the same pain all these years that I was trying my best to achieve your, my dreams, and to be a successful person that you will always proud of. You are always in my mind and heart.

To my lovely wife and children, Fatimah, Sarah, and Ayaa, we started this journey together and I know how much time and effort you provided for me. We had difficult days but we passed them and we will have more difficult days but I am sure we will pass them as well. Thank you for everything you have done and you will do for me. I am enjoying my life with you.

To my brothers and sister, Rehab, Zahra, Hussain, Ali, and Donia, as the oldest brother, I hope that I have been a good example and model for you to achieve success.

To my family and friends, I know many of you are proud of me and happy for my success. I would like to tell you that you have helped me to get to this point via your supportive and encouraging words through all of these years.

To everyone else who always believed in me and has supported me throughout my life.

Love you all

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CHAPTER I

INTRODUCTION TO THE STUDY

Teaching children with autism spectrum disorder (ASD) presents a significant challenge. Students with ASD need support and services for a wide variety of developmental domains and skills. For example, many of these students display a range of maladaptive behaviors such as irritability, aggression, hyperactivity, and attempts to preserve objects or routines (Anderson, Maye, & Lord, 2011). In addition, individuals with autism may also have difficulties with social interaction, imitation, play skills, forming social relationships, and verbal and non-verbal communication skills (American Psychiatric Association, 2001).

One core characteristic of ASD is a deficiency in communication and language skills. Research suggests that many children with ASD have difficulty with both verbal and non-verbal communication. Examples of verbal skills that may be difficult include paying attention to speech, being aware of communication range, making requests, having functional vocabulary, using simple phrases, using prepositions, asking and responding to questions, and labeling objects (Barrera & Sulzer-Azaroff, 1983; Buffington, Krantz, McClannahan, & Poulson, 1998; Koegel, R.L., Camarata, Valdez-Menchaca, & Koegel, L., 1998; Matson, Sevin, J.A., Box, Francis, & Sevin, M.B., 1993). Examples of non-verbal communication skills that are often lacking for children with ASD include attending or listening to others, joint attention, limited use of sign language, little eye contact, and infrequent use of non-verbal requests such as pointing (Brady & Smouse, 1978; Carr & Dores, 1981; Carr, Pridal, & Dores, 1984; Layton, 1988; Paul,

2008; Wherry & Edwards, 1983). According to the National Autism Center (2009), there are a variety of evidence-based, practical interventions to address the communication and language skills of children with ASD. These practices include behavioral packaging, antecedent packaging, comprehensive behavioral treatment, naturalistic teaching strategies, peer training packaging, story reading, pivotal treatment, peer training packaging, and modeling. Peer and adult modeling intervention is one of the earliest and more effective interventions for teaching communication and language skills for individuals with ASD (Paul, 2008). Modeling was first introduced by Albert Bandura in 1960-1961. Bandura put forward the idea that watching another individual receive reinforcement may lead the watcher to imitate the same behavior (Sherer et al., 2001). Bandura (1969) also introduced the theory of learning through observation, known as the Social Learning Theory, and the theoretical root of modeling in general. Bandura conducted much research to show that observation may lead individuals to cognitive and behavioral change (Bandura, 1986).

Researchers have continued to examine the effectiveness of different forms of modeling interventions, including adult and peer models, as well as live and video forms of visual representation. It is important to continue to explore practical and effective methods to help children with autism gain better commutation abilities. While the modeling intervention demands a lot of time and effort, using iPads may help practitioners save time and effort and get better outcomes (Jowett, Moore, & Anderson, 2012).

Statement of the Problem

Communication and language difficulties, including conversation skills, are one of the main challenges children with ASD manifest. Limited conversational skills can prevent children from interacting and forming positive relationships with others and gaining access to rich and valuable opportunities within their home, school, and community environments. Research that develops and examines new methods to enhance language and communication skills will enable children with ASD to be more adaptive and effective in society. In particular, there is a significant need for interventions that are not only effective, but also practical and acceptable to teachers who have varying degrees of skill and expertise.

Significance of the Study

This section provides an overview of the importance and significance of this research study. As noted earlier, many children with ASD lack the social and communication skills to express their needs and engage in positive interactions and relationships with others. To this point, adult and peer modeling have been established as effective for teaching language and conversational skills to children with autism. Over the past five years, a video modeling intervention has emerged as promising for improving social and communication skills (Jowett et al., 2012). The video modeling intervention involved video recording live models who had conversation skills. . That videotape was shown to a student with ASD who was asked to imitate or adopt the target skills.

The purpose of this study was to extend prior research that has examined the impact of video-based peer modeling. For one, the participants of this study utilized iPad-based modeling, which represented a significant extension of research conducted to date. Second, we examined the impact of a modeling intervention called video prompting. Finally, we focused on a range of conversational skills that have not been addressed in prior studies. More specifically, we intended to monitor conversational skills such as responses to questions and making comments in complete sentences in small group activity. Moreover, the dependent variables were the student's ability to answer questions and reply to comments in the context of teacher-student conversations. There is a significant need for interventions that improve children's ability to participate in their natural and routine school activities.

Purpose of the Study

The primary purpose of this study was to examine the effectiveness of iPad-based video modeling plus a video prompting package to teach conversational skills to children with autism. Both of these interventions, video modeling and video prompting, required a student to view a pre-made video of a peer exhibiting targeted conversational skills prior to his/her participation in a school activity. The video was designed to help the child perform the desired skills throughout the upcoming activity.

Research Questions

This research study investigated the following questions:

1. What is the effectiveness of an iPad-based video modeling plus video prompting package for teaching conversational skills to children with autism?

2. What degree of adult support and effort will children require to be successful with iPad-based video modeling intervention training sessions?
3. What degree of satisfaction (social validity) will teachers report with the effectiveness and feasibility of the iPad-based video modeling package intervention at the end of the study?

Conceptual Framework

This study employed a single-subject research design to examine the effectiveness of using an iPad-based video modeling plus video prompting package intervention for improving the conversational skills of four children with autism. Videos were created of the peer models engaged in a conversation with actual teachers in order for the target children to watch the peer models and imitate the targeted conversation skills.

This study took place at a special education school in the Midwest United States. Two typically developing children were involved to fulfill the video modeling roles. Data was collected on five phases (baseline, video modeling, video modeling plus video prompting 1, video modeling plus video prompting 2, and video modeling plus video prompting 3).

Definition of Terms

Autism Spectrum Disorder (ASD) – A neurodevelopmental disorder characterized by deficits in communication and social reciprocity, as well as by unusually repetitive behaviors and restricted interests (American Psychiatric Association, 2013).

Appropriate Conversation Skills – Many different skills are required to engage in appropriate conversation skills, including: eye contact and attention, waiting for your

turn, initiating and ending the interaction, and staying on task with having the correct response (Dotson, Leaf, Sheldon, & Sherman, 2010). For this present study, appropriate plus high quality conversation skills were a response package that children with ASD were to learn, including: getting the correct response and answering or responding to teachers in complete sentences.

Augmentative and Alternative Communication (AAC): All forms of communication that are other than oral speech. These forms are used to express needs, ideas, and thoughts (Heflin & Alaimo, 2007).

Organization of the Paper

This paper was organized in five chapters. Chapter I presented an introduction of the study, statement of the problem, significance and purpose of the study, research questions, limitations, delimitations, conceptual framework, definition of terms, and organization of the paper.

Chapter II provided a review of the literature regarding the communication and language characteristics for children with ASD. Information about modeling interventions, including live, video, iPad-based video modeling, and video prompting, were also provided. Moreover, Chapter II provided suggestions for practical applications of modeling interventions and outlined four steps to develop an effective peer modeling intervention package.

Chapter III described the methodology used in the study, including: setting, participants, research questions, general experimental procedure, structure of

experimental sessions and materials, experimental measures, inter-observer agreement or reliability procedures, and experimental design and procedures.

Chapter IV provided the results of the study, including answering the three research questions. Finally, Chapter V presented a discussion of the study, including: summary and explanation of each research question, limitations and recommendations for future research, delimitations, implications for practice, and conclusions.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter was to review the literature related to modeling intervention for children with ASD. Topics discussed include: (a) Communication and Language Characteristics for Children with ASD, (b) Modeling Interventions, (c) Suggestions for Practical Applications, (d) Four Factors Necessary to Create an Effective Model Intervention, and (e) Four Steps to Develop an Effective Peer Modeling (Live or Video) Intervention Package. The review of the literature articulates the organization of the study.

Communication and Language Characteristics for Children with ASD

Language and communication skills are a core domain or area of concern for individuals with Autism Spectrum Disorders (ASD). Some individuals with autism can speak and communicate normally with others, while others are non-verbal or lack any functional communication or language skills (Egel, Shafer, & Neef, 1984).

People with ASD may have trouble talking, or may not learn to talk at all. Others with ASD may have difficulties in verbalization or in developing sentences with meaning (Short & Schopler, 1988). Researchers have identified a range of specific communication and language difficulties that individuals with ASD may have:

1. Low attention to speech, problems in joint attention skills, communication rates, communicative range, and relation between language and action (Paul, 2008);

2. Sign, comprehension of signs versus speech, eye contact, and requests (Brady & Smouse, 1978; Carr & Dores, 1981; Carr et al., 1984; Layton, 1988; Wherry & Edwards, 1983);
3. Lack of preposition use, such as “behind,” “in front,” and “next to”; lack of use of phrases for social communication, such as “play with me,” “hello,” “thank you,” “help me,” and “excuse me” (Egel et al., 1984; Matson et al., 1993);
4. Labeling and asking questions (Barrea, Lobatos-Barrera, & Sulzer-Azaroff, 1980; Barrea & Sulzer-Azaroff, 1983; Koegel et al., 1998);
5. Response to “wh-” questions, response to “yes/no” questions, response to production of location, and object verbal and gestural response (Buffington et al., 1998; Handleman, 1979; Handleman, 1981; Krantz, Zalewski, Hall, Fenski, & McClannahan, 1981; Neef, Walters, & Egel, 1984; Secan, Egel, & Tilley, 1989).

Most typically developing children acquire communication skills through social interactions with caregivers, teachers, family, and peers. Unlike normal children, many children with ASD do not develop their communication and language skills easily or naturally. In reviewing the communication and language problems of children with autism, one area of difficulty that stands out is responding to questions or comments. All children need to develop the ability to answer questions in order to interact with others. Most children develop question and answering skills between the ages of 18 to 24 months (Hymes, 1967). The literature suggests that children learn to answer questions at an early age before learning to ask questions (Wilson, Fox, & Pascoe, 2012). In contrast, many

children with autism require specialized interventions and supports to learn the skill of answering questions.

Modeling Interventions

Researchers have developed a variety of interventions to improve the communication and language skills of individuals with ASD. These include antecedent packaging, behavior packaging, comprehensive behavioral treatment, naturalistic teaching strategies, peer training packaging, pivotal response treatment, story reading, and modeling (National Autism Center, 2009).

Modeling is one intervention that has been shown to be effective for improving communication and language skills (Charlop & Milstein, 1989). Learning by observation is one effective method for children with developmental difficulties as well as typically developing children. Many people with ASD are visual learners and may orient or attend to visual stimuli, such as models, pictures, computer technology, and videos (Sherer et al., 2001). Modeling is an observation process during which an individual may observe a model or models to increase the possibility that the individual imitates or adapts the target behavior.

Live modeling was first introduced by Albert Bandura in 1960-1961. Bandura put forward the idea that watching another individual receive reinforcement may lead the watcher to imitate the same behavior (Sherer et al., 2001). Bandura (1969) also introduced the theory of learning through observation, the Social Learning Theory, which is the theoretical root of modeling in general. Bandura continued researching to prove his theory that observation may lead individuals to cognitive or behavioral change (Bandura,

1986). Live modeling and video modeling are interventions that evolved from the Social Learning Theory created by Bandura.

Live Modeling Intervention

Live modeling occurs when an individual watches a live model(s) in order to imitate and learn new behaviors. Since Bandura's early research, many studies have examined the effectiveness of live modeling for individuals with ASD. Adults, peers, and siblings are three different live models that have been shown to be effective for children with ASD. A host of studies have examined the impact of live modeling on a child's learning of communication and language skills. For example, Jones and Schwartz (2004) examined the effectiveness of peer, sibling, and adult models for three preschool children with autism. Three groups were created to examine the effectiveness of the adult, peer, and sibling models. Each primary participant group had an adult, a peer, and a sibling model. The study took place outside classrooms, in hallways, and in the classrooms of primary participants. Researchers used a parallel treatments design (PTD). The three models -- adults, peers, and siblings -- underwent training to perform the desired skills for the study. Each target child learned to answer questions about pictures related to actions, professions, and opposites. Jones and Schwartz concluded that the sibling, peer, and adult models appeared to be equally effective.

Studies of live modeling have also focused on teaching question asking and answering to children with ASD. For instance, Ihrig and Wolchik (1988) compared the effectiveness of adult and peer models in teaching language tasks. Four children with ASD between 9-11 years old participated in the study. All four children had severe

language delays, but they were able to imitate simple verbal and non-verbal behaviors. The two models were a 9-year-old with normal development, and a 27- year-old who was unfamiliar with the target children. The researchers used a BCBC design, counter-balanced across the four subjects. Three settings in the study created assessment, training, and maintenance for each child with ASD. During the intervention, the subjects observed the models responding to questions. Results indicated that both the peer and adult models were equally effective for increasing children's imitation of language, including answering skills. Moreover, all four children showed high levels of generalization and maintenance.

In another study, Egel, Richman, and Koegel (1981) examined whether autistic children can learn by observing peers working on verbal discrimination and response to questions skills. Two female and two male children with ASD between the ages of 5and 7 participated in the study. The models included three typically developing children and one autistic child with very high functional development. Target children were shown pictures and answered questions about the pictures, including yes/no questions. Though all four children struggled to respond to tasks in their special education classroom curricula, a multiple baseline design across subjects showed that all four of the target children improved their verbal discrimination and responding to question skills during the intervention.

