Fall 2013

The Effect of Specific Professional Development on Speech-Language Pathologists' Perceptions of Their Knowledge, Skill, and Confidence in using the iPad as a Speech-Generating Device with Students who have Complex Communication Needs

Kelsey S. Hall
University of New Hampshire, Durham

Follow this and additional works at: https://scholars.unh.edu/thesis

Recommended Citation
Hall, Kelsey S., "The Effect of Specific Professional Development on Speech-Language Pathologists' Perceptions of Their Knowledge, Skill, and Confidence in using the iPad as a Speech-Generating Device with Students who have Complex Communication Needs" (2013). Master's Theses and Capstones. 799.
https://scholars.unh.edu/thesis/799

This Thesis is brought to you for free and open access by the Student Scholarship at University of New Hampshire Scholars' Repository. It has been accepted for inclusion in Master's Theses and Capstones by an authorized administrator of University of New Hampshire Scholars' Repository. For more information, please contact nicole.hentz@unh.edu.
The Effect of Specific Professional Development on Speech-Language Pathologists' Perceptions of Their Knowledge, Skill, and Confidence in using the iPad as a Speech-Generating Device with Students who have Complex Communication Needs

BY

Kelsey S. Hall, Ed.M.

Boston University, 2010

THESIS

Submitted to the University of New Hampshire in Partial Fulfillment of the Requirements for the Degree of Master of Science in Communication Sciences and Disorders

September, 2013
This thesis has been examined and approved.

Rae M. Sonnenmeier  
Thesis Director, Rae M. Sonnenmeier, Ph.D.

Stephen N. Calculator, Ph.D.

Amy Solomon Plante, M.S.

Barbara Prudhomme White, Ph.D., OTR/L

May 22, 2013

Date
DEDICATION

For each and every student in my life – past, present, and future.
ACKNOWLEDGMENTS

I would like to express the deepest appreciation to my committee chair, Professor Rae Sonnenmeier, who had great commitment to, and confidence in, me and my research over the course of the past two years. Her passion as a clinician and professor do not go unnoticed and continue to motivate and inspire me each day. Without her guidance and dedication, this thesis would not have been possible.

I would like to thank Amber Szilagyi, my “partner in crime”, throughout this entire experience. My graduate experience, research and all, would have not been the same without you. I look forward to our continued friendship and work together.

I would like to thank my committee members, Stephen N. Calculator, Ph.D., Barbara Prudhomme White, Ph.D., OTR/L, and Amy Solomon-Plante, M.S. whose commitment and dedication to their respective professions is something I can hope to achieve throughout my career.

To my friends – you have been a light through many nights of writing. Thank you for friendship and encouragement over the past two or more years.

I would like to thank my family, in particular my parents – Rick and Claire Hall – for your support, understanding, and continuous love, which made this research possible. Thank you for always believing in me.

Finally, to my darling Matthew. You have supported me in every endeavor, academic or other, and I am forever grateful to you. Through it all, you have kept me grounded. I love you and am thankful for who you are each day.
# TABLE OF CONTENTS

DEDICATION ........................................................................................................... iii  

ACKNOWLEDGMENTS ............................................................................................. iv  

LIST OF TABLES ........................................................................................................ ix  

LIST OF FIGURES ....................................................................................................... x  

ABSTRACT .................................................................................................................. xi  

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION ................................................................. 1</td>
<td></td>
</tr>
<tr>
<td>Evidence for the Use of AAC ......................................................... 1</td>
<td></td>
</tr>
<tr>
<td>Knowledge and Skills Needed to Support the Use of AAC ................................. 3</td>
<td></td>
</tr>
<tr>
<td>New iPad Technology .............................................................................. 6</td>
<td></td>
</tr>
<tr>
<td>SGD$s$ and iPad Technology ......................................................................... 8</td>
<td></td>
</tr>
<tr>
<td>Use of the iPad in Schools ......................................................................... 10</td>
<td></td>
</tr>
<tr>
<td>Professional Development ................................................................. 12</td>
<td></td>
</tr>
<tr>
<td>Professional Development Approaches ............................................. 13</td>
<td></td>
</tr>
<tr>
<td>Technical Assistance ................................................................. 14</td>
<td></td>
</tr>
<tr>
<td>Coaching ......................................................................................... 14</td>
<td></td>
</tr>
<tr>
<td>Consultation .................................................................................. 15</td>
<td></td>
</tr>
<tr>
<td>Mentoring .................................................................................... 15</td>
<td></td>
</tr>
<tr>
<td>Communities of Practice .......................................................... 15</td>
<td></td>
</tr>
</tbody>
</table>
Consultation .................................................................................................................. 33
Data Analysis Procedures .................................................................................................. 33

RESULTS .......................................................................................................................... 35

Intervention Fidelity ......................................................................................................... 35
Baseline Descriptive Attributes of SLPs' Experience .................................................. 36
Knowledge Indicators ....................................................................................................... 36
Skill Indicators .................................................................................................................. 38

Lola .................................................................................................................................. 38
Jessica ................................................................................................................................. 40
Diane ................................................................................................................................. 42

Use of SFY! Functions ...................................................................................................... 43
Perception of Use of SFY! with Students .......................................................................... 45

Confidence Indicators ...................................................................................................... 46
Baseline Descriptors of Confidence .................................................................................. 46
Perceived Confidence in Using SFY! .............................................................................. 47
Perceived Confidence in Using the iPad as a SGD ......................................................... 48

SLP Perceptions of the iPad as a SGD ............................................................................. 50

Evaluation of the Professional Development Procedures ............................................. 53

DISCUSSION ...................................................................................................................... 56

Role of Experience, Training, and Practice on Perceived Knowledge, Skills, 
And Confidence ................................................................................................................ 57

Knowledge and Skill ......................................................................................................... 57
Confidence .......................................................................................................................... 59
**LIST OF TABLES**

TABLE 1 SLP Characteristics and Baseline Experience ............................................ 20

TABLE 2 Setting Characteristics ............................................................................. 23

TABLE 3 SLPs' Knowledge Indicators of the iPad Operating System Pre- and Post-Professional Development ................................................................. 37

TABLE 4 SLPs' Reported Impact of Training Modules on Knowledge Post-
Professional Development ...................................................................................... 38

TABLE 5 SLPs' Perceptions about Using the Speak for Yourself! Application on the iPad Post-Professional Development ......................................................... 46

TABLE 6 SLPs' Perceived Confidence in Using Speech Generating Devices in General and the iPad as a Speech-Generating Device Pre-Professional Development ................................................................. 47

TABLE 7 SLPs' Perceptions of the Benefits of Using the iPad as a Speech Generating Device Pre/Post-Training ................................................................. 51

TABLE 8 SLPs' Reported Challenge(s) of Using the iPad as a Speech Generating Device Post-Training ................................................................. 52

TABLE 9 SLPs' Perceptions about using the iPad as a Speech Generating Device Post-Training ................................................................. 53

TABLE 10 SLPs' Feedback on the Presentation of the Training Modules .............. 54

TABLE 11 SLPs' Perceived Impact of Training Modules and Experience Using the iPad on Clinical Practice Post-Training ................................................................. 55
LIST OF FIGURES

FIGURE 1 Lola’s Reported Weekly iPad Use for Specific Activities ..................... 40

FIGURE 2 Jessica’s Reported Weekly iPad Use for Specific Activities ............... 41

FIGURE 3 Diane’s Reported Weekly iPad Use for Specific Activities ............... 43

FIGURE 4 Average Time Per Week Each Participant Spent Using SFY! Functions .................................................................................................................... 45

FIGURE 5 SLPs’ Perceived Confidence Levels in Using the SFY! Application on the iPad ...................................................................................................................... 48

FIGURE 6 SLPs’ Perceived Confidence in using the iPad as a Speech Generating Device Pre/Post-Training ................................................................. 49
ABSTRACT

THE EFFECT OF SPECIFIC PROFESSIONAL DEVELOPMENT ON SPEECH-
LANGUAGE PATHOLOGISTS' PERCEPTIONS OF THEIR KNOWLEDGE,
SKILL, AND CONFIDENCE IN USING THE IPAD AS A SPEECH-GENERATING
DEVICE WITH STUDENTS WHO HAVE COMPLEX COMMUNICATION NEEDS

by

Kelsey S. Hall

University of New Hampshire, September, 2013

Despite increasing popularity surrounding the implementation of the iPad in therapy by speech-language pathologists (SLPs) with students who have complex communication needs (CCNs), no research to date has explored professional development (PD) training and its outcome on SLPs knowledge, skill, and confidence in using the iPad as a speech-generating device (SGD). The present research explores the effect of PD and practice on the knowledge, skills, and confidence of three school-based SLPs, ages 43 to 59, implementing the Speak for Yourself! application on the iPad in therapy with students who have CCNs over 12 weeks.

