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# Two Single-Subject Experiments of an Ipad Protocol When Training Special Education Professionals in Video Modeling

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TWO SINGLE-SUBJECT EXPERIMENTS OF AN IPAD PROTOCOL WHEN TRAINING SPECIAL  
EDUCATION PROFESSIONALS IN VIDEO MODELING

by

Alyssa E. Schmitz

A Thesis Submitted in  
Partial Fulfillment of the  
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Master of Science  
in Occupational Therapy

at

The University of Wisconsin-Milwaukee

August 2014

## ABSTRACT

### TWO SINGLE-SUBJECT EXPERIMENTS OF AN IPAD PROTOCOL WHEN TRAINING TEACHERS IN VIDEO MODELING

by

Alyssa E. Schmitz

The University of Wisconsin-Milwaukee, 2014  
Under the Supervision of Kris Barnekow, PhD., OTR/L

**Objective:** This research was conducted to determine if an iPad training protocol using a teach-back strategy can feasibly be used in an educational setting and to determine if measures of use and technology perception are appropriate outcome measures. The studies were carried out in Wauwatosa, Wisconsin school district and involved two elementary level special education teachers. Utilizing single-subject methodology, two studies were carried out, including one study in which a subject received iPad training protocols and completed them independently and one study in which another subject received the same iPad training protocols combined with a teach-back strategy. The teach-back strategy is a health literacy technique that ensures the information was communicated effectively by asking the recipient to demonstrate their knowledge or skill.

**Background:** The prevalence of iPad use in schools is on the rise, and the increase in iPad use places a burden on teachers to learn how to utilize this technology effectively in order to achieve student gains. However, the iPad lacks a user guide and schools do not often provide adequate training for teachers to become proficient with this technology (Clark & Svanaes, 2012). An iPad protocol (Thompson, 2013) and a video modeling protocol (Sieglaff, 2013) were recently developed by graduate students and evaluated by educators with positive feedback. The intent of this research is to determine if the health literacy strategies utilized in the

protocols can help to increase iPad use and positive attitudes towards the iPad in educators receiving the training.

**Methods:** Two elementary school educators were recruited by publicizing the iPad training within local elementary schools. Two subjects received the intervention through one of two studies, including the protocols with teach-back (TB) or the protocols without teach-back (NT). Data collection included a self-report technology questionnaire and iPad use reports, which were used to evaluate the effects of the protocol intervention on teachers' use and attitudes towards the iPad.

**Results:** The results from these single-subject design experiments suggested that both teachers who received the protocols positively increased their attitudes towards the iPad as demonstrated by increased scores from pre-intervention to post-intervention questionnaires. While the NT subject showed improvements in positive attitudes towards the iPad, they were not as significant as the gains shown by the TB subject. Both subjects reported that the protocols were helpful, reflecting the increase in scores following intervention across studies. In terms of use, reported daily use of the iPad over the course of the study only increased for subject TB, whereas it stayed level and ultimately decreased for subject NT. The studies did not yield conclusive or significant data in terms of video modeling use.

**Conclusion:** This study provided new information about using a training protocol when training teachers in video modeling with the iPad. Results indicated that the iPad and video modeling protocols are feasible and may be effective for use in an elementary education setting. Implementing training such as this may help to increase widespread iPad use in elementary school-based settings, which could lead to educational and functional gains for students.

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## I. INTRODUCTION

### Purpose

Today in our digital era, it is essential to be able to stay abreast of the emerging technologies offered to us. Specifically, schools are beginning to integrate new technology into their classrooms and curricula. With the introduction of Apple's iPad in 2010, schools were eager to embrace this technology as the latest and greatest educational tool of its kind. However, the usefulness and effectiveness of these devices on learning outcomes is controversial among education professionals (Vu et al, 2014). Results from a recent small-scale iPad school implementation in Kent, England support the value of iPad use in classrooms, for they promote the development of higher-level thinking skills and improved information analysis (Heinrich, 2012). While several trials of tablet effectiveness have been initiated in the UK and other countries, the lack of teacher training has shown to present a barrier to the universal acceptance of this new technology for education (Clarke & Svanaes, 2012).

This research addressed the lack or 'gap' in educator training through the use of health literacy techniques and iPad protocols that will provide structure for technology education. The goal of the protocols is to improve educator knowledge and use of iPads in the classroom in order to potentially enhance learning for students. This research sought to discover if and how improving educator training in iPad video modeling techniques might lead to changes in educator attitudes towards this technology, thereby indirectly leading to student benefits. However, in order to understand how educators should be trained, it is first necessary to establish why iPad and video modeling protocols are being used as interventions.

## Relevance to Occupational Therapy

The question of how various interventions may help to increase an individual's ability to function is highly relevant to health and education professionals such as occupational therapists. Both occupational therapists and educators are often included on interdisciplinary teams for students with special needs. Therefore, it is important for occupational therapists as well as educators who work in school systems to recognize and resolve the barriers to using technology so that they may find ways to improve educational outcomes for students (Colorado Department of Education, 2014). School-based occupational therapists work with students with a variety of disabilities who may require the use of assistive technology in order to achieve functional educational performance. The iPad is a technological tool that has become more prevalent in schools to promote childhood participation in school-based activities (iPads, 2012). Teachers from schools where iPads were fully implemented reported that students are more engaged in learning tasks due to the interactive interface (iPads, 2012). School-based occupational therapists often provide direct service to clients as well as providing education and information to related service providers and educators within the school. Occupational therapists are well-suited to do this training because of their skills in improving client function and performance by using health literacy strategies in order to positively affect intervention efficacy (Levasseur & Carrier, 2011). In terms of the iPad, better educator understanding of the iPad and its uses should in turn foster better understanding in students, improving the likelihood that this technology will be utilized.

## II. LITERATURE REVIEW

### Background

The challenge presented with the recent increase of iPad use in schools primarily comes from a lack of standardized training methods, as many districts do not properly address the professional development required to successfully adopt a new technology (Fletcher, 2011). The lack of standardized technology training for teachers expected to use iPads in their classrooms is compounded by the fact that the number of children, including those diagnosed with autism spectrum disorder (ASD) who may benefit from the use of these technologies, is on the rise. There has been a recent increase in the reported prevalence of children diagnosed with ASD. Based on parent reports, the prevalence of ASD in school children ages 6-17 is estimated to be 2.00%, or 1 in 50 children (Blumberg et al, 2013). This is markedly higher than the 1 in 86 children in that group who were estimated to have ASD in 2007. Thus, the recent increase in the onset of potential users of assistive technology (AT) necessitates the identification of how technology can support teachers in accomplishing learning objectives for these students. However, in order to train educators to use technology effectively, they may need to become knowledgeable about strategies shown to be effective in improving health literacy (teach-back) and technological literacy in regards to assistive technology.

School districts are steadily joining the iPad rollout movement across the country. Correspondingly, examples of what works and what doesn't work in regards to widespread iPad implementation in K-12 school districts are emerging. The Chicago Public Schools (CPS) iPad Project has offered grants to provide iPads at schools in the district, and more than 200 schools in the district applied for grants to receive iPads for students and staff. As a way to utilize new technology to increase student engagement, CPS viewed this rollout as a test to see whether the iPad could become a permanent learning tool for the district (Mulholland, 2011). CPS credited

professional development provided by Apple and extensive teacher preparation as key factors in the rollout's success (Mulholland, 2011).

However, large iPad rollouts are not always successful, as evidenced by the recent implementation attempt in Los Angeles Unified School District. Soon after the \$30 million iPad rollout to 47 schools began, there were several students who found ways to bypass the security measures to view non-approved content (Hechinger Report, 2013). Under pressure from angry parents and teachers, district leaders delayed the rollout for the time being until technology rules are finalized and teachers receive more training (Iasevoli, 2013). The Hechinger Report (2013) attributed three sources for the failed rollout: the quick timeline of implementation and lack of a sufficient pilot study, lack of training and professional development for teachers, and take-home issues with the devices including parents not wanting to be responsible for loss, damage, or theft. From these two examples alone, one can ascertain how important teacher training was to the level of success of the iPad rollout. On a school website page regarding site-wide implementation of iPads, a quote states, "Planning needs to consider both infrastructure needs and the educational applications of the new technology. Without the proper preparation, technology initiatives are liable to become expensive failures" (Gliksman, 2011, para. 2).

## Health Literacy

In order to create standardized iPad training methods for educators, this research proposes using health literacy strategies to design and implement protocols that are understandable and universally accessible. Health literacy can be defined as, "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (What is Health Literacy, 2011). Health Literacy requires a set of complex cognitive and communicative skills to allow navigation

through the health care system. It is considered to be a shared responsibility in which patients and providers each must communicate in ways the other can understand (Osborne, 2005).

Osborne further suggests that as health care providers and educators, we face two issues: one is recognizing when clients do not understand the material, and the other is knowing how to communicate information through words, pictures, computer screens, and other visual media. Strategies that can promote health literacy can include: using a variety of ways to communicate information, conveying the key points only, 'readability' which includes using plain language and avoiding jargon, and using the "teach-back" technique. While the protocols were developed with plain language and readability principles in mind, only one subject in this study will receive the teach-back technique in order to examine the effectiveness of this specific strategy.

The teach-back technique involves asking open questions to the client to ensure that you understand each other. It confirms client understanding through an 'interactive communication loop', which consists of multiple steps; first, a new concept or information is introduced; next, the provider follows up with an assessment of client comprehension through open questions; third, the message is clarified if the client does not understand; then, client recall and comprehension is reassessed. This loop continues until a common understanding has been achieved (Osborne, 2005). The concept supporting this technique is that initially confirming that clients do understand takes less time than dealing with later problems that can occur when they do not understand.

The teach-back strategy will be used in one proposed intervention in order to ensure the effective delivery of information to improve the likelihood of educator understanding of the iPad and video modeling. However, translating the use of health literacy techniques such as teach-back into technology literacy with the iPad is not well-documented; thus, it is the innovation of this research.

## Technology Literacy

The overarching issue surrounding this gap in educator knowledge of iPad functions focuses on the ability to understand and evaluate technologies, or “technology literacy”. Districts, school decision makers, and especially educators must possess this competency; otherwise they are put at risk of simply ignoring new technology, using it incorrectly or ineffectively, and/or prematurely discontinuing its use (Keller, 2010). The International Technology Education Association (ITEA) defines technology literacy as the “ability to use manage, assess, and understand technology” (2007, p.9). Thus, by using a health literacy strategy such as teach-back with educators whose goal is to educate children through the use of the iPad, the educator must first assess and improve their knowledge, behaviors and capabilities with regard to this technology. With the recent and ongoing technology boom in schools and society in general, it is not surprising that there is growing support for iPad integration into schools. However, it is important to remember that gains in learning produced by expensive technologies are not automatic, as using iPads requires training, technical support, and technology-savvy teachers (Holzberg, 2012). When considering implementing new technologies such as the iPads into schools, it is of utmost importance that educators who will use them become “technologically literate” (Keller, 2010). The alternative is discontinuing use of the technology altogether, putting to waste the money and time spent on technology acquisition and professional development.

## Population

The population of interest in this research is educators of children who could benefit from the use of iPad technology. Since iPads are being implemented into entire school districts, including general and special education settings, the general iPad protocol can be of use to essentially any educator. However, the video modeling protocol is of particular interest to



educators who work with children with ASD. This is because video modeling is shown to be an effective approach when teaching children a range of communication and self-help skills, and children who have ASD often display mild to severe impairments in areas of social interaction and communication, as well as stereotyped patterns of behaviors and interests (Blumberg et al, 2013). For individuals with ASD, evidence is starting to support the use of various new technologies (including the iPad) in providing promising interventions to improve communication, assist in social skill development, and enhance their overall ability to learn (Technology and Autism, 2013). The results of a study by Mozzafar (2012) showed that the iPad was able to aid students with ASD to self-regulate, perform turn-taking, and communicate with peers. The helpful accessibility features included mobility and media integration, making it easier for the teacher and students to access multiple forms of media to support educational lessons. Mozzafar concluded that “the iPad cannot be utilized with every child with ASD, but it can be used as an incentive, for self-reinforcement of subject matter, and for lesson differentiation through the use of specific apps” (2012, p. 49).

To provide further evidence of iPad effectiveness, a recent systematic review suggested that the use of computer-based intervention in the treatment of ASD may offer some advantages to traditional instruction, including easier differentiation of instruction, fewer distractions and the consideration of a student’s visual learning strengths (Ramdoss et al, 2012). It is obvious from the literature that iPads can be very beneficial when used correctly. It is a viable tool to carry out video modeling, which has demonstrated effectiveness for children with ASD. The goal of this study is to ensure that iPads are used effectively by promoting standard and comprehensive teacher training.

While teachers of students with ASD are the target audience for intervention, the iPad and video modeling protocols are not meant to be exclusive to this population. Video modeling

has the potential to be used with children with a range of diagnoses, including developmental disabilities, learning disabilities, physical disabilities and cognitive impairments (Mason et al, 2012). This meta-analysis of single case studies by Mason et al (2012) lends evidence to the use of video modeling for other populations, as study findings indicated that video modeling is moderately effective for children with developmental disabilities and should be considered as an intervention due to its minimal resource expenditure requirements.

In addition, several other iPad accessibility features can also be utilized to improve educational performance for children with disabilities (Apple, 2014). Apple's website details these options, including voice-activation on iPads, which makes them accessible to individuals with reading/writing difficulties and physical disabilities that might otherwise prevent students from completing work by allowing them to say out loud what they want to write. Children with cognitive impairments might utilize programs with symbol-based material that may be easier to understand than written text. For children who often miss school due to medical conditions or impairments, FaceTime, Apple's video calling application, could help them securely connect back to their classroom through the use of video. In sum, the educational opportunities that iPads afford are vast; educators who seek to improve all student outcomes would be wise to consider learning about and using this technology with students who represent a variety of abilities and needs.

### **Predictive Factors**

In the medical field, health care providers tend to be unaware of their patients' limited literacy, and they seldom evaluate patient comprehension in any meaningful manner (Paasche-Orlow & Wolf, 2007). It is important for physicians to take time to ask their patients to repeat the instructions or otherwise demonstrate their understanding because patient

misunderstanding of instructions due to low literacy may lead to non-compliance (Making Health Care Safer, 2001). Likewise, it may be that an educator's lack of understanding of how to use the iPad can decrease use, and in turn increase discontinuation among teachers as well as students. The success of communicating any message depends upon knowing your audience and by using strategies and materials that address their unique needs. Health literacy strategies have the potential to improve technology literacy as new information technologies such as the iPad present new forms of learning opportunities that are more visually and auditorily interactive, improving the likelihood of information retention.

However, the unsuccessful use of training strategies may be a major predictive factor for discontinuance of the interventions utilized in this study. Some known factors affecting discontinuance of technology include: social aspects, personal factors (demographics), health status, economic factors (device loss), and physical environment (Lauer et al, 2012); Similar factors also affect a person's health literacy (Health Literacy Basics, 2012). Both training and access are likely factors that affect technology literacy. For example, a study of laptop programs in K-12 schools suggested that actual computer use with English as a second language students left much to be desired, due in part to the complexity of integrating new technology into instruction when students had uneven access to computers at school and at home (Warschauer et al, 2004). This supports reasoning as to why the iPad might be a viable technology tool for teaching children with various home access levels, as it is a portable technology and can be brought along with the students to the different environments in which they participate.

As eager as some teachers are to utilize iPads in the classroom, some educators may hold more negative attitudes towards the usefulness of the iPad in the classroom, resulting in an aversion to using this kind of technology. Teachers and critics have expressed a desire for more research supporting the iPad for student learning before widespread school implementation (Vu

et al, 2014). It is widely understood that there is no “one size fits all” approach to learning, and it is reasonable to believe that this technology will not be beneficial to everyone.

## Intervention Approaches

### Health literacy strategies/ iPad use.

A health literacy strategy included in the iPad training protocols is the “teach-back” technique, in which the person receiving information is asked to restate the information in their own words so as to convey their understanding to the provider. The premise of this technique is that clients should be able to explain the problem for which they need intervention, the general nature of the intervention, and any issues of which to be aware. This patient-centered approach of confirming comprehension has been established as a new standard of care for clinicians, and is one of the easiest ways to close the gap of communication between the clinician and the client (Paasche-Orlow & Wolf, 2007). It is also evidence-based; Teach-back was supported in a report from the Agency for Healthcare Research and Quality (AHRQ) in 2001, stating that “Asking that patients recall and restate what they have been told is one of 11 top patient safety practices based on the strength of scientific evidence” (Making Health Care Safer, 2001). The teach-back method can help to ensure that patients grasp at least one or two essential take-home messages from a typical 15-minute appointment (Subramanian & Doak, 2006). A similar level of information retention can reasonably be expected from teachers receiving iPad training with the teach-back technique.

The desired outcome of employing teach-back methods in this research is to increase educator knowledge and understanding of the training protocols. In this study, teach-back training is targeted toward the educators, and is designed to result in increased iPad use and positive attitudes towards the iPad in general, as well as to use the iPad to perform video

modeling effectively with students. While teach-back methods are effective in increasing patient compliance in medical settings, the use and effectiveness of teach-back in educational settings is not well known.

A few factors to be considered with this topic are why using the iPad is advantageous over other forms of technology and how it is beneficial for students. As mentioned previously, the small and portable nature of the iPad enables consistent and continual use, potentially increasing usability for students versus technologies that can only be used at school such as laptop or desktop computers. Results from a case study from Henderson and Yeow (2012) focused on iPad adoption and use in a primary school suggested that the iPad's main strengths for use in schools are the way in which it provides quick and easy access to information and the support it provides for collaboration among students and educators alike. The teachers interviewed in this exploratory case study noted that the iPad was used "not as a tool to improve learning in the context of grades or test scores, but rather as a tool to increase productivity by making things easier and more accessible" (Henderson & Yeow, 2012, p.6). However, few empirical studies have examined the use of the iPad on student behavior and performance. While this study did not consider actual iPad use or student outcomes, it aimed to measure educator perceptions of the iPad, which were hypothesized to directly affect the utilization of iPads in the classroom.

Another factor to consider is how iPads compare to other forms of technology and instructional methods for children with ASD. One small exploratory study from Price (2011) of 30 students from a school district sought to discover whether iPads used as e-readers versus using standard textbooks would help to increase comprehension among students with ASD who were significantly behind their grade level expectations in reading. Teacher questionnaires related to student interest in the technology and ease of use showed that the use of iPads

increased motivation and decreased off-task behavior; Ease of use was not rated favorably, as the teachers had difficulties in downloading and organizing the reading applications or 'apps'. Teachers reported that despite the complications, the benefits of the iPad were worth the cost (Price, 2011). However, prior subject use of iPad technology was not reported, so it cannot be determined how skilled the students or teachers were in using this technology before the study. This study's results suggest that the iPad holds a lot of promise as an educational tool for students with ASD, but its limitations in a lack of demographic and prior technological training information require that more detailed analyses be completed. For children with ASD, the predictability and organization of apps make it ideally suited to their unique needs, and the portability of the iPad is cited as essential for providing ways to calm, focus, and learn while on-the-go (ASDF, 2012). While smartphones provide similar desirable features, they are not likely as well-suited to an educational setting as iPads. It is important to recognize that students with ASD learn in a different way than children without ASD, but the iPad provides a medium that both children with and without ASD can use to engage with and enjoy learning.

### **Video Modeling.**

Video modeling involves presenting a videotaped sample of models engaged in a specific set of scripted actions and/or verbalizations in order to elicit these desired behaviors from an individual (Video Modeling, 2006). The model may be shown one to three times, and then the learner is asked to demonstrate the target behaviors observed. There are several ways to use video modeling including: a) videotaping another non-disabled peer or adult performing a targeted learning task, b) videotaping the child with ASD while they perform the task (Video self-modeling), then reviewing with them to discuss irregularities, c) recording the skill from the learner's perspective (Point-of-view modeling) and d) recording each step of a behavior in a

stepwise fashion with built-in pauses (Video prompting) (Franzone & Collet-Klingenberg, 2008). In this research, the first description of the adult or other non-disabled peer performing the tasks will be used initially. The short-term objective of video modeling in terms of this research is to make educators more comfortable with using this technology on an iPad, thereby increasing their motivation to use it with appropriate students. The long-term, indirect objective is an increase of appropriate school functioning in children with ASD by using video self-modeling on the iPad, resulting in an increased use of iPad technology.

It is important to understand why video modeling is the chosen method of intervention for this population, and a number of studies were consulted for evidential support. Video technology is one of the most readily available technologies for parents, educators, and clinicians. Many individuals can operate video equipment with little instruction, and it was proven to be a useful tool for modeling appropriate behavior, providing feedback, and creating discrimination opportunities for the child's own behavior (Sturmey, 2003). Key characteristics of children with ASD that favor the use of video modeling over other possible techniques include: over-selective attention, restricted field of focus, a preference for visual stimuli, avoidance of face-to-face interactions, and an ability to process visual information more readily than verbal information (Corbett & Abdullah, 2005). Furthermore, the context of viewing videos is typically associated with recreation, and may be more readily accepted and motivating for children. Because videos can be replayed over as needed without additional cost, they have been used as a teaching tool since this technology came about. Some general advantages of using video modeling treatments are that they are relatively unobtrusive, can be effective in a wide variety of environments, equipment is available at a low cost to families and/or schools, kids may be highly motivated to watch them, and they may be effective for children with strong visual processing abilities (Maione & Mirenda, 2006).