Charlop, Schreibman, and Tryon (1983) examined the ability of four autistic children to learn by observing peer models. All four of the target children exhibited severe delays in social behavior, play, and language. Independent variables were color

discrimination, discrimination of a square versus a circle, discrimination between on versus under, and responding of “yes” or “no” to questions. Researchers used a single subject probe design across subjects. Results showed that learning by observation using peer modeling was an effective procedure. Additionally, children showed high levels of generalization. Finally, the study conducted by Carr and Darcy (1990) examined factors that supported peer imitation for children with ASD, and examined setting generality as it affects a child’s imitation skills. Independent variables were physical and verbal responses to objects, such as holding a mug and saying “I am holding the mug”. Twenty actions were involved. Four children, who met five requirements, participated. The requirements were: following simple requests, using of one- or two-word statements, play skills, no experience in learning by observation, and ability to imitate. All four children were 45 years old and suffered from severe speech delay. On the Gesell Receptive Expressive Language Evaluation, all children functioned at a 2-year-old level. The peer model was a 5-year-old who identified as friendly and cooperative. Results suggested that the model student had a positive impact on the children’s ability to imitate the physical actions and increase their verbal responses to objects.

Video Modeling Intervention

Video modeling is when an individual watches a video model or models to imitate and learn targeted skills or behaviors (Maione & Mirenda, 2006). In accordance with Bandura’s early research, the purpose behind video modeling is to promote learning by observation, as individuals with ASD are often visual learners. Videos of adults, peers, and the self are three types of video models used in this type of modeling. A variety of

studies have examined the effectiveness of video modeling for teaching skills in language and communication to children with ASD. For example, Banda, Copple, Koul, Sancibrian, and Bogschutz (2010) examined the effectiveness of video modeling to teach individuals with ASD to use augmentative and alternative communication devices (AAC). Researchers attempted to teach children to use a speech-generating device. Participants were 17 and 21 years old who had very limited, conversational speech, but had the ability to watch video or television independently. Models for the study were two adults. A multiple baseline across subjects was used, and the results showed that video modeling was effective for teaching both participants to communicate using AAC. However, participants failed to generalize target skills.

In another study, Maione and Mirenda (2006) examined the effectiveness of video modeling and video feedback in teaching children with ASD to play with typically developing peers. The participant was a child with ASD who required prompting to play and interact with other children. Researchers used a multiple baseline design across three play activities to assess the effects of the intervention. The dependent variables were total number of verbalizations made by the participant, frequency of verbalizations, and frequency of responses and initiations. Results showed the video modeling intervention increased the use of social language in two activities (Play-Doh and Chevron Cars). The third activity (Caillou's Tree House) required video feedback and prompting for the target student to increase use of social language.

Numerous video modeling studies have focused on teaching question asking and answering skills to children with ASD. For example, Charlop and Milstein (1989)

examined the effectiveness of the video modeling intervention to improve conversational speech for children with autism. Three children with ASD who were 6-7 years old participated. All three participants were verbal, could ask and answer simple questions, and participate in conversations. A multiple baseline design across children and a multiple probe design across conversations were used. The video models were of two familiar adults. Results indicated that video modeling was effective for teaching appropriate conversation skills, especially in asking and answering questions. The students also generalized the target skills and maintained these skills for a period of over 15 months.

In another study, Buggey, Toombs, Gardener, and Cervetti (2001) examined self-video modeling to increase appropriate responding for children with ASD. Three student participants with ASD from 7-12 years old were included, and all participants had problems in language communication skills. Participants were to answer 17 questions related to items presented in the videotape, which was shown in the children's home settings. A multiple baseline design across students was used. Results showed that participants nearly doubled their frequency of target behaviors, including appropriate response and answering skills. Finally, Sherer et al. (2001) compared the effectiveness of self-video modeling versus video of different models. Participants were five students with ASD 3-11 years old. Participants were selected for this study based on their ability to maintain conversational skills and the willingness of parents for their children to learn simple, question-answering skills. Six typically developing students participated as peer video models. Subjects were asked to answer simple conversation questions (e.g.,

"Where do you live?"). Results showed that both self-video and other models were effective in teaching children to answer questions. Moreover, the results showed no differences between self-video modeling and other modeling, and the subjects learned equally in both conditions.

In conclusion, the literature indicates that both live and video models are effective for improving communication and language skills for children with ASD, including asking and answering questions (Charlop-Christy, Le, & Freeman, 2000; Gena, Couloura, & Kymissis, 2005). In the next section, suggestions are made for practical applications to help teachers, parents, and service providers offer successful modeling interventions for children with ASD.

iPad-Based Video Modeling Intervention

Technology has changed the way that students learn and many schools are using technology as a teaching tool. Student with ASD also can benefit by using technology to learn new skills or behaviors. The iPad is a special tool that all students can benefit from, including children with ASD, because it makes the education process quicker and easier with more quality (Buragga, Dhir, & Boreqqah, 2013). iPad-based video modeling is an intervention that appeared in previous modeling intervention research in general. The only difference between video modeling and iPad-based video modeling is that in video modeling the students watch the videotape on TV or a computer screen, while in iPad-based video modeling the students watch the videotape on a tablet device such as an iPad. Using iPad-based video modeling instead of using the normal video modeling can help caregivers and parents provide high quality models faster and easier. When video

modeling is used, the teacher may take the student aside in order for him or her to watch the video model, which can be difficult for some students, especially those with ASD. It is not easy for many individuals with ASD to transition from an activity to another. Using iPad-based video modeling can help students stay on task and not get confused. Also, it can make the education process quicker and easier (Neely, Rispoli, Camargo, Davis, & Boles, 2013).

Some studies have examined the benefit of using the iPad as a tool to teach and support new skills to children with autism. For example, Jowett et al., (2012) evaluated the effectiveness of video modeling using iPads to teach a 5-year-old boy diagnosed with autism basic numeracy skills using a single subject multiple baseline across numerals design. Results showed that iPad-based video modeling was an effective intervention. In another study, Burton, Anderson, Prater, and Dyches (2013) investigated the effective use of video self-modeling on an iPad to teach math skills. A multiple baseline design was used across four adolescent males with ASD and an intellectual disability. Results confirmed that video self-modeling on an iPad was an effective tool for teaching math skills to each participant. In another study, Macpherson (2012) examined the effectiveness of a video modeling intervention on iPads to teach social skills. A multiple baseline design across subjects was used. Results showed that all five participants with ASD learned the social skills that were targeted. Finally, Hart and Whalon (2012) investigated the effectiveness of using iPad self-video modeling to teach academic responses during science instruction to an adolescent with autism. An ABAB reversal

design was used. Results showed increased correct academic responses during the iPad self-video modeling intervention and during the re-intervention phases.

Video Prompting Intervention

According to Sigafoos, O'Reilly and de la Cruz (2007), there is only one main difference between video modeling and video prompting. Video modeling involves having a student watch an extended video and typically entails providing instruction and support for attention and imitation of targeted skills. However, with video prompting, instead of watching the entire video, sub-videos are provided. For example, if a teacher wants to teach a student how to wash his or her hands, in video modeling the teacher will have the student watch one video of someone washing his or her hands and ask the student to imitate the skill of washing. However, with video prompting the teacher will provide sub-videos of someone washing hands. The teacher can create three videotapes. The first video shows how to turn on the tap, wet your hands, and get some soap. The second video shows how to lather and scrub your hands for 20 seconds. The final video shows how to rinse your hands for 10 seconds, dry your hands, and turn off the tap.

Several studies have examined the effectiveness of using video prompting to teach children with disabilities. For example, Sigafoos et al. (2005) evaluated the effectiveness of using video prompting to teach adults with developmental disabilities how to make popcorn using a microwave oven. A multiple-probe design was used across three adult men. Results showed that the intervention was effective with two of the adults during the follow-up phase and that the video prompting may be an effective intervention to teach daily living skills for individuals with developmental disabilities. In another

study, Sigafoos, O'Reilly, Cannella et al., (2007) evaluated the effectiveness of using video prompting to teach three adults with development disabilities how to wash dishes. Results suggested that video prompting was an effective procedure to teach these daily living skills. In another study, Cannella-Malone et al. (2006) compared the effectiveness of using video modeling versus video prompting to teach six adults with developmental disabilities to put away groceries and set a table. Results showed that while video prompting was effective for teaching daily living skills, video modeling was not effective. Also, the study suggested that the quality and quantity of the videos can be an important factor for better outcomes. Finally, Cannella-Malone, Brooks, and Tullis (2013) examined the use of self-directed video prompting to teach four adolescents with moderate to severe intellectual and developmental disabilities daily living tasks. Participants used iPods to watch the videos. Results showed that participants were able to use the iPods independently and the intervention was effective in teaching targeted skills.

To this point, research on video prompting has not focused on children with ASD and has focused primarily on life and physical activity skills. There is a significant need for research that examines the effectiveness of video prompting to teach children with autism a variety of skills, including communication and language skills.

Peer Modeling

Peer modeling is one intervention that is effective in supporting communication and language skills for individuals with ASD. A peer model can be a classmate, a sibling, a friend, or a family member, such as a cousin who shares characteristics such as school level or age. McCoy and Hermansen (2007) indicated that peer models can typically be

the same age or gender of the target child. Peer models can also include individuals familiar to the participant, such as classmates, siblings, or peers. There are two types of peer modeling interventions. The first type is live or in viva peer modeling (LPM) where an individual watches a live peer model perform activities. The second type is video peer modeling (VPM) where the individual watches a video of a peer performing target behaviors to give the individual an opportunity to learn through observation and then to imitate, memorize, generalize, or adapt new behaviors (Hitchcock, Dowrick, & Prater, 2003; Neumann, 2004). Both interventions require attention to the visual stimulus and annotation of the model behavior.

Numerous researchers have discussed the conditions that are necessary for modeling interventions to be effective. For example, Jones and Schwartz (2004) discussed the benefits of using peer modeling and concluded that the relationship between the model and the target student or learner may play big role in the effectiveness of a peer modeling intervention. Moreover, positive relationships with peers can have a positive influence on target learners, which supports the imitation process and results in an effective peer modeling intervention. Sigafoos, O'Reilly, and de la Cruz (2007) concluded that not all learners benefit from modeling as an intervention; there are prerequisites needed to use peer modeling interventions such as the ability to orient, imitate, and attend to the model. In other words, individuals with no imitation skills cannot learn through modeling interventions.

Suggestions for Practical Applications

Live and video models have been demonstrated to be effective in improving children's abilities to ask and answer questions. Teachers, parents, and service providers need to know which one of these two models support asking and answering question skills for individuals with ASD. The goals of this section are to: (a) discuss advantages and disadvantages for using video verses live models; and (b) describe four factors that are necessary for modeling interventions to be effective.

Live Versus Video Modeling

As noted earlier, live or in viva modeling involves using a live model to demonstrate an activity, assuming that target students adopt or simulate an activity by watching the model. In contrast, video modeling entails recording a live model and having an individual watch the videotape later to adopt or simulate an activity or behavior. Researchers have noted that video modeling has several advantages over live modeling. First, videotapes can be made and used in many naturalistic settings where it would not be as simple to use live models. Second, the teacher or therapist has the opportunity to re-record and improve the videotape until achieving the desired scene or behavior. Third, it is difficult to present a live model every time for target students to observe; therefore, using a videotape makes it simple to re-watch a model or a behavior. Fourth, videotapes can be used for multiple children with ASD. Finally, as the previous researchers showed, video modeling appears to be more effective more quickly than live modeling; it also provides better generalization for children with ASD (Banda et al., 2010; Charlop-Christy et al., 2000; Sherer et al., 2001). On the other hand, some studies

suggest that live or in viva modeling is also effective to teach children language and communication skills. One advantage of live modeling is that it is more natural. Another advantage is that live models can prompt and support the target child during the occurrence of an intervention.

Four Factors Necessary for Model Intervention to be Effective

Modeling is a highly recommended intervention that positively influences the educational process for autistic children and leads to positive impacts in developing appropriate communication and language skills. Jones and Schwartz, (2004) have identified four factors that are necessary to create an effective model: length of modeling, competency of modeling, nature of the relationship, and the children's attention to the model.

The first factor is length of the modeling, which means that the intervention requires a sufficient duration of time or a sufficient episode to be effective. For example, we may not expect that showing students with ASD a video only once will ensure that they learn and perform the target behavior. Teaching skills in asking and answering questions can be very difficult for some children with ASD, which requires longer interventions. As noted earlier, children with ASD may be able to develop answering skills more quickly than asking skills. Asking skills need more time to be developed because of grammatical behaviors that a child needs to understand to ask appropriate questions. All individuals with ASD are different; some need longer interventions than others. Therefore, we cannot set an exact time to implement a modeling intervention. Rather, the decision to discontinue an intervention should be decided when the target

behavior is acquired. In general, however, we should expect to provide repeated episodes or sessions of a model to teach children with ASD to ask and answer questions.

A second factor is the competency of the model. Models should be accurate and precise in their demonstration of the target behaviors or skills. Ideal models are those that allow individuals with ASD to focus on the target skills or behaviors in need of being adopted or imitated. Caregivers may prefer using video modeling because they can re-record the model, include additional modifications to improve the video, or focus on the target behavior. Moreover, adult modeling may be the correct choice if the behavior or skill is difficult to imitate, such as asking or answering questions. While peer models may demonstrate some degree of competency, they may not be able to provide the degree of quality of expertise to ensure effectiveness for children with ASD.

A third factor is the relationship between the model and the participant. A variety of researchers suggest that target children should have a positive history or a relationship with the model. One characteristic of individuals with ASD is that they struggle to make new relationships, which can affect the learning experience if a target child does not have a relationship with the model. For communication and language skills, live or video models can be used whether models are adults or peers; however, they should have a positive relationship with the target child. A peer or sibling would be an appropriate model because of the relationship between them; however, peer or sibling models need training to be excellent models. An adult, such as a teacher or speech language pathologist (SLP), would also be an excellent model if he or she has a positive relationship with the child.