Changes in the SLP's perceived knowledge, skill, and confidence were measured through pre- and post-surveys, pre- and post-interviews, and weekly data collection sheets. The data were reported through descriptive summaries and organized into a series of figures and tables. Preliminary findings suggest providing PD and time for practice has a positive impact on SLPs' perceived knowledge, skill, and confidence in using the iPad as a SGD.
Introduction

It is estimated that 1.3%, or 3.5 million, of individuals in the United States have complex communication needs (CCNs)¹ that significantly interfere with their speech understandability and overall communication. Many of these individuals could benefit from some form of augmentative and alternative communication (AAC) (Beukelman & Mirenda, 2013). The American-Speech-Language-Hearing Association (ASHA) estimated 8 to 12 people per 1,000 require the use of AAC. ASHA (2008) defines AAC as:

...an integrated group of components, including the symbols, aids, strategies, and techniques used by individuals with severe speech and language disabilities to enhance communication. The system serves to supplement any gestural, spoken, and/or written communication abilities. Augmentative and alternative modes of communication have assumed an increasingly important role in meeting the communication needs of individuals with severe disabilities (p. 1).

Evidence for the Use of AAC

AAC has a continuously growing evidence base that demonstrates the effectiveness of AAC technologies and strategies across a widely diverse spectrum of individuals with CCNs with differences in age, disability, socio-economic status, culture, language, and more. The evidence base for AAC has been accumulating over the last three to four decades with research supporting

---

¹ For the purpose of this study, the term “complex communication needs” (CCNs) will be used when referring to individuals struggling with speech, such as those with neurodevelopmental disorders (i.e., autism, Down syndrome, etc.), who may require an alternate method of making their wants, needs, and desires known.
its use across the lifespan (Blackstone et al., 2007; Schlosser & Raghavendra, 2004).

Schlosser and Raghavendra (2004) discussed the relevance of evidence-based practice to the field of AAC. These researchers offered a decision-making process and a working definition of evidence-based practice as it relates to AAC, stating "Evidence-based AAC practice is the integration of best and current research evidence with clinical/educational expertise and relevant stakeholder perspectives, in order to facilitate decisions about assessment and intervention that are deemed effective and efficient for a given direct stakeholder" (Schlosser and Raghavendra, 2004, p. 3). These researchers created a schematic of the evidence-based practice process specific to AAC. This schematic is a framework for those who want to use evidence-based practice effectively by highlighting three key steps of this process: (a) develop a "well-built" question, (b) perform a data search for evidence using valid sources, and (c) then implement the identified strategy in a clinical manner. After implementation, the clinician must decide if the evidence-based practice was successful and then disseminate the experiences and findings. The only way evidence-based practice works successfully is through the sharing of information via professional conferences, journals, and/or newsletters. This way, other professionals may benefit from the implementation of the practice.

Snell et al. (2010), through a review of literature, verified speech and language services to be beneficial for improving the communication skills of individuals with CCNs, including those with profound cognitive disabilities. These
researchers concluded approximately 96% of individuals receiving speech and language therapy experienced a positive change in various aspects of their specific communication goals. Of the 96% of individuals found to benefit from speech and language therapy, 25% received therapy related to AAC.

This evidence base has involved dedicated speech-generating devices, such as the Echo, DynaVox, and Vantage Lite, which have, and currently still are, used during speech-language therapy with students who have CCNs. A speech-generating device (SGD) is a portable electronic device that will produce previously recorded or digitized speech when activated by the individual intending to communicate. Generated messages are intended to provide the user with the ability to use communicative functions such as requesting, commenting, greeting or answering questions (Schlosser, 2003). Depending on the type, SGDs often cost schools and insurance (such as Medicaid and Medicare) thousands of dollars per individual (ASHA, 2012). These SGDs are considered to be dedicated communication devices, meaning they serve one purpose - allowing the individual to select a symbol (icon or text) and producing speech output. Once this type of SGD is purchased, technical support and resources are included in the cost and available throughout the life of the device (DynavoxTech, 2012; Prentke Romich Company, 2012).

Knowledge and Skills Needed to Support the Use of AAC

ASHA (2002) provides an extensive list of knowledge, skills, and proficiencies required of practicing speech language pathologists (SLPs) related to eight specific areas of AAC practice: (a) Assessment, (b) Documentation, (c)
Implementation of AAC intervention, (d) Use of Evidence Based Practice in AAC intervention, (e) Evaluation of AAC effectiveness for Clients, (f) Advocacy for AAC in the larger community, (g) Collaboration with AAC Users, and (h) Coordination of AAC Services.

Despite the availability of ASHA's knowledge and skill guidelines for AAC practice, the ASHA 2012 Schools Survey found 28.2% of SLPs identified a lack of training and professional development (PD) related to the use of technology, including AAC, to be a challenge when working in school systems. Of 1,760 SLPs who responded to the survey, 48.8% reported working with students who are “nonverbal... [and require] augmentative and alternative communication” (p. 7). Of these SLPs, an average of 4.3 students on their caseloads would benefit from AAC. SLPs who work with students who use AAC stated they only spent approximately 1.1 hours troubleshooting technology per week. From this information, it is clear there are three potential barriers to success regarding SLPs' knowledge, skills, and confidence levels when implementing AAC technology with students: (a) lack of quality training and PD, (b) heavy caseload sizes, and (c) limited time to practice skills needed to use AAC technology.

The knowledge and skills of facilitators of the use of AAC [in this case, SLPs] should exceed those needed to interact with natural speakers. For example, Beukelman and Mirenda (2013) stated, “facilitators typically need to be operationally competent in the programming, use, and maintenance of electronic AAC devices” (p. 128). These researchers go on to discuss the implications a

---

2 Facilitator refers to Beukelman & Mirenda's definition: “...family members, professionals, and frequent communication partners who, in one way or another, assume some responsibility for keeping the AAC system current and operational and/or for teaching the person using it to do so effectively” (p. 157).
lack of training places on individuals with CCNs, explaining "failure to specifically consider adequate facilitator skills in the assessment process will almost always result in implementation failure later on; this is especially true for more demanding high-tech devices" (p. 157). Researchers have found SLPs to be inadequately trained and prepared to implement SGDs despite the availability of technical support, training, and programming guides from SGD manufacturers (ASHA, 2012; Costigan & Light, 2010; Johnson, Inglebret, Jones, & Ray, 2006; Schepis & Reid, 2003).

Through a review of the literature, Costigan and Light (2010) found pre-service training programs for SLPs, special education teachers, and occupational therapists did not adequately equip entry-level professionals for providing quality services to individuals who use AAC. Obtained through an analysis of themes in the literature related to pre-service training, these researchers attributed the entry-level professionals' lack of knowledge and skill levels with AAC to (a) limited exposure with proper coursework, (b) instructors who are not experts in the field teaching courses on AAC, (c) minimal access to AAC interdisciplinary courses, and (d) minimal exposure with programming AAC devices. This suggests entry-level SLPs are unprepared to support the use of AAC with students in school-based settings.

More specifically, Schepis and Reid (2003) found multiple issues affecting the proper use of SGDs by direct service providers with their clients, including (a) a lack of effective training and (b) a lack of supervision of direct staff by appropriate personnel. Similarly, Johnson et al.'s (2006) research on the
perspectives of SLPs regarding success versus abandonment of AAC devices found a void in effective training of professionals and lack of consistent device implementation in therapy often lead to a higher rate of AAC abandonment among users. According to Johnson et al (2006), abandonment of a device "may refer both to those who appropriately discontinue using AAC once they no longer need it as well as those who continue to need AAC, but do not use it" (p. 86); in contrast, device rejection "was used to refer to situations in which clients were shown AAC options but chose not to pursue the options from the outset" (p. 86).

New iPad Technology

On April 3rd, 2010, the face of technology changed with the release of the first iPad tablet device, created by Apple, Inc. According to Murray and Olcese (2011), approximately 3 million iPads were sold within the first few weeks of being released. The iPad resembles a compact, lightweight computer, allowing consumers to fulfill multiple personal and academic needs with ease.

Researchers and reviewers complimented Apple, Inc. on creating a sleek, lightweight, multi-purpose, high-tech device (Baker, 2012; Furie, 2010; Griffey, 2012; Hager, 2012; Murray & Oclese, 2011; Stone, 2010) that has redefined the idea of personal computers and overall technology. Additionally, the application software revolution has provided consumers affordable access to a variety of resources, such as games, newspapers, books, educational tools, and more for purchase through the Apple App Store.

Due to increased media attention and positive anecdotal reports (Baker, 2012; Furie, 2010; Griffey, 2012; Hager, 2012; Murray & Oclese, 2011; Stone,
2010), the iPad quickly caught the interest of parents, educators, and direct service personnel, including SLPs, in school systems throughout the United States. Schools began purchasing this user-friendly device for educators in the hopes of increasing technology use within classrooms and therapy (Murray & Oclese, 2011; Peluso, 2012; Price, 2011). Since this new technology and various speech-generating applications have flooded the market at an affordable rate for schools (Newton & Dell, 2011), iPads were being urged upon staff and students with the expectation everyone would embrace and become fluent users of this new technology (Cordle & Lewis, 2012; Murray & Oclese, 2011; Palser, 2011).