While there are several demonstrations of the effectiveness of video modeling in general, only one published study has directly compared the use of video modeling to live modeling (in-vivo). Charlop-Christy et al (2000) suggest that video modeling may result in greater generalization than in-vivo modeling because it (a) uses a relatively simple format to present concepts in a systematic way, (b) effectively gains and maintains children's attention, and (c) is a less "emotionally laden" way to learn. Additionally, video modeling offers the freedom to present a variety of exemplars to facilitate maintenance and generalization, and allows easy repetition of the model without the requirement of repeated model effort and the risk of inconsistency in the model. Although the production of video modeling tapes may be initially effortful and time consuming, recorded models can be used repeatedly with the same child and even with other children who have similar deficits. This study aims to lessen the effort and time spent on producing video models by providing training in its use.

In regards to training caregivers in video modeling techniques, one study examined if a link existed between caregiver-implemented video modeling imitation training (VMIT) and increased imitation skills in children with ASD. A multiple baseline design across four caregivers and their children was carried out, resulting in indications that all caregivers were able to successfully create video models on an iPad when provided with minimal training (Cardon, 2012). They were able to implement VMIT with fidelity, so the results would likely be repeatable and have a high level of generalizability. The results from this study are very encouraging for promoting standardized training protocols for using video modeling as a successful intervention across settings (i.e., at home and at school).

In order for video modeling to be used with children with ASD, educators must participate in developing the tape or 'model' demonstrating the desired skill, and then lead the student through the intervention. The use of video modeling by educators may be increased by



using health literacy strategies such as receiving both written and verbal instructions and demonstrating newly acquired knowledge immediately after the learning takes place through teach-back. When creating video models for children with ASD, several design features should be kept in mind. First, video models should display clear and detailed behaviors. Second, important stimulus features should be as salient as possible while minimizing irrelevant or distracting stimuli to combat potential problems with stimulus over selectivity (LeBlanc et al., 2003). Tapes created for one child will often have applicability for use with other children, so subjects should foster the sharing of these resources perhaps by establishing publicly available collections of the videos created on cloud databases such as Dropbox. Public accessibility to video models may be instrumental in making video modeling and feedback a tool with more widespread use and applicability.

A limitation of past research was that co-interventions were not controlled for in many studies, so children receiving video modeling as an intervention were also receiving a variety of other therapeutic strategies within their treatment plans. More research is needed on video modeling as an isolated treatment strategy for better generalization of results. Another limitation in relation to evidence of educator training in the video modeling approach is that social validity and intervention fidelity were not documented in most of the included studies. In effect, one cannot determine that interventions were implemented as intended. Given the need for replication and technological proficiency required to implement video modeling as an intervention, this weakens the analysis' applicability considerably. On the other hand, this research aims to provide a more sound research design through the use of developed protocols that will yield stronger applicability along with intervention fidelity documentation and controlling for co-intervention bias.

## Summary

The summary of evidence reviewed suggests that video modeling is a beneficial intervention for children with ASD in gaining social skills and behaviors and that iPad technology is useful for teaching and learning because it is interactive, technologically advanced, and mobile. To improve the existing evidence, studies that control for co-intervention effects by isolating video modeling as the sole treatment at one time should be carried out to demonstrate its efficacy. Developing standardized protocols for video modeling would aide in establishing improved reliability and validity of the results of studies with the opportunity for replication in order to demonstrate intervention effectiveness. However, no controlled study has looked at using a protocol to train educators on iPad use in order to carry out video modeling for children with ASD.

Hypotheses for this study focus on using specialized training techniques considering health literacy principles in order to teach educators of children with ASD how to use the iPad in order to create video models, thereby increasing their technology literacy. Specifically, the research questions are: Will educators who receive iPad and video modeling protocols positively increase their attitudes towards the iPad? Will educators who receive iPad and video modeling protocols increase their use of the iPad as demonstrated by increased reported daily use from pre- to post-intervention? Will educators who receive iPad and video modeling protocols report a change in attitude and/or behavior regarding the iPad during the follow-up phase? Ultimately, this research asks if a teach-back protocol for iPad use and video modeling on the iPad will be effective for training educators of children with ASD in a school setting. Since two single-subject studies were done, one utilizing teach-back and one that doesn't, this research seeks to discover what kind of differences occur in use and attitudes from baseline to follow-up for the subject in each study.

### III. METHODS

#### Research Design

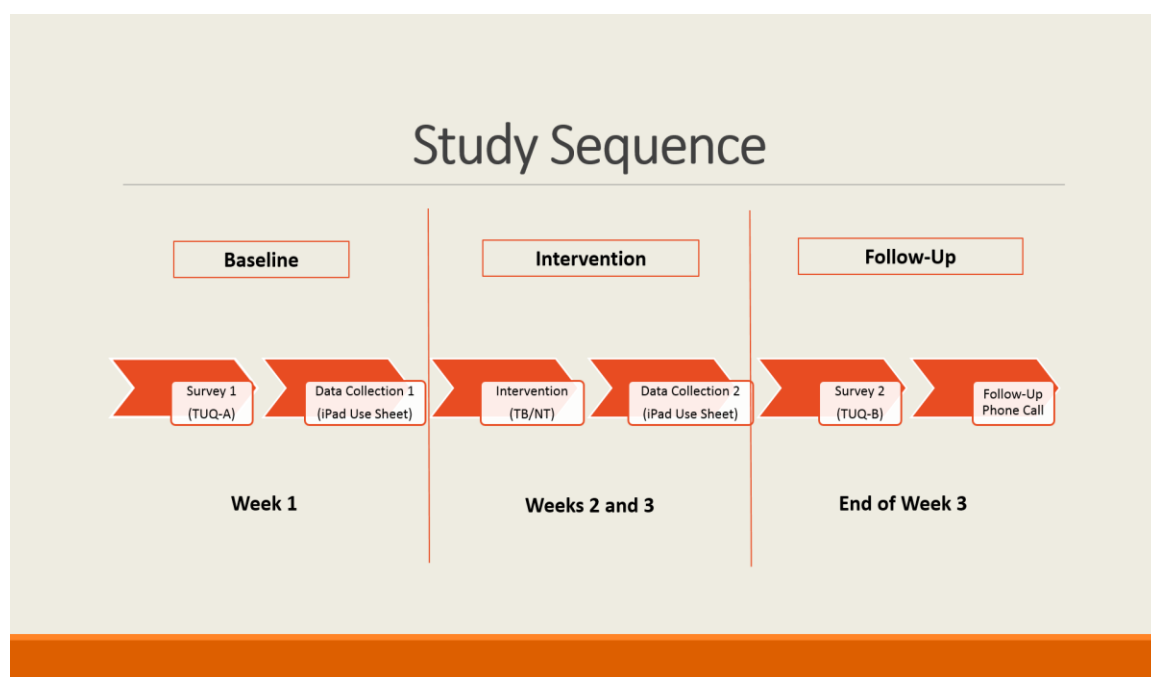
The format of this research design is experimental. Specifically, two single-subject design studies were completed in serial order. In study one, the subject received the protocol intervention face to face using teach-back (TB), and in study two the subject received the protocol remotely without teach-back, or non-teach-back (NT). From this point on, the studies will be referred to as Study TB and Study NT for ease of understanding. Single-subject design studies are often used to examine the behavioral change an individual exhibits as a result of some treatment. Single-subject design is appropriate when the research question aims to show that one treatment is more effective than another (Portney & Watkins, 2009). By definition, single-subject designs allow researchers to draw conclusions about the effect of treatment based on the responses of a single participant under controlled conditions (Portney & Watkins, 2009).

Like other single-subject designs, this research employed repeated measurements of a behavioral response over time, in this case before, during, and after the protocol intervention. The experimental research design was A-B, signifying baseline phase followed by intervention phase. The iPad training protocol for video modeling was the treatment/intervention in this study. This research utilized a questionnaire for collecting data on subject characteristics and opinions in regards to the iPad and a documentation sheet to record weekly iPad and video modeling use. An adapted version of the Technology Use Questionnaire (TUQ) was used to establish a baseline of teacher attitudes prior to treatment (TUQ-A), and then following intervention (TUQ-B) to see if/how their attitudes changed after receiving the intervention. Data collection in regard to iPad use was documented throughout the study, including during the baseline (Data Collection 1) and intervention (Data Collection 2) phases. By using this

responsive A-B design, if iPad use increases during the intervention phase and/or the TUQ responses show change following the intervention period, one may logically suggest that the intervention was potentially the reason for the change. A follow-up phone call with subjects evaluated more qualitative aspects of the intervention, which in combination with the qualitative format of the iPad use forms and TUQ, gives this study an overall mixed-methods design.

The following is the visual representation of the study sequence/research design for both TB and NT:

Figure 1: Study Sequence



(Figure 1 Text Description)

The studies were non-concurrent because the subjects began the intervention at different times, which were dependent on school recruiting time and subject availability. Due to recruitment challenges, the study sequence was altered from the original plan to use non-

concurrent multiple baseline lengths for three subjects in the NT study and three subjects in the TB study. Thus, the first subject recruited received the TB intervention and the second subject recruited received the NT intervention and both subjects were assigned to one-week baseline lengths.

Survey 1 scores from the TUQ established a baseline of attitudes towards the iPad within subjects, strengthening evidence for intervention causal factors. The history of each subject, including technology learning experiences between the baseline and follow-up phases, was addressed during the follow-up phone calls. This study element allowed the researcher to find out if the subjects obtained any other technology training during the course of the study. Instrumentation effects were controlled for by changing the order of questions on the TUQ from Survey 1 to Survey 2. A gift card was given to subjects who completed the studies as an incentive to decrease attrition, increasing the likelihood of good internal validity. The UW-Milwaukee Institutional Review Board approved all research procedures before the study was conducted. (Protocol # 14.238 approved January 31, 2014) (Appendix A.1: IRB Approval).

### Variables

In this research, the treatment or independent variable consisted of two levels: the iPad and video modeling protocols using teach-back (used in study TB) and the iPad and video modeling protocols without using teach-back (used in study NT). The responses or dependent variables for both studies were iPad use as measured using iPad Use Documentation Sheets and participant attitudes towards the iPad as measured using the TUQ. Studies differed solely on the basis of what occurred between measurements, which in this case was either the TB or NT intervention.

## Hypotheses

Both studies TB and NT will focus on the same hypotheses and question:

### Hypothesis 1.

*Null Hypothesis 1.* There will be no differences in TUQ scores from Survey 1 (baseline) to Survey 2 (follow-up).

*Alternative Hypothesis 1.* There will be a difference in TUQ scores from Survey 1 (baseline) to Survey 2 (follow-up).

### Hypothesis 2.

*Null Hypothesis 2.* There will be no differences in iPad and video modeling use from baseline to intervention phases.

*Alternative Hypothesis 2.* There will be a difference in iPad and video modeling use from baseline to intervention phases.

Question 3. Will the subject report a change in attitude and/or behavior regarding the iPad during the follow-up phase?

## Protocol Materials

There were a large number of materials created and adapted for the protocol interventions in these studies. The protocol materials were based on iPad training and video modeling training on the iPad, with and without teach-back strategies. In order to incorporate the brochure materials developed as part of two graduate projects into this thesis study, the protocols had to be adapted into more accessible formats. This involved making the original hard-copy protocol brochures into PowerPoint presentations. The intent of creating the PowerPoints was to present the information with accompanying audio narration, to make the protocols accessible to a wider user population. Because the original protocols only considered the 1<sup>st</sup>-3<sup>rd</sup> versions of the iPad, an iPad protocol for the 4<sup>th</sup> generation iPad with the iOS7 operating system was developed. This was done by taking screenshots of the researcher's

personal iPad in order to illustrate the same functions detailed in the protocol for 1<sup>st</sup>-3<sup>rd</sup> generation iPads.

Protocol materials specific to the iPad itself were generated from the Basics to the iPad Handout (Appendix E.1), which is a basic overview of iPad vocabulary, icons, and features. This protocol was used to create the iPad Training Protocol PowerPoints (E.2 for 1<sup>st</sup>-3<sup>rd</sup> generation or E.3 for 4<sup>th</sup> generation). The iPad Training Protocol PowerPoints were created by the researcher to provide a more detailed overview of the iPad while illustrating the basic functions in an interactive way by including visual as well as audio descriptions of several iPad features. All materials specific to the iPad were included in both TB and NT studies.

Protocol materials regarding video modeling were generated from the Video Modeling Brochure (Appendix F.1), which details the steps needed to create video models with students. This brochure was adapted to PowerPoint Format (Appendix F.2) by the researcher. This brochure was used in both TB and NT studies.

Material specific to the TB study included the Teach-back protocol for Video Modeling hard copy (Appendix F.3), which again details the stepwise process needed to create video models and denotes where and when the teach-back strategy should be utilized during subject training. This teach-back protocol was adapted to PowerPoint format and can be found in Appendix F.4. In the PowerPoint version, \*TB denotes where the teach-back strategy should be used.

Material specific to the NT study included the Video Modeling Protocol-No Teach-back Brochure (Appendix F.5), which is essentially the same as the Teach-back protocol for Video Modeling, except that it does not prescribe the use of teach-back. The PowerPoint format of this document can be found in Appendix F.6.

## Participants and Recruitment

This study included a sample of special educators recruited from Wauwatosa, WI School District where the primary researcher completed fieldwork affiliations. The Wauwatosa School District has an enrollment of about 7,300 students from nine elementary schools, one elementary charter STEM school, one elementary Montessori school, two middle schools, and two high schools. For the 2013-14 school year, a total of 3,371 students were enrolled in the district's elementary schools and 179 teachers worked in these schools. Of these, 10.9% of students were classified as having a disability: CD (0.5%), EBD (0.4%), LD (1.2%), SL (5.8%), or other primary disability (3.0%). Thirty-five students with autism spectrum disorder were identified as being enrolled in the district's elementary schools, constituting 1.0% of the elementary population (WINSS, 2014).

After receiving approval from the school principals and administration to conduct this study, advertisement flyers (see Appendix B) were distributed by the student's fieldwork educator to potential study candidates in three elementary schools. As suspected, the subjects began the studies at different times due to differing time of both subject recruitment and report of interest in participation.

Eligibility was determined through a demographics form (see Appendix C) that was completed after the potential subject called or contacted the researcher for detailed study information. Inclusion criteria used to determine eligibility of participants included: being between the ages of 25-65, having 1 year of more of teaching experience, ownership of an iPad, and having minimal prior technology training in video modeling (<5 hours). Exclusion criteria include being younger than 25 or older than 65, having less than one year of teaching experience, not owning or having regular access to an iPad, and having extensive prior technology training in video modeling (> 5 hours). Only two potential subjects expressed



interest in the studies, and they were screened for compliance with this criteria before acceptance into each study took place.

Potential participants did receive incentives for their participation. Gift cards from iTunes with a \$15.00 value were offered to participants upon return of all materials at study completion. Funding for incentives was provided by the researcher.

## Instrumentation

The measurement methods used in this research included an adapted TUQ and an iPad Use Documentation Sheet. The TUQ is a self-assessment of a teacher's motivation, professional goals, use, access, confidence level, and student use in the integration of technology in the classroom (Insight, 2005). The original TUQ (Appendix D.1) was adapted for this research because the TUQ focuses specifically on computer use, while the focus of this research is the iPad, so prompts were altered to say "iPad" rather than "computer" wherever possible. The original TUQ had 36 questions, and the adapted version (Appendix D.2) has 48 questions, to include prompts about video modeling. Sample prompts from this questionnaire include, "I am motivated to find ways to use the iPad in my classroom", "One of my professional goals is to learn more ways to use iPads for seamless instruction", "I am proficient in basic iPad use and application", and "I am motivated to use video modeling with my students".

The original TUQ was developed by Insight: The South Central Instrument Library and Data Repository. The results from the TUQ have historically provided information for professional development and training needs (Insight, 2005). Psychometric data reported includes a Cronbach Alpha Internal Consistency reliability coefficient of .93 with  $n=36$  items and 107 subjects. This means that 93% of the total score is measured consistently and represents that subject's true score. The researcher requested more psychometric information from

Insight, but there is reportedly no more information available. For ease of understanding, the adapted TUQ will be referred to as the TUQ from this point on unless denoted as the original version.

The TUQ utilizes a 5-point Likert-like scale, which provides a rating of the degree to which respondents agree or disagree with statements about the iPad. Ranked responses include: strongly disagree, disagree, neither agree nor disagree, agree, or strongly agree. Each choice on the scale was assigned a point value (1-5) that represents the degree to which the statement reflects a positive or negative characteristic or attitude. Agreement with positive items was always rated higher than agreement with negative statements. For example, in the statement, “One of my technology goals is for students to be able to use the iPad as a tool for learning”, a response of strongly agree would be rated a 5, agree=4, neither agree nor disagree=3, disagree=2, and strongly disagree=1. Conversely, an item that reflects a negative characteristic is illustrated by, “I have an immediate need for more professional development in order to design student-centered video models that use iPad in a seamless fashion”. This item is considered a negative statement because the intent of the training is to make teachers more comfortable with creating video models using the iPad, so a response of strongly agree would be rated a 1, agree=2, neither agree nor disagree=3, disagree=4, and strongly disagree=5. The three negative TUQ items, along with all item scores, are denoted in the raw data in Appendix H.1.

For these studies, TUQ-A was the baseline measurement and TUQ-B was the follow-up measurement. Both versions of the TUQ contained the same content in a different order, to control for testing effects. The TUQ-A was used to establish a baseline of teacher attitudes prior to treatment. The TUQ-B was used as a follow-up measure to see if/how subject attitudes changed after receiving the intervention. Overall scores from were computed for each survey by adding the points from each item to create summative totals that represented the subject’s

general attitudes towards the iPad during baseline (TUQ-A) and after the intervention (TUQ-B) in both studies TB and NT.

The iPad Use Documentation Sheet (see Appendix D.3) was used to collect data regarding how often each subject used the iPad both before and after the intervention, to see if receiving the intervention had any effect on use. This form asked the two questions, “How many times per day did you use the iPad in your classroom?” and “How many times per day did you use video modeling with a student?” The form provided spaces for the subject to fill in these two pieces of information on a daily basis, Monday-Friday, throughout the studies. For both TB and NT, each subject completed a use form for each week of the 3-week studies, including one week of baseline and two weeks of intervention data. The forms were either completed in hard copy or in Google Drive format, according to the particular subject’s comfort level and preference.

### **Data Collection Procedures**

After interested subjects were determined to be eligible for the studies and sent in appropriate IRB consent (Appendix A.2) and demographic forms, they received the TUQ-A (Survey 1) and an iPad Use Documentation (Data Collection 1) sheet to complete during the one-week baseline phase. Then, the subjects received the intervention of iPad and video modeling protocol materials, whether they were in the TB or the NT study. The materials were offered to each subject in hard copy and/or narrated PowerPoint formats, to make them more accessible to a wider range of learning and usability needs.

### **Study TB**

The intervention materials that the subject in the TB study received included: Basics to the iPad Handout, an iPad training PowerPoint, Video Modeling Brochure and the Teach-back

protocol for video modeling. The intervention for the TB study occurred at the beginning of week two and consisted of a 45-minute training session in which the researcher reviewed the protocols with the subject, using the teach-back strategy to ensure subject understanding. After this training session, no other face-to-face contact occurred with the TB subject. This subject was instructed to consult the PowerPoints and/or handouts as needed throughout the two-week intervention phase to reinforce the information learned, and to continue filling out the daily iPad use documentation sheets.

### Study NT

The intervention materials that the subject in the NT study received included: Basics to the iPad Handout, an iPad training PowerPoint, Video Modeling Brochure, and the video modeling protocol-no teach-back. The intervention for the NT study occurred remotely, by sending the subject the intervention materials through email at the beginning of week two. The subject was instructed to review the protocols independently and continue filling out iPad use documentation sheets throughout the two-week intervention phase.

After the intervention phases of 10 school days (2 weeks), the researcher completed a follow-up phone call with each subject, which included a series of questions (Appendix G.1) to ensure understanding, to determine if there were any co-occurring interventions, and to qualitatively evaluate each subject's learning experience. During this call the researcher reminded each subject of the last study requirement, the TUQ-B (Survey 2). Transcripts of the brief follow-up exchanges can be found in Appendix G.2.

### Data Analysis

In single-subject design research, data analysis is based on the evaluation of behavior/response change across design phases (Portney & Watkins, 2009). Graphic display is a

common and intuitive form of visual data analysis, and was the method used to display response data from both studies included in this research. Data collected was analyzed in terms of between-phase characteristics (baseline to intervention) within subjects from each study. To address hypothesis 1, bar graphs displaying raw scores and change scores by category were completed for TUQ-A and TUQ-B. To address hypothesis 2, line graphs showing iPad and video modeling use data were analyzed with trend lines, two-standard deviation bands, and non-overlapping point data. In addition, bar graphs displaying total weekly iPad and video modeling use across phases were used to analyze each subjects' results in regards to hypothesis 2.