A fourth and final factor is attention to the model. When presenting a model intervention, there are many distractions involved that may interfere with attention and imitation such as loud conversations. Moreover, children with ASD lose their attention easily, which requires specific modeling interventions. Caregivers must often use prompts and reinforcement to ensure that target children focus on models to learn skills or behaviors. Adult, peer/sibling, or self-type models can be used to encourage children to learn and perform conversational skills. For example, when we teach asking and answering questions to children with ASD, each episode or session must be short, because such children may lose their attention if the session is too long. Also, models must be able to focus on the target skill or behavior, as children with ASD may become confused if watching other skills. This is important for both live and video models. However, when teaching children with ASD to ask and answer questions, video models may have an advantage because children with ASD may be more interested in watching videos than on focusing on live models performing activities (Sherer et al., 2001).

Live and video models are both effective interventions to support language and communication skills, including skills in answering and providing comments in complete sentences. Using live and video models would be an appropriate choice, because each intervention has different elements. Choosing which type of model to use should be decided based on the four factors presented above. Also, choosing the type of model, whether adult, peer/sibling, or self, should be decided on based on the same four factors.

Four Steps to Develop an Effective Peer Modeling (Live or Video) Intervention Package

There are four basic steps to be followed to implement live or video peer modeling interventions. They are: (a) identifying the target skill(s) or behavior(s); (b) selecting and preparing the models; (c) implementing the modeling intervention; and (d) promoting generalization and maintenance. Each of these is described next.

Step 1: Identify the Target Skill(s) or Behavior(s)

The first step to support an individual with ASD through a modeling intervention is to identify the skills or behaviors that need to be addressed to collect data. If a child exhibits a behavior that is not appropriate, then it may be necessary to observe the target student, or to interview school staff or family members to know more about the reasons for the behavior (Heflin & Alaimo, 2007). Prior to implementing the peer model intervention, the caregiver must reasonably assume that the target skill or behavior can be learned through imitation. For example, reading skills cannot be learned through modeling interventions, because imitating a reading model does not lead to learning reading skills. In contrast, research indicates that we can teach individuals with ASD communication and language skills by imitation or modeling intervention.

Step 2: Select and Prepare the Models

Once the target skill or behavior is identified, then the caregiver selects and prepares the model. An ideal peer model should have a positive relationship with the target student, be competent, and be available (Jones & Schwartz, 2004). Individuals with ASD have difficulties making relationships; therefore, if the model has no relationship with the target student, the target student may refuse the intervention, which leads to a

negative outcome. When choosing a model, it is also important to ensure the competency and availability of the model. The intervention team, which can be constituted of caregivers and parents, must review their choices of possible models and choose models that can effectively help in developing positive skills or behaviors in the target student (Sigafoos, O'Reilly, & de la Cruz, 2007). For example, a classmate or a sibling who has a positive relationship with the target student is an effective model. However, if there is no relationship between the model and the learner, it is difficult for the learner to attend to the model and imitate the positive skill or behavior.

After choosing the model, then training must be conducted to ensure a high quality of model performance. The interventionist should create a plan that includes writing scripts or task analyses, choosing the model type (live or video), creating a number of settings, and collecting tools that help create the model. Ganz, Earles-Vollrath, and Cook (2011) as well as Sigafoos, O'Reilly, and de la Cruz (2007) provided additional information when choosing a peer model:

- Choose the type of model (live or video) that works best for the target individual with ASD;
- When choosing a live peer model, ensure that the model is available across all settings;
- When choosing a video peer model, be sure to record the model in as many different settings as possible;
- Write at least three different scripts or task analyses of the same skill or behavior;

- Support the peer modeling intervention by providing an appropriate learning environment, by giving the model tools to be successful, and by promoting the target skill or behavior as needed;
- Provide the teaching aids that support peer modeling. For example, in the case of video peer modeling, a camera, a television, video editing software, and video player must be available for use when creating the peer modeling video;
- Caregivers must ask for permission from the model's parents.

Step 3: Implementing the Model Intervention and Supporting Imitation and Fluency

It is not possible to expect that the focal student will observe the peer model and readily imitate or perform the target skill. In fact, caregivers should be prepared to provide additional support for the target student to focus on observing the model. Prompting is an appropriate method to help the target student focus on the model and ensure the student attends to the model. In the case of video peer modeling interventions, other methods include placing the television or viewing device near the target student, removing distractions, directing the target student to watch the video, and prompting the student to focus his or her attention on the model if their attention strays (Ganz et al., 2011; Sigafoos, O'Reilly, & de la Cruz, 2007).

Troubleshooting

During the third step, when implementing the model, and after a number of sessions, if the target student is not showing positive outcomes, it is time to offer additional support. Depending on the needs of the target student, additional support

should be used to aid the target student to adopt or imitate the target skill or behavior (Ganz et al., 2011).

Fading the Model

The intervention team should have developed a time period to stop or to continue the intervention, depending on the needs of the target student. It is not appropriate to stop the intervention immediately when the target skill or behavior is acquired; rather, it is better to fade the intervention slowly and carefully, as the target student depends on the intervention to imitate the positive skill or behavior. For example, if the peer model is shown to the target student 10 times a week during two sessions each day, and the target student acquires the skill, the intervention team should decrease sessions to once a day and then fade the intervention completely (Sigafoos, O'Reilly, & de la Cruz, 2007).

Step 4: Promoting Generalization and Maintenance

It is not enough to implement the peer modeling intervention to attain an acceptable outcome and assume that the skill or behavior is generalized. Individuals with ASD commonly have difficulties generalizing a new skill or behavior (Bellini, Peters, Benner, & Hopf, 2007). Sigafoos, O'Reilly, and de la Cruz (2007) suggested that there are factors that should be followed to implement a generalizable environment when using peer modeling interventions. Table 1 describes these factors and how to implement them.

Table 1

Factors to Support Generalization

Factors	Implementation
Different setting	Providing many different settings as possible supports generalization (classroom, school, and home).
Number of peer models	Provide as many peer models as possible. If a target student experiences a new skill with more than one model, the skill will have better chance of being generalized.
Scripts or task analysis	Provide as many scripts or task analyses as possible. It is important to support generalization. To teach specific skills, it is important to create at least three scripts, or task analyses, and to have the target student practice each.
Natural environment	Provide as many natural environment settings as possible, which helps in generalization. Practicing new skills in a natural environment leads to greater generalization.
Other strategies	Target students should be encouraged to use other strategies, such as self-recording or self-monitoring.
Data collection	Data should be collected during and after the intervention to compare the target student's performance, which helps in determining the benefits of using peer modeling.

In addition, research suggests that video modeling alone is not an appropriate intervention to teach new skills or behaviors without support from teachers or caregivers. Teachers can support the video modeling procedure (e.g. introduce the intervention session, speak with the target student about the intervention, give target student some instructions, and speak with the target student about what he/she will see). Moreover, according to Sigafoos, O'Reilly, and de la Cruz (2007), the provider of the video modeling intervention should follow some roles to ensure high quality intervention including: the target's attending to the model, removing distractions, and teacher support. The literature suggests that video modeling is effective for teaching new skills when the

adult/trainer completes some specific processes before the video is viewed, during a showing of the video, and afterwards. A first level of the video modeling process could be defined as the roles that the teacher could practice to ensure that the target student understands what he/she needs to do and make sure that the target student is able to participate in the intervention. The second level during intervention would be when the teacher ensures that the student is actively participating by observing the video and imitating the targeted skills. At the final level after showing the video, when the teacher ensures that the target student got support and reinforcement and understood the directions to provide appropriate responses.

CHAPTER III

METHODOLOGY

Setting

This research study took place at a special education school in the Midwest United States. This school was established to serve students with disabilities. This school could have been closed because of the movement to provide special education services in least restrictive educational environments and the request for full inclusion for all students. Many schools for special services were closed, but it was the parents who kept the doors open at this school. This school provides special education services for many children with special needs, including children with ASD. Moreover, a number of its students go back each year to their home school district, to a less restrictive educational environment. By having professional staff that are trained to deal with challenges for students with needs, this school continues to provide high quality services. Moreover, the school is serving many students with different challenges such as medical and behavior needs.

This study was conducted in four of the 22 classrooms in the school. Each classroom served three to seven children with disabilities. One special education teacher and two assistant teachers were in each classroom. Each classroom had a half circle table where the study was conducted daily during a 30-minute opening class activity.

Participants

Target Participants

Four children with ASD aged 14–19 years old who have difficulty performing conversational skills were the primary participants for this study.

Joseph, Anne, Dan, and Jad, three boys and one girl, were enrolled in four different classrooms. All of the target participants were diagnosed with autism spectrum disorder, possessed and used verbal communication skills, were able to attend to a two-minute long video, were capable of imitating adult and peer models, compliant with teacher directions and requests, had no physical problems including sight and hearing, and exhibited some difficulties using verbal conversation skills in a group instruction setting.

The school administrators and teachers helped identify the children who participated on this study. All four participants had difficulties answering teacher questions readily or consistently, responding to a teacher's questions or comments in the course of a conversation or dialogue, and answering or responding to the teachers in complete sentences. For all four participants, we were unable to access their records because of the school's confidentiality of all research participants. However, a description for each participant is provided next based on information we received from the teachers and our own observational records.

Joseph was a 19-year- old with ASD who had attended a special education program. Joseph had some appropriate communication and language skills. He could answer the teacher questions with appropriate responses, but most of the time he used just

one word to answer. He could not answer in complete sentences and could not reply to teacher comments. He engaged in positive behavior most of the time.

Anne was a 17-year-old girl diagnosed with ASD. Like Joseph, she had some communication and language skills. She could not answer teacher questions or reply to comments using complete sentences. Like Joseph, she engaged in positive behavior most of the time. Anne could engage in conversations with adults. She understood most of the questions and the requests that adults provided and answered them appropriately. Anne had acceptable attention skills. She had positive interactions with her peers.

Dan was 14-year-old diagnosed with ASD. Dan had some problems with his communication and language skills. His teacher indicated that he always repeated some words and sentences that he had memorized from TV shows. He used one specific word to reply to teacher comments -- “Yeah”. Sometimes, he could not understand the teacher questions or orders the first time and the teacher had to repeat her question or comment for him to understand. It seemed that his attention level was not appropriate and he often needed to be prompted by the teacher. He had no eye contact, and he did not interact with other children or adults.

Jad was 14-year-old boy diagnosed with ASD. Jad’s communication and language skills were limited. He always repeated what the teacher said, and it seemed that did not understand what the teacher wanted him to do. He could not answer or reply to the teacher in complete sentences and, most of the time, he could not provide an answer, comment, or appropriate response. Jad displayed self-injurious behavior.

Peer Model Participants

We selected two children who were videotaped exhibiting targeted skills during the context of a conversation with a teacher. The peer model participants were typically developing children who exhibited age appropriate language and conversation skills, had a positive relationship with the target children (two sessions were created to make positive relationships between the target students and the peers), and were able to fulfill the model role in a video recording session. The peer models' primary role in this study was fulfilled in a video taped conversation with a teacher. The researcher provided some form of preliminary instruction and training to prepare the peer models to perform this role.

Adult Participants

Four teachers with 2-20 years of experience participated in this study (each teacher was responsible for one target student). Each teacher had an endorsement or certification in special education and assumed the role of head teacher for their classroom. Each teacher conducted the daily small group instruction sessions and was responsible for implementing the video modeling and prompting interventions that occurred during this study. All four teachers participated as volunteers in this study. The four teachers had no experience implementing video modeling or video prompting interventions, and they acknowledged that they would need assistance to implement the intervention package.

Research Questions

This research study investigated the following questions:

1. What is the effectiveness of an iPad-based video modeling plus video prompting package for teaching conversational skills to children with autism?
2. What degree of adult support and effort will children require to be successful with iPad-based video modeling intervention training sessions?
3. What degree of satisfaction (social validity) will teachers report with the effectiveness and feasibility of the iPad-based video modeling package intervention at the end of the study?

General Experimental Procedures

All experimental sessions occurred during opening class activities. These activities occurred routinely in each classroom at the school and were designed to address content such as days in the week, months, years, weather, school activities, out of school activities, and rules. All students (three-seven) in the classroom sat at a half circle table and a teacher faced them to give the lesson. The teacher directed questions to individual members of the group throughout this 30-minute activity. In addition to the head teacher, two adults were generally available to assist and support students' participation throughout the duration of the opening activity. We collected observational data during a 12-minute segment of these opening activities.

Prior to the start of the study, teachers, parents, and administrators were informed about their responsibilities during the study. All participants, included two typically

developing children who played the models roles, signed the study informed consent forms.

For about three weeks before starting the study, preliminary or pilot observations were conducted to gather information about the children's ability to respond to teachers' verbal questions and comments. This three-week period was used to develop the structure for the specific group lessons and experimental measures that were conducted during the actual study.

Experimental Measures

Three types of data were collected. First, we monitored students' verbal responses (conversational skills) to teacher questions and comments during the opening class activities. Second, we examined the fidelity or quality of a video modeling procedure that teachers used in teaching children the targeted conversational skills. Finally, we examined teachers' satisfaction with the intervention package at the termination of this study. Each of these measures is described next.

Measure 1: Students' Responses to Teacher Questions and Comments

An observational code was developed to examine the students' appropriate and high quality responses to the teacher's questions and comments (see Table 2 for more details).

Table 2

An Example for the Observational Code Developed to Examine the Students' Appropriate and High Quality Responses to the Teacher's Questions and Comments

<table>
<tr><td>Room #</td><td>Student #</td><td>Date:</td><td>Question #</td></tr>
<tr><td>Antecedent support</td><td>Teacher</td><td>Student Response</td><td>Student's verbal response</td></tr>
<tr><td rowspan="2">Video Prompt

- Attend

- N Attend</td><td>Question _____
1 2 3
S NS
If NS what:</td><td>Answer
Verbal response
AP ___ 5 10
Q LQ

NA___ 5 10

No ___</td><td></td></tr>
<tr><td>Comment _____
1 2 3
S NS
If NS what:</td><td>Comment or Reply
Verbal response
AP ___ 5 10
Q LQ

NA___ 5 10

No ___</td><td></td></tr>
</table>

Conversational Episode

A sequence of teacher and student responses that were initiated by the teacher and pertained to a specific topic. Each conversational episode became a unit for recording the series of events listed below. A total of five conversational episodes were in each observational section.