Since its release, iPad technology has been implemented in a variety of ways by SLPs. The iPad supports speech-generating applications, allowing the iPad to become a non-dedicated communication device for use with students who have CCNs. Researchers have become interested in the efficacy of this new technology (Murray & Oclese 2011; Peluso, 2012) compared to that of more traditional dedicated communication devices (Flores, et al., 2012). From the previously mentioned anecdotal reports regarding the influx of this new technology, as well as the lack of evidence base supporting the iPad as an effective SGD, one prominent question continues to be unanswered: Will SLPs be effectively trained and prepared to provide services to students with CCNs who use the iPad as a SGD?
SGDs and iPad Technology

In October of 2011, CBS aired a segment on the popular show *60 Minutes*, "Apps for Autism", praising the use of iPad technology with individuals diagnosed with autism spectrum disorder (ASD). This segment included interviews with, and video footage of, individuals with ASD and their families successfully using the iPad as a SGD. More recently, Baker (2012) reported on multiple individuals’ use of the *Proloquo2Go™*, one of the first speech-generating applications created for use on the iPad. In this article, Janice C. Light, a professor at Pennsylvania State University and pioneer in the field of AAC, was quoted supporting the new application, yet cautioning the use of Proloquo2go™ and the iPad for all students, explaining each student has different needs that the iPad or Proloquo2go™ application may not address most effectively.

Due to the influx of cost-effective iPad technology and specific speech-generating applications, as well as the "bandwagon effect" often seen with new technologies (Palser, 2011), it is valid to speculate the previously mentioned evidence-based SGDs (Dynavox, Vantage Lite, etc.) may become less significant. Since the iPad’s release, thousands of applications have been created (Murray & Oclese, 2011). As of 2012, more than 50 applications had been created for use on the iPad for speech generation (Sheldon, 2012). This new technology poses potential complications that educators, such as SLPs, may face in using the iPad over other SGDs devices with years of research and a
solid evidence base to support their efficacy (ASHA, 2004; Rispoli et al., 2010; Schlosser & Raghavendra, 2004; Schlosser & Sigafoos, 2009).

Thus far, minimal research exists to support the use of various speech-generating applications on the iPad as appropriate for students with CCNs. Much of the current research is specific to general Apple, Inc. technology or preliminary research exploring the use of Apple, Inc. technology with individuals who have CCNs (Cihak, Wright, & Ayers, 2010; Flores et al., 2012; Kagohara et al., 2010). For example, Kagohara et al. (2010) found a student with autism learned how to activate and use a speech-generating application effectively on the iPod Touch when provided with basic instruction. Initially, this student was found to not benefit from other types of SGDs. Even still, by the end of the study he was able to request basic wants and needs, particularly related to food items using the iPod Touch.

Flores et al. (2012) compared the effect of using the low-tech Picture Exchange Communication System (Bondy & Frost, 1994) with use of an iPad with students with autism. This pilot study found the iPad to be just as effective as the PECS for requesting basic wants and needs during a routine snack time within a school setting. Flores et al. stated, “Accessibility is another advantage of the iPad over other SGDs in terms of cost and availability... [yet] it is not clear whether the iPad... [is] better than more costly SGDs” (p.82). These researchers supported the need for further research on assessing the use of the iPad.

Although these studies provide preliminary evidence, through single-case studies or single-subject design, in support of students with CCNs using Apple,
Inc. technology as a means of speech-generation, they did not evaluate the qualifications of the students' SLPs (or other facilitators supporting the student's use of the device) related to knowledge, skill, and confidence in implementing these devices in therapy. Likewise, these studies did not address the training needs of SLPs and other educators who use speech-generating technology with students. Despite whether or not students are able to embrace the iPad in a positive way, an equally important consideration is whether or not SLPs are prepared to undertake the task of effectively using this technology as a SGD in therapy. Do SLPs perceive they have adequate PD to use iPad technology with their students who have CCNs? To date, there is minimal research that has examined the effect of specific PD on SLPs' perceived knowledge, skill, and confidence levels pertaining to use of the iPad as a SGD in therapy with students who have CCNs, despite the numerous researchers noting such research is needed (Cordle & Lewis, 2012; Gosnell, 2011; Hershberger, 2011). This lack of research is the basis for the purpose of this study.

Use of the iPad in Schools

As the popularity of the iPad increased, SLPs began to use the iPad during therapy sessions in the hopes of improving the speech, language, and communication skills of their students who have CCNs. Not only are SLPs expected to know or learn how to effectively use SGDs, they are occasionally asked to train other personnel in their educational setting for the carry-over of communication goals from therapy into the classroom (Beukelman & Mirenda, 2013), which falls under the expected knowledge and skills and qualifications
(ASHA, 2002). Although the iPad (and other Apple, Inc. products) has shown to have merit because it is popular, relatively easy to use, and socially acceptable across a variety of settings (Flores et al., 2012; Murray & Oclese, 2011), this new technology requires training and practice to use, especially when choosing from the variety of applications available to the public on the “App Store”.

Even though research regarding the efficacy of the iPad as a SGD is limited, many schools have purchased iPads for use by students with communication disorders. The iPads are used, in some cases, in place of other dedicated SGDs that have been researched and have evidence supporting their use. Additionally, the iPad applications do not come with the same level of training and technical support that dedicated SGD manufacturers provide.

AppleCare, general software and technical support through Apple, Inc., is available to the iPad consumer. Yet, AppleCare does not cover technical support specific to each application purchased (Apple, 2012). When making the decision to purchase iPads, schools may not recognize the support, training, and resources provided to educators that often accompany well researched, dedicated SGDs (i.e., Dynavox, Vantage Lite), do not come prepackaged with the iPad. Therefore, if an educator, such as a SLP, needs technical support for a specific speech-generating application on the iPad, he or she will need to contact the application developer directly to find out if any support is provided.

Researchers have learned many SLPs and other educators struggle to become confident in their use of speech-generating technology (Beukelman & Mirenda, 2005; Costigan & Light, 2010; Johnson et al., 2006; McNaughton, et al.,
(2008; Soto, Muller, Hunt, & Goetz, 2001), often stating they need more training and support. Therefore, without specific training for the iPad and its increasing number of speech-generating applications, it appears unlikely clinicians will feel confident in their levels of knowledge and skill, particularly when held to the standards of ASHA's AAC knowledge and skill level requirements for service delivery (ASHA, 2002).

**Professional Development**

Companies that distribute high-tech SGDs provide extensive training and support on how best to use their products (see for example, DynaVoxTech, 2012; Prentke Romich Company, 2012). Despite the availability of training and support, SLPs continue to report feeling ill-prepared to program and implement high-tech SGDs with students (Beukelman & Mirenda, 2013; Costigan & Light, 2010; Johnson et al., 2006; McNaughton et al., 2008; Soto et al., 2001). Thus, it is likely SLPs will also lack the knowledge, skills, and confidence to use speech-generating applications on the iPad. Additionally, SLPs may be unable to properly support the training and supervision of other staff in using the iPad with students who have CCNs.

It is important to consider the demographics of current SLPs in identifying technical support needs for using the iPad as a SGD with students. According to ASHA's most recent member and affiliate counts (2011), about one fourth (25.9%) of ASHA members are age 55 or older. It is often a general assumption the baby boomer generation (ages 55 and up) is slower to learn new technology in relation to experience, exposure, and use. However, according to Githens
(2007), it is a misconception that adults are resistant to learning and using technology. Rizzuto and Mohammed (2005) found older workers' overall commitment to their job and learning outweighed any resistance to change involving technology, which was further supported by other researchers and sources (Morris & Venkatesh, 2000; Rizzuto & Mohammed, 2000). Therefore, it may be advantageous for school administrators to recognize the commitment and drive many of their seasoned SLPs have in ensuring the best for students by providing proper training for new technology to improve knowledge, skill, and confidence levels. Information gleaned from current PD resources related to "adult learning" may help to provide some perspective on best practice for training and supporting SLPs to effectively program and implement use of the iPad as a SGD with students who have CCNs.

Professional Development Approaches

There are numerous models of best practice for PD, particularly in education (Association of Teacher Educators, 2004; Maxwell, Field, & Clifford, 2005; National Association for the Education of Young Children, 1993; National Child Care Information Center, 2006; Winton, McCollum, & Catlett, 2008). The National Professional Development Center on Inclusion (NPDCI) (2008), presented a conceptual framework for offering PD to early educators. This conceptual framework was born of a variety of PD models, yet highlights five major approaches as successful: (a) technical assistance, (b) coaching, (c) consultation, (d) mentoring, and (e) communities of practice (NPDCI, 2008). While there is little agreement regarding which of these approaches is most
effective, each may have a place within a PD plan, specifically when it involves training with new technology. The National Association for the Education of Young Children (NAEYC) and National Association of Child Care Resource & Referral Agencies (NACCRRA) created a joint document in 2011, as a “roadmap” for PD for the use of technology and specifically emphasized four of the five approaches (with the exception of communities of practice). To understand how these approaches connect to the present study, the five approaches are briefly summarized below.