Raw scores, representing the level of positive attitudes towards the iPad, are reported for each subject TB and NT for the TUQ-A and TUQ-B. To provide a more comprehensive understanding of any subject differences, TUQ items were categorized into one of five categories: Motivation to Use Technology, Use of Technology, Perceived Support of Technology, Comfort with Technology, and Skills with Technology. This categorization can be found in the TUQ raw data table in Appendix H.1. Analysis of subject scores between TUQ-A and TUQ-B was completed using change scores that signify the difference between Survey 1 and Survey 2. In addition to raw scores, change scores were used to show differences in how each subjects' scores changed within each category of TUQ item.

Use documentation sheets were used to analyze the number of times the iPad was used during the initial baseline and intervention phases. Daily value data is displayed using line graphs for simple and intuitive visual analysis. Reported use was further analyzed for each study by examining variation and trends between phases using trend lines and non-overlapping point data. Trend lines find the line that creates the least distance to all points in the data set, providing the best opportunity to predict any data value. Non-overlapping point data is a nonparametric method that quantifies intervention effectiveness by counting the intervention

points that exceed the highest baseline point (Chenier, 2012). A two-standard deviation band method was used to analyze TB data by assessing the variability in the baseline phase using the calculated mean and standard deviation. If at least two data points during intervention fall outside of this band, changes from baseline to intervention are considered significant (Portney & Watkins, 2009).

## VI. RESULTS

### Participants

#### Study TB.

This study included a sample of one elementary school educator. This subject taught special education at an elementary school in the Wauwatosa School District. Subject TB was female and completed a bachelor's degree level of education. This subject was 46 years old and had worked in education for three years at the time of the study. At baseline, subject TB reported having received one hour of prior professional technology training in video modeling. Individual demographic data for the subject is reflected in Table 1.

#### Study NT.

This study included a sample of one elementary school educator. This subject was special education assistant at a different elementary school from the TB subject in the Wauwatosa School District. Subject NT was female and completed a master's degree level of education. This subject was 50 years old and had worked in education for six years at the time of the study. At baseline, subject NT reported having received zero hours of prior professional training in video modeling. Individual demographic data for the subject is reflected in Table 1.

Table 1: Subject Demographics

Study Code	Level of Education	Age	Sex	Years Worked in Education	Assignment	Hours of Professional Technology Training in Video modeling
TB	Bachelor's	46	F	3	Special Education Teacher	1

NT	Master's	50	F	6	Special Education Assistant	0
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(Table 1 Text Description)

## Hypotheses Results

### Hypothesis 1 results.

The null hypothesis 1 stated that there would be no differences in TUQ scores from Survey 1 to Survey 2. The alternative hypothesis 1 stated that there would be a difference in TUQ scores from Survey 1 to Survey 2.

### *Study TB.*

The data displayed in table 2 shows that the TUQ-A score for TB was 130, while the TUQ-B score was 151, resulting in an increase of 21 points towards the positive.

Figure 2 displays this information graphically.

When looking at the data in terms of change scores between categories of TUQ items, differences between how items were rated in each measure were present between TUQ-A and TUQ-B, affecting the categorical totals as shown in figure 3. TB scores improved by 5 points in Motivation to Use Technology category, 1 point in the Use of Technology category, 7 points in the Comfort with Technology category, 6 points in the skills with Technology category, and finally by 2 points in the Perceived Support of Technology category.

Table 2: TB TUQ-A and TUQ-B Scores

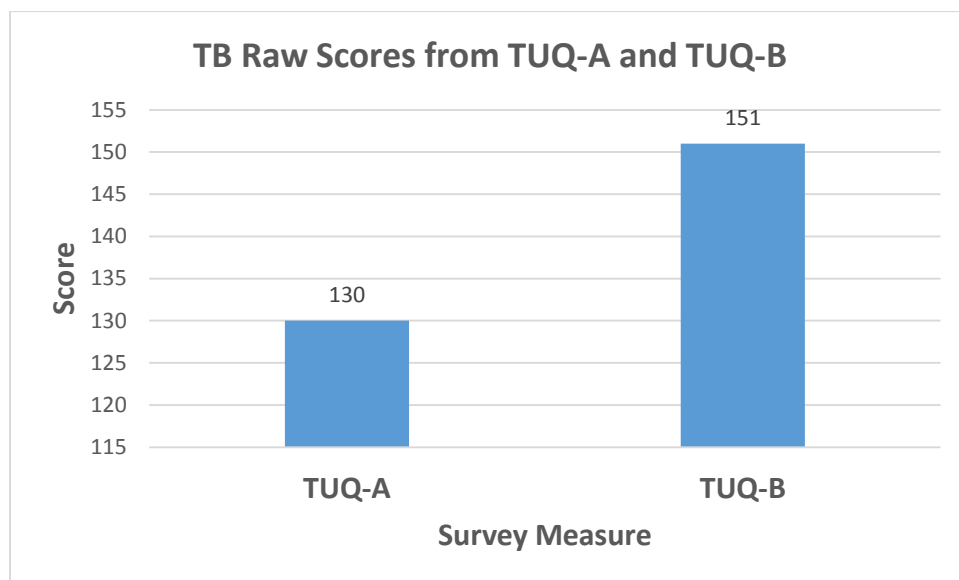
Survey Measure	TB Scores
TUQ-A	130
TUQ-B	151



Change in Score	+21
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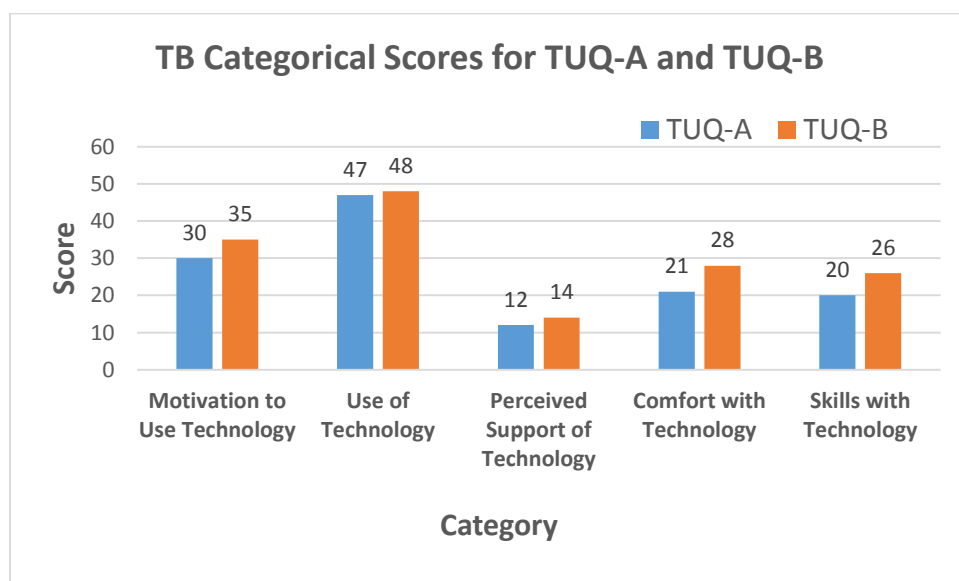
(Table 2 Text Description)

Figure 2: TB Raw Scores from TUQ-A and TUQ-B



(Figure 2 Text Description)

Figure 3: TB Categorical Scores for TUQ-A and TUQ-B



(Figure 3 Text Description)

### *Study NT.*

The data displayed in table 3 shows that the TUQ-A score for NT was 134, while the TUQ-B score was 145, resulting in an increase of 11 points towards the positive.

Figure 4 shows this information graphically. When looking at the data in terms of change scores between categories of TUQ items, there were differences in many of the item ratings and subsequent category totals between TUQ-A and TUQ-B, as shown in figure 5.

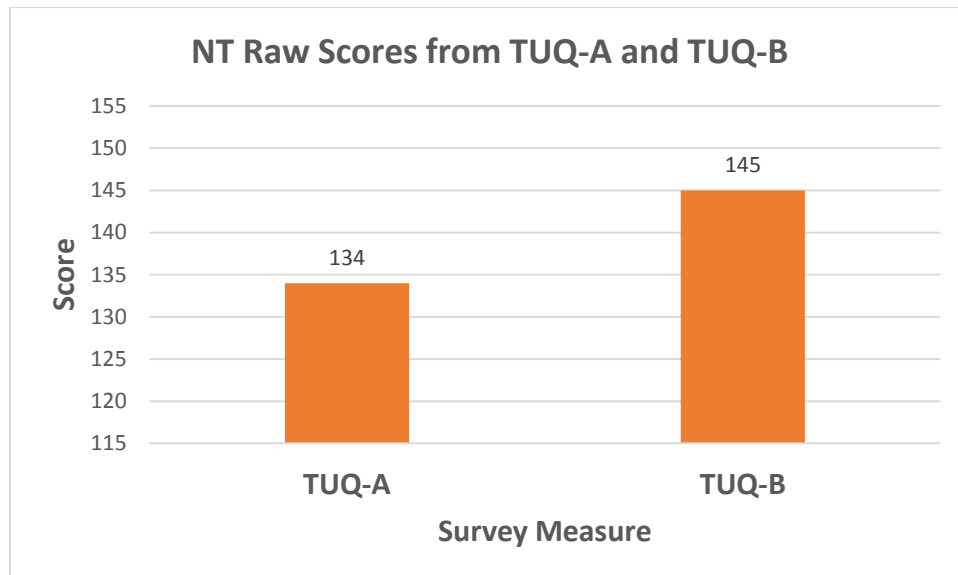
NT scores improved by 1 point in the Motivation to Use Technology category, 10 points in the Use of Technology category, stayed the same in the Comfort with Technology category, 6 points in the skills with Technology category, and finally decreased by 6 points in the Perceived Support of Technology category.

Table 3: NT TUQ-A and TUQ-B Scores

Survey Measure	NT Scores
TUQ-A	134
TUQ-B	145
Change in Score	+11

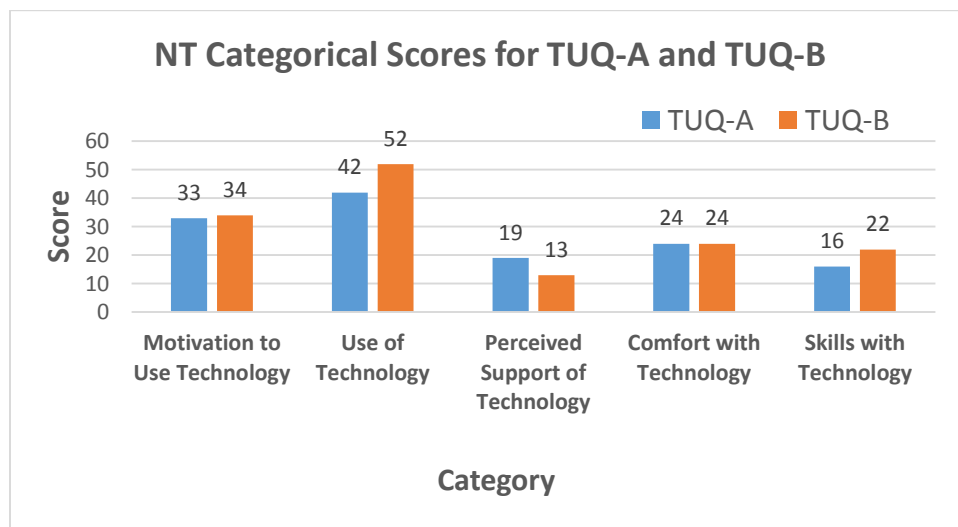
(Table 3 Text Description)

Figure 4: NT Raw Scores from TUQ-A and TUQ-B



(Figure 4 Text Description)

Figure 5: NT Categorical Change Scores for TUQ-A and TUQ-B



(Figure 5 Text Description)

Hypothesis 2 results.

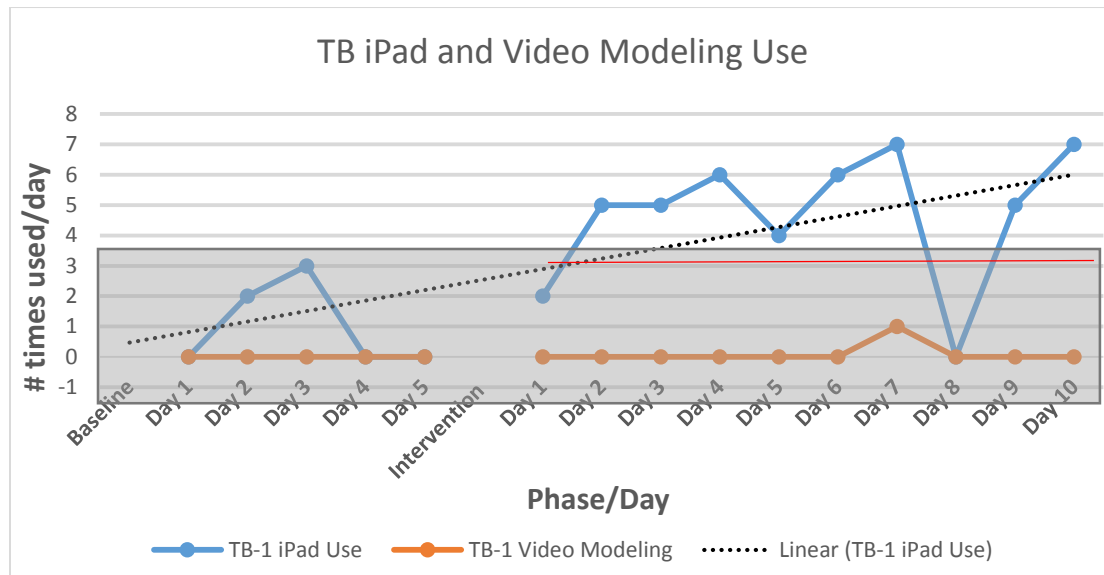
The null hypothesis 2 stated that there would be no differences in iPad and video modeling use from baseline to intervention. The alternative hypothesis 2 stated that there would be a difference in iPad and video modeling use from baseline to intervention.

### *Study TB*

The data shown in figure 6 reflects the differences in iPad and video modeling use from baseline to intervention in the TB study. The red line denotes value of the highest baseline point, which is identified to count the number of intervention points that exceed this point. This nonparametric method of percentage of non-overlapping data points (PND) calculates the percentage of non-overlapping to total number of intervention points. In this data set, 8/10 intervention data points do not overlap with the highest baseline point, to reveal a PND of 80%, which is moderately effective (Chenier, 2012). The black dashed trend line created using the equation  $y=0.346x + 0.122$  also indicates a steady increase in iPad use from baseline through the intervention phase. The gray shaded area indicates the two-standard deviation band. Eight intervention points fall outside this band, suggesting significant change from baseline to intervention.

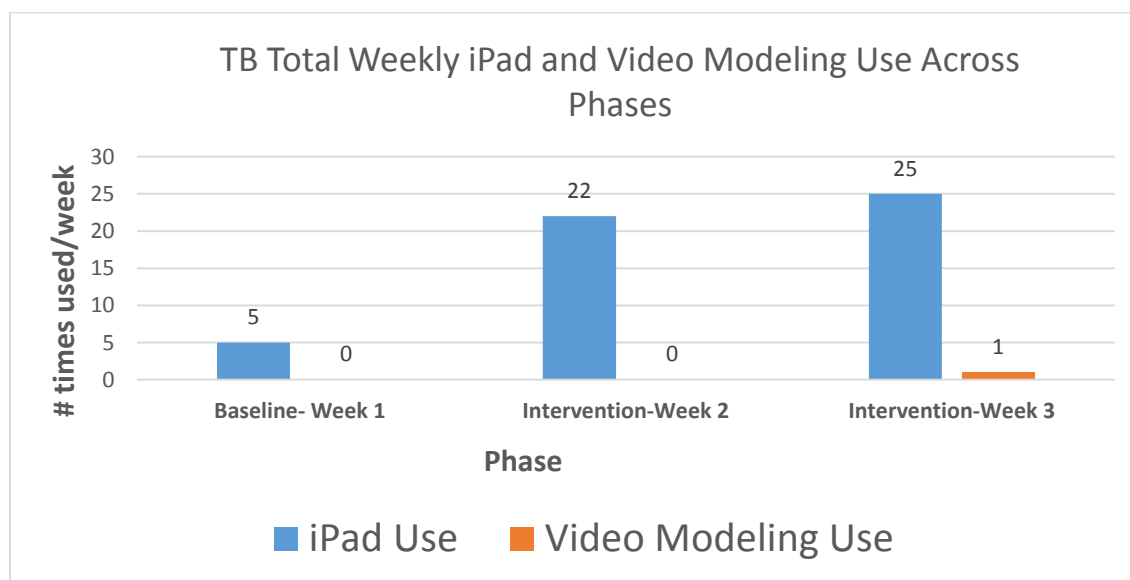
Figure 7 represents the weekly totals of iPad and video modeling use across baseline and intervention phases. During the baseline phase, subject TB reported using the iPad a total of 5 times. Subject TB reported using the iPad a total of 22 times during intervention-week 2, and 25 times during intervention-week 3. TB reported using video modeling only once throughout the study, during intervention-week 3 on day 7. Cumulatively during the study, subject TB reported using the iPad during the school day a total of 52 times.

Figure 6: TB iPad and Video Modeling Use



(Figure 6 Text Description)

Figure 7: TB Total Weekly iPad and Video Modeling Use Across Phases



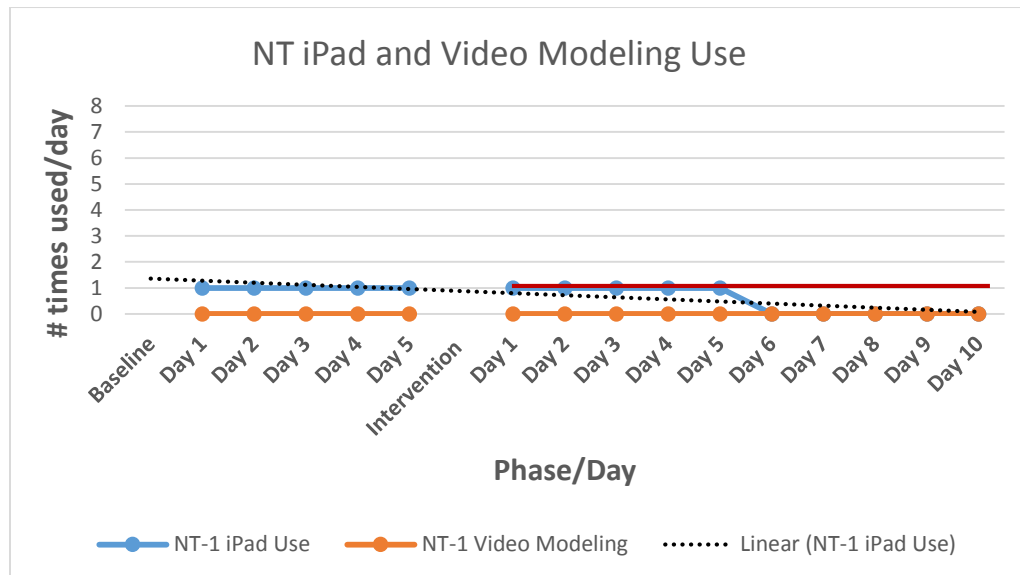
(Figure 7 Text Description)

### *Study NT*

Figure 8 displays iPad and video modeling use from the NT study. The red PND line indicates that all intervention points overlap with the highest baseline point of 1. This 0% PND suggests an ineffective intervention (Chenier, 2012). The black dashed trend line created using the equation  $y = -0.08x + 1.44$  shows a downward slope from the baseline through intervention, suggesting that use decreased after subject NT received the intervention. Since there was a lack of variability in the baseline phase, a two-standard deviation band was not appropriate for inclusion in NT data analysis.