Video Prompt

Teacher presentation of a 10 to 20-second video clip that illustrated the desired student responses to the teachers' questions and comments. This presentation may have been aided by teacher instruction, prompting, and support for the focal child's attention and responses. Video prompting always occurred immediately before a conversational episode. It did not occur during the baseline phase. Student responses to video prompting were measured as *attend* or *not attend* to the video prompt. If *attend*, students looked at the iPad while the video prompting was occurring and responded appropriately to the teacher's questions and comments. Second, students did not look at the iPad while the video prompting was occurring and did not respond appropriately to the teacher's questions and comments.

Teacher Questions

The teacher asked a question related to one of the area of study: greeting, academic, and schedule. We only coded questions that were directed to one of the target students.

Students' Responses to Questions

Two levels of appropriate response to teacher question:

- Appropriate: Student responded verbally within 10 seconds with an answer that was related to the question. The answer did not have to be correct, but only related to the question. Moreover, the student could answer using one word or repeat what the teacher already said.

- High Quality: when the student answered in a complete sentence within 10 seconds.
- Not appropriate: student response was none verbal or a verbal response that was not related to the question within 10 seconds.
- No response: student did not response verbally within 10 seconds.

Teacher Comment

Immediately after the student answered the question, the teacher asked for a comment that related to the general topic of that episode. After the comment, the teacher waited for the student to respond. The comment needed to be exactly liked the one that was written. We only coded comments that were directed to one of the target students.

Students' Response to Comments

Two levels of appropriate responses to teacher comments:

- Appropriate: Student's responded verbally within 10 seconds with a response that was related to the comment. The response did not have to be correct, but only related to the teacher's comment. Moreover, the student comment could use one word or repeat what the teacher already said.
- High Quality: when the student provided a comment in a complete sentence within 10 seconds.
- Not appropriate: student response was none verbal or a verbal response that was not related to the question within 10 seconds.
- No response: student did not respond verbally within 10 seconds.

The observers followed a teacher throughout the 12-minute opening class activity session focusing on five instructional separate episodes or conversations that the teacher initiated with the target child. Each episode consisted of a teacher question, expected student response, a follow-up teacher comment, and a final student response (see Table 3 for more details). The teacher questions and comments for each episode were scripted or planned ahead of time and pertained to the following themes or topics:

- Conversational episode 1 focused on a personal greeting (i.e., welcoming the student to the classroom, inquiring about the student's evening or weekend, etc.);
- Conversational episodes 2-4 focused on topics that were typically addressed in the opening activity, such as calendar, weather, academic themes, etc.);
- Conversational episode 5 focused on the schedule or course of activities that would occur in the classroom on that day.

Table 3

An Example of Episodes 1, 2, 3, 4, and 5 for One Day

Qs & theme	Questions and comments	Instruction
Q 1 Greeting	**TQ: Anne, how do you feel this morning?** (use the same question) **SR**: (wait 10 s, you just can repeat the q, no verbal support) You may say the answer if 10s and no answer from the student. **TR: I feel great, because you are with us today,** (use the same comment) **SR:** (wait 10 s, you just can repeat the C, no verbal support)	1) Try to use the same Q and C that you have; 2) Always say the name of the target student before asking the question, you do not have to say the name before making the comment; 3) Do not provide verbal support when you ask the question or make comment for at least 10 seconds; 4) However, you can repeat the question or the comment 2 or 3 times that have provided; 5) If you ask a different question or make a new comment before 10 seconds of the child response, we do not count the episode and you need to make another comment; 6) Try to avoid any other help from your associates or peers prior 10 seconds from asking the question or making the comment for first time; 7) If the student answers your question before 10 second, you may start with the comment; 8) The appropriate answer is not always the right answer. For example, even if the student says "I don't know" that will considered as an appropriate answer; and 9) We are going to count only the first response that occurs in 10 seconds
Q 2 Academic Month	**TQ: Anne, what is the last month of the year**? (use the same question) **SR:** (wait 10 s, you can repeat the q, no verbal support) You may say the answer if 10 s and no answer or wrong from the student. **TC: I like December, because Santa gives gifts for us** (use the same comment) **SR:** (wait 10 s, you just can repeat the C, no verbal support)	
Q 3 Academic Day of the week	**TQ: Anne, what is the first day of the week?** (use the same question) **SR:** (wait 10 s, you just can repeat the q, no verbal support) You may say the answer if 10 s and no answer from the student. **TC: I like Monday, because I see you in the school after the weekend** (use the same comment) **SR:** SR: (wait 10 s, you just can repeat the q, no verbal support)	
Q 4 Academic Time	**TQ: Anne, what time did you sleep last night?**(use the same question) **SR:** (wait 10 s, you just can repeat the q, no verbal support) You may say the answer if 10 s and no answer from the student. **TC: I like to sleep early, because I will not be tired in the morning** (use the same comment) **SR:** (wait 10 s, you just can repeat the q, no verbal support)	
Q 5 Schedule	**TQ: Anne, what are you going to do this afternoon?**(use the same question) **SR:** (wait 10 s, you just can repeat the q, no verbal support) you may say the answer if 10 s and no answer from the student. **TC: I like to play outside this afternoon.** (use the same comment) **SR:** (wait 10 s, you just can repeat the q, no verbal support)	

We developed five different sets of questions and comments following the same theme for each episode to use during the five days of the week. We reasoned that if we used the same questions and comments every day, the target students might memorize the answers and would be difficult to assess their performance on the package.

Measure 2: Quality plus Fidelity of the Video Modeling Training Sessions

Based on the literature to implement video modeling intervention, the investigator developed the quality plus fidelity of video modeling checklist to assess the degree of adult support and effort to implement the video modeling package. The measure consists of 14 “yes” or “no” items. Three levels of support were created -- an introduction to video modeling, viewing the video, and after the video. These levels have been developed to support teachers’ implementing of video modeling intervention (see Table 4 for more details).

Prior to implementing video modeling intervention, each teacher participated in training sessions by the investigator to learn how to use the iPads for teaching children with autism conversation skills using video modeling. Each teacher had an opportunity to practice using the iPad for at least three days before we started collecting data. When the teachers confirmed that they were able to start using the iPads to teach conversational skills, then the investigator observed them for one day to confirm their ability to implement the intervention. Verbal support was provided for teachers if they had questions. It was not difficult for the teachers to learn to use the video modeling intervention, and all four teachers were following the steps to implement the intervention presented in Table 4. Each teacher was also provided with guided notes as a reference for

the steps that needed to be followed. Corrective verbal feedback was provided as needed related to the use of video modeling. After starting the intervention phases, data was collected for each teacher using the quality plus fidelity of video modeling checklist to ensure the ability of the teachers to implement the video modeling and video prompting intervention package.

Table 4

Examining Quality plus Fidelity of Video Modeling Checklist

Introduction to video modeling	Viewing the video	After the video
Get students' attention and remove distractions	Turn the video on	Summarize information about target skills
Greet the student	Identify the target skills for the student	Describe upcoming (group opening activity)
Specify today goal	Facilitate the student's imitation and performance of the target skills	Describe what the teacher expects from the student to perform the target skills
Identify skills to be practiced and learned	Give the student opportunities to practice the skills	
Explain that it is important to learn the skills and the benefit of modeling	Give feedback	
	Have the student watch the video for the second time without any support or interruption and turn off the video	

Measure 3: Teachers' Satisfaction with the Intervention Package

Using the Treatment Evaluation Inventory – Short Form (TEI – SF), the teachers had the opportunity to answer nine questions related to their satisfaction of using this intervention package. The TEI – SF was developed by Kelley, Heffer, Gresham, and Elliott (1989) and was first used to assess opinions of groups of students about a treatment suggested in a case study to correct boys' problems. Other studies use TEI – SF to evaluate treatments that relate to children with autism. For example, LeBlanc, Crossett, Bennett, and Detweiler (2005) used TEI – SF to anonymously evaluate the caregiver satisfaction of treatment procedure. The study examined the effectiveness of intensive toilet training procedure by Azrin and Foxx (1971). Two parent participants returned the survey form and explored their ideas about the treatment which were positive. In another study (Jowett et al., 2012), a mother completed the TEI – SF form to evaluate an iPad-based video modeling package to teach numeracy skills to a child with ASD as social validity. The TEI – SF utilizes a 5 – point Likert – type scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree). Forty-five points was the highest score. A score of more than 27 points indicated that the treatment was an acceptable treatment. Short interviews conducted by the researcher asked the teachers about their answers (see Appendix A for more details).

Inter-observer Agreement or Reliability Procedures

Inter-observer agreement assessed for Measures 1 and 2 on at least 30% of the sessions during each phase. Inter-rater agreement was assessed by having two observers simultaneously but independently record using the same codes of observation. Agreement

was calculated by dividing the total number of agreement codes plus disagreement codes by the total number of agreement codes and multiplying by 100. First, agreement on the measure 1, examining students' responses to teacher questions and comments, averaged 99%, with arrange of 98% to 100% for child appropriate responses to questions, high quality responses to questions, appropriate responses to comments, and high quality responses to comments. Second, agreement on the measure 2, examining the quality plus fidelity of the video modeling training sessions, averaged 100%, for teachers following the three steps to implement video modeling sessions-- introduction to video modeling, viewing the video, and after the video.

Experimental Design and Procedures

Data were collected during the regular curriculum or activities, and participants did not miss any regularly scheduled work/class. Data were collected by two graduate students from the University of Northern Iowa. The study required the collection of data during five experimental phases: baseline, video modeling, video modeling plus video prompting 1, video modeling plus video prompting 2, and video modeling plus video prompting 3. Experimental sessions were held five days a week in each classroom.

A single-subject multiple across participants design was used to examine the effects of the five experimental conditions that are described next.

Baseline (BL)

During the opening class activities, the teachers conducted five conversational episodes with the target students, which were interspersed between interactions with other members of the class/group. As noted earlier, the teachers' questions/comments

were planned or scripted ahead of time and pertained to personal information, academics, and the schedule for that day. Other than planning the episodes ahead of time, the teachers followed their existing small group procedures during this initial baseline phase.

Video Modeling (VM)

Using a high quality video camera, a series of conversational episode sessions were recorded involving each participating teacher and peer model. A professional camera operator was the video recorder for the conversation. Editing for the videos was required to ensure high quality videos. Each video was approximately 1 to 2 minutes long. Immediately prior to the daily opening class activities sessions, the four target students participated in a video modeling session with the teacher. As shown in Table 4, there were three levels of support that the teacher provided (introduction to video modeling, viewing the video, and after the video). Specific instruction about answering and commenting in appropriate and high quality ways was provided on the video (e.g. a teacher said “look at me when I am asking” or “wait for your turn” and after that starting the conversation). The goal of watching the video was having the target students perform and practice appropriate ways to respond to teacher questions and comments and to answer or replay in complete sentences during a group activity.

Video Modeling plus Video Prompting 1 (VP 1)

The daily video modeling sessions continued, but video prompting was added to support and prompt students’ conversational skills during the group sessions. For the video prompting, five individual videos were created out of the five questions and comments video that were presented during the video modeling phase. Each video

presented just one conversational episode between the teacher and peer model (see Table 3 for an example of an episode). Immediately prior to the initiation of conversational episodes during the actual lesson, the teacher showed the target student the videotaped episode in an effort to prompt the desired conversational skills. Each video prompt lasted 10 to 20 seconds. The video modeling intervention continued to be implemented prior to the opening activity.

Video Modeling plus Video Prompting 2 (VP 2)

The daily video modeling sessions continued very similarly to the VM 1 phase with only one specific difference. For the video prompting, 10 individual videos were created out of the five questions and comments video that were presented during the video modeling phase. Each episode was divided into two videos. One video presented only the question and another presented the comment.

Video Modeling plus Video Prompting 3 (VP 3)

The daily video modeling sessions continued and were very similar to the VM 2 phase with only one specific difference. During this phase, the teachers had to present a verbal prompt to the students after having them watch each video prompt. For example, the teacher asked the student to repeat the answer he/she saw during a video prompting session, she repeated the answer, and then the target student repeated the answer after her.

CHAPTER IV

RESULTS

This study was originally designed to examine the effectiveness of using an iPad-based video model plus a video prompting package to teach conversational skills to children with autism spectrum disorder (ASD). As the study progressed, the purpose of the study was expanded to find ways to help children with ASD benefit from video modeling and video prompting packages. A second goal of the study was to determine the degree of adult support and effort that was needed to implement the video modeling intervention effectively. A third goal of the study was to evaluate the degree of satisfaction that teachers reported with the effectiveness and feasibility of iPad-based video modeling intervention. The results for each of these questions are presented next.

Research Question 1

1. *What is the effectiveness of an iPad-based video modeling plus video prompting package for teaching conversational skills to children with autism?*

When the study was developed, the three conditions that were created to answer this question included: baseline, video modeling, and video modeling plus video prompting 1. However, modifications were applied to the research conditions to get better results. For Joseph and Anne, one more condition was added --video modeling plus video prompting 2. For Dan, a third condition, video modeling plus video prompting 1, was not applied. Instead, video modeling plus video prompting 2 and video modeling plus video prompting 3 were added. For the last participant, Jad, the first condition, video modeling plus video prompting 1, was not applied. However, instead of that condition another

condition, video modeling plus video prompting 3, was added. All of these conditions are described in Chapter III.

Figure 1 presents the percentage of appropriate answers to teachers' questions for Joseph and Anne across baseline, video modeling, video modeling plus video prompting 1, and video modeling plus video prompting 2. Figure 1 also presents the percentage of appropriate answers to a teacher's questions for Dan across baseline, video modeling, video modeling plus video prompting 2, and video modeling plus video prompting 3. Finally, Figure 1 presents the percentage of appropriate answers to a teacher's questions for Jad across baseline, video modeling, video modeling plus video prompting 3.

Figure 2 presents the percentage of high quality answers to a teacher's questions for Joseph and Anne across baseline, video modeling, video modeling plus video prompting 1, and video modeling plus video prompting 2. Figure 2 also presents the percentage of high quality answers to a teacher's questions for Dan and Jad across their various phases.