**Technical assistance.** Technical assistance (TA) is a relatively overarching term. The methods behind TA are relationship-based, meaning interaction with others while learning new information plays a crucial role in outcome. TA may be provided through continuing education or training, with an individual or group. TA may be provided face-to-face, through distance technology, or a combination of the two.

**Coaching.** This approach provides educators with an individual who has “expert knowledge” and understanding of adult learning and how it applies to the development of specific skills. The relationship between the coach and his or her trainees should be built on trust and respect. A mutual development and understanding of the training are established initially through goals and consistently referred to throughout the process. A coach typically works in the same school or school district as the person who is engaged in building his or her skills.
Consultation. Consultation and coaching are somewhat similar in nature, however a consultant is generally an individual who is not related to the educational setting, but is brought in to "facilitate the assessment and resolution of an issue-specific concern...or address a specific topic" (NPDCI, 2008). Consultation services may be provided face-to-face, through distance technology, or a combination of the two.

Mentoring. A mentor acts as an individual who has a similar professional role to his or her trainees, but has more experience in the particular area of training. Similar to coaching, this role is established based on the trainee's personal goals and should be based upon trust and respect. This role is not intended to be supervisory in nature. The mentor may provide support face-to-face, through distance technology, or a combination of the two.

Communities of practice (COP). The term "communities of practice" is consistent with what NAEYC and NACCERRA refer to as peer-to-peer technical assistance. COP refers to the variety of ways an individual practices and uses new technology as a way in which they can work with others to practice a particular skill.

These five approaches provide a guideline for PD, with each frequently overlapping. Although these guidelines were designed specific to classroom-based educators in the field of early education, they provide a PD framework for a variety of fields, including the training of SLPs to use the iPad as a SGD. More importantly, these are approaches geared towards increasing the knowledge and skill level of professionals in order to feel confident using technology.
Making the Case

Speech-generating applications on the iPad may prove to be an asset to individuals with CCNs in schools. However, the field of speech-language pathology, per ASHA's Knowledge and Skills for AAC standards (ASHA, 2002) requires the use of best, or evidence-based, practice when working with clients. As iPad technology continues to be purchased by school systems, it is possible educators may forgo previously used, evidence-based forms of dedicated SGDs in favor of non-evidenced-based iPads for use as SGDs in therapy. Likewise, the expectation that school-based SLPs are well-versed in iPad technology, specifically for use as a SGD with students who have CCNs, without receiving proper training may be impudent.

The Current Study

This pilot study was designed to examine the effect of providing specific PD to support SLPs' use of a speech-generating application on an iPad with their students who have CCNs. The aim of this study was to measure potential impact on SLPs' perceived knowledge, skill, and confidence levels over time when provided with specific PD training to use an iPad use as a SGD with young children who have CCNs.

In order to target the aim of this research, SLPs were provided PD training to enhance their knowledge and skills related to the use of an iPad and a speech generating application in three ways: (a) TA (instructional videos prior to the study taking place), (b) consultation (technical support provided throughout the
study), and (c) practice (implementing knowledge gleaned from instructional videos into practice with students to use the iPad as a SGD).
Method

Research Design

The research design and subsequent procedures were approved by the Institutional Review Board of the University of New Hampshire. This research applied a pre/post, descriptive case study design (Yin, 2009) on three SLPs’ perceptions of their knowledge, skill, and confidence to implement an iPad as a SGD in therapy with a student with CCNs. Data were collected regarding the SLPs’ perceptions prior to, during, and after being provided with PD including completion of training modules, access to consultation, and repeated opportunities for practice.

According to Yin (2009), “the case study is preferred in examining contemporary events…” (p. 11). The emerging iPad technology and its use as a SGD in schools is a recent, contemporary phenomenon about which we know little. Therefore, case studies can provide insight into SLPs’ perceptions of their knowledge, skills, and confidence to use the iPad as a SGD. Data were obtained primarily through surveys and interviews, qualitative components that more quantitative studies may neglect to include (Yin, 2009). Yin (2009) described case studies as being able to “explain presumed causal links”, “describe an intervention and the real life context in which it occurred”, and “illustrate the various topics within an evaluation”, and “enlighten situations in which the intervention being evaluated has no clear, single set of outcomes” (p. 19-20).

This study followed multiple protocols considered to be qualitative, as described by Patten (2012): (a) recruitment of participants through purposive
criterion sampling, (b) use of questionnaires and interviews, and (c) small number of participants due to limited resources and extensive amount time required with each participant.

Self-report measures were developed and interviews conducted to address the following research questions:

1. Will SLPs who receive specific PD for use of a speech generating application on the iPad report a perceived increase in knowledge, skill, and confidence levels over time?

2. Will SLPs attribute any reported increases in knowledge, skill, and confidence to the PD in general, and/or components of the PD specifically?

Participants

Three ASHA certified female speech-language pathologists (SLPs), ranging in age from 43 to 59, participated in this study. The SLPs worked in educational settings with elementary aged students in the seacoast region of New Hampshire. All SLPs were employed in their educational setting for at least 3 years prior to the beginning of the study. Each SLP's self-reported demographic information and experience are summarized in Table 1.
<table>
<thead>
<tr>
<th></th>
<th>“Lola”</th>
<th>“Jessica”</th>
<th>“Diane”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>47</td>
<td>59</td>
<td>43</td>
</tr>
<tr>
<td>Degree Type</td>
<td>M.A.</td>
<td>M.Ed.</td>
<td>M.S.</td>
</tr>
<tr>
<td>Certification Type</td>
<td>CCC-SLP</td>
<td>CCC-SLP</td>
<td>CCC-SLP</td>
</tr>
<tr>
<td># of years of experience in the field</td>
<td>2</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td># of years using AAC</td>
<td>2</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td># of years using the iPad</td>
<td>1</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td>Types of AAC/AT used</td>
<td>Go Talk, ECO</td>
<td>Picture Exchange Communication System</td>
<td>Go Talk, Vantage Lite, Dynavox</td>
</tr>
<tr>
<td>Types of SGDs used</td>
<td>Go Talk, ECO</td>
<td>None</td>
<td>Go Talk, Vantage Lite, Dynavox</td>
</tr>
<tr>
<td>Age groups</td>
<td>Across the lifespan</td>
<td>N/A</td>
<td>Preschool, Elementary, &amp; High School</td>
</tr>
<tr>
<td>Completed AAC Assessments</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Responsible for training others</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td># of AAC courses completed</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AAC continuing education</td>
<td>None</td>
<td>2 Workshops</td>
<td>9 Workshops</td>
</tr>
</tbody>
</table>

Note: \(^a\)Names of the Students are pseudonyms, \(^b\)Attainment Company, \(^c\)Prentke Romich Company, \(^d\)DynaVox
Recruitment. Each SLP participant was chosen using *purposive criterion sampling* (Patten, 2012) based on the following inclusion criteria, as reported by each potential participant: (a) previous experience with, or exposure to, a SGD (i.e., a semester long course, a workshop and/or training, use with students in therapy) using a Unity-based or Minspeak® system, (b) reported a general feeling of comfort with using technology, (c) basic knowledge of navigating the iPad 2 operating system, (d) willingness to implement training learned from the study with at least one student weekly, (e) use of the iPad for a variety of tasks regularly (i.e., games, word processing, etc.) and willingness to keep data regarding such use weekly, and (f) work within an educational setting where research is approved to take place. SLPs were excluded from this study if they had previous experience with the speech generating iPad application selected for use in this study (*Speech for Yourself!* [SFY!], as described below).

To recruit the participants, the researcher reached out to known contacts from the University of New Hampshire (i.e., previous professors) as well as known contacts from local school systems (i.e., previous co-workers, such as other SLPs or educators) on the seacoast of New Hampshire through e-mail or in person. Known contacts were informed about the study and the inclusion and exclusion criteria and asked if they knew any local SLPs who fit the criteria. If so, they were asked if they felt comfortable contacting the potential participant(s) with a recruitment flyer (see Appendix A) and an informational letter (see Appendix B) describing the nature of the research being conducted. Attached to
the informational letter was an "opt-in/opt-out" form that the potential participant was asked to fill out and return to the researchers.

If a participant decided to opt-in to learn more about the study, he or she completed the opt-in form, provided a phone number as primary contact information, and returned it to the researchers. A phone script was created (see Appendix C) to provide a potential participant with more information if needed. If any potential participants provided an e-mail contact, the phone script was then used to respond via e-mail.

A total of 15 potential participants were informed about the study by known contacts. Of these 15, six responded. Of the six respondents, the researcher – based on the potential participants' self-reported information in comparison to the pre-established inclusion and exclusion criteria - ultimately chose three participants.