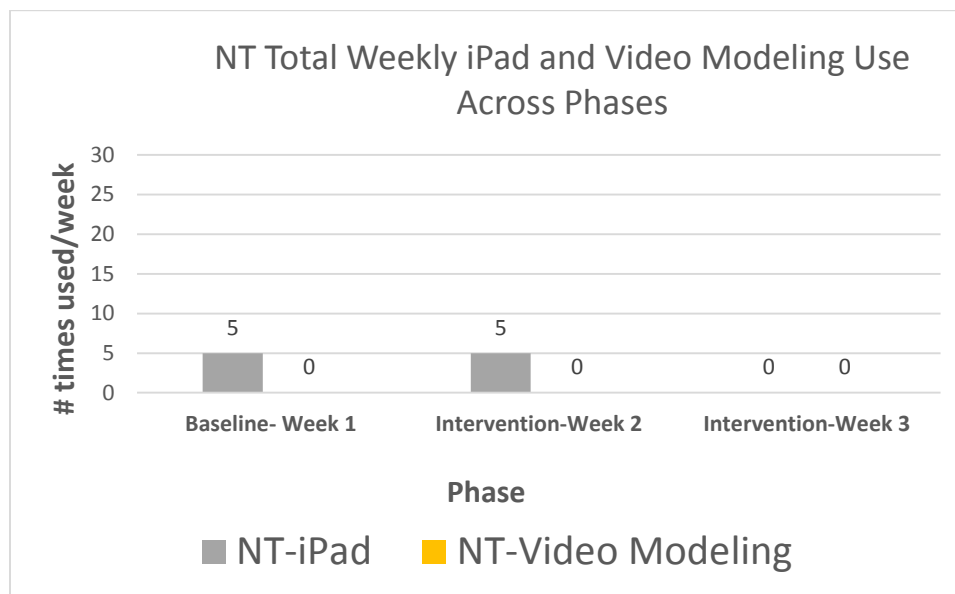
Figure 9 represents the weekly totals of iPad and video modeling use across baseline and intervention phases. During the baseline phase, subject NT reported using the iPad a total of 5 times, one time per day. During the intervention phase-week 2, subject NT reported using the iPad a total of 5 times. NT reported using the iPad zero times during intervention-week 3. NT also reported using video modeling zero times throughout the study. Cumulatively during the study, subject NT reported using the iPad a total of 10 times. For more detailed iPad use data within subjects, see Appendix H.2.

Figure 8: NT iPad and Video Modeling Use



(Figure 8 Text Description)

Figure 9: NT Total Weekly iPad and Video Modeling Use Across Phases



(Figure 9 Text Description)

For more detailed iPad use data within subjects, see Appendix H.2.

### Question 3 results.

#### *Study TB*

In terms of more qualitative results, the subject reported during the follow-up phone call that the protocol was helpful. A transcript of the phone call can be found in Appendix G.2. Subject TB stated, "It [the protocol] helped me understand the basic functions of the iPad better so that I could use it more easily." This subject reported attempting to make a video model for a student. Subject TB denied having any further questions about the protocols or feeling that something was missing from the protocols. This subject denied receiving any other technological training during the course of the study.

#### *Study NT*

In terms of qualitative results, subject NT stated that her attitudes towards iPad technology have not changed in any way. This subject reported attempting to make a video model for a student, but said that this occurred right after the intervention period. Subject NT denied having any further questions about the protocols or feeling that something was not included in the protocol that should have been. Subject NT also denied receiving any outside technological training during the study. However, the subject did report a lack of time and resources at her school position, and credited poor timing of the study and high stress in the department as limiting factors for her participation. The results of the follow-up phone call can be found in Appendix G.2.

### Discussion

The results obtained following visual analysis of the data from studies TB and NT were consistent with the hypotheses. These studies aimed to answer the questions: Will educators who receive iPad and video modeling protocols increase their use of the iPad as demonstrated



by increased reported daily use from baseline to intervention phases? Will educators who receive iPad and video modeling protocols positively increase their attitudes towards the iPad? And will educators who receive iPad and video modeling protocols report a change in attitude and/or behavior regarding the iPad during the follow-up phase? This discussion highlights the hypotheses within the context of each study, and then focuses on a general discussion of both studies together.

### Hypothesis 1.

Null hypothesis 1 stated that there would be no differences in TUQ scores from Survey 1 to Survey 2 for educators who receive intervention protocols, while the alternative hypothesis 1 stated that there would be a difference in TUQ scores from Survey 1 to Survey 2 for educators who receive intervention protocols.

The results indicate that there was a difference in TUQ scores from Survey 1 to Survey 2 for the subject who received teach-back. The numerical and graphical difference in scores from 130 to 151 seem to be sufficient to reject the null and accept the alternative hypothesis 1 for subject TB. This data reflects positively on the teach-back intervention and suggests that it did, in fact, change teacher attitudes towards the iPad in a positive way. This finding is consistent with the research on the effectiveness of teach-back as a strategy to improve the understanding and retention of shared information (Neptune & McLeod, 2012). It is possible that, with the increased understanding of the iPad, subject TB was more comfortable with using this device, leading to increased positive attitudes towards the iPad.

The results also indicate a difference in TUQ scores from Survey 1 to Survey 2 for the NT subject. The numerical and graphical differences in scores from 134 to 145 seem to be sufficient to reject the null and accept the alternative hypothesis 1 for subject NT. This data seems to

support the iPad and video modeling training protocols as effective in changing educator attitudes as measured by the TUQ.

Interestingly, even though TUQ-B scores for the subjects only differed by a few points (151 for TB and 145 for NT), visual analysis of the change scores suggests that there were item- and category-related differences between TB and NT scores. These changes were particularly notable in the areas of Motivation to Use Technology and Comfort with Technology.

### Hypothesis 2.

Null hypothesis 2 stated that there would be no differences in iPad and video modeling use from baseline to intervention, whereas the alternative hypothesis 2 stated that there would be a difference in iPad and video modeling use from baseline to intervention.

The results for hypothesis 2 indicate that there was a difference in iPad use from baseline to intervention phase for subject TB. As seen in the graphical representations of the data, iPad use increased profoundly after the baseline phase. Figure 7 shows that total iPad use more than quadrupled from baseline to intervention measurement for subject TB. This increase parallels the increased TUQ scores for subject TB, suggesting that this intervention was successful in increasing both use and positive attitudes towards the iPad. The PND, trend line, and two-standard deviation band analysis further support TB intervention effectiveness. The visual analysis conducted suggests that differences in iPad use for subject TB was significant enough to reject the null and accept the alternative hypothesis.

Conversely, subject NT showed steady iPad use of one time per day across baseline and week two after receiving the intervention, decreasing to 0 times per day during the third week. This decline to non-use may have reflected a disinterest or lack of confidence in iPad use

following intervention. These results suggest that difference in iPad use for subject NT were not significant enough to reject the null. Therefore, for subject NT, the null hypothesis 2 is accepted.

The results of data analyzing iPad and video modeling use across studies shows a marked difference between the two subjects. It was notable that both subjects used the iPad an equal 5 times during the baseline period, but after the intervention the TB scores vastly increased whereas NT scores stayed the same and then tapered off. This significant increase in use may reflect the TB protocol specifically, as subject TB may have felt more confident in using this device more often following their training. The PND data shown in figures 6 and 8 also supports the effectiveness of the TB intervention as compared to the NT intervention. In study TB, 80% of intervention data points did not overlap with baseline data points, suggesting that the intervention increased use. On the other hand, in the NT study 0% of the iPad use data during intervention was non-overlapping with baseline data, showing no change in use after the intervention. In other words, the TB PND reflects a moderately effective intervention, whereas the NT PND suggests an ineffective intervention.

It was interesting that, with the seemingly lower use of the iPad by NT suggested in visual analysis, that NT TUQ change scores in the area of Use of Technology increased by 10 points from TUQ-A to TUQ-B (see Figure 5). This inconsistency between measurements suggests that either subject NT's iPad use did not accurately reflect their feelings about iPad use or that the TUQ was not a sensitive enough instrument to reflect actual subject report of and feelings about use.

Results for video modeling use were not as significant for either study, however. Subject TB only reported using the iPad for video modeling with a student one time during day 7 of the intervention period. While this was technically an increase from the baseline, when TB reported

using video modeling 0 times, it does not constitute a meaningful change. It must also be considered that TB reported receiving one hour of professional technology training in video modeling prior to the study (Table 1), which may have affected that subject's willingness to try video modeling. Due to the lack of significant change in video modeling use during each study, the null hypothesis 2 in terms of video modeling must be accepted for both TB and NT.

### Question 3.

The qualitative results support the quantitative results of each study. Subject TB reported feeling more positive about the protocols, whereas subject NT reported a lack of time to fully engage and feeling more stress in general.

### General Discussion.

In terms of use, reported daily use of the iPad over the course of the study only increased for subject TB, whereas it stayed level and ultimately decreased for subject NT. This finding was interesting because subject NT reported more positive feelings in regards to iPad use in TUQ-B than in TUQ-A, but the use data did not reflect this reported attitudinal change.

In response to the question about attitudes towards the iPad, the results from these single-subject design experiments suggested that both teachers who received the protocols did positively increase their attitudes towards the iPad as demonstrated by increased scores from TUQ-A to TUQ-B. It is interesting to note that while the NT subject did show improvements in positive attitudes towards the iPad, they were not as significant as the gains shown by the TB subject. This reflects positively on the use of teach-back in educational settings, and suggests that this health literacy technique can translate into improved technology literacy in the form of iPad comfort and competency.

In response to the last question, the qualitative results seemed to support the quantitative results of this study. Notably, the reported feeling from both subjects that the protocols were helpful reflected an increase in TUQ scores following intervention across studies. However, subject TB seemed to hold the training in higher regard as compared to subject NT, reporting feeling that her attitudes towards iPad technology have changed as a result of the intervention. Subject NT seemed to have a difficult time implementing the ideas shared in the training due to reported lack of time and resources. She attributed poor timing for the study due to high stress in her department brought about by staffing issues and caseload management.

### Limitations

Although the researcher attempted to control as many conditions as possible, random measurement errors could have affected a subject's score because of purely chance happenings. For example, a subject may have misread or misunderstood a statement on the TUQ, causing them to select an inaccurate rating. Variation within the testing situation had the potential to cause scores to vary and influence reliability of the data collected. This was evident in subject TB's reports of stress and home life interference during the study. Another possible limitation is that the subject in the NT study who did not receive in-person intervention may not have taken sufficient time to go through the protocols or attempt all of the iPad functions included in the protocols because this training was self-initiated. In contrast, the subject from the TB study went through the protocols with the researcher, ensuring that all training protocols were reviewed in their entirety.

Even though the targeted population has been identified, the intended sample in this study was relatively small. Thus, additional studies will be needed in order to generalize findings to a larger sample. A threat to external validity with this design was the potential interaction of

treatment and testing. Because subjects were given a baseline measurement, there may have been reactive effects, which would not be present if this measurement weren't taken. Reactive effects can distort measures by altering subject reports or behavior due to their awareness of being measured (Portney & Watkins, 2009).

Since iPad use data was all based on self-report, there was a chance that subjects altered their responses to portray doing well in the study. Use documentation sheets were not collected daily, so there is also a chance that subjects did not fill these out consistently. For this reason, data may reflect an estimate rather than an exact count of times the iPad was used. The use data may also reflect ideal values of what each subject thought was most desirable. For these reasons, the self-reported nature of the data collection is another potential limitation.

A factor that limits what kind of conclusions can be drawn from subject data is the one hour of prior technology training that subject TB reported. This was not viewed as an inherent limitation to the study because she did not exceed the five-hour limit set for study eligibility. However, the researcher does not know how prior training may have influenced the subject's ability to learn new information about the iPad. This prior training could have been influential in how the subject learned and how comfortable they felt with the protocols.

The content of the TUQ may have been a limitation. Many of the items in the TUQ were not specifically related to the intervention, but were included for consistency and to maximize the amount of data collected that could be considered meaningful. For example, many of the items in the TUQ were related to curriculum and instruction using the iPad. While this might have been more relevant information in a school district where iPads were regularly used by all teachers for classroom instruction, this was not the case in Wauwatosa. Some items were simply

not targeted by the protocols, and might have been left out of the survey measurements for a more accurate portrayal of the training effects.

### Significance and Implications for Further Research

An overarching question guiding these studies asks if a teach-back protocol for iPad use and video modeling on the iPad would be feasible for training educators of children with ASD in a school setting, to which the study results suggest it is. Results indicated that using teach-back might benefit school districts that adopt iPads on a large scale by helping educators become more comfortable and skilled with this technology. This notion could be explored through a randomized controlled trial carried out in a district with more widespread use of iPads. In a larger study with many more subjects, it would be useful to look at three conditions in terms of iPad training, including: treatment per usual, NT, and TB. Including a treatment per usual condition would help to determine the effectiveness of the protocols to see if they really make a difference in use and personal attitudes towards the iPad, or if any sort of training might produce similar results.

Since the study did not yield conclusive or significant data in terms of video modeling use, a future study might isolate video modeling as the intervention, using basic competence in iPad use as inclusion criteria for study participation. Future research should also consider only including TUQ items specifically related to iPad use and video modeling in order to focus only on relevant data, and on areas addressed in the intervention. However, the TUQ might not have been an appropriate measure, so it may be beneficial to either limit the TUQ items used to those that are directly related to the study itself, or seek a more relevant and sensitive measurement instrument.

This study was designed to consider the iPad in its present technological state. Due to the ever-changing nature of technology, the protocols will need to be adapted as new versions of the iPad are released.



## V. CONCLUSION

This research provided new information about using a training protocol when training teachers in video modeling with the iPad. Results indicated that the iPad and video modeling protocols are feasible and may be effective for use in an elementary education setting. Although direct comparisons cannot be made across studies, it was interesting to note the non-change in NT use of the iPad while TB use changed quite significantly. Findings also support the teach-back strategy for iPad training as a way to enhance understanding of the device. This is encouraging for occupational therapists, who as healthcare providers aim to educate clients and colleagues in the most effective ways possible. The results of these studies also support the use of a mixed-methods study design to examine both quantitative and qualitative effects of the intervention.

As shown in this research, the teach-back iPad training protocol has potential to increase iPad use as well as positive attitudes towards the iPad. Implementing training such as this may help to increase widespread iPad use in elementary school-based settings. This could lead to educational and functional gains for students with ASD, who are shown to benefit from the use of this technology. Further research in a larger, controlled study is warranted for protocol use on a broader scale.

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## VII. APPENDICES

## Appendix A.1: IRB Approval

**New Study - Notice of IRB Exempt Status**

**Date:** January 31, 2014

**To:** Kris Barnekow, PhD  
**Dept:** Occupational Science and Technology

**Cc:** Alyssa Schmitz

**IRB#:** 14.238

**Title:** Feasibility of a Teachback Protocol when Training Teachers in Video Modeling with the iPad

Melissa Spadanuda  
 IRB Manager  
 Institutional Review Board  
 Engelmann 270  
 P. O. Box 413  
 Milwaukee, WI 53201-0413  
 (414) 229-3173 phone  
 (414) 229-6729 fax

<http://www.irb.uwm.edu>  
[spadanud@uwm.edu](mailto:spadanud@uwm.edu)

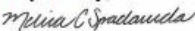
After review of your research protocol by the University of Wisconsin – Milwaukee Institutional Review Board, your protocol has been granted Exempt Status under **Category 1** as governed by 45 CFR 46.101(b).

This protocol has been approved as exempt for three years and IRB approval will expire on **January 30, 2017**. If you plan to continue any research related activities (e.g., enrollment of subjects, study interventions, data analysis, etc.) past the date of IRB expiration, please respond to the IRB's status request that will be sent by email approximately two weeks before the expiration date. If the study is closed or completed before the IRB expiration date, you may notify the IRB by sending an email to [irbinfo@uwm.edu](mailto:irbinfo@uwm.edu) with the study number and the status, so we can keep our study records accurate.

Any proposed changes to the protocol must be reviewed by the IRB before implementation, unless the change is specifically necessary to eliminate apparent immediate hazards to the subjects. The principal investigator is responsible for adhering to the policies and guidelines set forth by the UWM IRB, maintaining proper documentation of study records and promptly reporting to the IRB any adverse events which require reporting. The principal investigator is also responsible for ensuring that all study staff receive appropriate training in the ethical guidelines of conducting human subjects research.

As Principal Investigator, it is also your responsibility to adhere to UWM and UW System Policies, and any applicable state and federal laws governing activities which are independent of IRB review/approval (e.g., [FERPA](#), [Radiation Safety](#), [UWM Data Security](#), [UW System policy on Prizes, Awards and Gifts](#), state gambling laws, etc.). When conducting research at institutions outside of UWM, be sure to obtain permission and/or approval as required by their policies.

Contact the IRB office if you have any further questions. Thank you for your cooperation and best wishes for a successful project

Respectfully,  
  
 Melissa C. Spadanuda  
 IRB Manager

## Appendix A.2: IRB Informed Consent

### Part One

This study will be using a previously-developed iPad training protocol to teach elementary school educators how to use the iPad for video modeling. The protocol uses health literacy techniques, including verbal teach-back, to enhance learner understanding of the information presented. There will be two intervention conditions, one will be receiving the protocol and reviewing it remotely and one that will require going through the protocol face-to-face with the principal investigator, who will employ the teach-back strategy to help to ensure understanding. Educator iPad use will be reported throughout the study to see if receiving the protocol makes any difference in how often the educators use the iPad in general, as well as for video modeling. A baseline and follow-up questionnaire regarding educator attitudes and perceptions will help to determine if these feelings changed in response to the intervention.

### Part Two

## **Subjects**

### **A. Subjects/Participants Population**

#### **1. Sex, race, ethnic group, age range (Inclusion Criteria)**

Participants will be recruited from a population of elementary school teachers in Wauwatosa School District, as it is the location where the PI will complete 12 weeks of internship, during which data will be collected. Subjects will include a sample of teachers aged 25-65. Subjects may be either male or female and may come from any racial, ethnic, or socioeconomic background, as long as they are English-speaking. Subjects must have at least one year of teaching experience so that they are comfortable with the job itself before taking on extra training. They also must own/have consistent access to an iPad throughout the study because the study is examining iPad use. Subjects must have minimal prior technology training in video modeling (<5 hours), otherwise the protocol will not be of much value/use.

#### **2. Affiliation of subjects/ participants**

Elementary school teachers/staff in Wauwatosa, WI school district

## **II. Procedures**

### **A. Procedures for contacting and enrolling subjects/participants**

Word of mouth advertising will be done and study flyers will be distributed detailing the study intent and the SPI's contact information for participation inquiries. Recruitment will be done in Wauwatosa School District Elementary (K-5) schools, and



will start in February 2014. It will continue through March 2014, or as long as it takes to recruit up to 6 subjects, not to exceed past June 2014.

SPI will obtain verbal consent to participate in the study from each subject on the telephone after completing the eligibility screening and explaining the study facets from the informed consent form. Then, potential subjects will be sent two copies of the informed consent; the subject will keep one copy and the second copy will be sent back to the PI to be kept on file.

#### **B. Information to be gathered and means of collecting/recording**

A demographic form will be used to collect: School position, highest level of education attained, grade level assignment, experience, age, gender, email address, school location, phone number, and last four digits of SSN. This information will be collected during a screening call to determine eligibility for the study. The screening phone call will take no longer than 20 minutes.

Subjects will complete a pre-intervention questionnaire once the PI receives their signed informed consent and a post-intervention questionnaire after the intervention phase is complete. The questionnaires will collect identical information about the subjects' attitudes and perceptions towards the iPad and video modeling. Each questionnaire will take 15-20 minutes to fill out, and will be completed at each subject's convenience.

Throughout the 1, 2, or 3-week baseline period as determined by randomization of baseline phase length, and throughout the 2-week intervention period, subjects will complete weekly iPad use documentation forms on which they will record the number of times they used the iPad and video modeling each school day. Recording these two values will take less than one minute each day.

A follow-up phone call will occur 14 days from when the subject received the intervention. This phone call will last 15-30 minutes, depending on subject's comfort with the protocol and also their time availability.

#### **C. Personnel interacting with the subjects/participants**

This study requires that the subjects interact with one student primary investigator. The student primary investigator is Alyssa Schmitz, BS, OTS. The investigator is a graduate student in occupational therapy and is responsible for all study procedures. The study will be completed under the supervision of the primary investigator, Dr. Kris Barnekow, Assistant Professor Department of Occupational Therapy in Enderis Hall room 996. Dr. Barnekow will not be responsible for administration of study procedures.

#### **D. Location of human subject involvement**

If subject is randomly assigned to the teach-back condition, he/she will organize a time with the SPI either 1, 2, or 3 weeks after they start baseline documentation to hold a 1-1.5 hour training session in the district where they work. All efforts will be

made to hold training sessions in a convenient location for each particular teacher and after normal school hours.

If the subject is randomly assigned to the no-teach-back condition, they will receive the intervention protocol materials, in word document and PowerPoint formats, through their school email address and will review the materials on their own time. The protocol should take no longer than 1-1.5 hours to go through one time.

#### **E. Duration of the project**

Data collection, screening, recruitment, enrollment, or consenting activities will not begin before 02/14/2014. Expected end date for data analysis, queries, and paper write-up will not exceed 12/31/2014.

#### **F. Payment**

This study involves incentives or compensation to the subjects. Subjects will receive a \$15 iTunes gift card once the subject has completed and returned the post-intervention questionnaire, signifying completion of the study requirements. However, the confidentiality of the subjects is not a serious issue, as providing the last four digits of their social security number for payment will not pose a serious risk to subjects.

#### **G. Confidentiality**

All demographic information will be stored both on paper and in an electronic spread sheet in a locked drawer and secure computer in Enderis Hall Room 979 and will be kept separate from the other study data. No recordings of any kind will be done as part of this study. The only people who can access identifiable information will be the SPI and the PI. Data will not be retained for uses beyond this study.

### **III. Risks and Benefits**

#### **A. Beneficial Research**

The findings from this research may have slight benefits to the subjects as they may learn something new about iPads. The results of this study will demonstrate whether iPad protocols using teach-back are a feasible and effective method to enhance teacher use and understanding of the iPad and its features. Another potential benefit is that there could be an indirect increase in function and iPad use for students who benefit from the use of video models in order to appropriately perform school activities.