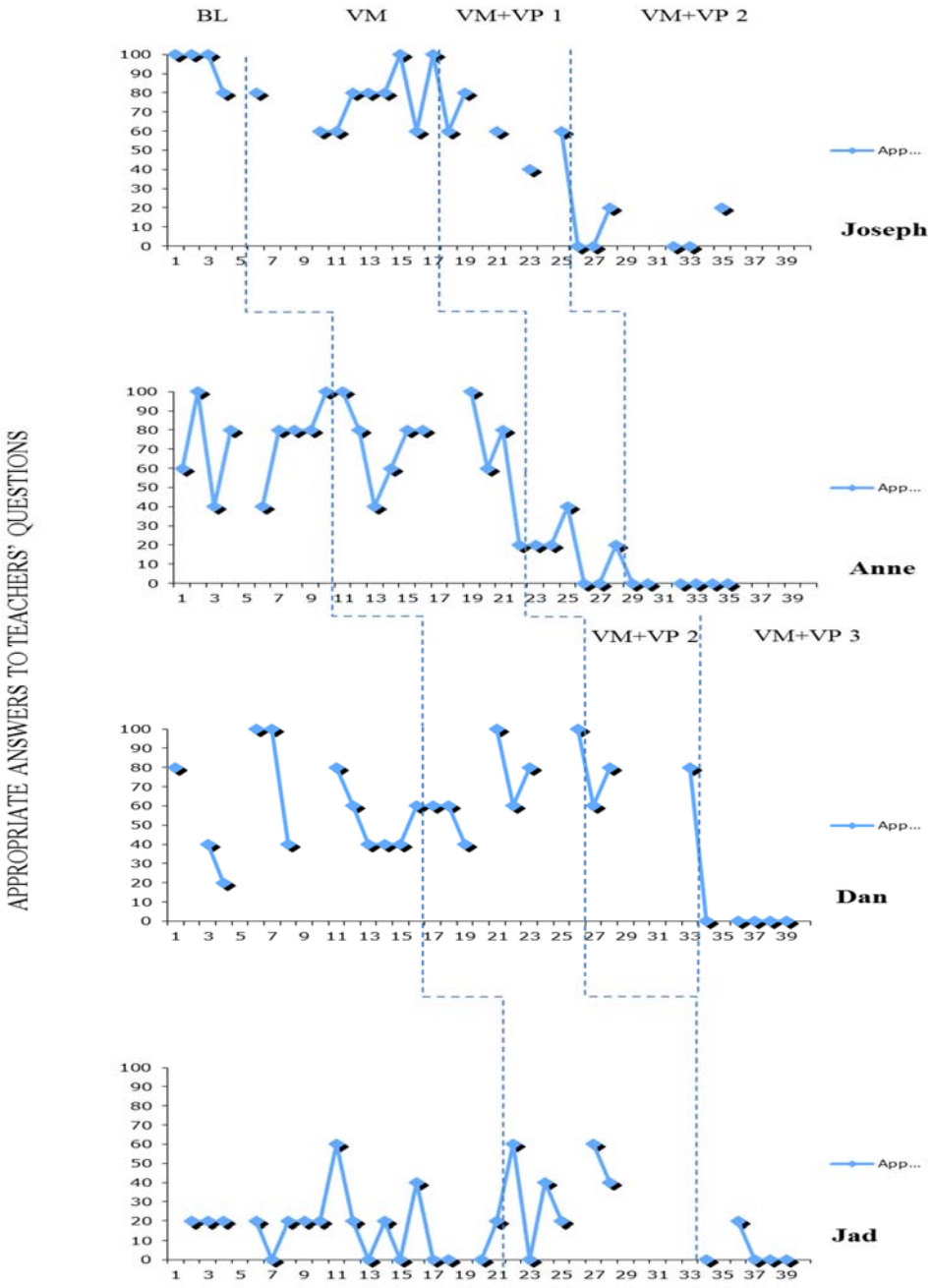

Figure 1. Appropriate answers to teachers' questions completed for each participant across baseline, video modeling, video modeling plus video prompting 1, video modeling plus video prompting 2, video modeling plus video prompting 3 for Joseph, Anne, Dan, and Jad.

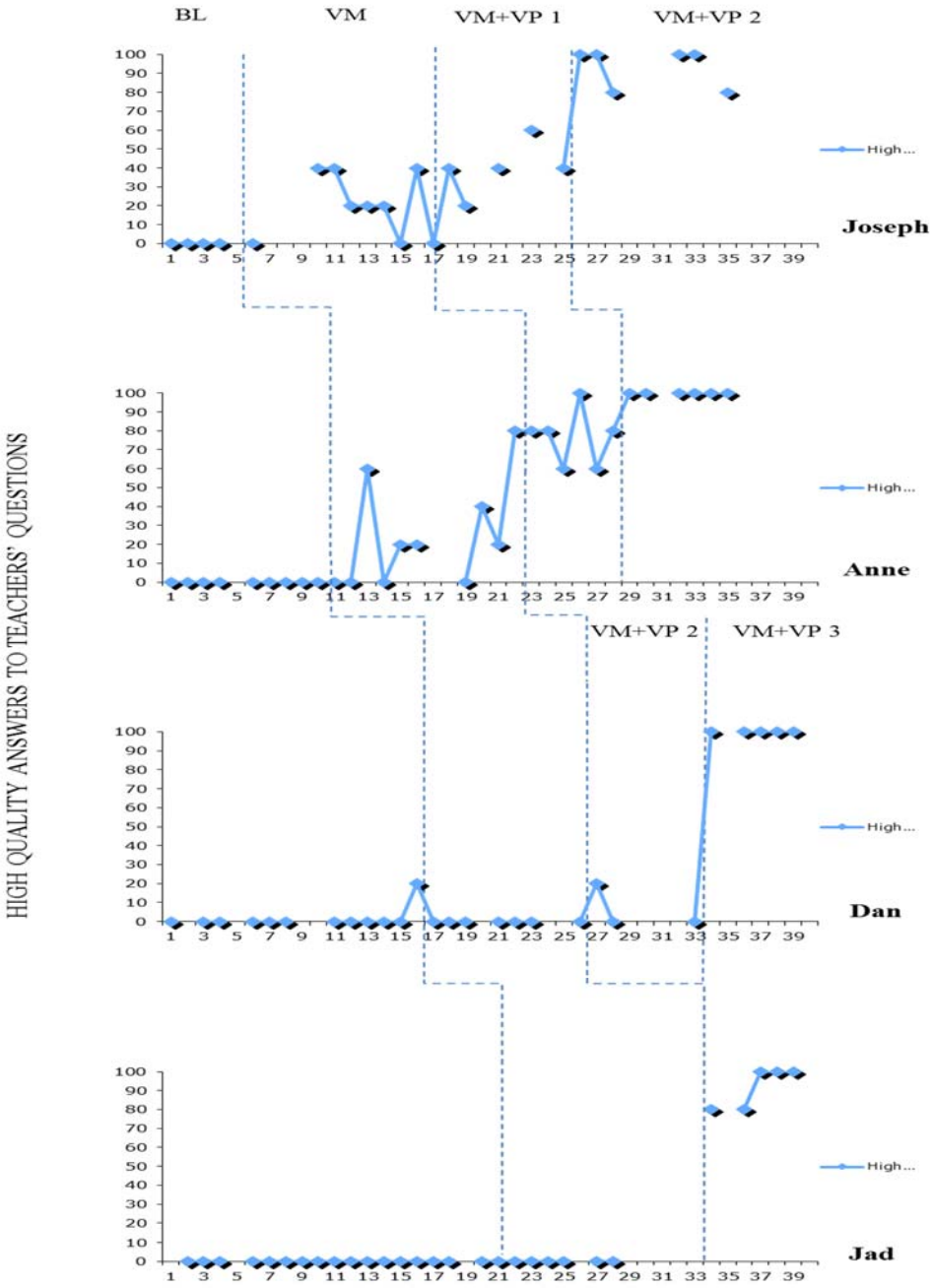

Figure 2. High quality answers to teachers' questions completed for each participant across baseline, video modeling, video modeling plus video prompting 1, video modeling plus video prompting 2, video modeling plus video prompting 3.

Joseph

Data for Joseph's appropriate and high quality answers to teacher questions are presented in the top tiers of Figures 1 and 2. During the baseline phase, Joseph completed 95% of the appropriate answers to teacher questions. However, his data showed that he did not answer any question with high quality answers. After video modeling occurred in the second phase, his appropriate answers to teacher questions decreased to 77% and high quality answers increased to 23%. During the third phase, video modeling plus video prompting 1, the data also showed a decrease in the appropriate answers to teacher questions to 60% in favor of an increase in the high quality answers to teacher questions to 40%. During the last phase, video modeling plus video prompting 2, Joseph's appropriate answers to teacher questions decreased to 7% while high quality answers increased to 93%.

Anne

Data for Anne's appropriate and high quality answers to teacher questions are presented in the second tiers of Figures 1 and 2. During the baseline phase, Anne completed 73% of the appropriate answers to teacher questions, and did not provide high quality answers to any questions. After the video modeling was presented on the second phase, her appropriate answers to teacher questions decreased to 70%, and high quality answers averaged 24%. During the third phase, video modeling plus video prompting 1, Anne's percentage of appropriate answers to teacher questions decreased even further to 17% and her high quality answers averaged 77%. During the last phase, video modeling plus video prompting 2, Anne's high quality answers to teacher questions equaled 100%.

Dan

Data for Dan's appropriate and high quality answers to teacher questions performance are presented in the third tiers of Figures 1 and 2. Dan's appropriate answers to teacher questions averaged 58% during baseline, and his high quality answers to teacher questions averaged only 2%. After the video modeling was presented, his appropriate answers to teacher questions increased to 71%, and he did not provide any high quality answers. Figures 1 and 2 show little change for Dan's performance during phase 3, video modeling plus video prompting 2. His appropriate answers to teacher questions averaged 73% and his high quality answers were only 7%. During the last phase, video modeling plus video prompting 3, data showed that high quality answers were 100% on each day.

Jad

Data for Jad's appropriate and high quality answers to teacher questions performance is presented in the fourth tiers of Figures 1 and 2. During the baseline phase, Jad's appropriate answers averaged 17% and he did not reply to any question with high quality answers. Jad's appropriate answers increased to 37% during the video modeling phase and he did not provide any high quality answers. Finally, Jad's percentage of appropriate answers decreased to 4% during the final phase and his high quality answers increased to 92%.

Figures 3 and 4 present the daily percentage of appropriate and high quality responses to teacher comments for Joseph, Anne, Dan, and Jad during each of their experimental conditions.

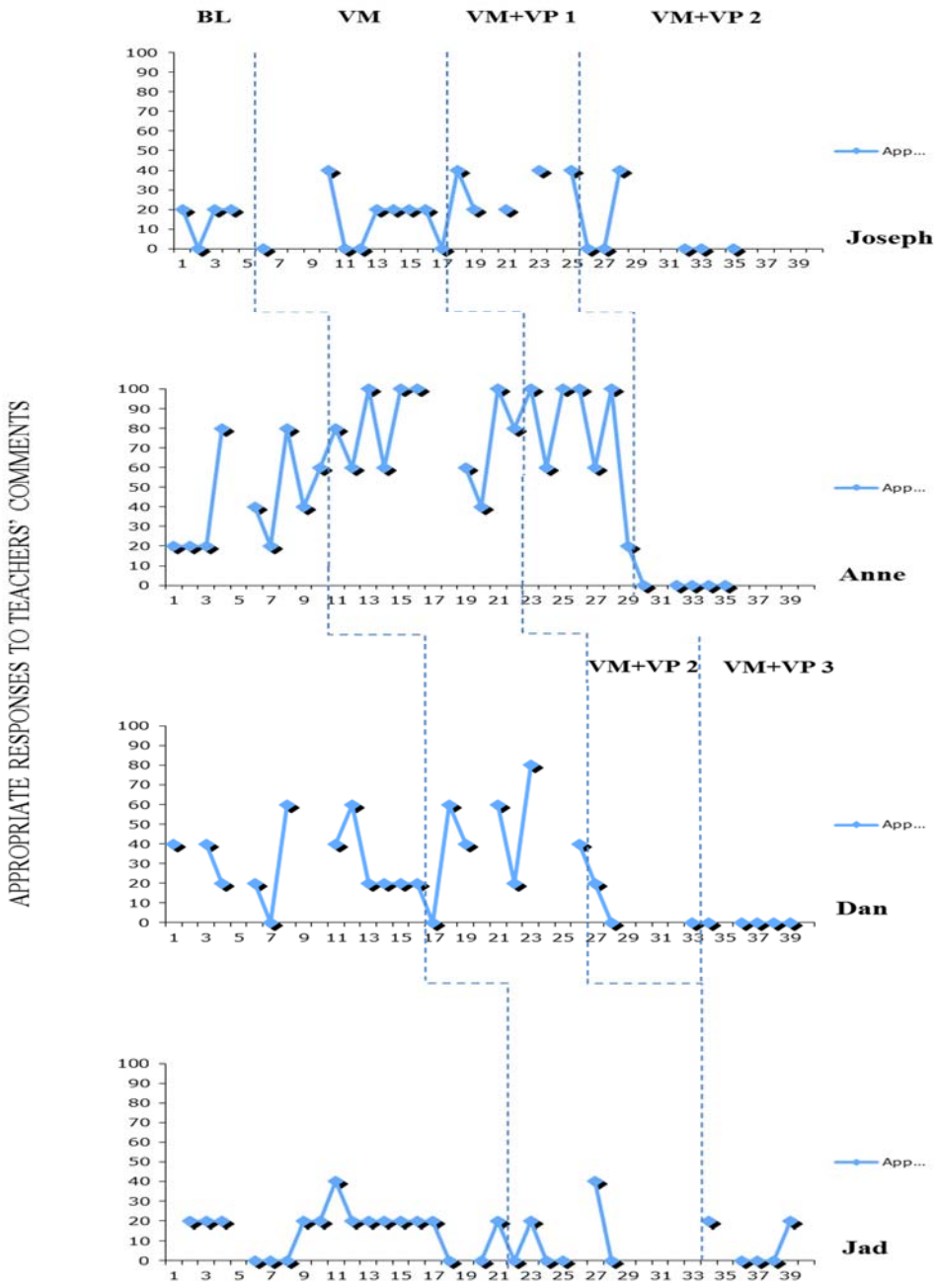

Figure 3. Appropriate responses to teachers' comments completed for each participant across baseline, video modeling, video modeling plus video prompting 1, video modeling plus video prompting 2, video modeling plus video prompting 3 for Joseph, Anne, Dan, and Jad.