Once it was determined a potential participant met the inclusion/exclusion criteria, a meeting was scheduled with the researcher to review informed consent and building administrator consent documents (see Appendix D) and answer any questions or discuss concerns regarding the requirements of the study. At the end of the meeting, potential participants were given up to one week to decide on their participation in the study. Recruitment ended once both the informed consent and building administrator consent forms were returned to the researcher. Table 2 outlines each participant's setting characteristics.
Table 2

*Setting Characteristics*

<table>
<thead>
<tr>
<th></th>
<th>Setting 1</th>
<th>Setting 2</th>
<th>Setting 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades</td>
<td>K - 5</td>
<td>1 - 4</td>
<td>Pre-K - 5</td>
</tr>
<tr>
<td>Average # of Students School-wide</td>
<td>350</td>
<td>430</td>
<td>600</td>
</tr>
<tr>
<td>Average Classroom Size</td>
<td>22</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>Average Teacher/Student Ratio</td>
<td>1:7</td>
<td>1:20</td>
<td>1:12</td>
</tr>
</tbody>
</table>

**Incentive.** Upon fulfilling their commitment to the study, each SLP was allowed to keep an 16 GB Apple iPad 2 as compensation for their time and efforts. Although all participants completed the study in full, had any SLP participant decided to terminate their participation, she would have received a $25 VISA gift card as appreciation for her time up to the point of exit. Prior to exiting, she would have been required to return the iPad used for the study.

**Students.** Each SLP identified one student on her caseload for whom she would address study questions about her own professional skill development. Guidelines included selection of a student between the ages of 5 and 9 who presented with CCNs and, based on clinical judgment, was perceived to benefit from using speech-generating technology, and parental consent for use of the speech generating application on an iPad during at least one scheduled therapy session weekly. However, this study did not focus on student outcomes, and thus students are not mentioned throughout the remainder of this study.
**Materials**

**iPad.** One white, 16 GB Apple, Inc. iPad 2 was provided to each of the three SLP participants. A black iPad OtterBox case with screen protector was also provided with each iPad to serve as protective covering.

**Speak for Yourself (SFY)!** SFY! (LoStracco & Collender, 2012) is a speech generating AAC application available for use on tablet devices, including the iPad. SFY! was chosen for this research because it was brand new to the market in January of 2012. The SFY! application mimics the display of a dedicated SGD, similar to devices that use Minspeak©. This application was also chosen because it would be novel to most potential participants, yet be familiar to those with experience using SGDs.

SFY! is comprised of more than 13,000 vocabulary words, which are customizable to the particular user. There are 119 buttons on the home screen, which then link to additional screens as they are pressed. This application can be programmed and customized according to the language needs of a particular individual. Features of this application include: Open and Close, Babble, Lock Edit, Edit and Add Words, No Duplication, and Word Finder. For more information about each feature, please refer to the PD training modules (Appendix E).

**Training Modules.** Three training modules, each approximately 10 minutes in length, were designed for the PD (see Appendix E). The three topics covered in these modules were titled: (a) The Research Base for AAC, (b) Introduction to Speak For Yourself!, and (c) Speak for Yourself! Features. The
videos embedded within these modules were recorded using a 16 GB Apple iPad 2 with the preloaded recording software provided in the “camera” application. Each video provided a close-up of the SFY! screen on an iPad with real time instruction on how to customize each feature of the application. Videos were edited using iMovie, a program preloaded on most Mac computers. Talking points from each video were provided on a corresponding PowerPoint slide. Each SLP participant received a burned CD-R with each of the modules, which could be accessed on her personal computer.

**Qualtrics** (Qualtrics Labs, Inc., 2009). This is a web-based software program designed for creating survey tools, which aided in collecting data. The researcher accessed this software for free based on affiliation with the University of New Hampshire. Using this software, the researcher developed both a survey to be implemented with the SLP participants prior to and upon completion of the PD period for the study.

**Evernote®** (Evernote, 2013). This software is available for download on a computer and tablet application, which is designed to organize notes, pictures, and audio files into folders at the user’s discretion. The researcher used this software to take notes during interview sessions with the SLP participants prior to and upon completion of the PD period.

**Measures**

Each of the following steps in this research study aimed to measure the variables of knowledge, skill, and confidence levels as reported by the three SLP participants. Data were collected on these variables prior to and after
implementation of the PD model (including the training modules, regular practice with at least one student for 12 weeks, and consultation as needed). Skill (based on evidence of practice) and perception of confidence measures were also collected during the 12-week practice period. These variables are defined as the following:

1. Knowledge Indicators: Measures of the SLPs' understanding of how to use the iPad's basic operating system were based on self-reports and interviews conducted prior to and after completion of the PD period for the study. Specific iPad knowledge indicators centered around functions and tasks, such as turning on the iPad, altering settings (brightness, volume), and installing applications. Based on the post-survey and interview, SLPs provided qualitative feedback regarding their knowledge for the use of the SFY! application post-training.

2. Skill Indicators: Evidence of practice was used an indirect measure of the SLPs' skill development, assuming more time spent on an activity or task increases one's skill level in that specific area. Evidence of practice was measured based on each SLP's weekly self-reports of the amount of time spent using the iPad for *personal use, speech-language therapy*, and *SFY!*. Self-reported information was translated into evidence through half-hour increments of time, which indicated the amount of use. The researcher examined amount of use (high use, medium use, low use). Additional measures of skill based on evidence of practice were measured based on each SLP's weekly self-reports of the amount of time, in half
hour increments, spent using the four specific functions of SFY! (open/close buttons, babble, editing vocabulary, and editing voice quality) discussed in the training modules. The SLPs perceptions regarding about their use of the SFY! on the iPad with students also provided an indirect indicator of their skill to use the application.

3. Confidence Indicators: Measures of the SLPs' perceived confidence to use the iPad as a SGD with the SFY! application were based on weekly self-ratings of their level of confidence using the following scale: not at all confident, somewhat confident, confident, to very confident and able to train others. Additional measures of perceived confidence were based on self-reports to online surveys and interviews conducted prior to and after completion of the PD period for the study.

4. Perceptions of the iPad as a SGD: Perceptions of the iPad as a SGD were based on the following pre- and post-interview questions:

- What do you perceive as the greatest benefit(s) of implementing the iPad as a SGD in your academic setting?
- What were some of the challenges in implementing this device in your setting?
- How do you feel about using the iPad as a SGD?

Responses to these questions were analyzed for commonalities and organized into tables, which are outlined and discussed in the chapter on results.
5. Evaluation of the PD Procedures: During each of their post-interviews, SLPs responded to the following questions, which asked them to evaluate the PD procedures (training modules, practice, and consultation):

- How did you feel about how the training modules were presented?
- How has this training or experience changed your practice?

Responses to these questions were analyzed for commonalities and organized into tables, which are outlined and discussed in the chapter on results.

Data Collection Procedures

Online surveys. Prior to implementation of the PD model, each SLP completed an online survey comprised of 30 questions, including basic demographic information (subsequently referred to as the pre-survey). Following the 12 week PD period for the study, the SLPs completed a follow-up survey comprised of 28 questions (subsequently referred to as the post-survey). Both the pre- and post-PD surveys were aimed at collecting information regarding each SLP's perceived knowledge, skills, and confidence levels with using the iPad in general and as a SGD with individuals in therapy. Other questions inquired about their general knowledge and confidence levels with using AAC of all forms (high- and low-tech). These questions were based on prior clinical observations, experience, and judgment gained by the researcher in her role as a working professional. In addition, the researcher took into consideration ASHA's (2002) knowledge and skill guidelines regarding the various competencies for SLPs specific to AAC. Finally, specific aspects of knowledge, skill, and
confidence of SLPs and the role of PD needed were identified from prior research as part of the process of developing the pre- and post-surveys (Beukelman & Mirenda, 2005; Costigan & Light, 2010; Johnson et al., 2006; McNaughton, et al., 2008; Soto, Muller, Hunt, & Goetz, 2001).

Survey questions took a variety of forms, including rating scales using a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree), multiple choice selection boxes, and descriptive text (more open ended questions) (see Appendix G for a copy of the pre-survey). In an effort to validate the survey questions prior to sending the survey to the three participants, they were reviewed and edited by two other researchers, one of whom is an AAC expert.

Once the SLP agreed to participate in the study and informed consent was signed (including that of the building administrator's), she was contacted separately via e-mail with a link to the online pre-survey created in Qualtrics (see Appendix G). Each participant was given one week to complete the pre-survey. At the completion of the 12-week study, each participant received a link to the post-survey and was asked to complete the survey within one week. The answers to the surveys guided the questions asked during the semi-structured interviews.

**Semi-structured interviews.** Following completion of the pre-survey and prior to implementation of the PD training modules, each SLP was interviewed by the researcher (subsequently referred to as the pre-interview). The researcher worked with each participant to find a time to meet separately prior to the
beginning of the study for the pre-interview. These interviews were individual and took place at the SLPs' respective elementary schools.

Following the 12-week PD period and after completion of the post-survey, a follow-up interview was conducted by the researcher (subsequently referred to as the post-interview). Depending on how each participant answered the questions from the pre- and post-surveys, the pre- and post-interview questions were modified in order to probe for more information and clarification (see Appendix H for an example). Therefore, the specific questions asked varied among the participants. One other clinician reviewed the interview questions in comparison to each SLP's survey responses prior to their pre- and post-interview. Both the pre-survey and pre-interview questions were designed to aid in establishing a baseline of experience regarding each SLP's perceived knowledge, skill, and use of the iPad and SGDs based on self-report. Information reported by SLPs was accepted as accurate and was not cross-referenced.