#### **1. Immediate/long-range risks**

The risk for participation is minimal and the anticipated benefits to future students and teachers outweigh the minimal risks posed by the study.

### **V. Informed Consent Document**

See attached pages.

#### **Informed Consent Document**

**Title:** Feasibility of a Teach-back Protocol when Training Teachers in Video Modeling with the iPad

**Description:** You are being asked to participate in a research study because you are an educator who may be interested in learning more about the iPad for video modeling. Your participation is completely voluntary. You do not have to participate if you do not want to.

The purpose of this study is to implement a protocol for training educators in how to use the iPad in order to create video models. The intent of video modeling is to use video recording and display to provide visual models of targeted functional behaviors, including self-care skills such as shoe-tying or school-based skills such as handing in assignments or going through the lunch line. Children with autism spectrum disorder (ASD) often lack knowledge of appropriate self-care and social skills, and the videos aim to model desirable behaviors in an engaging and motivating way.

This study is being done to determine if an iPad training protocol using a teach-back strategy can feasibly be done in an educational setting in order to change teacher use and/or perceptions of this technology. The study will be carried out in Wauwatosa, Wisconsin school district and will involve elementary level teachers.

The intended number of subjects is 2-6. If they qualify for the study, subjects will be asked to record their iPad usage each week of the 5-week study on documentation forms provided electronically each week by the Student Principal Investigator (SPI). During the baseline phase, subjects will first complete a pre-treatment Technology Use Questionnaire (TUQ) to establish a baseline of attitudes and perceptions towards iPad technology and classroom use. During the intervention phase of 2 weeks, each subject should expect to commit to spending 1-1.5 hours of time on reviewing the protocol itself. After the intervention, the SPI will conduct a follow-up phone call of 10-30 minute duration that will take place to ensure understanding and to evaluate more qualitative effects of the intervention. The last requirement is that the subjects will complete a post-treatment TUQ. This questionnaire will not take longer than 30 minutes to complete each time, to make the total time commitment around 3-4 hours for each subject.

The SPI will recruit subjects through informational flyers created by the SPI and distributed by the SPI's fieldwork educator to teachers in Wauwatosa, WI elementary schools. The flyers will contain brief study information and will instruct interested subjects to contact the SPI for more information. Once interested subjects contact the SPI through a phone call, the SPI will first complete a verbal eligibility screening of demographic information to determine if the individuals qualify for the study. The exclusion criteria include: being under 25 or over 65, having less than one year of teaching experience, not owning an iPad, and having extensive prior technology training. Once eligibility is determined, the SPI will give the potential subject a verbal description of informed consent so that they are aware of the purpose and procedures of the study. The SPI will then obtain verbal consent from the subjects to participate in the study. Once verbal consent is given, the SPI will mail two copies of the informed consent form, the demographic form, and one pre-treatment questionnaire to each subject with return envelopes included.

Once the subjects each return one signed informed consent form and the completed pre-treatment questionnaire and demographic form, the SPI will randomly assign each subject to a training condition using a random number calculator called QuickCalcs. Subjects will receive either face-to-face training or remote training for the iPad protocol during the intervention phase. Remote training will also be known as no teach-back (NT). The SPI will send the NT subjects the intervention materials through school email. The subjects who receive face-to-face training will be known as the teach-back condition (TB), and the SPI will schedule a 1-1.5 hour appointment with them to carry out their iPad training during the intervention phase.

In addition to being assigned to a treatment condition, the non-concurrent multiple baseline design requires variation in baseline. Thus, subjects will be randomly assigned to a baseline intervention sequence dependent upon the random number generator. Subjects will be assigned to either 1-, 2-or 3-week baseline lengths in addition to being assigned to NT or TB training condition. With 6 subjects, there will be 2 subjects (NT/TB) in each sequence (A, B, or C).

Sequence A: 1-week baseline + 2-week intervention= 3 weeks total

Sequence B: 2-week baseline + 2 week-intervention=4 weeks total

Sequence C: 3-week baseline + 2-week intervention=5 weeks total

Each subject will receive a follow-up phone call from the SPI two weeks from the start of intervention period (i.e. at either 3, 4, or 5 weeks).The phone call will last 10-30 minutes, depending on the amount of questions and/or feedback each subject chooses to express. During the phone call, the SPI will remind each subject of completing the post-questionnaire. Once the SPI receives the completed post-questionnaire, the gift card will be distributed.

**Procedures:** If you agree to participate in this study, you will be asked to fill out a questionnaire assessing your prior knowledge of iPads and video modeling using an adapted Technology Use Questionnaire (TUQ). You will then review a 1-1.5 hour intervention protocol outside of normal school hours. You will also be asked to chart your iPad and video modeling use over the duration of the 3, 4, or 5-week study. A 10-30 minute follow-up phone call will take place 2 weeks after you receive the intervention. After the phone call, you will again be assessed on your feelings and perceptions towards the iPad with the adapted TUQ.

**Risks and Benefits:** There are no foreseeable risks by participating in this research study. The only slight inconvenience to subjects will be the time commitment for protocol review/training session, documentation, questionnaire completion, and follow-up phone call.

Subjects will directly benefit from receiving training in how to use iPads in order to provide video models for children with whom they regularly interact. By making these video models, subjects will foreseeably help their students to improve their social behaviors and skills. Video support has been shown to be a positive behavioral support for children with ASD, and

video modeling has resulted in quicker rates of acquisition and increased in behavior generalization in social contexts.

You will be compensated with a \$15 iTunes gift card for taking part in this research study once all study materials are completed are returned to the SPI. It is assumed that the knowledge and insight that you will gain by using the protocols will be of benefit to you and your students, as you increase your understanding and competence in iPad use for video modeling.

**Safeguards:** All information collected about you during the course of this study will be kept confidential to the extent permitted by law. No individual participant will ever be identified with his/her research information. At the beginning of the study we will collect demographic information and assign you an identification number, after this point all of your information will only contain your identification number. The demographic information will be stored both on paper and in an electronic spread sheet in a locked drawer and secure computer in Enderis Hall Room 979 and will be kept separate from the other study data. I may decide to present or publish the results of this study in scientific/educational journals or conferences. However, information that identifies you personally will not be released and only aggregate data will be presented. Only the SPI and supervisor will have access to identifying information. All identifying information collected for this study will be destroyed after the study is complete.

The Institutional Review Board at UW-Milwaukee or appropriate federal agencies like the Office for Human Research Protections may review this study's records.

In order to obtain the iTunes gift card, the subjects will submit the last four digits of their social security numbers before fund disbursement takes place. Since the SPI is not using university funds for this stipend, collecting just the last four digits will ensure subject confidentiality while creating a record that the subjects received the stipend they were promised.

**Freedom to Withdraw:** Your participation in this study is entirely voluntary. You may choose not to take part in this study. If you decide to take part, you can change your mind later and withdraw from the study. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with the University of Wisconsin-Milwaukee.

If you should decide to withdraw early or completely, the information collected up to that point will be used.

**Voluntary Consent:**

For more information about the study or the study procedures or treatments, or to withdraw from the study, contact:

Alyssa Schmitz, OTS (SPI)

Department of Occupational Science and Technology

University of Wisconsin-Milwaukee

PO Box 413

Milwaukee WI 53201

(920)728-1052

alyssa.schmitz12@gmail.com

Kris Barnekow, PhD., OTR/L

Department of Occupational Science and Technology

University of Wisconsin-Milwaukee

PO Box 413

Milwaukee WI 53201

(414)-229-7151

krisb@uwm.edu

For questions about my rights or complaints towards my treatment as a research subject, contact:

Institutional Review Board

Human Research Protection Program

Department of University Safety and Assurances

University of Wisconsin – Milwaukee

P.O. Box 413

Milwaukee, WI 53201

(414) 229-3173

The Institutional Review Board may ask your name, but all complaints are kept in confidence.

**Research Subject's Consent to Participate in Research:**

*To voluntarily agree to take part in this study, you must sign on the line below. If you choose to take part in this study, you may withdraw at any time. You are not giving up any of your legal rights by signing this form. Your signature below indicates that you have read or had read to you this entire consent form, including the risks and benefits, and have had all of your questions answered, and that you are 18 years of age or older.*

---

Printed Name of Subject/ Legally Authorized Representative

\_\_\_\_\_  
Signature of Subject/Legally Authorized Representative

\_\_\_\_\_  
Date

**Research Subject's Consent to Audio/Video/Photo Recording:**

It is okay to audiotape/videotape me while I am in this study and use my audiotaped/videotaped data in the research.

Please initial: \_\_\_\_ Yes \_\_\_\_ No

This research project has been approved and granted Exempt Status under Category 1 as governed by 45 CFR 46.101(b) by the University of Wisconsin-Milwaukee Institutional Review for the protection of Human Subjects for a three year period.

IRB # 14.238 approved January 31, 2014

## Appendix B: Recruitment Flyer





FROM GENERAL  
NAVIGATION  
STRATEGIES TO  
CREATING  
VIDEO MODELS

—

PART OF A  
GRADUATE  
THESIS

—

FREE OF  
CHARGE

—

STIPEND  
INCLUDED  
UPON  
COMPLETION OF  
STUDY

—

TIME  
REQUIREMENT:  
3-4 hours total

# ATTENTION TEACHERS: iPad Training Study

## Learn how to use your iPad for video modeling!

To take part in this study, you must:

- Be between the ages of 25-65
- Have at least 1 year of teaching experience
- Have minimal prior technology training in video modeling
- Have an iPad

If interested,  
please call Alyssa  
for more  
information at:

**920.728.1052**

## Appendix C: Demographics Form

## Demographics

Name:

ID:

**Assignment**

As a teacher, what best describes your assignment?

- ☐ Elementary or Self-Contained
- ☐ Language Arts
- ☐ Math
- ☐ Foreign Language
- ☐ Social Studies
- ☐ Science
- ☐ Family and Consumer Science
- ☐ Industrial Technology
- ☐ Business
- ☐ Music
- ☐ PE/Health
- ☐ Art
- ☐ Special Education
- ☐ Gifted and Talented
- ☐ Computer Specialist

☐ Agriculture

### Education

What is the highest educational level you have attained?

☐ High School

☐ Bachelors

☐ Masters

☐ Doctorate

### Grade level assignment

What best describes your grade level assignment?

☐ Kindergarten

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

### Experience

How many years have you worked in education?

How many hours of technology professional development have you completed in the last two years?

Please enter the year of your birth. (Example: 1975)

**Gender**

What is your gender?

☐ Female

☐ Male

Email Address:

Location where you would like materials to be sent (Mail Address/Classroom Location):

Phone Number:

## Appendix D: Instrumentation

### Appendix D.1: Original TUQ

#### Technology Use Questionnaire

##### Computer Access

Yes      No

Do you have computer access at school?

Do you have computer access in your classroom?

##### Questionnaire

Please indicate how strongly you agree or disagree with each statement.

Strongly Disagree      Disagree      Neither Disagree nor Agree      Agree      Strongly Agree

-I am motivated to find ways to use the computer(s) in my classroom.

-I assign daily or weekly computer-related tasks that support my curriculum (analyzing data from a survey, creating multimedia presentations that showcase students' understanding of important content, researching information via CDs or the Internet).

-My students have access to all forms of technology and computers at any time during the instructional day.

-I provide short-term (daily or weekly) assignments using the classroom computer(s) that emphasize the use of different software applications (such as spreadsheets, databases, Internet use, multimedia).

-I alter my instructional use of the classroom computer(s) as I gain new knowledge of software applications and research on teaching and learning.

-One of my technology goals is for students to be able to use the classroom computer as another tool for learning.

-I find computers to be an important part of classroom instruction.

-I seek professional development that maximizes the use of the computers and technology available to my students.

-I allocate time for students to practice their computer skills on the classroom computer(s).

-My students eagerly pursue the use of the classroom computers.

-Using the classroom computer(s) is a priority for me this school year.

-I use the computer for my own continuing education.

I have enough time to use the classroom computer(s).

-I need more and/or more current computers in order to use technology with my classroom instruction.

-I have an immediate need for more professional development in order to design student-centered, integrated curriculum units that use the classroom computer(s) in a seamless fashion.

-My students use the Internet for collaboration with others, including joint publishing, communicating, and researching to solve authentic problems.

-I seek out activities that promote increased problem-solving and critical thinking using the classroom computer(s).

- I plan computer-related activities in my classroom that will improve my student's basic skills (e.g., reading, writing, math computation).
- In my classroom, students use technology-based computer and Internet resources beyond the school (NASA, other government agencies, private sector) to solve authentic problems.
- One of my professional goals is to learn more ways to use computers in seamless instruction (i.e., it is as easy for me as using a chalkboard.)
- It is easy for me to design student-centered, integrated curriculum units that use the classroom computer(s) in a seamless fashion.
- I prefer to use existing curriculum units that integrate the classroom computer(s) with authentic assessment and student relevancy rather than building my own units from scratch.
- I use my students' interests, experiences, and desires to solve authentic problems when planning computer-related activities in my classroom.
- Using available technology and computers, I have expanded the horizons of instructional computing in my classroom.
- I use integrated curriculum units that place heavy emphasis on complex thinking skills, computer use, and student relevancy to the real world.
- I use my classroom computer(s) primarily to track grades and/or answer email.
- I rely on others (student assistant, parent volunteer, close friend) to do my computer-related tasks for me in my classroom.
- I access the Internet quite frequently.

- I am proficient with basic software applications (word processing, Internet applications, CD ROMs, Games).
- I am proficient with at least one multimedia authoring tool (such as HyperStudio, PowerPoint, KidPix, or AppleWorks).
- I integrate the most current research on teaching and learning when using the classroom computers.
- I have the background to show others how to merge technology with integrated, thematic curricula.
- I am very comfortable using a computer.
- I find the use of computers to be practical for my students.
- I am able to troubleshoot various software problems such as translations, compression of image files, and cross-platform issues.
- I actively participate in online collaboration opportunities.

## Appendix D.2: Adapted TUQ

### Adapted Technology Use Questionnaire

ID:



**iPad Access**

Yes

No

Do you have iPad access at school?

☐☐

Do you have iPad access in your classroom?

☐☐**Questionnaire:** Please indicate how strongly you agree or disagree with each statement.

Strongly Disagree

Disagree

Neither Agree nor  
Disagree

Agree

Strongly Agree

One of my technology goals is for students to be able to use the iPad as a tool for learning.

☐☐☐☐☐

My students eagerly pursue the use of iPads.

☐☐☐☐☐

My students have access to many forms of technology, including iPads at any time during the instructional day.

☐☐☐☐☐

I provide short-term (daily or weekly) assignments using iPads that emphasize the use of different software applications (spreadsheets,

☐☐☐☐☐

databases,  
Internet use,  
multimedia,  
apps).

I need more  
and/or more  
current iPads in  
order to use this  
technology within  
classroom  
instruction.

☐☐☐☐☐

I am motivated to  
find ways to use  
the iPad in my  
classroom.

☐☐☐☐☐

I find iPads to be  
an important part  
of classroom  
instruction.

☐☐☐☐☐

I have enough  
time to use iPads  
in the classroom.

☐☐☐☐☐

I allocate time for  
students to  
practice their iPad  
skills in the  
classroom.

☐☐☐☐☐

I assign daily or  
weekly iPad-  
related tasks that  
support my  
curriculum.

☐☐☐☐☐

Using the iPad is a priority for me this school year. ☐ ☐ ☐ ☐ ☐

I use the iPad for my own continuing education. ☐ ☐ ☐ ☐ ☐

One of my professional goals is to learn more ways to use iPads for seamless instruction (i.e., it is as easy for me as using a chalkboard). ☐ ☐ ☐ ☐ ☐

I alter my instructional use of iPads as I gain new knowledge of software application and research on teaching and learning. ☐ ☐ ☐ ☐ ☐

I have an immediate need for more professional development in order to design student-centered, integrated curriculum units that use iPads in a seamless fashion. ☐ ☐ ☐ ☐ ☐

I seek professional development that maximizes the use of iPads and technology available to my students.

☐☐☐☐☐

I seek out activities that promote increased problem-solving and critical thinking using the iPad.

☐☐☐☐☐

I plan iPad-related activities in my classroom that will improve my student's basic skills (e.g., reading, writing, math computation).

☐☐☐☐☐

I integrate the most current research on teaching and learning when using the classroom computers and/or iPads.

☐☐☐☐☐

I am proficient with basic iPad

☐☐☐☐☐

use and  
application.

It is easy for me to  
design student-  
centered,  
integrated  
curriculum units  
that use the  
classroom iPad(s)  
in a seamless  
fashion.

☐☐☐☐☐

I prefer to use  
existing  
curriculum units  
that integrate the  
classroom iPad(s)  
with authentic  
assessment and  
student relevancy  
rather than  
building my own  
units from  
scratch.

☐☐☐☐☐

I find the use of  
iPads to be  
practical for my  
students.

☐☐☐☐☐

Using available  
technology and  
iPads, I have  
expanded the  
horizons of  
instructional  
computing in my  
classroom.

☐☐☐☐☐

I feel that my district supports the use of iPads in the classroom and curriculum.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

I am very comfortable using an iPad.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

I access the Internet quite frequently.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

My students use iPads for collaboration with others, including joint publishing, communicating, and researching to solve authentic problems.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

I am proficient with at least one multimedia authoring tool (such as iMovie).

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

In my classroom, students use technology-based computer/iPad and Internet resources beyond the school (government agencies, private

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

sector) to solve authentic problems.

I use my students' interests, experiences, and desires to solve authentic problems when planning iPad-related activities in my classroom.

☐☐☐☐☐

I use integrated curriculum units that place heavy emphasis on complex thinking skills, iPad use, and student relevancy to the real world.

☐☐☐☐☐

I am able to troubleshoot various software and navigation problems on the iPad.

☐☐☐☐☐

I actively participate in online collaboration opportunities.

☐☐☐☐☐

I rely on others (student

☐☐☐☐☐

assistants, parent volunteers, close friends) to do my computer-, iPad- or technology-related tasks for the classroom.

I have the background to show others how to merge technology with integrated, thematic curricula.

☐☐☐☐☐

After training, I feel that I could use the iPad in an effective manner in my classroom.

☐☐☐☐☐

I feel positively towards integrating the iPad into my classroom and curriculum.

☐☐☐☐☐

Parents of my students support the integration of the iPad into the classroom and curriculum.

☐☐☐☐☐

I feel that I would be adequately

☐☐☐☐☐



supported by  
school/district IT  
services when  
technological  
issues arise with  
iPad use.

I am motivated to  
use video  
modeling with my  
students.

☐☐☐☐☐

I have students on  
my caseload who  
could benefit  
from the use of  
video modeling  
(students who  
have ASD).

☐☐☐☐☐

I have experience  
with video  
modeling.

☐☐☐☐☐

I feel comfortable  
creating video  
models for  
students.

☐☐☐☐☐

## Appendix D.3: iPad Use Documentation Sheet

Code:

Phase:

**iPad Use Documentation Sheet**


<b>Day</b>	1. How many times per day did you use the iPad in your classroom?	2. How many times per day did you use video modeling with a student?
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		

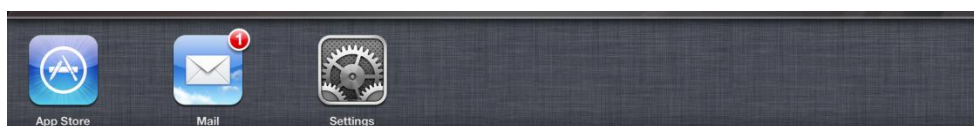
## Appendix E: iPad Training

### Appendix E.1: Basics to the iPad Handout

# Basics to using the iPad

## Vocabulary:

- App: This term is the shortened version of “Application”. Apps are the programs that you can download and use on your iPad.
- Home Button: On the outside rim of your iPad you will see a button which looks like this:  When this button is pushed it will bring you back to the main screen, also called the “home” screen
- Status Bar: When you push the Home Button two times, the “Status Bar” will appear at the bottom of the screen. This will show which apps are active. The Status bar looks like this:








If you touch an app’s icon in the status bar it will open. If you hold your finger on the icon for a few seconds the icon will begin to shake and you will see this icon



appear in the corner: Touching this icon will allow you to close the app.

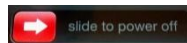
Press the home button to stop the apps from shaking.