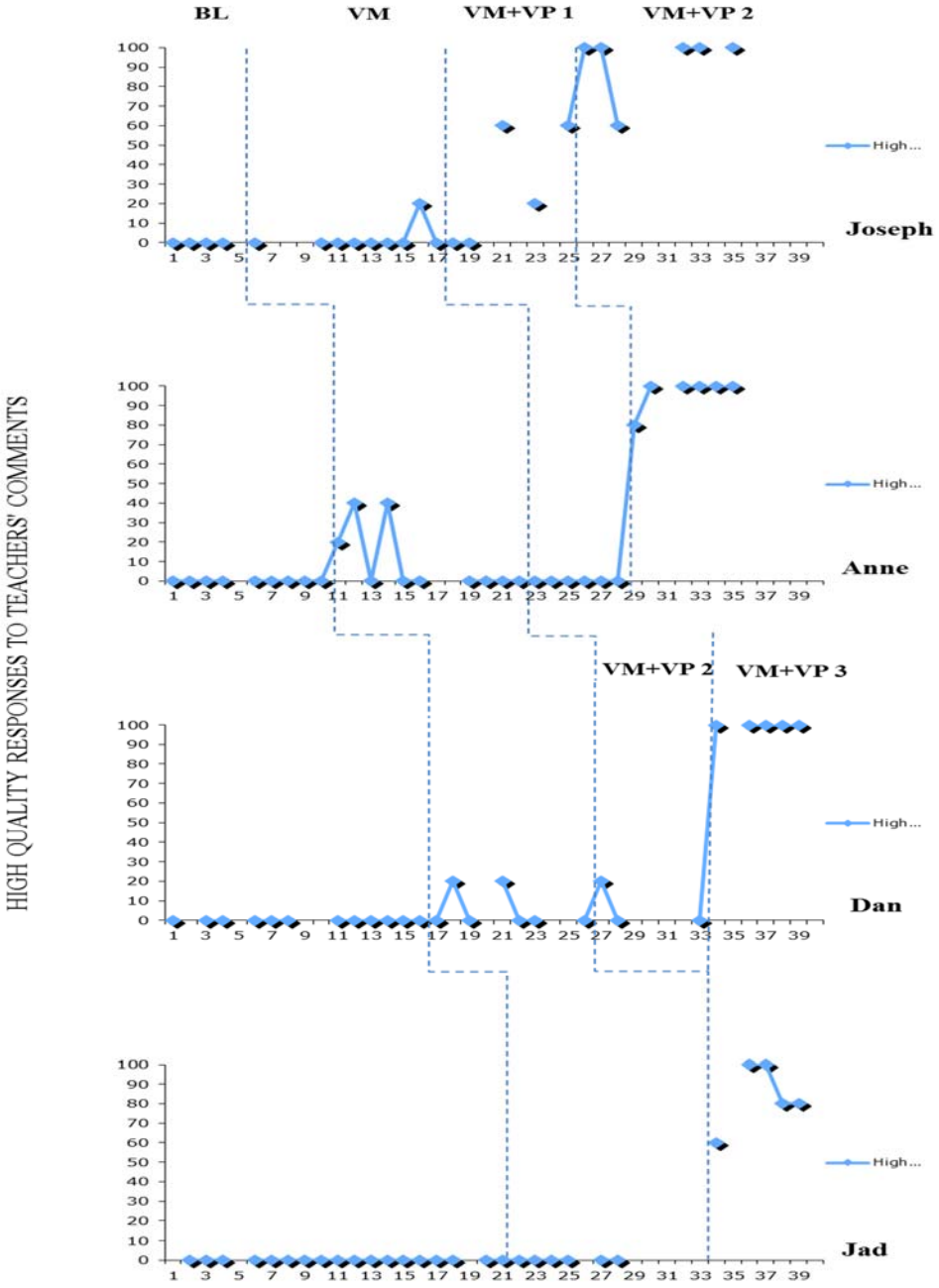

Figure 4. High quality responses to teachers' comments completed for each participant across baseline, video modeling, video modeling plus video prompting 1, video modeling plus video prompting 2, video modeling plus video prompting 3 for Joseph, Anne, Dan, and Jad.

Joseph

Data for Joseph's appropriate and high quality responses to teacher comments are presented in the top tiers of Figures 3 and 4. Joseph's percentage of appropriate responses to teacher comments averaged 15% during baseline, and he did not reply to any comments with high quality responses. After the video modeling was presented on the second phase, his appropriate responses to teacher comments averaged 13%, and high quality responses were 2%. During the third phase, video modeling plus video prompting 1, the data showed that his appropriate responses to teacher comments increased to 32%, and high quality responses increased to 28%. During the last phase, video modeling plus video prompting 2, Joseph's high quality responses to teacher comments averaged 93% and appropriate responses decreased to 7%.

Anne

Data for Anne's appropriate and high quality responses to teacher comments are presented in the second tiers of Figures 3 and 4. During the baseline phase, Anne's percentage of appropriate responses to teacher comments averaged 42%, and she did not respond to any comment with high quality response. After the video modeling was presented on the second phase, her appropriate responses to teacher comments increased to 78%. Also, the high quality comments increased to 10%. During the third phase, video modeling plus video prompting 1, the data showed an increase on her performance on the appropriate responses to the teachers' comments to 77%, and Anne did not reply to any comment with high quality responses. During the last phase, video modeling plus video prompting 2, Anne's high quality responses to teacher comments averaged 97%.

Dan

Data for Dan's appropriate and high quality responses to teacher comments are presented in the third tiers of Figures 3 and 4. Dan's percentage of appropriate responses to teacher comments averaged 30% during baseline and he did not respond to any comment with high quality response. After the video modeling was presented on the second phase, his appropriate responses to teacher comments increased to 43%, and quality comments increased to 6%. During the third phase, video modeling plus video prompting 2, the data showed decreasing on his appropriate responses to teacher comments to 7%, and almost no changes on high quality comments 7%. During the last phase, video modeling plus video prompting 3, Dan's high quality responses to teacher comments averaged 100%.

Jad

Data for Jad's appropriate and high quality responses to teacher comments performance are presented in the fourth tiers of Figures 3 and 4. During the baseline phase, Jad's appropriate answers averaged 16 % and he did not answer any question with high quality responses. Jad's appropriate responses decreased to 10% during the video modeling phase and he did not provide any high quality answers. During the last phase, video modeling plus video prompting 3, Jad's high quality responses to teacher comments averaged 84%.

Research Question 2

2. *What degree of adult support and effort will children require to be successful with iPad-based video modeling intervention training sessions?*

To measure the degree of adult support and effort that were required to implement a successful video modeling intervention, two assessments methods were applied. The first one was our assessment of time duration. The informal records for the video modeling sessions indicated that video modeling sessions were 3 to 7 minutes long and an average of 4 to 5 minutes. The second assessment was that the observers used the quality plus fidelity of video modeling checklist. The teachers demonstrated a quality and fidelity degree of 100% over a total of 20 video modeling sessions (five sessions for each teacher). See Table 4 in Chapter III for more information about the quality plus fidelity of video modeling checklist.

Research Question 3

3. *What degree of satisfaction will teachers report with the effectiveness and feasibility of the iPad-based video modeling package intervention at the end of the study?*

Using the Treatment Evaluation Inventory – Short Form (TEI – SF), the four teachers answered nine questions related to their satisfaction of using this intervention. The TEI – SF utilizes a 5 – point Likert – type scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree). Forty-five points is the highest score. According to Jowett et al., (2012) a score of more than 27 points indicates that the treatment is acceptable. Table 5 presents each teachers' answers to the survey questions.

Table 5

Summary of the Teachers' Answers to (TEI – SF)

Statement		Teacher number 1	Teacher number 2	Teacher number 3	Teacher number 4	Total Score
1	I find this approach to be an acceptable way of dealing with the child's problem behavior.	Neutral	Agree	Neutral	Agree	14/20
2	I would be willing to use this procedure if I had to change the child's problem behavior.	Neutral	Agree	Neutral	Agree	14/20
3	I believe that it would be acceptable to use this approach without children's consent.	Disagree	Agree	Strongly Disagree	Agree	11/20
4	I like the procedure used in this approach.	Agree	Neutral	Strongly Agree	Agree	16/20
5	I believe this approach is likely to be effective.	Strongly Agree	Neutral	Strongly Agree	Agree	17/20
6	I believe the child will experience discomfort during the approach.	Neutral	Disagree	Neutral	Agree	12/20
7	I believe this approach is likely to result in permanent improvement.	Agree	Disagree	Neutral	Neutral	12/20
8	I believe it would be acceptable to use this approach with individuals who cannot choose treatments for themselves.	Neutral	Neutral	Strongly Agree	Strongly Agree	16/20
9	Overall, I have a positive reaction to this approach.	Strongly Agree	Agree	Strongly Agree	Agree	18/20
Total Score		32	31	33	34	130/180

Overall, the teachers rated the intervention as being favorable with a total score of 32.5, (130/4 participants). The four teachers had total scores of 32, 31, 33, and 34 out of 45. These scores indicated that this intervention was acceptable and usable for children with ASD to teach them conversation skills.

Short interviews were presented to make sure that teachers understood the survey questions and understood the reasons for the answers to the Treatment Evaluation Inventory-Short Form (TEI – SF). A summary of the four teachers' answers are presented below:

1. *I find this approach to be an acceptable way of dealing with the child's problem behavior.*

   All teachers agreed that this was a good approach for dealing with a child's problem behavior especially with communication and language skills. Joseph's teacher indicated that video modeling and video prompting intervention should be personalized to individual children to be more effective.

2. *I would be willing to use this procedure if I had to change the child's problem behavior.*

   The four teachers suggested that this intervention would be one of their choices to change students' behaviors especially with social communication skills. Joseph's teacher expressed concern with the amount of time required to implement the intervention. Dan's teacher thought that this intervention might be more effective with younger students.

3. *I believe that it would be acceptable to use this approach without children's consent.*

   Anne's, Jad's, and Joseph's teachers did not believe that it would be acceptable to use this approach without children's consent or cooperation. However, Dan's teacher thought she would use this approach without children's consent.

4. *I like the procedure used in this approach.*

   Anne's, Jad's, and Joseph's teachers liked the procedure used in this approach, and Dan's teacher chose neutral when answering this question.

5. *I believe this approach is likely to be effective.*

   All teachers believed this intervention is likely to be effective. Dan's teacher indicated that using this approach with younger students would be more effective.

6. *I believe the child will experience discomfort during the approach.*

   Jad's and Joseph's teachers believed that the children may experience discomfort during this approach. Dan's teacher thought that this approach would affect the anxiety level of her student, but indicated that she was wrong. Anne's teacher thought that it was important that she use an iPad and familiar with the technology.

7. *I believe this approach is likely to result in permanent improvement.*

   Jad's and Joseph's teachers were not sure if the approach would result in permanent improvement. Dan's teacher disagreed because she thought that this approach would be more effective with younger students. Anne's teacher thought that to get permanent improvement the approach should be for a longer time period.

8. *I believe it would be acceptable to use this approach with individuals who cannot choose treatments for themselves.*

   Dan's, Jad's, and Joseph's teachers all agreed that it would be acceptable to use this approach with individuals who cannot choose treatments for themselves.

Anne's teacher was not sure because she believed that it would be very difficult to choose an approach for someone else, especially students with disabilities. She also thought it was hard to respond because it would be difficult to know if the approach would work with individuals who cannot choose a treatment for themselves prior to actually trying this approach.

9. *Overall, I have a positive reaction to this approach.*

   All four teachers agreed that they had a positive reaction to this approach. Also, Anne's teacher indicated that even though it was a little confusing at the beginning and it took a long time, this approach was very helpful to teach conversation skills. (See Appendix B, C, D, and F for more details on the teachers' answers to the survey questions).

CHAPTER V

DISCUSSION

This study examined the effectiveness of using iPad-based video modeling plus a video prompting package to teach conversational skills to children with ASD. The results can be summarized as follows. First, the video modeling plus video prompting package was partially effective to teach conversational skills to children with ASD. Second, the four students required additional or specialized interventions in order to learn and perform their conversational skills. Third, it took reasonable time and effort from the teachers to implement a successful video modeling intervention. Finally, the use of video modeling plus a video prompting package was viewed favorably by the four teachers who participated. Each of these results is discussed below.

Frist, the video modeling plus video prompting was partially effective for improving conversational skills for students with ASD. Video modeling had little impact for Joseph and Anne to improve their conversational skills especially when answering questions with complete sentences. In addition, the video modeling intervention did not help Dan and Jad improve their conversation skills. Also, the video modeling plus video prompting package when first presented was partially effective for Joseph and Anne and helped them to increase their answers in complete sentences, but it did not show a significant impact. Moreover, the video modeling plus video prompting did not help Dan and Jad to improve their conversational skills at all.

Attention to the model factor could be the main reason for these results. During the video modeling and video modeling plus video prompting 1 phases, the observers

noted that Joseph and Anne were fully observant of the video models and the video prompting sessions which led to better performance. For example, during the video sessions, Joseph and Anne's teachers had some conversations using questions, responses to the questions, comments, and responses to teacher comments between them and their students. However, Dan and Jad appeared to not be fully attentive to the videos. For example, if the teacher asked them a question, they just watched for the answer on the video; they could not answer in complete sentences. The investigator believed that better performance during the video modeling sessions led to better performance overall from the package. Other factors may be applied for getting better results with video modeling plus a video prompting package such as the relationship with the teacher, the relationship with the model, the ability to imitate, the level of the autism, etc.