The pre-interview took place over approximately one hour. Approximately 13 pre-established questions were asked to the SLP participant by the researcher. The number of questions exceeded the initial 13 if more clarification was needed from the pre-survey or comments made during the pre-interview. The researcher took notes on her laptop. The notes were then placed onto a secure server in order to reference the information later. At the completion of the pre-interview, the researcher spent time consulting with the SLPs regarding goals for the 12 weeks and suggested implementation of the iPad in regularly
scheduled therapy (i.e., based on each participants’ specific materials and setting, activities were discussed using clinical observations and judgments).

At the end of the study, the same procedure was executed regarding the post-interview. Post-interview questions were pre-established and were altered depending on whether or not further clarification was needed from the SLP’s post-survey or comments made during the post-interview. Post-interviews lasted approximately one hour and, if the SLP desired, concluded with further consultation regarding continued implementation of the $SFY!$ application in therapy beyond their participation in the research project.

**Weekly data collection.** Using Microsoft Word, the researcher designed a double-sided data collection sheet that was comprised of checklist tables regarding use of the iPad and corresponding time measures (as evidence of practice), as well as confidence ratings as perceived by the SLP participants (see Appendix F). Each SLP was expected to complete a data collection sheet weekly. Twelve copies of data collection sheets were provided to each participant.

The participants estimated and recorded the amount of time (evidence of practice) spent weekly using the iPad in 30 minute intervals (0-30, 30-60, 60-90, 90-120, and >120): for the following activities: (a) Personal Use, (b) games, (c) stories, (d) speech-language therapy, (e) AAC general use, (f) speech generation (excluding the $SFY!$ application), and (g) the $SFY!$ application (see Appendix I).

To track the SLPs’ confidence in using the application over time, each participant was asked to circle one of the following responses regarding the use
of SFY! in weekly therapy with students: *Not at all confident, Somewhat confident, confident, and very confident.*

Finally, specific information regarding the number of times each participant accessed consultation (defined as any contact initiated by an SLP involved in the study to the researcher requesting support and/or guidance related to the application itself or its use in therapy) was also tracked in the form of yes and no checks.

**Professional Development Procedures**

**Implementation Guidelines.** An implementation packet was provided to each SLP that contained the following items: (a) a “thank you” letter for participation in the research, (b) training modules developed by the researcher, (c) the projected timeline for the course of the study, (d) data collection sheets, and (e) child assent board (see Appendix J). The researcher reviewed the sections of the packet with the participant to ensure each was aware of the extent of her responsibilities. Prior to initiating use of the iPad with the identified student during each therapy session, the SLP was instructed to gain the student’s agreement to use the iPad, using the child assent board as needed.

**Training Modules.** Each SLP was given one week to review the training modules prior to the initiation of the practice period using the SFY! application in therapy with a student. These modules remained with each SLP throughout the duration of the study for reference, if needed, as a form of TA regarding how to navigate the operating system of the iPad, as well as the various features of the SFY! application.
Practice. Each SLP was expected to implement use of the iPad with SFY! with one student with CCN over the course of 12 weeks (referred to as the practice period). SLPs were expected to continue with their usual therapy, with the addition of the iPad using the SFY! application. Participants were also encouraged to use the iPad and application with more than the one identified student, as well as provide basic training to other staff members (teachers, para-educators, speech assistants, etc.) as they continued through the research study. Data were not collected on an SLP’s decision to expand her use and train others – it was simply suggested as an opportunity to extend her knowledge and skills learned from the PD training modules.

Consultation. Consultation was available as needed throughout the course of the study. Consultation was defined as facilitating the assessment and resolution of an issue-specific concern, providing more expert knowledge on using the SFY! application in therapy, and providing ideas for therapy strategies. In addition, the researcher was on-call, via phone and e-mail with an up to 24 hour response window of time, to trouble-shoot any technical or software concerns related to the iPad itself or SFY! application.

Data Analysis Procedures

The data were analyzed through both descriptive summaries and reported time use to examine the variables of interest – knowledge, skills (based on evidence of practice), and perceived confidence to use the iPad and speech generating application. For narrative data gleaned from pre- and post-interviews and online surveys, data were screened for exemplary comments that relayed
each SLPs overall sentiment. These exemplary comments were placed in tables for comparison among participants. For amount of time reported using the iPad or applications, graphs were created and analyzed visually across the 12 weeks data collection period for each SLP.
Results

Each SLP initially recruited remained an active participant for the full duration of the study and completed all necessary tasks. Each participant began data collection Monday, October 29th 2012 and finished on Friday, February 2nd 2013, equaling a total of 12 weeks of implementing the iPad with SFY! as a SGD in therapy with at least one student during one therapy session per week. Week 6 data were eliminated from analysis due to school vacation week. Specific measurements of time spent using SFY! and various aspects of the iPad use are described below.

Intervention Fidelity

Intervention fidelity was ensured through each participant's completion of the training modules and practice using the iPad and the SFY! application as documented on the weekly data collection sheets. The researcher inferred the targeted skills were acquired based on data collected regarding weekly use, as well as the SLPs' perceptions reported during pre- and post-surveys and interviews. Documentation by each participant of the amount of time per week spent using the iPad for specific activities (evidence of practice) also served as a measure of intervention fidelity. Each participant documented use of the iPad with at least one student during at least one scheduled therapy session during each week of the study. Evidence of practice findings, as described below, indicate that the participants used the iPad well beyond what was expected for the purposes of this study.
The researcher also ensured fidelity by contacting each participant by e-mail every Friday throughout the duration of the study as a reminder to fill out the week's data sheet. This e-mail also provided a reminder the researcher was available to answer questions and troubleshoot any problems. Though not a requirement of the study, Jessica and Diane responded to the Friday e-mails each week and provided an update on the status of their data collection.

**Baseline Descriptive Attributes of SLPs' Experience**

Diane was the most experienced with AAC based on her 19 years using AAC, as well as the 9 workshops she had previously attended for continuing education. All 3 participants had used the iPad with students for less than 2 years and none had used this device for speech-generation. Their education backgrounds, in regards to coursework and/or continuing education, were diverse, ranging from 2 years of experience with AAC to 19 years and from 0 reported continuing education workshops to 9 workshops. Each participant began the study without prior exposure to the *SFY!* application.

**Knowledge Indicators**

Table 3 presents each participant's iPad specific knowledge indicators as reported during the pre- and post-training surveys and interviews. Both Lola and Diane reported having previous knowledge of the iPad's basic operating functions. Their reported knowledge did not change post-training. Jessica reported being somewhat able to alter settings and download and install applications. Post-training, Jessica indicated she was able to complete each operating function.
Table 3

*Speech Language Pathologists' Knowledge Indicators of the iPad Operating System Pre- and Post-Professional Development*

<table>
<thead>
<tr>
<th></th>
<th>Lola</th>
<th>Jessica</th>
<th>Diane</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
</tr>
<tr>
<td>Can you turn on the iPad?</td>
<td>Y Y</td>
<td>Y Y</td>
<td>Y Y</td>
</tr>
<tr>
<td>Can you alter settings</td>
<td>Y Y</td>
<td>S Y</td>
<td>Y Y</td>
</tr>
<tr>
<td>(brightness, volume)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can you download and install</td>
<td>Y Y</td>
<td>S Y</td>
<td>Y Y</td>
</tr>
<tr>
<td>an application?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key: Y = yes; N = no; S = somewhat.

Each participant's responses to post-implementation interview questions regarding the effect of the training modules on her knowledge of the various functions of the SFY! application were examined. All 3 participants reported positive effect of the training modules on their perceived knowledge of the SFY! application (see Table 4). Each participant reported the modules provided enough information to begin programming and implementing the application in therapy. Lola reported, “I was able to get the program up and running quickly and learn the features.” Jessica reported referencing the modules multiple times before and during training stating, “After a few viewings I was good.” Diane reported, “Once I saw them [training modules], I felt like I could just jump right in.”
Table 4

Speech Language Pathologists' Reported Impact of Training Modules on Knowledge Post-Professional Development

Question: What was the impact of the training modules on your practice?

<table>
<thead>
<tr>
<th>Participant</th>
<th>Response</th>
</tr>
</thead>
</table>
| Lola        | "I was able to get the program up and running quickly and learn the features."
|             | "I didn’t have to reference it more than once."
|             | "I felt comfortable using the application."
| Jessica     | "They were great."
|             | "Watched them a few times in the beginning."
|             | "The editing piece was tricky, I referenced that one."
|             | "After a few viewings I was good."
|             | "They were very clear and helpful."
| Diane       | "They were great."
|             | "Once I saw them I felt like I could just jump right in."

Skill Indicators

Summaries of the amount of time each SLP spent using the iPad for specific activities, including personal use, speech-language therapy (articulation, phonology, fluency, language, and pragmatic therapy), and use of the SFY! application, over the course of 12 weeks provide evidence of practice as an indirect indicator of skill.