## Icons:

	<p>This icon shows that the iPad is connected to wireless internet</p>
	<p>This icon means, “share”. Pushing it will allow you to e-mail a document, share it on a social media website or open a document in another program.</p>
	<p>This icon indicates how much battery power is left on the iPad.</p>
	<p>This icon means, “delete”. This will delete the document that is in use on the device.</p>
	<p>This icon is the “search” icon. When you press this icon, your keyboard will appear and you can type in the topic or item you want to search for.</p>

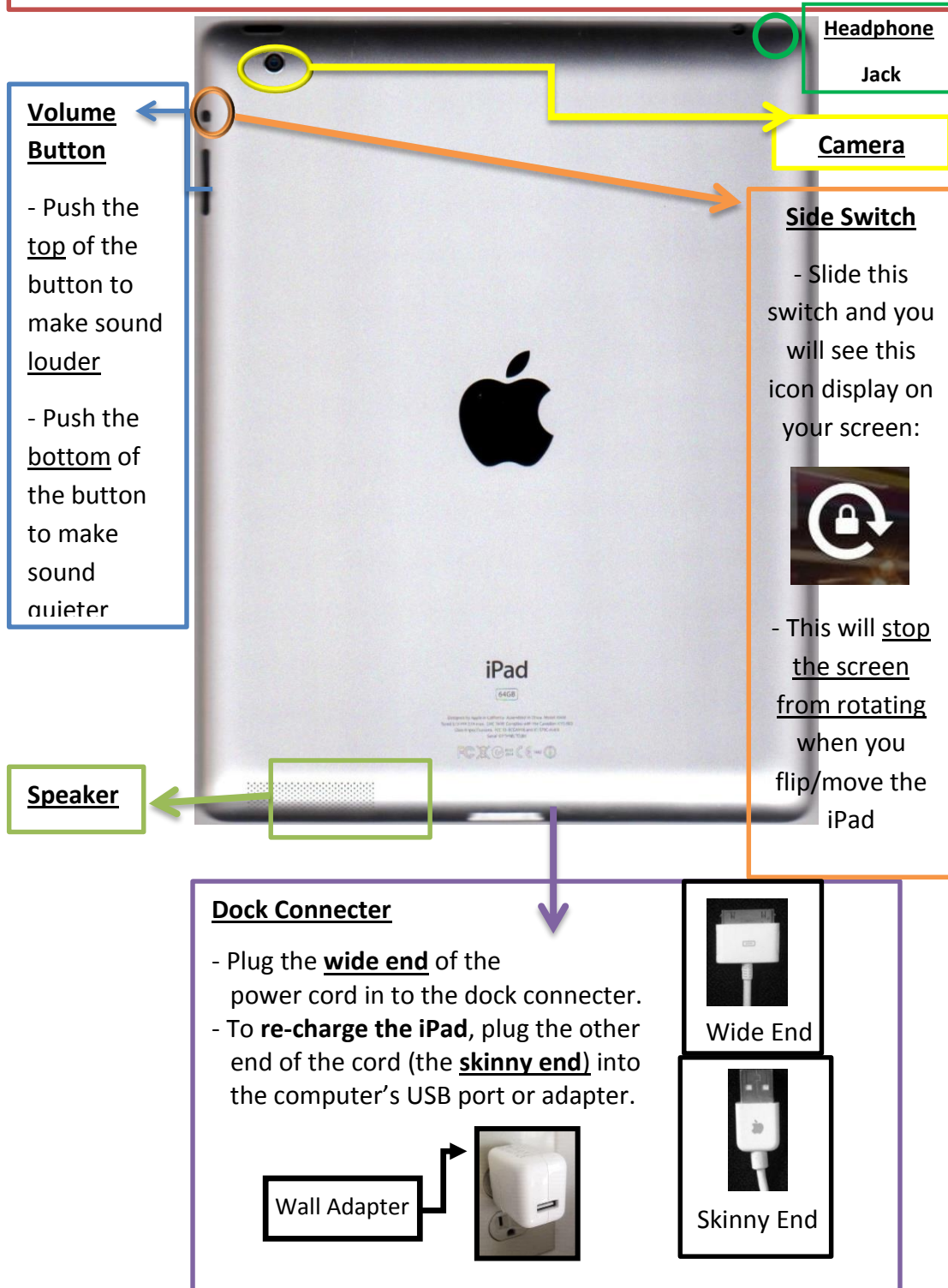
### Power On and Off Button:

- Activate screen: Push **once** to turn the screen on or off
- Power Off: **Hold button down** for a few seconds until you see this:



Place your finger on the  and slide your finger to the right to power off.

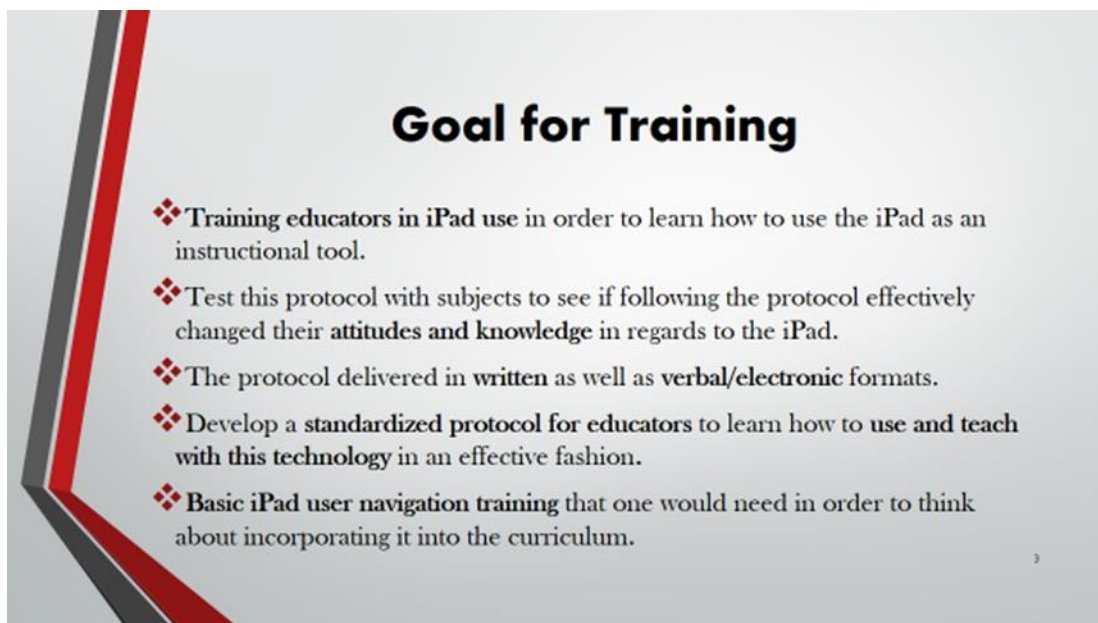
- Power On: **Hold button down** for a few seconds to power iPad on.



iPad notes for: \_\_\_\_\_

Date: \_\_\_\_\_

## Appendix E.2: iPad Training PowerPoint (1<sup>st</sup>-3<sup>rd</sup> generation)



## Why use the iPad as an instructional tool in schools?

- The iPad inspires **creativity** and **hands-on** learning.
- **Students** are **motivated** to use this exciting and interactive tool.
- With **textbooks** on the iPad, students can get a brand-new, up-to-date version each year for a fraction of the price of a paper book.
- At the App Store, there are over **20,000 educational apps** for all kinds of learners.
- It is **accessible**- the iPad comes with a screen reader, support for playback of closed-captioned content, and other innovative universal access features.
  - No extra software to install.
  - Easily adaptable for use by students with learning, physical, vision, or hearing disabilities.

5

## How to Navigate on the iPad

- Most navigation on the iPad is done through **simple touch gestures**.
- Touch an icon to select an application.
- Swipe your finger left or right across the screen to move from one screen of icons to the next.
- Touch and hold your finger down on an icon to move it somewhere else.



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## Important Vocabulary

- Home Button
- App
- Status Bar

9

## The iPad Home Button



- The **Home button** is the circular button with a square on it found at the bottom outer rim of the iPad.
- Uses of the **Home button**:
  - Brings you back to the main or “home” screen
  - Waking up the iPad when you are ready to use it
  - Exiting out of applications (“apps”) or special modes
  - Use in combination with the suspend button at the top of the iPad to take a screenshot
  - Double click the **Home button** to access a list of recently opened apps

## iPad Apps

- “App” is the shortened version of “Application”. Apps are the programs that you can download and use on your iPad.

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## Finding iPad Apps

- To get to the App Store, tap on the [App Store icon](#) on the iPad home page
- Once in the App Store, you can search by the name of the app you are looking for by typing it in the [search box](#).
- Or, you can search by [category](#).



## Downloading iPad Apps

1) To select the app, touch the gray box.

2) When you touch the gray box, it will turn green. Touch the green box to install the app.

3) Some apps are free.

4) Other apps you must purchase.



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## Moving iPad Apps

- Once you have downloaded an app from the App Store, you can move it to another screen by placing your finger and holding it down on the icon until all the icons start shaking. All of the icons should have a black 'x' in the corner.
- This is called the "move state".
- To move icons, simply hold your finger down on top of the icon in the "move state" and drag your finger across the screen.
- If you want to move the icon to a different screen, slide your finger to the edge of the screen and the iPad will shift to the screen to the left or right, depending on which edge you hold your finger near.
- To place the icon, lift your finger off the screen.
- To exit the "move state", click the home button.



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## Deleting iPad Apps




- Delete apps by getting to the “move state” discussed previously.
- Simply **tap the black ‘x’** over the icon from the app you wish to delete.
- The iPad will confirm your choice before deleting permanently.
- Default applications such as the App Store and iTunes will not have a black ‘x’ over the icon, because you are not allowed to delete their apps.<sup>21</sup>

## Status Bar

- When you push the Home Button two times, the “Status Bar” will appear at the bottom of the screen. This bar will show which apps are active. The Status Bar looks like this:



- If you touch an app’s icon in the status bar it will open. If you hold your finger on the icon for a few seconds, the icon will begin to shake signifying the “move state” and you will see this image appear in the corner of the icon: 
- Touching this icon will allow you to close the app. Press the home button to stop the icons from shaking.

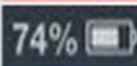
## Icons



This icon shows the the iPad is connected to wireless internet.



This icon means “share”. Pushing it will allow you to e-mail a document, share it on a social media website, or open a document in another program.



This icon indicates how much battery power is left on the iPad.



This icon means “delete”. This will delete the document that is in use on the device.



This icon is the “search” icon. When you press this icon, your keyboard will appear and you can type in the topic or item you want to search for.

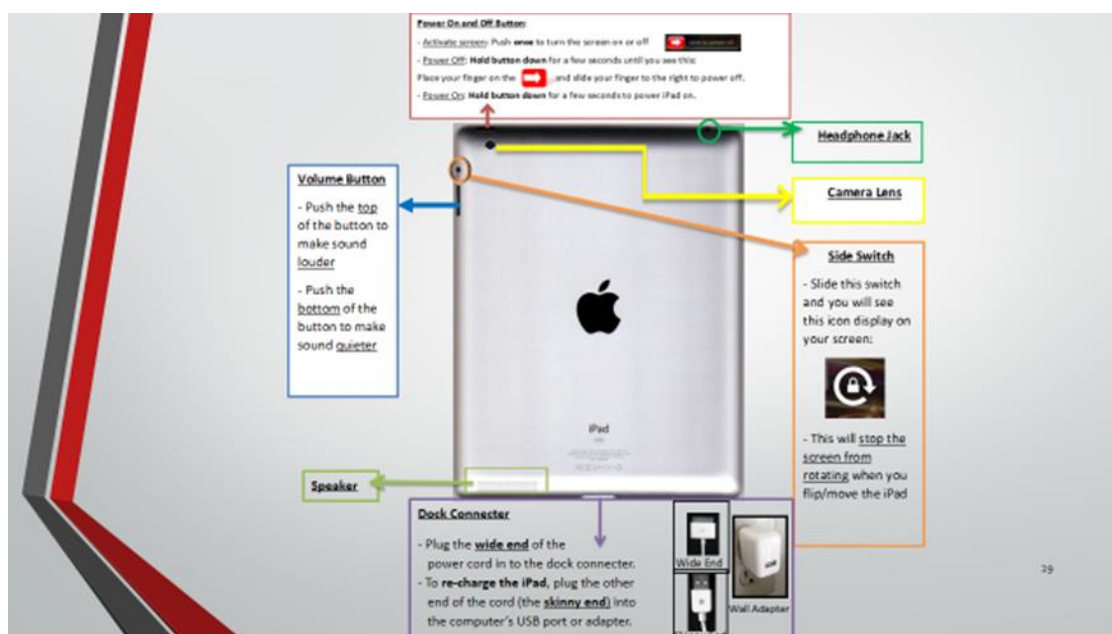
## How to Create Folders to Organize Apps

- You may want to organize apps into folders by class subject or purpose of the app.
- In order to organize your apps into easily accessible folders, you need to enter the “move state”.
- Select an icon in the “move state” and use your finger to drag and drop the icon on top of another icon you wish to group it with.
- When you move an icon over another icon, the app will be highlighted by a **dark square**.
- When you create a folder, you will see a title bar pop up with the name of the folder and the contents listed below it. Change the name by touching the title bar and re-typing in your desired name.

Then, you can just tap the **folder icon** to get access to the category of apps you wish to use.







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## Explore the iPad



- The best way to learn to use any new technology is to **explore it!**
- Try things out, move things around, create folders, and learn to navigate around the iPad in order to become skilled in its use.
- You'll want to make sure you are comfortable with the basics before you take the next step of planning for use of the iPad with students within the curriculum.
- **Take your time** and **enjoy** the countless options that the iPad offers. 😊

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### Appendix E.3: iPad Training PowerPoint iOS 7 (4<sup>th</sup> generation)



## Goal for Training

- ❖ Training educators in iPad use in order to learn how to use the iPad as an instructional tool.
- ❖ Test this protocol with subjects to see if following the protocol effectively changed their attitudes and knowledge in regards to the iPad.
- ❖ The protocol delivered in written as well as verbal/electronic formats.
- ❖ Develop a standardized protocol for educators to learn how to use and teach with this technology in an effective fashion.
- ❖ Basic iPad user navigation training that one would need in order to think about incorporating it into the curriculum.

## Why use the iPad as an instructional tool in schools?

- The iPad inspires **creativity** and **hands-on** learning.
- **Students are motivated** to use this exciting and interactive tool.
- With **textbooks** on the iPad, students can get a brand-new, up-to-date version each year for a fraction of the price of a paper book.
- At the App Store, there are over **20,000 educational apps** for all kinds of learners.
- It is **accessible**- the iPad comes with a screen reader, support for playback of closed-captioned content, and other innovative universal access features.
  - No extra software to install.
  - Easily adaptable for use by students with learning, physical, vision, or hearing disabilities.

## How to Navigate on the iPad

- Most navigation on the iPad is done through **simple touch gestures**.
- Touch an icon to select an application.
- Swipe your finger left or right across the screen to move from one screen of icons to the next.
- Touch and hold your finger down on an icon to move it somewhere else.





## Important Vocabulary

- Home Button
- App
- Status Bar

## The iPad Home Button



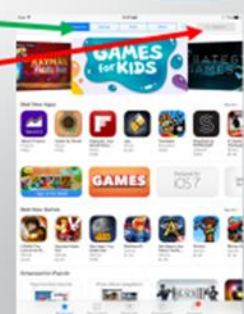
- The **Home button** is the circular button with a square on it found at the bottom outer rim of the iPad.
- Uses of the **Home button**:
  - Brings you back to the main or “home” screen
  - Waking up the iPad when you are ready to use it
  - Exiting out of applications (“apps”) or special modes
  - Use in combination with the suspend button at the top of the iPad to take a screenshot
  - Double click the **Home button** to access a list of recently opened apps

## iPad Apps

- “App” is the shortened version of “Application”. Apps are the programs that you can download and use on your iPad.

## Finding iPad Apps

- To get to the App Store, tap on the [App Store icon](#) on the iPad home page
- Once in the App Store, you can search by [category](#)
- Or, you can search by the name of the app you are looking for by typing it in the [search box](#)



## Downloading iPad Apps

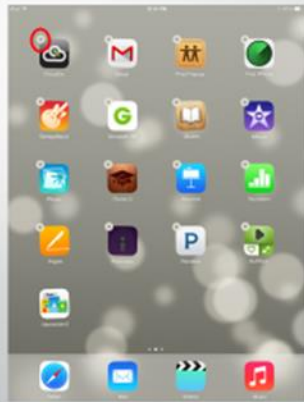


The screenshot shows the iTunes Store interface for iPad apps. Annotations include:
 

- A blue arrow pointing to a 'FREE' button on an app icon.
- A green arrow pointing to an 'INSTALL' button on an app icon.
- Red arrows pointing to 'FREE' and '\$3.99' price tags on app icons.
- A 'Sign in to iTunes Store' dialog box with a password field and 'Cancel'/'OK' buttons.
- A blue 'OPEN' button at the bottom.

- 1) To select the app, touch the **blue** box
- 2) When you touch the blue box, it will turn **green** and say either "BUY" if it is a paid app or "INSTALL" if it is a free app. Touch the green box to install the app.
- 3) Once you press the green box, you will be prompted to sign in to iTunes Store to purchase the app. Enter your password, press OK
- 4) This icon will appear next to the app that is installing.
- 5) This icon will appear when the app is installed. Click to open app.

## Moving iPad Apps



The screenshot shows an iPad home screen with various app icons like Mail, Photos, App Store, and others. A red circle highlights a specific icon.

- Once you have downloaded an app, you can move it to another screen by placing your finger and holding it down on the icon until all the icons start shaking. All of the icons should have an 'x' in the corner.
- This is called the "move state".
- To move icons, simply hold your finger down on top of the icon in the "move state" and drag your finger across the screen.
- If you want to move the icon to a different screen, slide your finger to the edge of the screen and the iPad will shift to the screen to the left or right, depending on which edge you hold your finger near.
- To place the icon, lift your finger off the screen.
- To exit the "move state", click the home button.

## Deleting iPad Apps








- Delete apps by getting to the “move state”.
- Simply tap the ‘x’ over the icon from the app you wish to delete.
- The iPad will confirm your choice before deleting permanently.
- Default applications such as the App Store and iTunes will not have an ‘x’ over the icon, because you are not allowed to delete these apps.

## Status Bar



- When you push the Home Button two times, the “Status Bar” will appear in the middle of screen.
- This bar will show which apps and documents are recently active. The Status Bar looks like this:
- You can scroll to the right and left by swiping with your finger.
- If you touch an app or document in the status bar, it will open.

## Icons

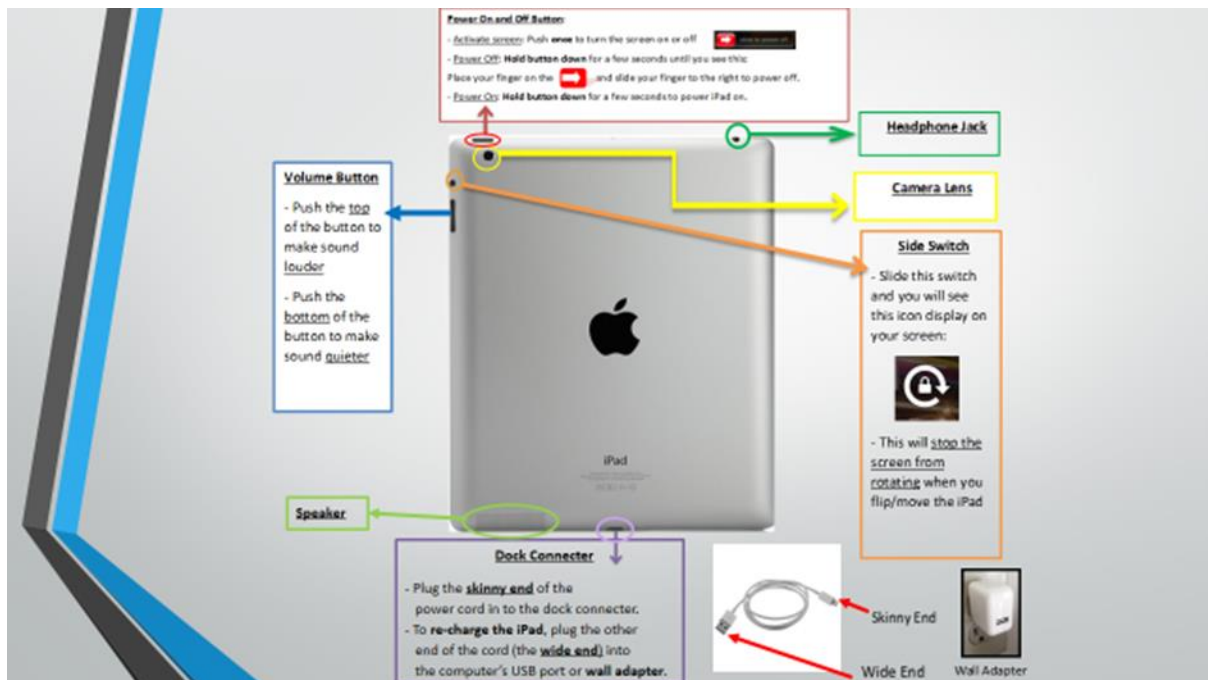
	This icon shows the the iPad is connected to wireless internet.
	This icon means "share". Pushing it will allow you to e-mail a document, share it on a social media website, or open a document in another program.
	This icon indicates how much battery power is left on the iPad.
	This icon means "delete". This will delete the document that is in use on the device.
	This icon is the "search" icon. When you press this icon, your keyboard will appear and you can type in the topic or item you want to search for.