Second, the four students required additional or specialized interventions in order to learn and preform their conversational skills. It was important to add modifications to the study conditions to seek better results. The package did not have the desired impact when first presented, so then the researcher engaged in troubleshooting for the four participants (Ganz et al., 2011). For Joseph and Anne, the researcher noticed that their conversational skills were improving, but slowly and only partially during use of the package. He thought that they needed more video prompts to support their conversational skills. The researcher had to break the video prompting videos into four parts, VM+VP 2, instead of two parts during VM+VP 1 to get better results. This was an easy fix and led to excellent results. For Dan, it was not enough for the researcher to break the video into more parts; Dan needed more assistance. The investigator recognized that Dan needed to

learn how to imitate the skills on the videos. A new condition was created for this reason and was called video modeling plus video prompting 3. During this condition, the teacher was required to prompt her student to answer in complete sentences. During this condition, Dan learned to imitate and provided full sentences when answering or responding to the teacher. Finally for Jad, the investigator decided that it was not necessary to implement the video modeling plus video prompting 2 phase and moved forward to the new condition, video modeling plus video prompting 3. The reason for that was the low performance that Jad showed during video modeling sessions that could lead to low performance during the VM+VP 1 or VM+VP 2. The VM+VP 3 condition worked perfectly for Jad and it helped him to answer and provide responses in complete sentences.

Third, the degree of adult support and effort required to implement a successful video modeling session was assessed by using the quality plus fidelity of video modeling checklist. The four teachers followed the steps that were provided-- introduction to video modeling, viewing the video, and after the video-- to ensure a successful implementation process for the package. In other words, to make it easier for the teachers to implement the video session, a checklist form was provided for daily use that the teachers followed (see Table 4). The results indicated that it took reasonable time and effort from teachers to provide high performances when using video modeling to teach conversation skills.

Finally, the results of the Treatment Evaluation Inventory-Short Form (TEI – SF) indicated that the teachers favorably viewed the video modeling plus video prompting package. Moreover, we interviewed the four teachers who participated. The interviews

with the four teachers presented important rules that need to be studied and focused on when using video modeling and video promoting procedures.

These rules can be summarized in five important factors. First, making the intervention personal to the target child can lead to better results. In other words, the videos the target child would watch to learn from should be related to the individual child. For instance, if a child liked to read, we could create conversation videos about reading, or if the child liked to play with cars, we could create conversations about the cars. Second, the time required to create excellent videos lead to better results. Third, this intervention would be more effective if used with younger children and for a longer period of time. Fourth, parents can play a huge role by supporting the intervention process to get better results. Finally, the fifth factor was that the knowledge that target children have about using the iPad and familiarity with it prior to teaching would lead to better results and would help the target child feel comfortable during the intervention process. These factors need to be examined to have a better understanding of the modeling interventions in general and to find better avenues to implement the modeling interventions.

Results of this study replicate previous research in teaching students with ASD communication and language skills, including conversation skills using video modeling (Banda et al., 2010; Buggey et al., 2001; Charlop & Milstein, 1989; Sherer et al., 2001; Maione & Mirenda, 2006). Moreover, the researcher could not find any study that presented video prompting as an intervention to teach conversation skills to children with ASD. This study extends the literature by presenting video modeling and video

prompting interventions as packages to teach children with ASD conversation skills and also presenting the iPad as a successful tool to use when teaching conversation skills for children with ASD using video modeling plus video prompting interventions. Also, this study looked at conversation skills as a set of skills, including answering questions and responding to comments. Moreover, one of the unique features of this study was its focus on two different conversational skills -- answering questions and replying to comments -- and two levels of quality -- appropriate and high quality. The researcher's goal was to teach and support high quality conversational skills to students with ASD.

Limitations and Recommendations for Future Research

Although the results of this study were positive, there were some limitations. The first limitation was the number of participating children because there were just four children involved as target children. Therefore, the findings cannot be generalized to other children with ASD. Second, this study was conducted at a special education school that teaches only children with disabilities, including children with ASD. Almost all the students in this school are considered to have severe disabilities. Third, the researcher could not get involved in choosing the target children because of the strict rules of the school to protect the children's identities, so the school administrators and the teachers were responsible for finding the right participants for the study. The researcher provided a number of characteristics that needed to be evaluated when choosing the target children. Finally, the study had a specific time period. About three months after starting the study, the study had to be stopped because of the end of the school year. The study was developed to address a follow-up phase but that data could not be collected.

This study extends the literature base for teaching children with ASD conversation skills using video modeling plus video prompting interventions. Future studies need to focus on addressing the limitations of this study. There are many factors that can affect the success of modeling interventions; video modeling and video prompting are two of these interventions that need more research to learn best practices for implementation. Many questions still need to be asked and we do not know the answers to them. For instance, does the age of the target student matter for better results? Is video modeling and video prompting more effective to use with younger children than older children? Does the relationship between the model and the target student matter for better results? Does it help if the videos are created to be personal to the target children? Does the quality and quantity of the videos affect the results of the interventions positively or negatively? What are the characteristics that need to be evaluated on the target children prior to using video modeling or video prompting interventions, such as the ability to imitate or attend to a video? What level of imitation or attention skills should be applied to the target children before we decide to use video modeling or video prompting interventions? All of these factors and more can play big roles in leading the intervention to better results.

Future studies could look at the effectiveness of using video modeling plus video prompting as a package to address a variety of skills or behaviors in children with ASD or other disabilities. Also, research should continue to examine the use of technology such as using the iPads as a successful tool to teach children with ASD and other disabilities.

Finally, future studies could examine the video modeling plus video prompting in a different setting. Also, including additional phases, such as following-up, would help determine the effectiveness of this approach as it relates to maintenance of conversation skills over time.

Delimitations

The following delimitations were identified for this study:

1. The study was delimited to a single-subject research design.
2. The study was delimited to video modeling plus a video prompting package intervention to teach conversation skills to children with ASD.
3. The study was delimited to the use of iPads to teach conversation skills to children with ASD.
4. The study was delimited to children with ASD who were diagnosed with autism spectrum disorder, possessed and used verbal communication skills, were able to attend to a 2-minute video, were capable of imitating adult and peer models, could comply with teacher directions and requests, had no problem with the five senses, and exhibited some difficulties using verbal conversation skills in a group instruction setting.

Implications for Practice

The use of the iPad-based video modeling plus video prompting in this study helps to develop new ways to teach children with ASD. This study focuses on teaching conversation skills. However, the benefits of modeling interventions can be larger and broader. A variety of skills and behaviors can be addressed using modeling interventions

in general, including video modeling and video prompting. The use of video modeling and prompting can create many opportunities for children with disabilities, including the children with ASD to learn and develop positive skills or behaviors.

This study suggests that using iPads as an educational tool to teach conversation skills appears to be a successful approach. Also, using iPads creates many benefits because they are easy to use, they save time, and the target students can remain at the same setting while the intervention is being implementing.

Conclusion

Children in this study learned two conversation skills, answering and responding to teachers using full sentences, using video modeling plus video prompting interventions. Using an iPad was an easy and successful process for the teachers to implement the intervention. The results indicate that video modeling plus a video modeling intervention package was an effective approach to teach conversation skills to children with ASD.

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APPENDIX A

TREATMENT EVALUATION INVENTORY-SHORT FORM

Please complete the items listed below by placing a checkmark on the line next to each question that best indicates how you feel about the treatment. Please read the items very carefully because a checkmark accidentally placed on one space rather than another may not represent the meaning you intended.

Statement		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I find this approach to be an acceptable way of dealing with the child's problem behavior.					
2	I would be willing to use this procedure if I had to change the child's problem behavior.					
3	I believe that it would be acceptable to use this approach without children's consent.					
4	I like the procedure used in this approach.					
5	I believe this approach is likely to be effective.					
6	I believe the child will experience discomfort during the approach.					
7	I believe this approach is likely to result in permanent improvement.					
8	I believe it would be acceptable to use this approach with individuals who cannot choose treatments for themselves.					
9	Overall, I have a positive reaction to this approach.					

APPENDIX B

TEACHER NUMBER 1 (ANNE'S TEACHER)

THE FULL ANSWER TO THE SURVEY QUESTIONS

Statement		The Teacher Responses
1	I find this approach to be an acceptable way of dealing with the child's problem behavior.	I don't see it as problem behavior. Students just not willing to communicate in details, a lot of just answer in one word like yes, no, or whatever; but actually engage more in conversation skills. I do not see it as behavior, this is much of social.
2	I would be willing to use this procedure if I had to change the child's problem behavior.	It is because it is not a behavior but definitely to improve social communication and engage more in conversations.
3	I believe that it would be acceptable to use this approach without children's consent.	I think it is important for a part of the study to get the parents involved. They are speaking for their student. If the guardian likely say no I don't want my student to participate in this so I think doing that up front with my particular student Anne, I shared a lot with the family as far as what was going on. I communicated back and forth about how it was going and infect today, I am going to send home a list of those questions from day after day and kind of say this is what we worked on and so that the parents helped us too. I mean they are big support and they can see it has worked to get her talk in conversation using complete sentences.
4	I like the procedure used in this approach.	I thought it was very helpful.
5	I believe this approach is likely to be effective.	I believe because we all sow success in Anne.
6	I believe the child will experience discomfort during the approach.	She liked that time that we spend together before we go to opening. She is very used to an iPad and has her own at home so that was a plus for Anne that she knew what the iPad was and she knew how to turn it on and off so that was good.
7	I believe this approach is likely to result in permanent improvement.	I think if we discontinue at opening to engage that conversation skills especially with Anne.
8	I believe it would be acceptable to use this approach with individuals who cannot choose treatments for themselves.	With this population, it is hard to get them to speak for themselves and if they and to participate or not. They are trusting us to know that what we are going to try is going to work and maybe they will learn something, learning is fun, school is fun so they look up to us for the directions and treatments and why they do in the school what they have to do. I choose natural because they cannot speak for themselves
9	Overall, I have a positive reaction to this approach.	I thought it was very successful and at the beginning it was a little confusing. It took a lot of time. Even this morning at opening she was answering question, and I was trying to throw some different comments in there and that to make her think and she was like looking at me like I know I supposed to say something. It will take some encouragement.

APPENDIX C

TEACHER NUMBER 2 (DAN'S TEACHER)

THE FULL ANSWER TO THE SURVEY QUESTIONS

Statement		The Teacher Responses
1	I find this approach to be an acceptable way of dealing with the child's problem behavior.	Dan needs an assistance when it comes to talking in complete sentences, answering in complete sentences because he is so programed to do that trough TV talk and scripted talk so this a good approach for him.
2	I would be willing to use this procedure if I had to change the child's problem behavior.	I would be willing to do this if I had to change the child's problem behavior because I think now toward the end of it we are seeing a little bit of change because the answering questions in complete sentences. The interviewed asked the teacher about why she did not choose strongly agree for this question. The teacher said, she believe that it is difficult to change the student behavior with Dan and the procedure would work better if presented when Dan was younger. The intervention would be better to use with younger students.
3	I believe that it would be acceptable to use this approach without children's consent.	Yes, because we use technology all the time so video modeling would not be anything you need consent form.
4	I like the procedure used in this approach.	I put neutral for that one because I think I should done a different approach with him by having him repeat me after watching the video. If I were to do it again this is what I would do.
5	I believe this approach is likely to be effective.	With Dan if this approach used when he was 5 years old and cared on I think it would be very effective, it is helping him answering the questions even we are in the end of the study.
6	I believe the child will experience discomfort during the approach.	I disagree, I though it may affect his anxiety level but it has not.
7	I believe this approach is likely to result in permanent improvement.	I disagree because as I said, if the approach started when he maybe 5 or 6 and cared on I think we would see a lot of effectiveness.
8	I believe it would be acceptable to use this approach with individuals who cannot choose treatments for themselves.	I think it is a good approach to use with any student with autism that need to work on answering question and using complete sentences.
9	Overall, I have a positive reaction to this approach.	Agree, because I see some improvement on him answering questions and I wish we started that earlier.

APPENDIX D

TEACHER NUMBER 3 (JAD'S TEACHER)

THE FULL ANSWER TO THE SURVEY QUESTIONS

Statement		The Teacher Responses
1	I find this approach to be an acceptable way of dealing with the child's problem behavior.	When I look to approach and how to change problem behavior, any kind or behavior, any intervention is helpful so I agreed on that.
2	I would be willing to use this procedure if I had to change the child's problem behavior.	Yes, if they have communication skills problem, this would be an appropriate one to change that.
3	I believe that it would be acceptable to use this approach without children's consent.	Any time we are going to change or introduce something we need to sit-down with and share with the family what we are going to do.
4	I like the procedure used in this approach.	I feel that this approach is very thorough in trying to change communication skills.
5	I believe this approach is likely to be effective.	I strongly agree. However, it depends on the student skills and what he has to be effective to make this good outcome.
6	I believe the child will experience discomfort during the approach.	I was neutral on this based on the student, because I know when we were doing Jad at time he would get frustrated so I think he was captive in the beginning.
7	I believe this approach is likely to result in permanent improvement.	I am neutral on that based on the outcome.
8	I believe it would be acceptable to use this approach with individuals who cannot choose treatments for themselves.	Any educator would always try to do interventions and we would not know if they are effective unless we do try them.
9	Overall, I have a positive reaction to this approach.	I feel that this is a very good study and I feel Jad did learn something from it even if it is not immediate.

APPENDIX F

TEACHER NUMBER 4 (JOSEPH'S TEACHER)

THE FULL ANSWER TO THE SURVEY QUESTIONS

Statement		The Teacher Responses
1	I find this approach to be an acceptable way of dealing with the child's problem behavior.	I can see, you have to make it personal, you have to make it something meaningful to them, you ask questions that is going to trigger something.
2	I would be willing to use this procedure if I had to change the child's problem behavior.	Yeah, the only problem would be the pre-time consuming to do the video and the other staff, so that would be one negative part of it, the time it would take to do it.
3	I believe that it would be acceptable to use this approach without children's consent.	No, at least explain what it is because they may take that out home tell the mom that my teacher videotaping me than the mom would call and say no, no, no, that not what we are going. You get to explain to the family.
4	I like the procedure used in this approach.	Yea, I learned.
5	I believe this approach is likely to be effective.	Agree.
6	I believe the child will experience discomfort during the approach.	Yeah, I know Joseph did, he was not conferrable. It was not easy for him. He was discomfort.
7	I believe this approach is likely to result in permanent improvement.	I don't know.
8	I believe it would be acceptable to use this approach with individuals who cannot choose treatments for themselves.	Strongly agree.
9	Overall, I have a positive reaction to this approach.	Yeah, defiantly, I can see him engage in it.