Lola. As shown in Figure 1, Lola’s reported amount of time spent using the iPad for personal use each week showed a steady increase over the course of the study. During weeks 1 through 5 Lola’s reported amount of time for personal use remained steady at between 0 to 30 minutes. During weeks 7 and
Lola reported an increase in personal use to between 60 and 90 minutes. During weeks 9 through 12 Lola reported her personal use to be greater than 120 minutes per week.

Lola’s reported amount of time spent using the iPad for speech-language therapy varied over the course of the 12 weeks (see Figure 1). During week 1, Lola reported use of the iPad for therapy was between 60 to 90 minutes. Reported use for therapy decreased to between 30 to 60 minutes during week 2 and to between 0 to 30 minutes during weeks 3 and 4. Reported use for therapy increased to between 30 to 60 minutes in week 5. For the remainder of the study, weeks 7 through 12, Lola reported iPad use for therapy at between 30 and 60 minutes per week. Lola reported using the iPad and SFY! application with more than one student as the study progressed and could account for this variability.

Lola’s reported amount of time spent using the iPad for SFY! was consistently at more than 90 minutes per week over the course of the study (see Figure 1). During weeks 1, 2, and 7 she reported using SFY! for 90 to 120 minutes per week and more than 120 minutes per week during weeks 3 through 6 and weeks 8 through 12.
Figure 1. Lola’s reported weekly iPad use for specific activities. Each activity is represented by a distinct line and measured in 30 minute intervals over the course of the 12 week study.

Note: Week 6 data were eliminated due to school vacation week.

Jessica. Jessica’s reported amount of time spent using the iPad for personal use each week showed an increase over the course of the study, with the exception of week 12 (see Figure 2). During week 1, Jessica reported no time using the iPad for personal use. During weeks 2 through 8 Jessica reported an increase in personal use to between 0 and 30 minutes. During week 9 personal use of the iPad increased to 60 to 90 minutes per week. During week 10 personal use showed a decrease to 30 to 60 minutes. Jessica reported personal use at greater than 120 minutes during week 11. During week 12 Jessica reported her personal use decreased to 30 to 60 minutes.

As shown in Figure 2, Jessica’s reported amount of time spent using the iPad for speech-language therapy during week 1 was 30 to 60 minutes. During week 2, Jessica reported an increase in use for therapy to more than 120
minutes. Jessica reported using the iPad for therapy for 60 to 90 minutes during week 3. Jessica's use for therapy increased to more than 120 minutes during weeks 4 and 5. The remainder of the study, weeks 7 through 12, Jessica reported use for therapy at more than 120 minutes per week.

During weeks 1 through 4 Jessica reported iPad use for SFY! at 30 to 60 minutes per week. She reported using the application 60 to 90 minutes per week during week 5. Week 7 Jessica reported using the application for 30 to 60 minutes. Jessica's use of SYF! increased to 60 to 90 minutes at week 8, 90 to 120 minutes week 9, and 60 to 90 minutes weeks 10 and 11. Week 12 she used the application 90 to 120 minutes (see Figure 2).

**Figure 2. Jessica's reported weekly iPad use for specific activities. Each activity is represented by a distinct line and measured in 30 minute intervals over the course of 12 weeks.**

*Note: Week 6 data were eliminated due to school vacation week.*

Jessica provided anecdotal information on her weekly data collection sheets that accounted for variability in use of the iPad. During week 1, Jessica
noted 2 school days were cancelled due to a hurricane. During week 11 Jessica reported attending an iPad workshop where she was expected to use the iPad during the workshop.

Diane. Diane's reported amount of time she used the iPad for personal use and speech-language therapy remained steady over the course of the 12-week study (see Figure 3). She reported both personal use and speech-language therapy at greater than 120 minutes per week, with the exception of one week. During week 3 of the study, Diane reported using the iPad for personal use at 90 to 120 minutes.

Diane's reported amount of time using SFY! on the iPad was less than for personal use or therapy each week. During week 1, Diane reported using SFY! for 60 to 90 minutes. During week 2 and 3 Diane used the application for 30 to 60 minutes. During week 4 reported use of SFY! increased to 60 to 90 minutes. Diane reported her use of SFY! at 30 to 60 minutes for the remainder of the study (weeks 5 through 12).
Figure 3. Diane's reported weekly iPad use for specific activities. Each activity is represented by a distinct line and measured in 30 minute intervals over the course of 12 weeks.

Note: Week 6 data were eliminated due to school vacation week.

Use of SFY! functions. Summaries of the amount of time (in 30 minutes intervals) each SLP spent using the specific functions of the SFY! application (open/close buttons, babble, editing vocabulary, and editing voice quality) over the course of 12 weeks provide additional evidence of practice as indirect indicators of skill (see Figure 4). For comparison purposes, the average weekly time spent using each function was calculated. In calculating average time, the researcher used the larger number in each time interval for consistency. For example, if the participant reported using a specific function for 30 to 60 minutes, 60 minutes was used for that week's reported use. For each participant, the 12 weekly measures of use were averaged and are reported in terms of time intervals (0-30, 30-60, 60-90, and 90-120 minutes). Summaries of the averaged
reported use for each of the four functions for each participant are presented in Figure 4. Each participant reported open/close buttons as the function used most often throughout the study.

Overall, Lola reported using the open/close and the editing functions more often than the other participants. Her average use regarding open/close buttons and editing vocabulary was 90 to 120 minutes per week. Use of the babble and editing voice quality functions were reported to be between 30 and 60 minutes per week on average.

Jessica reported using open/close buttons and editing vocabulary function 30 to 60 minutes per week on average. Her reported use of the babble and editing voice quality functions were between 0 to 30 minutes per week on average.

Diane reported using the open/close buttons 30 to 60 minutes per week on average. She reported using the babble, editing vocabulary, and editing voice quality functions at between 0 to 30 minutes per week on average.
Figure 4. Average time per week each participant spent using SFY! functions reported in 30 minutes intervals. Averaged time is based on each participant's reported time spent using these functions as recorded on the weekly data collection sheets. The higher number from each interval set was used to calculate the average time.

Perception of use of SFY! with students. Participants noted positive success in their ability to use the SFY! application with their students as another indirect indicator of skill (see Table 5). Lola stated, "I felt good and pretty confident" and Jessica reported, "It was easy to program." All participants noted a barrier to successful use of the application related to carryover from the therapy room into the classroom and/or staff acceptance. Negative reports regarding the application's voice quality were also noted by Jessica and Diane.
Table 5

Speech Language Pathologists' Perceptions about Using the Speak For Yourself! Application on the iPad Post-Professional Development

<table>
<thead>
<tr>
<th>Participant</th>
<th>Response</th>
</tr>
</thead>
</table>
| Lola        | "I felt good."
|             | "I always wonder if what I am doing is the best way for [the student] to learn the application."
|             | "I felt pretty confident." |
| Jessica     | "It was easy to program."
|             | "[I] feel more confident about approaching other devices."
|             | "Using [SFY!] on the iPad made me plan different activities that I would not normally have planned."
|             | "I used a lot more varied vocabulary with my student because it was easy to find." |
| Diane       | "Great program."
|             | "Works best for kids without [significant] motor challenges." |

Confidence Indicators

Three specific measures of the SLPs' perceived confidence were examined: (a) confidence levels at baseline, (b) confidence levels in using the SFY! application in therapy, and (c) confidence levels in using the iPad as a SGD in therapy.

Baseline descriptions of confidence. Each participant's perception of her confidence in using SGD in general and the iPad as a SGD are summarized in Table 6. Lola reported the least amount of confidence in her abilities in comparison to the other participants stating, "I do not feel confident..." and "It is
difficult to know where to start." Both Jessica and Diane reported feeling positive towards SGDs and use of the iPad as a SGD in therapy. Jessica stated, "I feel comfortable using [the iPad]" and "I have a positive attitude." Diane described herself as "experienced" and described having a supportive school system.

Table 6

Speech Language Pathologists' Perceived Confidence in Using Speech Generating Devices in General and the iPad as a Speech Generating Device

Pre-Professional Development

<table>
<thead>
<tr>
<th>Question: Can you talk about your confidence in using SGDs [in general] and the iPad as a SGD?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
</tr>
<tr>
<td>-------------</td>
</tr>
</tbody>
</table>
| Lola        | “I do not feel confident using a SGD.”  
“I have a lack of experience.”  
“It is difficult to know where to start what the basic vocabulary is.” |
| Jessica     | “I feel I have a basic understanding of the iPad.”  
“I feel comfortable using it.”  
“I have a positive attitude.”  
“I am excited to begin [the study].” |
| Diane       | “I have had a lot of experience, some self-taught and some through workshops.”  
“The school is supportive of technology.”  
“I've been lucky to have a mentor.” |

Perceived confidence in using SFY! Figure 5 provides an overview of each SLP's perceived confidence in using the SFY! application in therapy with students over the 12 weeks of the study. Overall, each SLP reported increased perceived confidence levels in using the application on the iPad.
Lola reported feeling somewhat confident during weeks 1 through 4. During weeks 5, and weeks 7 through 9, Lola reported perceiving herself as confident. During weeks 8 through 12, Lola reported feeling very confident.