## How to Create Folders to Organize Apps

- You may want to organize apps into folders by class **subject** or **purpose** of the app.
- In order to organize your apps into easily accessible folders, you need to enter the **"move state"**.
- Select an icon in the "move state" and use your finger to **drag and drop the icon on top of another icon** you wish to group it with.
- When you move an icon over another icon, both icons will be displayed in a folder. Icons will still be in the "move state".
- In the folder, you will see a title bar pop up with the name of the folder and the contents listed below it. Change the name by touching the title bar and re-typing in your desired name.
- Press the home button to exit the folder.
- Then, you can just tap the **folder icon** to get access to the category of apps you wish to use.







## Explore the iPad

- The best way to learn to use any new technology is to **explore it!**
- Try things out, move things around, create folders, and learn to navigate around the iPad in order to become skilled in its use.
- You'll want to make sure you are comfortable with the basics before you take the next step of planning to use the iPad with students.
- **Take your time** and enjoy the countless options that the iPad offers. 😊

## Appendix F: Video Modeling

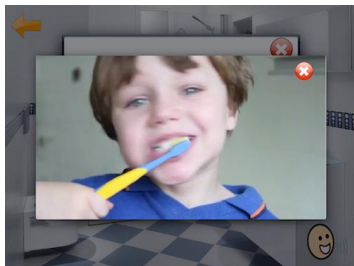
### Appendix F.1: Video Modeling Brochure (Hard Copy)

## VIDEO MODELING

Steps to video modeling:

### 1) Prior to creating the video

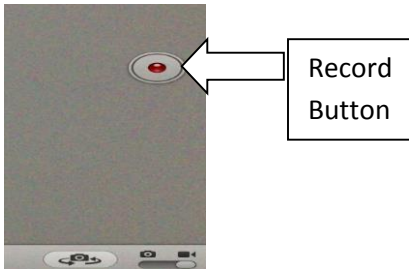
- a. Have you chosen the task or behavior that is to be modeled?
  - i. Is the task challenging but not too difficult?
- b. Have you chosen the best time to create the video?
- c. Have you decided who will record and who will assist/cue the child?



### 2) Begin recording

- a. Have you set up the iPad to record the child?
  - i. Be sure the recording will be steady and clear
- b. Are the child and assistant in the best position for recording
  - i. Remember to focus on the child and record very little interaction of the assistant!

c. If everyone is in place press the record button



ii. The red light will flash when recording is taking



place

d. When the task or behavior is finished press the red button again.

### 3) Length of the video

- a. The length of the video will depend on child and task or behavior
  - i. Usually the recording equals the length of time it takes to complete task or behavior
  - ii. The recording should not exceed 3 minutes



### 4) Viewing the video

- a. Only 1 task at a time should be taught
- b. Child should view video 5 – 10 times
  - i. If changes in the target behavior are not occurring you may want to take a new video



- c. When the child completes the task/behavior without using the video, it has been mastered.
  - i. Be sure to keep the video as a reminder

## Appendix F.2: Video Modeling Brochure (PowerPoint Format)

# Video Modeling Protocol

Alyssa Schmitz

Adapted from Tammy Sieglaff

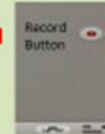
## 1) Prior to creating the video

- a. Have you chosen the task or behavior that is to be modeled?
- b. Have you chosen the best time to create the video?
- c. Have you decided who will record and who will assist/cue the child?



## 2) Begin recording

- a. Have you set up your iPad to record the child?
  - i. Be sure the recording will be steady and clear
- b. Are the child and assistant in the best position for recording?
  - i. Remember to focus on the child and record very little interaction of the assistant!
- c. If everyone is in place press the record button
  - i. the red light will flash when recording is taking place
- d. When the task or behavior is finished press the red button again to stop video



## 3) Length of the video

- a. The length of the video will depend on child and task or behavior
  - i. Usually the recording equals the length of time it takes to complete the task or behavior
  - ii. The recording should not exceed 3 minutes



## 4) Viewing the video

- a. Only one task should be taught at a time
- b. Child should view video 5-10 times
  - i. If changes in the target behavior are not occurring you may want to take a new video
  - When the child completes the task/behavior without using the video, it has been mastered
  - i. Be sure to keep the video as a reminder

### Appendix F.3: Teach-back Protocol for Video Modeling (Hard Copy)

## A TEACH-BACK PROTOCOL FOR VIDEO MODELING

**Video Modeling Description:** Video modeling is a teaching tool that shows a target skill on a screen (TV, computer, iPad) for a learner to view and provide opportunities for a learner to imitate the task or skill. This method of using the iPad for video modeling has been used successfully to teach a variety of skills in children with special needs. Basically three different forms of Video based modeling (VBM) exist and they are:

1. Video self-modeling (VSM) is when the individual models the behavior with either verbal or physical cues from another person. This is best done with the cues being performed out of sight of the recording device, so the subject will see themselves performing the activity or task.
2. Video other modeling (VMO) uses another individual as the model and requires another person video recorded while performing the skill or task. Although this method has also been shown to be effective, it is better if the model closely resembles the subject.
3. Point of view modeling entails only recording the task the model is completing without actually showing the model themselves. For example if the task is putting on a shoe the video would only show the models foot and hands while the task is being completed, never showing the rest of the model.

**Using teach-back methods to promote video modeling:** Teach-back is a way for professionals to verify that recipients learning about video modeling know and understand all information given to them. Teach-back helps the professional understand how well they have explained the concept or information. It is important to know that teach-back is not a test of the recipients knowledge overall but is a way for professionals to know if they communicated effectively.

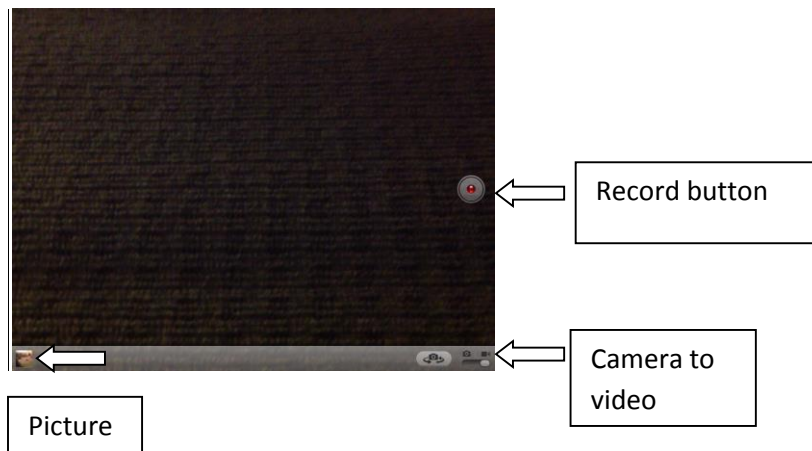
When using teach-back the professional should ask the recipient in a very non-judgmental way to please repeat the information in their own words as they understood it. Once the recipient of the information responds, the professional and the recipient discuss the information and any misinterpretations are cleared up. The recipient is then asked to repeat the information one more time for clarification. This procedure should be used with all recipients no matter their literacy level or appearance of understanding.

**Teach – Back Procedure:** This document outlines the steps for professionals to use when teaching a family to perform video modeling using the iPad. In addition professionals will be able to apply teach-back to clarify their understanding and follow-through. Anytime **TEACH-BACK** is written in the document the professional should stop the instruction and use the teach-back method described below:

The professional will ask the recipient to explain the steps that have been covered in their own words; a discussion will take place at this time regarding any confusion the recipient may have had. Then the same instructions will be reiterated by the professional and the recipient will again be asked to repeat them in their own words. This process should continue until the recipient is able to repeat the steps without confusion and then the process can move on to the next steps. After each set of steps a teach-back shall happen before the next steps are given, each teach-back should include the new information plus the previous information eventually including the entire process. (For video modeling the best teach-back will include the recipient actually performing the tasks while talking through them).

**Video Modeling:** Professionals may use the protocol below when teaching video modeling to other professionals or parents. To begin, the professional may want to ask about the familiarity with the iPad.

- 1) Are you familiar with using an iPad?
- 2) If not start with iPad protocol
- 3) Are you familiar with the recording feature of the iPad?
  - a. We will begin by reviewing this feature:



- i. First we must choose the camera icon on our iPad
- ii. Next we must switch from camera to video – slide the button in the lower right corner to be under the video camera picture
- iii. To record you will touch the red light on the right side of your screen, a counter will appear in upper right corner
- iv. To stop recording you will again touch the red button on the right side of your screen
- v. You may view the video by tapping picture located on bottom left of your screen

#### **TEACH-BACK (with demonstration)**

##### 4) Steps to video modeling:

- a. First the skill/behavior to be recorded is determined in advance (putting on an article of clothing, shoes, etc.)
  - i. The task/behavior must be challenging but not too far beyond their ability
- b. Next decide when is the best time to video record the child performing this task/behavior – it is best to plan this timeframe rather than attempt to create the video on the go
- c. Finally, decide who will assist with the task/behavior and who will record (if only one person is doing both the iPad will need to be placed so it can capture the event/activity)

#### **TEACH-BACK (with demonstration)**

##### 5) Ready to begin recording:

- a. Set up the iPad so it will record where the child will be completing the activity. It is best to place the iPad on a steady surface even if another person is responsible for operating the iPad.
- b. If the iPad cannot be placed on a steady surface the person recording the video should position themselves in a location where they are able to catch the activity with minimal movement
- c. Position the child and the assistant to perform the task/behavior
  - i. Although the person is there to assist it is important to record little to none of their interaction or verbal cues. The child should look at the video and believe they are performing the task/behavior completely on their own – this is most effective
- d. When everyone is in place press the record button on the iPad (the red dot in the center will flash while it is recording)
  - i. Be sure to capture the entire task/behavior in one video,
    - 1. If this does not happen the video needs to be retaken
- e. Press the red button again when task/behavior is completed

### **TEACH-BACK (with demonstration)**

#### 6) Length of video

- a. The length will depend on the individual who will be viewing the video and the task/behavior
  - i. If the learner/student has only a brief attention span the video may need to be very brief
  - ii. The video usually will be the length of time it takes to complete the task/behavior
    - 1. It is best if the video does not exceed 3 minutes
  - iii. If the task/behavior is longer it may be best to break it down into sections
    - 1. If the task is longer, for example dressing, break the activity down into steps and record 1 step at a time.

### **TEACH-BACK**

#### 7) Viewing the video



- a. Once the video has been recorded it is time for the child to view the video
- b. Be sure the child is viewing only one task/behavior.
  - i. Wait until the child has mastered the task/behavior before introducing a new task
- c. The video should be shown to the child until the child can perform the skill when not using the video.
  - i. If after 5 viewings there is no change in the targeted behavior or task the same task/behavior may be rerecorded, but change an aspect of the task/activity to enhance success.
- d. Once the task/behavior has been mastered you may move onto a new task/behavior
- e. Save the videos to use to reference if the child struggles with the task/activity in the future.

8) Give family the “Video Modeling” handout

- a. Be sure to note on the handout particular areas the client struggled, highlighting them for future reference.
- b. Note other important concepts or ideas that may have been covered in the session.

9) Follow-Up session or phone call

- a. If you have weekly sessions, ask them to bring the iPad to the next session and discuss how the video modeling is working for them and if they have any new questions. Then review with them any videos they have created during that week.
- b. If no session is scheduled or it is more than 2 weeks out, call the patient. Explain that you are following up on the material that was covered and inquire if they have encountered any areas of confusion since the session. If there are, clarify these areas or schedule a second meeting to ensure that patients understanding.

Appendix F.4: Teach-back Protocol for Video Modeling (PowerPoint Format)

# Teach-Back Protocol for Video Modeling

Alyssa Schmitz, OTS  
Adapted from Tammy Sieglaff

## Step 1

- 1) Are you familiar with using an iPad?
  - If not, start with the iPad protocol

## Step 2

- Are you familiar with the recording feature of the iPad?
  - a. We will begin by reviewing this feature:
    - i. First, we must choose the camera icon on our iPad
    - ii. Next, we must switch from camera to video- slide the button in the lower right corner to be under the video camera picture
    - iii. To record you will touch the red light on the right side of your screen, a counter will appear in upper right corner
    - iv. To stop recording you will again touch the red button on the right side of your screen
    - v. You may view the video by tapping picture located on bottom left of your screen

\*TB

## Step 3: Steps to Video Modeling

- a. First the skill/behavior to be recorded is determined in advance (putting on an article of clothing, shoes, etc.)
- b. Next, decide when is the best time to video record the child performing this task/behavior-it is best to plan this timeframe rather than attempt to create the video on the go
- c. Finally, decide who will assist with the task/behavior and who will record (if only one person is doing both the iPad will need to be placed so it can capture the event/activity)

\*TB

## Step 4: Recording

- a. Set up the iPad so it will record where the child will be completing the activity.
- b. If the iPad cannot be placed on a steady surface the person recording the video should position themselves in a location where they are able to catch the activity with minimal movement
- c. Position the child and the assistant to perform the task/behavior
- d. When everyone is in place press the record button on the iPad
- e. Press the red button again when the task/behavior is completed

\*TB

## Step 5: Video Length

- a. The length will depend on the individual who will be viewing the video and the task/behavior
  - i. If the student has only a brief attention span, the video may need to be very brief
  - ii. The video usually will be the length of time it takes to complete the task/behavior
    - 1. It is best if the video does not exceed 3 minutes
  - iii. If the task/behavior is longer it may be best to break it down into sections

\*TB

## Step 6: Viewing the video

- a. Once the video has been recorded it is time for the child to view the video
- b. Be sure the child is viewing only one task/behavior
- c. The video should be shown to the child until the child can perform the skill when not using the video
- d. Once the task/behavior has been mastered you may move on to a new task/behavior
- e. Save the videos to reference if the child struggles with the task/activity in the future

## Step 7: Give the educator the “Video modeling” Handout

- a. Be sure to note on the handout particular areas the client struggled, highlighting them for future reference
- b. Note other important concepts or ideas that may have been covered in the session

## Step 8: Follow-up Session or Phone Call

- a. If you have weekly sessions, ask them to bring the iPad to the next session and discuss how the video modeling is working for them and if they have any new questions. Then, review with them any videos they have created during that week.
- b. If no session is scheduled or it is more than 2 weeks out, call the patient. Explain that you are following up on the material that was covered and inquire if they have encountered any areas of confusion since the session. If there are, clarify these areas to help ensure understanding.



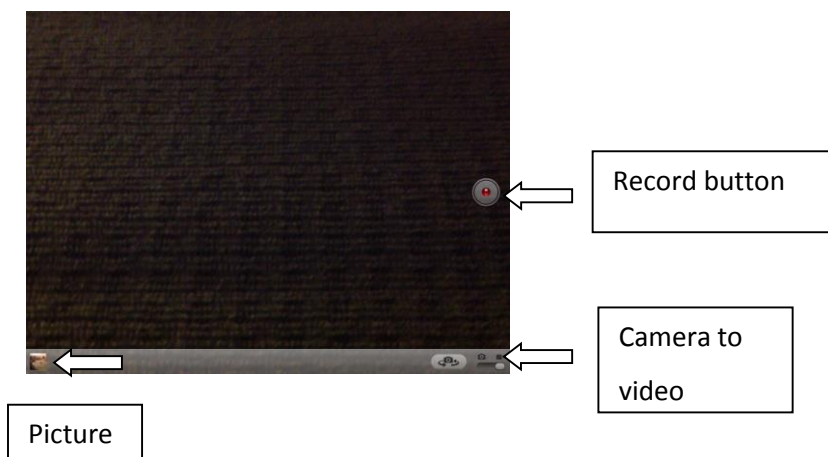
## Appendix F.5: Video Modeling Protocol- No Teach-back (Hard Copy)

**Video Modeling Description:** Video modeling is a teaching tool that shows a target skill on a screen (TV, computer, iPad) for a learner to view and provide opportunities for a learner to imitate the task or skill. This method of using the iPad for video modeling has been used successfully to teach a variety of skills in children with special needs. Basically three different forms of Video based modeling (VBM) exist and they are:

1. Video self-modeling (VSM) is when the individual models the behavior with either verbal or physical cues from another person. This is best done with the cues being performed out of sight of the recording device, so the subject will see themselves performing the activity or task.
2. Video other modeling (VMO) uses another individual as the model and requires another person video recorded while performing the skill or task. Although this method has also been shown to be effective, it is better if the model closely resembles the subject.
3. Point of view modeling entails only recording the task the model is completing without actually showing the model themselves. For example if the task is putting on a shoe, the video would only show the models foot and hands while the task is being completed, never showing the rest of the model.

**Video Modeling:** Professionals may use the protocol below when teaching video modeling to other professionals or parents. To begin, the professional may want to ask about the familiarity with the iPad.

- 1) Are you familiar with using an iPad?
- 2) If not start with iPad protocol
- 3) Are you familiar with the recording feature of the iPad?
  - a. We will begin by reviewing this feature:



- i. First we must choose the camera icon on our iPad

- ii. Next we must switch from camera to video – slide the button in the lower right corner to be under the video camera picture
- iii. To record you will touch the red light on the right side of your screen, a counter will appear in upper right corner
- iv. To stop recording you will again touch the red button on the right side of your screen
- v. You may view the video by tapping picture located on bottom left of your screen

#### 4) Steps to video modeling:

- a. First the skill/behavior to be recorded is determined in advance (putting on an article of clothing, shoes, etc.)
  - i. The task/behavior must be challenging but not too far beyond their ability
- b. Next decide when is the best time to video record the child performing this task/behavior – it is best to plan this timeframe rather than attempt to create the video on the go
- c. Finally, decide who will assist with the task/behavior and who will record (if only one person is doing both the iPad will need to be placed so it can capture the event/activity)

#### 5) Ready to begin recording:

- a. Set up the iPad so it will record where the child will be completing the activity. It is best to place the iPad on a steady surface even if another person is responsible for operating the iPad.
- b. If the iPad cannot be placed on a steady surface the person recording the video should position themselves in a location where they are able to catch the activity with minimal movement
- c. Position the child and the assistant to perform the task/behavior
  - i. Although the person is there to assist it is important to record little to none of their interaction or verbal cues
    - 1. The child should look at the video and believe they are performing the task/behavior completely on their own – this is most effective
- d. When everyone is in place press the record button on the iPad (the red dot in the center will flash while it is recording)
  - i. Be sure to capture the entire task/behavior in one video,



1. If this does not happen the video needs to be retaken

e. Press the red button again when task/behavior is completed

#### 6) Length of video

a. The length will depend on the individual who will be viewing the video and the task/behavior

i. If the learner/student has only a brief attention span the video may need to be very brief

ii. The video usually will be the length of time it takes to complete the task/behavior

1. It is best if the video does not exceed 3 minutes

iii. If the task/behavior is longer it may be best to break it down into sections

1. If the task is longer, for example dressing, break the activity down into steps and record 1 step at a time.

#### 7) Viewing the video

a. Once the video has been recorded it is time for the child to view the video

b. Be sure the child is viewing only one task/behavior.

i. Wait until the child has mastered the task/behavior before introducing a new task

c. The video should be shown to the child until the child can perform the skill when not using the video.

i. If after 5 viewings there is no change in the targeted behavior or task the same task/behavior may be rerecorded, but change an aspect of the task/activity to enhance success.

d. Once the task/behavior has been mastered you may move onto a new task/behavior

e. Save the videos to use to reference if the child struggles with the task/activity in the future.

# Protocol for Video Modeling

## Step 1

- 1) Are you familiar with using an iPad?
  - If not, start with the iPad protocol

## Step 2

- Are you familiar with the recording feature of the iPad?
    - a. We will begin by reviewing this feature:
      - i. First, we must choose the camera icon on our iPad
      - ii. Next, we must switch from camera to video- slide the button in the lower right corner to be under the video camera picture
      - iii. To record you will touch the red light on the right side of your screen, a counter will appear in upper right corner
      - iv. To stop recording you will again touch the red button on the right side of your screen
      - v. You may view the video by tapping picture located on bottom left of your screen
- \*TB

## Step 3: Steps to Video Modeling

- a. First the skill/behavior to be recorded is determined in advance (putting on an article of clothing, shoes, etc.)
- b. Next, decide when is the best time to video record the child performing this task/behavior-it is best to plan this timeframe rather than attempt to create the video on the go
- c. Finally, decide who will assist with the task/behavior and who will record (if only one person is doing both the iPad will need to be placed so it can capture the event/activity)

## Step 4: Recording

- a. Set up the iPad so it will record where the child will be completing the activity.
- b. If the iPad cannot be placed on a steady surface the person recording the video should position themselves in a location where they are able to catch the activity with minimal movement
- c. Position the child and the assistant to perform the task/behavior
- d. When everyone is in place press the record button on the iPad
- e. Press the red button again when the task/behavior is completed

## Step 5: Video Length

- a. The length will depend on the individual who will be viewing the video and the task/behavior
  - i. If the student has only a brief attention span, the video may need to be very brief
  - ii. The video usually will be the length of time it takes to complete the task/behavior
    - 1. It is best if the video does not exceed 3 minutes
  - iii. If the task/behavior is longer it may be best to break it down into sections

## Step 6: Viewing the video

- a. Once the video has been recorded it is time for the child to view the video
- b. Be sure the child is viewing only one task/behavior
- c. The video should be shown to the child until the child can perform the skill when not using the video
- d. Once the task/behavior has been mastered you may move on to a new task/behavior
- e. Save the videos to reference if the child struggles with the task/activity in the future

## Appendix G: Follow-Up

### Appendix G.1: Follow-up phone call script

#### **Questions to Address during Follow-Up Phone Call:**

1. Do you have any further questions about the protocols?
2. Did you feel that the protocols were helpful to you?
3. Since you received the protocol, have you tried a new activity on the iPad or downloaded any apps?
4. Because of this training, have you done anything differently? (i.e. make a video model, make a plan, try with a student)
5. Was there anything not included in the protocols that you wish would have been included?
6. Do you feel that your attitudes towards iPad technology have changed in any way?
7. Did you receive any other technological training since you received the protocols?