APPENDIX G

LETTER OF COOPERATION

February 27, 2014

Mr. Mohammed M Alzayer
403 Bergstrom Blvd
Cedar Falls, IA, 50613

Dear Mohammed,
The River Hills School is pleased to collaborate with you on your project **"Examining the Effectiveness of Using an iPad-Based Video Modeling plus Video Prompting Package to Teach Conversation Skills to Children with Autism Spectrum Disorder (ASD)"** being conducted by the University of Northern Iowa.

We understand that participating in this research will include staff and children participation and will take between 2-3 months. We had ample opportunities to discuss the research with you and ask for clarifications. We understand that the researcher and key personnel for this project will maintain confidentiality of all research participants in all phases of this project.

According to our agreement, project activities will be carried out as described in the research plan reviewed and approved by the University of Northern Iowa Institutional Review Board.

We look forward to working with you, and please consider this communication as our Letter of Cooperation.

Sincerely,

Mr. Michael Lonning
Special Ed Principal (River Hills School)

APPENDIX H

UNIVERSITY OF NORTHERN IOWA

HUMAN PARTICIPANTS REVIEW

INFORMED CONSENT

Invitation to Participate in a Dissertation Study

Dear Staff [Teacher, Co-teacher, or Staff],

I am writing to invite you to participate in a research study titled: **"Examining the Effectiveness of Using an iPad-Based Video Modeling plus Video Prompting Package to Teach Conversation Skills to Children with Autism Spectrum Disorder (ASD)"** being conducted by persons affiliated with the University of Northern Iowa.

At River Hills School, you are providing a special education program to teach and support children with disabilities, including children with autism.

The main purpose of this research study is to examine the effectiveness of using iPad-based video modeling to teach conversation skills for children with autism. This research study may take two to three months at River Hills School. Sixteen to 45 sessions will be required of data collection (three to five sessions a week). Each session will take approximately 15 minutes.

Staff will implement the intervention and provide support or reinforcement for the participants (three to five children with autism spectrum disorder) in the classroom without any change to the daily schedule or removal from the classroom. The procedure is part of the regular curriculum or activities and participants will not miss any regularly scheduled work/class. Training to use the modeling intervention will be provided for staff. Data will be collected by graduate students from the University of Northern Iowa. The study requires the collection of data for four phases: baseline, video modeling, video modeling plus video prompting, and follow-up. Data will be collected on conversation skills and the level of support from staff. Staff will be asked to complete a short survey and interview about the survey questions to show the degree of satisfaction with using the intervention. The interview will take approximately 15 minutes. Staff will be video recorded fulfilling short conversation(s) with a typically developing peer for less than a minute in length.

Participation in this study will be an opportunity for school staff to use new technology to provide appropriate intervention to teach children with autism. Information shared during this study will be confidential. Your participation in this study is voluntary; participants are under no obligation to participate. Participants may withdraw at any time. The study involves minimal risk or harm to participants.

If you have questions about the study you may contact me through email at alzayerm@uni.edu or by telephone (319) 961-3566. You can contact the research advisor, Dr. Frank Kohler, by email at frank.kohler@uni.edu or by telephone (319) 273-

7484. For Institutional Review Board (IRB) research questions, please contact Anita Gordon, UNI IRB Administrator, 319-273-6148, anita.gordon@uni.edu.
Thank you for your time and consideration.

I am fully aware of the nature and extent of my participation in this project as stated above and the possible risks arising from it. I hereby agree to participate in this project. I acknowledge that I have received a copy of this consent statement. I am 18 years of age or older.

_____ _____

(Signature of participant) (Date)

_____

(Printed name of participant)

_____ _____

(Signature of investigator) (Date)

_____ _____

(Signature of instructor/advisor) (Date)

APPENDIX I

PARENTS LETTER

Dear Parent:

I am a graduate student in the Special Education Department at the University of Northern Iowa. I am working with my advisor, Dr. Frank Kohler, on a research study I developed to meet the requirement of my dissertation. The main purpose of this research study is to examine the effectiveness of using iPad-based video modeling to teach conversation skills to children with autism.

If you and your child agree for him/her to participate in this study, your child will watch video recordings of one of his peers engaging in conversation with a staff member on an iPad for 1-2 minutes a day for 1-2 months. Graduate students from the University of Northern Iowa will collect data on conversation skills and the support that the teacher provides to teach conversation skills. Your child's file will be reviewed for information about whether or not the communication and language skills are one of his/her IEP goals. Information about gender and age will be collected. There is minimal risk for your child to participate in this study. However, your child may refuse to watch the videos. If that is the case, the researcher will make sure that your child feels comfortable watching the videos. During the study, your child will be in his/her classroom, following the class schedule, and doing the daily activities. Participation in this study does not require your child to leave his/her classroom. All data collection and intervention will be in the classroom during the daily activities. If you or your child decide not to continue participation in the study, he/she can stop doing the study without any negative consequences. Information shared during this study will be confidential and participation is voluntary. Please contact me if you have any questions about the study.

I am attaching a consent form. Please read it carefully, and if you do consent, please return the signed copy within one week of the date of this letter to your child's teacher.

If you have questions about the study you may contact me through email at alzayerm@uni.edu or by telephone (319) 961-3566.

Best regards,

Mohammed Alzayer
Doctoral Candidate in Special Education
University of Northern Iowa

APPENDIX J

UNIVERSITY OF NORTHERN IOWA

HUMAN PARTICIPANTS REVIEW

INFORMED CONSENT

Invitation to Participate in a Dissertation Study
Dear Parents,
I am writing to invite you to participate in a research study titled: **"Examining the Effectiveness of Using an iPad-Based Video Modeling plus Video Prompting Package to Teach Conversation Skills to Children with Autism Spectrum Disorder (ASD)"** being conducted by persons affiliated with the University of Northern Iowa at River Hills School.
The main purpose of this research study is to examine the effectiveness of using iPad-based video modeling to teach conversation skills for children with autism. This research study may take between two to three months. Sixteen to 45 sessions will be required of data collection (three to 5 sessions a week). Each session will take approximately 15 minutes.
As part of this study, your child will be watching video recordings of one of his peers engaging in conversation with a staff member on an iPad for one to two minutes a day for two to three months. Graduate students from the University of Northern Iowa will be collecting data on conversation skills and the support that the teacher provides to teach conversation skills. Your child's file will be reviewed for information about whether or not the communication and language skills are one of his/her IEP goals. Information about gender and age will be collected. There is minimal risk for your child to participate in this study. However, your child may refuse to watch the videos. If that is the case, the researcher will make sure that your child feels comfortable watching the videos. During the study, your child will be in his/her classroom, following the class schedule, and doing the daily activities. Participation in this study does not require your child to leave his/her classroom. All data collection and intervention parts will be in the classroom during the daily activities. The study requires the collection of data for three phases: baseline, intervention, and follow-up. Data will be collected on conversation skills and level of support from staff.
This study will take place at the school and your child's teachers and administrators will be aware of the study to ensure that there will be minimal risk for your child participating in the study. Participating in this study will be an opportunity for your child to develop or support his/her conversation skills using iPad-based video modeling. Your child may watch his/her peer fulfill appropriate conversation skills on an iPad in order for him/her to imitate or adopt these skills. If you or your child decide to not continue participation in the study, he/she can stop participating in the study without any negative consequences. Information shared during this study will be confidential and participation is voluntary.

If you have questions about the study you may contact me through email at alzayerm@uni.edu or by telephone (319) 961-3566. You can contact the research advisor, Dr. Frank Kohler, by email at frank.kohler@uni.edu or by telephone (319) 273-7484. For Institutional Review Board (IRB) research questions, please contact Anita Gordon, UNI IRB Administrator, 319-273-6148, anita.gordon@uni.edu.

Thank you for your time and consideration.

I agree that my child, _____, will participate in this study. I am fully aware of the nature and extent of his/her participation in this project as stated above and the possible risks arising from it. I acknowledge that I have received a copy of this consent statement. I am 18 years of age or older.

_____ _____

(Signature of participant) (Date)

_____

(Printed name of participant)

APPENDIX K

PARENTS LETTER

Dear Parent:

I am a graduate student in the Special Education Department at the University of Northern Iowa. I am working with my advisor, Dr. Frank Kohler, on a research study I developed to meet the requirement of my dissertation. The main purpose of this research study is to examine the effectiveness of using iPad-based video modeling to teach conversation skills for children with autism.

If you and your child agree for him/her to participate in this study, your child will be recorded interacting with a teacher. One to six conversations of your child and the teacher will be video recorded. Other students will watch the videos to learn from your child's conversation skills. Your child has been chosen for this study because of his/her conversation skills and because he/she will be a good model for students. One to six sessions will be recorded of your child, each session will be less than a minute in length. Information about gender and age will be collected. There is minimal risk for your child to participate in this study. However, your child may be uncomfortable being video recorded. If that is the case, the researcher will make sure that your child feels comfortable doing the video recording. Participation in this study does not require your child to miss any of his/her classroom assignments or activities. No data will be collected on your child. If you or your child decide to not continue participation in the study, he/she can stop doing the study without any negative consequences. Information shared during this study will be confidential, and participation is voluntary. Please contact me if you have any questions about the study.

I am attaching a consent form. Please read it carefully, and if you do consent, please return the signed copy within one week of the date of this letter to your child's teacher.

If you have questions about the study you may contact me through email at alzayerm@uni.edu or by telephone (319) 961-3566.

Best regards,

Mohammed Alzayer
Doctoral Candidate in Special Education
University of Northern Iowa

APPENDIX L

UNIVERSITY OF NORTHERN IOWA

HUMAN PARTICIPANTS REVIEW

INFORMED CONSENT

Invitation to Participate in a Dissertation Study
Dear Parents,
I am writing to invite you to participate in a research study titled: **"Examining the Effectiveness of Using an iPad-Based Video Modeling plus Video Prompting Package to Teach Conversation Skills to Children with Autism Spectrum Disorder (ASD)"** being conducted by persons affiliated with the University of Northern Iowa at River Hills School.
The main purpose of this research study is to examine the effectiveness of using iPad-based video modeling to teach conversation skills for children with autism. This research study may take between two to three months. Sixteen to 45 sessions will be required of data collection (three to five sessions a week). Each session will take approximately 15 minutes.
As part of this study, your child may be recorded interacting with a teacher. One to six conversations of your child and the teacher will be video recorded. Other students will watch the videos to learn from your child's conversation skills. Your child has been chosen for this study because of his/her conversation skills and because he/she will be good model for students. One to six sessions will be recorded of your child and each session will be less than a minute long. Information about gender and age will be collected. There is minimal risk for your child to participate in this study. However, your child may be uncomfortable being video recorded. If that is the case, the researcher will make sure that your child feels comfortable doing the video recording. Participation in this study does not require your child to miss any of his/her classroom assignments or activities. No data will be collected on your child.
This study will take place at River Hills School and your child's teachers and administrators will be aware of the study to ensure that there will be minimal risk for your child participating this study. Participation in this study will be an opportunity for your child to help and support his/her peers on their conversation skills. If you or your child decide not to continue participation in the study, he/she can stop doing the study without any negative consequences. Information shared during this study will be confidential and participation is voluntary.

If you have questions about the study you may contact me through email at alzayerm@uni.edu or by telephone (319) 961-3566. You can contact the research advisor, Dr. Frank Kohler, by email at frank.kohler@uni.edu or by telephone (319) 273-

7484. For Institutional Review Board (IRB) research questions, please contact Anita Gordon, UNI IRB Administrator, 319-273-6148, anita.gordon@uni.edu.

Thank you for your time and consideration.

I agree that my child, _____, will participate in this study. I am fully aware of the nature and extent of his/her participation in this project as stated above and the possible risks arising from it. I acknowledge that I have received a copy of this consent statement. I am 18 years of age or older.

_____ _____

(Signature of participant) (Date)

_____

(Printed name of participant)

APPENDIX M

UNIVERSITY OF NORTHERN IOWA

HUMAN PARTICIPANTS REVIEW

INFORMED ASSENT

Project Title: Examining the Effectiveness of Using an iPad-Based plus Video Prompting Video Modeling Package to Teach Conversation Skills to Children with Autism Spectrum Disorder (ASD)

Name of Principal Investigator: Mohammed Alzayer

My name is _____. I have been told that my mom, dad, or person who takes care of me has said it is okay for me to watch videos on an iPad. I will watch my friend speaking on the video with one of my teachers. I will watch the video every day. If I do not want to watch the video, I will tell my teacher that, and I will not have to watch the video.

I am doing this because I want to. I have been told that I can stop my part in the activity at any time. If I ask to stop or decide that I don't want to do this activity at all, nothing bad will happen to me.

Name: _____ Date: _____

APPENDIX N

UNIVERSITY OF NORTHERN IOWA

HUMAN PARTICIPANTS REVIEW

INFORMED ASSENT

Project Title: Examining the Effectiveness of Using an iPad-Based plus Video Prompting Video Modeling Package to Teach Conversation Skills to Children with Autism Spectrum Disorder (ASD)

Name of Principal Investigator: Mohammed Alzayer

My name is _____. I have been told that my mom, dad, or person who takes care of me has said it is okay for me to be recorded for a video speaking with a teacher. The video will not take a long time, and it is easy to do. Just a few people will watch this video, including some of my peers, teacher, and the research team.

I am doing this because I want to. I have been told that I can stop my part in the activity at any time. If I ask to stop or decide that I don't want to do this activity at all, nothing bad will happen to me.

Name: _____ Date: _____