## Appendix G.2: Follow-up phone call transcript

### Vocabulary

TB=subject who received the protocols with the teach-back strategy

NT=subject who received the protocols without the teach-back strategy

SPI= student primary investigator (researcher)

### **TB**

SPI: Do you have any further questions about the protocol?

TB: Not at this time.

SPI: Did you feel that the protocol was helpful to you?

TB: Yes, it helped me understand the basic functions of the iPad better so that I could use it more easily.

SPI: Since you received the protocol, have you tried a new activity on the iPad or downloaded any apps?

TB: Yes, I downloaded Core 5 Lexia and have been using it with a student.

SPI: Because of this training, have you done anything differently? Such as make a video model, plan to make a video model, or try it with a student?

TB: I made a video model of a student inserting his own straw into a juice pouch and showed it to him.

SPI: Was there anything not included in the protocol that you wish would have been included?

TB: Not that I can think of.

SPI: Do you feel that your attitudes towards iPad technology have changed in any way?

TB: Yes, I'm a bit more comfortable with the iPad now.

SPI: Did you receive any other technological training since you received the protocol?

TB: No.

### **NT**

SPI: Do you have any further questions about the protocol?

NT: No

SPI: Did you feel that the protocol was helpful to you?

NT: Yes it was.

SPI: Since you received the protocol, have you tried a new activity on the iPad or downloaded any apps?

NT: Yes, after the study's timeframe, however. I did make a video model for a student to watch her upcoming presentation.

SPI: Because of this training, have you done anything differently? Such as make a video model, plan to make a video model, or try it with a student?

NT: With the exception of that one video model recording, no.

SPI: Was there anything not included in the protocol that you wish would have been included?

NT: I don't believe so.

SPI: Do you feel that your attitudes towards iPad technology have changed in any way?

NT: No, I've always been a proponent of the idea; viewed technology positively, believed in its purpose. This current assignment (school position) is not as conducive to having the luxury of the time or resources available to us. The one iPad I used was my teacher's personal iPad.

SPI: Did you receive any other technological training since you received the protocol?

NT: No.

NT: The timing and/or the person selected to conduct this study may not be the best. Our department had practically gone through a full turnover in staff this year, with 5 new staff and only 1 incumbent from the previous year. We had to hit the ground running off the bat. The learning curve was tremendously demanding. The student caseload increased from 5 at the beginning of the school year to 9 by second semester.



## Appendix H: Raw Data

## H.1: TUQ Items Spreadsheet

Question	Category		Sample			
		+/- Item	TB-A	TB-B	NT-A	NT-B
I am motivated to find ways to use the iPad in my classroom.	Motivation		4	4	5	5
I assign daily or weekly iPad-related tasks that support my curriculum.	Use		3	4	4	4
My students have access to many forms of technology, including iPads, at any time during the instructional day.	Use		3	4	5	3
I provide short-term (daily or weekly) assignments using iPads that emphasize the use of different software applications (Internet, multimedia, apps).	Use		2	2	1	4
I alter my instructional use of iPads as I gain new knowledge of software application and research on teaching and learning.	Use		3	4	3	3
One of my technology goals is for students to be able to use the iPad as a tool for learning.	Motivation		4	4	4	4
I find iPads to be an important part of classroom instruction.	Use		4	4	4	4
I seek professional development that maximizes the use of iPads and technology available to my students.	Motivation		3	2	3	3
I allocate time for students to practice their iPad skills in the classroom.	Use		2	3	2	4
My students eagerly pursue the use of iPads.	Motivation		4	4	4	3
Using the iPad is a priority for me this school year.	Motivation		4	4	4	3
I use the iPad for my own continuing education.	Use		2	2	4	4
I have enough time to use iPads in the classroom.	Use		4	2	1	2
I need more and/ or more current iPads in order to use this technology within the classroom.	Support		2	2	5	1
I have an immediate need for more professional development in order to design student-centered video models that use iPads in a seamless fashion.	Comfort	-	1	4	1	2
My students use iPads for collaboration with others, including joint publishing, communicating, and researching.	Use		2	2	1	1
I seek out activities that promote increased problem-solving and critical thinking using the iPad.	Motivation		2	3	3	4

I plan iPad-related activities in my classroom that will improve my student's basic skills (i.e., reading, writing, math computation).	Use		3	4	4	4
In my classroom, students use technology-based computer/iPad and Internet resources beyond the school (government agencies, private sector) to solve authentic problems.	Use		2	2	3	3
One of my professional goals is to learn more ways to use iPads for seamless instruction (i.e., it is as easy for me as using a chalk/white board).	Motivation	-	1	5	2	2
It is easy for me to design student-centered video models that use iPads in a seamless fashion.	Comfort		2	4	1	2
I prefer to use existing curriculum units that integrate the classroom iPads with authentic assessment and student relevancy rather than building my own units from scratch.	Comfort		4	4	3	3
I use my students' interests, experiences, and desires to solve authentic problems when planning iPad-related activities in my classroom.	Comfort		3	2	4	4
Using available technology and iPads, I have expanded the horizons of instructional computing in my classroom.	Comfort		2	3	4	2
I use integrated curriculum units that place heavy emphasis on complex thinking skills, iPad use, and student relevancy to the real world.	Use		2	2	1	3
I use classroom computers and/or iPads primarily to track grades and/or answer email.	Use		4	2	1	1
I rely on others (student assistants, parent volunteers, close friends) to do my computer-, iPad-, or technology-related tasks for the classroom.	Use	-	3	3	2	4
I access the Internet/email quite frequently.	Use		4	4	4	4
I am proficient with basic iPad use and application.	Skills		3	3	3	4
I am proficient with at least one multimedia authoring tool.	Skills		3	2	1	3
I integrate the most current research on teaching and learning when using the classroom computers and/or iPads.	Use		2	2	1	2
I have the background to show others how to merge technology with integrated, thematic curricula.	Skills		1	2	1	1
I am very comfortable using an iPad.	Comfort		2	3	3	3
I find the use of iPads to be practical for my students.	Comfort		4	4	4	4
I am able to troubleshoot various software and navigation problems on the iPad.	Skills		2	2	2	3
I actively participate in online collaboration opportunities.	Use		2	2	1	2
I feel that my district supports the use of iPads in the classroom and curriculum.	Support		4	4	5	4
I feel that I have received adequate training in the use of the iPad to make video models.	Skills		3	4	1	1

I feel that I could use the iPad in an effective manner in my classroom.	Skills		4	4	4	4
I feel positively towards integrating the iPad into my classroom and curriculum.	Comfort		3	4	4	4
Parents of my student support the integration of the iPad into the classroom and curriculum.	Support		3	4	4	4
I feel that I would be adequately supported by school/district IT services when technological issues arise with iPad use.	Support		3	4	5	4
I have experience with video modeling.	Skills		2	4	2	3
I have students on my caseload who could benefit from the use of video modeling (students who have autism spectrum disorder or other skill deficits).	Motivation		4	5	4	5
I feel comfortable creating video models for students.	Skills		2	5	2	3
I am motivated to use video modeling with my students.	Motivation		4	4	4	5

## H.2: iPad Use Across Conditions

Phase	TB	NT
Baseline		
Day 1	0	1
Day 2	2	1
Day 3	3	1
Day 4	0	1
Day 5	0	1
<b>Total-Baseline</b>	<b>5</b>	<b>5</b>
Intervention-Week 1		
Day 1	2	1
Day 2	5	1
Day 3	5	1
Day 4	6	1
Day 5	4	1
<b>Total-Week 1</b>	<b>22</b>	<b>5</b>
Intervention-Week 2		
Day 6	6	0
Day 7	7	0
Day 8	0	0
Day 9	5	0
Day 10	7	0
<b>Total- Week 2</b>	<b>25</b>	<b>0</b>
<b>Cumulative Totals</b>	<b>52</b>	<b>10</b>

## Appendix I: Full Text Descriptions for Figures and Tables

### Text Description for Figure 1

**Brief Description:** Visual depiction of the study sequence

**Summary:** This figure depicts the timeline and study elements of the baseline, intervention, and follow-up phases

**Detailed Description:** This figure depicts the study sequence of the two single-subject design studies. The figure is labeled 'Study Sequence' at the top. There are three columns labeled 'Baseline', 'Intervention', and 'Follow-Up' from left to right. Under these labels is a study timeline that depicts the two study elements within each phase. In the baseline phase, there is a series of six arrows labeled with study elements pointing to the right to indicate what will come next. The arrows, from left to right, are labeled: 'Survey 1 (TUQ-A)', 'Data Collection 1', 'Intervention', 'Data Collection 2', 'Survey 2 (TUQ-B)', and 'Follow-Up Phone Call'. Under the arrows for each phase, there is a week label to indicate the amount of time for each phase. In the baseline phase, the label says 'Week 1', the intervention phase label says 'Weeks 2 and 3', and finally the follow-up label says 'End of Week 3'.

### Text Description for Figure 2

**Brief Description:** TB Raw Scores from TUQ-A and TUQ-B

**Summary:** This figure depicts the raw score values from the TB study for Survey 1 (TUQ-A) and Survey 2 (TUQ-B).

**Detailed Description:** This bar graph figure depicts the raw score values for Survey 1 (TUQ-A) and Survey 2 (TUQ-B) for the TB subject. The y-axis is labeled 'Score' and values range from 115 to

155 in increments of five. The x-axis is labeled 'Survey Measure' and contains the labels from left to right: 'TUQ-A' and 'TUQ-B'. TB scores are graphed using vertical blue bars. Taller bars indicate higher scores on the TUQ. The first bar on the left, TUQ-A, depicts a score of 130. On the right, a taller bar shows a TUQ-B score of 151.

### **Text Description for Figure 3**

**Brief Description:** TB Categorical Scores for TUQ-A and TUQ-B

**Summary:** This figure provides a graphical representation of TUQ-A and TUQ-B scores according to category from study TB.

**Detailed Description:** This figure is a vertical bar graph representing the scores from TUQ-A to TUQ-B as organized by category of TUQ item from study TB. The y-axis is labeled 'Score' and values range from zero to 50, in increments of ten. The x-axis is labeled 'Category' and contains, from left to right, the five categories of TUQ items, including: 'Motivation to Use Technology', 'Use of Technology', 'Perceived Support of Technology', 'Comfort with Technology', and 'Skills with Technology'. The legend in the upper right hand corner of the graph indicates that blue vertical bars represent TUQ-A scores and orange vertical bars represent TUQ-B scores. From the left, 'Motivation to Use Technology' category contains a blue bar indicating a score of 30 and the orange bar indicating a score of 35. Next to this, the 'Use of Technology' column contains a blue bar indicating a score of 47 and an orange bar indicating a score of 48. To the right of this, the 'Perceived Support of Technology' column contains a blue bar indicating a score of 12 and an orange bar indicating a score of 14. Next, the 'Comfort with Technology' column contains a blue bar that indicates a score of 21 and an orange bar indicating a score of 28. Finally, in the 'Skills with Technology' column, the blue bar indicates a TUQ-A score of 20, while the orange bar indicates a TUQ-B score of 26.

#### **Text Description for Figure 4**

**Brief Description:** NT Raw Scores from TUQ-A and TUQ-B

**Summary:** This figure depicts the raw score values from the NT study for Survey 1 (TUQ-A) and Survey 2 (TUQ-B).

**Detailed Description:** This bar graph figure depicts the raw score values for Survey 1 (TUQ-A) and Survey 2 (TUQ-B) for the NT subject. The y-axis is labeled 'Score' and values range from 115 to 155 in increments of five. The x-axis is labeled 'Survey Measure' and contains the labels from left to right: 'TUQ-A' and 'TUQ-B'. NT scores are graphed using vertical orange bars. Taller bars indicate higher scores on the TUQ. The first bar on the left, TUQ-A, depicts a score of 134. On the right, a taller bar shows a TUQ-B score of 145.

#### **Text Description for Figure 5**

**Brief Description:** NT Categorical Scores for TUQ-A and TUQ-B

**Summary:** This figure provides a graphical representation of TUQ-A and TUQ-B scores according to category from study NT.

**Detailed Description:** This figure is a vertical bar graph representing the scores from TUQ-A to TUQ-B as organized by category of TUQ item from study NT. The y-axis is labeled 'Score' and values range from zero to 50, in increments of ten. The x-axis is labeled 'Category' and contains, from left to right, the five categories of TUQ items, including: 'Motivation to Use Technology', 'Use of Technology', 'Perceived Support of Technology', 'Comfort with Technology', and 'Skills with Technology'. The legend in the upper right hand corner of the graph indicates that blue vertical bars represent TUQ-A scores and orange vertical bars represent TUQ-B scores. From the left, 'Motivation to Use Technology' category contains a blue bar indicating a score of 33 and the

orange bar indicating a score of 34. Next to this, the 'Use of Technology' column contains a blue bar indicating a score of 42 and a taller orange bar indicating a score of 52. To the right of this, the 'Perceived Support of Technology' column contains a blue bar indicating a score of 19 and a shorter orange bar indicating a score of 13. Next, the 'Comfort with Technology' column contains a blue bar that indicates a score of 24 and an orange bar of the same height indicating a score of 24. Finally, in the 'Skills with Technology' column, the blue bar indicates a TUQ-A score of 16, while the taller orange bar indicates a TUQ-B score of 22.

### **Text Description for Figure 6**

**Brief Description:** TB iPad and Video Modeling Use

**Summary:** This line graph depicts TB iPad and video modeling use across baseline and intervention phases

**Detailed Description:** This line graph with markers depicts iPad use by phase and day across the TB study. The y-axis is labeled 'number of times used per day', ranging from negative one on the bottom left of the graph to eight on the top left of the graph in increments of one. The x-axis is labeled 'phase and day', including baseline days one to five on the left and intervention days one to ten moving towards the right of the graph. TB daily iPad use values are depicted using blue lines and markers, and video modeling daily use values are depicted using orange lines and markers. The greater distance the line travels vertically indicates higher reported values of daily use. There is a black dotted trend line from the lower left corner of the graph where it says 'Baseline' between  $y = 0$  and  $y = 1$ , spanning diagonally across the graph at a steady incline, ending at 'Day 10' at  $y = 6$ . There is also a solid red horizontal line spanning across the intervention phase data on  $y = 3$ , indicating that 3 was the highest baseline point for the PND



data. There is a gray shaded area ranging across the chart from  $y = -1.48$  to  $3.52$ , to indicate the two-standard deviation band around the baseline mean of one.

### **Text Description for Figure 7**

**Brief Description:** TB Total Weekly iPad and Video Modeling Use Across Phases

**Summary:** This bar graph depicts total weekly iPad and video modeling use for subject TB across week one of the baseline phase and weeks two and three of the intervention phase.

**Detailed Description:** This bar graph depicts subject TB's total weekly iPad and video modeling use by study phase across baseline and intervention phases by week. The y-axis indicates the number of times per week that the iPad and video modeling were used, ranging from zero to thirty in increments of five. The x-axis indicates the phase and includes the labels from left to right, 'Baseline-Week one', 'Intervention-Week two', and 'Intervention-Week three'. TB iPad use is graphed with a vertical blue bar and TB video modeling use is graphed with a vertical orange bar. The greater distance the line travels vertically indicates more total use. In the baseline-week one column on the left of the graph, the short blue bar indicates that the iPad was used five times throughout the week. There is a number zero in place of an orange bar in the baseline column, indicating that video modeling was not used during that week. In the middle intervention-week two column, the taller blue bar indicates that the iPad was used 22 times that week. There is a number zero in place of an orange bar in the intervention-week two column, indicating that video modeling was not used that week. On the far right in the intervention-week three column, the tallest blue bar indicates that the iPad was used a total of 25 times that week. The small orange bar indicates that video modeling was reportedly used one time during that week.

### **Text Description for Figure 8**

#### Brief Description: NT iPad and Video Modeling Use

Summary: This line graph depicts NT iPad and video modeling use across baseline and intervention phases

Detailed Description: This line graph with markers depicts iPad use by phase and day across the NT study. The y-axis is labeled 'number of times used per day', ranging from zero on the bottom left of the graph to eight on the top left of the graph in increments of one. The x-axis is labeled 'phase and day', including baseline days one to five on the left and intervention days one to ten moving towards the right of the graph. NT daily iPad use values are depicted using blue lines and markers, and video modeling daily use values are depicted using orange lines and markers. The greater distance the line travels vertically indicates higher reported values of daily use. There is a black dotted trend line from about  $y=1.25$  on the left side of the graph above where it says 'Baseline', and it spans diagonally across the graph at a steady decline, ending at 'Day 10' at  $y=0$ . There is also a solid red horizontal line spanning across the intervention phase data on  $y=1$ , indicating that 1 was the highest baseline point for the PND data.

#### Text Description for Figure 9

##### Brief Description: NT Total Weekly iPad and Video Modeling Use Across Phases

Summary: This bar graph depicts total weekly iPad and video modeling use for subject NT across week one of the baseline phase and weeks two and three of the intervention phase.

Detailed Description: This bar graph depicts subject NT's total weekly iPad and video modeling use by study phase across baseline and intervention phases by week. The y-axis indicates the number of times per week that the iPad and video modeling were used, ranging from zero to thirty in increments of five. The x-axis indicates the phase and includes the labels from left to

right, 'Baseline-Week one', 'Intervention-Week two', and 'Intervention-Week three'. NT iPad use is graphed with a vertical gray bar and NT video modeling use is graphed with a vertical yellow bar. The greater distance the line travels vertically indicates more total use. In the baseline-week one column on the left of the graph, the short gray bar indicates that the iPad was used five times throughout the week. There is a number zero in place of a yellow bar in the baseline column, indicating that video modeling was not used during that week. In the middle intervention-week two column, a gray bar of equal height to the first bar indicates that the iPad was used five times again that week. There is a number zero in place of a yellow bar in the intervention-week two column, indicating that video modeling was not used that week. On the far right in the intervention-week three column, there are number zeroes in place of gray and yellow bars, indicating that neither the iPad or video modeling were reportedly used by the NT subject during that week.

### **Text Description for Table 1**

Brief Description: Subject demographics

Summary: The table represents demographic information for the sample.

Detailed Description: The table has seven columns and three rows. The first row is the header row. Each column in the first row has a different heading. The first column is labeled 'Subject Code' and refers to the subject's intervention condition. The second column is labeled 'Level of Education' and refers to the subject's highest level of education achieved. The third column is labeled 'Age' and refers to the subject's age in years at the time of testing. The fourth column is labeled 'Sex' and refers to the subject's sex. The fifth column is labeled 'Years Worked in Education' and refers to the amount of time that the subject has worked in the school system.

The sixth column is labeled 'Assignment' and refers to the subject's position within the school. The seventh and final column is labeled 'Hours of Professional Technology Training in Video Modeling' and refers to the amount of prior training that the subject has received in video modeling. There are two rows below the header row. Each row is filled with the corresponding data for each participant.

### **Text Description for Table 2**

Brief Description: TB TUQ-A and TUQ-B Scores

Summary: This table provides the raw scores and change scores for the teach-back subject on the TUQ-A and TUQ-B.

Detailed Description: This table consists of two columns and four rows. The first row is the header row and indicates for what and whom the scores are listed. The first column is labeled 'Survey Measure' and indicates either TUQ-A, TUQ-B, or the change in score from survey 1 to survey 2. The second column is labeled 'TB Scores' to indicate the scores for the subject who received the intervention with teach-back strategies. The TB scores indicated are 130 for the TUQ-A, 151 for the TUQ-B, and plus 21 for the change in score, indicating that this subject's score increased by 21 points from TUQ-A to TUQ-B.

### **Text Description for Table 3**

Brief Description: NT TUQ-A and TUQ-B Scores

Summary: This table provides the raw scores and change scores for the non-teach-back subject on the TUQ-A and TUQ-B.

Detailed Description: This table consists of two columns and four rows. The first row is the header row and indicates for what and whom the scores are listed. The first column is labeled 'Survey Measure' and indicates either TUQ-A, TUQ-B, or the change in score from survey 1 to survey 2. The second column is labeled 'NT Scores' to indicate the scores for the subject who received the intervention without teach-back strategies. The NT scores indicated are 134 for TUQ-A, 145 for the TUQ-B, and plus 11 for the change in score, indicating that this subject's score increased by 11 points from TUQ-A to TUQ-B.