Jessica reported an increase in confidence level over the course of the 12 week study. During weeks 1 through 5 she reported feeling somewhat confident. The remainder of the study, weeks 7 through 12, she reported feeling confident.

Diane reported an increase in confidence level over the course of the 12 week study. During weeks 1 through 3 she reported feeling confident in using SFY! in therapy. The remainder of the study, weeks 4 through 12, Diane reported feeling very confident with implementing the SFY! application in therapy.

![Confidence Levels Graph](image)

*Figure 5. Speech Language Pathologists' perceived confidence levels in using the Speak For Yourself! application on the iPad throughout the 12 week study. Each line represents a corresponding participant. Note: Week 6 data were eliminated due to school vacation week.*

**Perceived confidence using the iPad as a SGD.** Figure 6 shows each SLP's perceived measure of confidence in using the iPad as a SGD pre- and
post-training. The participants each improved by one measure or remained the same in their reported perceived level of confidence.

Lola's pre-training perceived confidence in use of the iPad as an SGD was somewhat confident. Her perceived confidence improved by one measure, ending the study at confident.

Jessica's pre-training perceived confidence in use of the iPad as an SGD was not at all confident. Her perceived confidence improved by one measure, ending the study at somewhat confident.

Diane's pre-training perceived confidence in use of the iPad as an SGD was very confident. Her perceived confidence remained at very confident post-training.

Figure 6. Speech Language Pathologists' perceived confidence in using the iPad as a speech generating device pre/post-training.
SLP Perceptions of the iPad as a SGD

In addition to understanding the effect of training and practice on knowledge, skill, and confidence levels, each SLP’s perceptions about using the iPad in therapy as an SGD were examined. Because this study focused on the use of the SFY! application on the iPad, information about the participants’ perceptions of this application as speech-generating “software” were obtained based on specific questions asked during the pre- and post-survey and interview questions.

All 3 participants reported a positive attitude towards using the iPad as a SGD in therapy with students (see Table 7). Pre-training, each participant reported the iPad provided a socially acceptable opportunity to expand communication. Lola mentioned, “[using the iPad] can allow [students] to have a voice in class.” Jessica reported, “[using the iPad] can open up spontaneous communication for kids.” Diane commented using the iPad would “reduce behaviors and provide more access to the curriculum.”

Post-training, each participant commented further on the use of the iPad as a SGD. Jessica and Diane specifically discussed the effects of using the iPad with students. Lola reported, “the student was able to communicate to his potential.” Jessica reported, “I was surprised at the level of grammar one student understood, it opened up a wider range of vocabulary and allows others to see [the student’s] capabilities.” Diane noted a positive difference in the speech output of her student and reported, “[using the iPad] helped to slow the student down long enough to form a complete sentence.”
<table>
<thead>
<tr>
<th>Participant</th>
<th>Pre-Training Response</th>
<th>Post-Training Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lola</td>
<td>“It can promote communication with other kids and allow them to have a voice in the class.”&lt;br&gt;“If used correctly it can enrich language receptively as well as expressively.”</td>
<td>“[The student] was able to communicate to his potential, or at all [with a voice].”</td>
</tr>
<tr>
<td>Jessica</td>
<td>“Opening up spontaneous communication with students.”&lt;br&gt;“The possibility of using [this technology] with other students.”</td>
<td>“Gave students who were nonverbal a chance to communicate in an understandable way.”&lt;br&gt;“I was surprised at the level of grammar one student understood.”&lt;br&gt;“Opens up a larger range of vocabulary for the student and allows other to see capabilities.”</td>
</tr>
<tr>
<td>Diane</td>
<td>“Kids will be able to access the curriculum.”&lt;br&gt;“Behavior reduction.”&lt;br&gt;“Peer integration.”&lt;br&gt;“Having a voice.”</td>
<td>“Helped to slow the student down long enough to form a complete sentence.”&lt;br&gt;“Helped him to realize words are separate entities.”&lt;br&gt;“Linked this to his literacy skills.”&lt;br&gt;“Auditory feedback was great.”&lt;br&gt;“Noticed a positive difference in [the] student’s speech.”</td>
</tr>
</tbody>
</table>
Post-training, the SLPs reported on the greatest challenges they experienced using the iPad as a SGD in their setting (see Table 8). Each participant reported educational staff's limited knowledge and acceptance of the device as a barrier to classroom carryover. Lola stated she could have been "more of an advocate for the student" in regards to iPad use in the classroom. Jessica reported having difficulty "thinking of new activities to do in therapy [using the iPad as a SGD]." Diane reported "more opportunity to practice in the classroom" would have benefited her student.

Table 8

Speech Language Pathologists' Reported Challenge(s) of Using the iPad as a Speech Generating Device Post-Training

<table>
<thead>
<tr>
<th>Participant</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lola</td>
<td>&quot;Acceptance by staff and having it be used in other environments [outside of the speech room].&quot; &quot;Myself being an advocate for the student.&quot; &quot;Knowing what activities to do with it [iPad] in therapy.&quot;</td>
</tr>
<tr>
<td>Jessica</td>
<td>&quot;Carryover into the classroom.&quot; &quot;For other adults to take to it and engage with it.&quot; &quot;Having the vocabulary you need when you need it.&quot; &quot;Thinking of new activities to do in therapy.&quot; &quot;Voice quality was terrible and buttons were too small.&quot;</td>
</tr>
<tr>
<td>Diane</td>
<td>&quot;Training other staff to use it in the student's preschool classroom.&quot; &quot;More opportunity to practice in the classroom.&quot; &quot;The voices were a big issue.&quot; &quot;I felt the screen was a little too busy.&quot;</td>
</tr>
</tbody>
</table>
Post-training, the SLPs responded to open-ended interview questions regarding their perceptions about using the iPad as a SGD in therapy with students (see Table 9). Each participant reported a positive attitude about this technology. Lola stated, “Overall it worked well.” Jessica reported feeling “more confident about approaching other [speech-generating] devices” post-training. Diane reported perceived social and economical values of the iPad, stating “it looks cool to other kids” and “it is cheaper, much faster, and they are lighter.”

Table 9

**Speech Language Pathologists’ Perceptions about Using the iPad as a Speech Generating Device Post-Training**

<table>
<thead>
<tr>
<th>Question: How do you feel about using the iPad as a SGD?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>Lola</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Jessica</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Diane</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Evaluation of the Professional Development Procedures**

Each of the participants reported positive feedback regarding the presentation format of the training modules (see Table 10). Lola reported, “The
videos that helped me the most were on babbling and open/close buttons.”

Jessica specifically reported, “The videos, visuals, and step-by-step instructions helped.”

Table 10

Speech Language Pathologists’ Feedback on the Presentation Format of the Training Modules

<table>
<thead>
<tr>
<th>Participant</th>
<th>Response</th>
</tr>
</thead>
</table>
| Lola        | “The videos that helped me the most were on babbling and open/closing buttons.”
|             | “I’m not sure if reading the instructions on the modules or watching the videos affected my practice more.” |
|             | “The trainings felt more than adequate.” |
| Diane       | “They were great.” |

Both Lola and Jessica stated their participation in the training and study made them more accountable to follow through with using the iPad as a SGD in therapy with students each week (see Table 11). Lola reported, “If it wasn’t for the training, I wouldn’t have been using the application correctly and I am not sure I would have followed through with the use.” Jessica reported the study held her “accountable” and helped her with “follow-through”. Each participant reported confidence in using the application by the end of the study. Diane reported, “It gave me additional knowledge of another tool.” Jessica reported more confidence in approaching other SGDs in the future.
Table 11

Speech Language Pathologists’ Perceived Impact of Training Modules and Experience using the iPad on Clinical Practice Post-Training

<table>
<thead>
<tr>
<th>Question: How has this training or experience changed your practice?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>Lola</td>
</tr>
<tr>
<td>Jessica</td>
</tr>
<tr>
<td>Diane</td>
</tr>
</tbody>
</table>
Discussion

Although this research is preliminary, it could provide a baseline for future research in the area of iPad technology and PD. It is important for SLPs to remain evidence-based in their practices and demonstrate the effectiveness of those practices, particularly when working with special populations who show improvement when proper interventions are provided (Snell et al., 2010), such as children with CCNs who require the use of SGDs. SLPs, per ASHA's (2002) guidelines, should be prepared to take on the task of implementing AAC and SGDs with students who have CCNs in their school-based setting. Therefore, it is crucial to provide effective PD for SLPs to stay abreast and educated in an ever-changing world of technology.

Many students with CCNs require the support of SLPs to use their communication devices appropriately as they become more independent. SLPs often report a lack of knowledge and skill, or feel unprepared, to undertake such a task effectively (Beukelman & Mirenda, 2013; Costigan & Light, 2010; Johnson et al., 2006; McNaughton et al., 2008; Soto et al, 2001). The aim of this pilot study was to examine the effect of PD and practice for use of the iPad as a SGD on the perceived knowledge, skill, and confidence levels of three SLPs. Each participant reported that the training modules had a positive impact on their knowledge to better implement the iPad as a SGD during practice, which then in turn improved their skills over the course of the study. These preliminary findings contribute to the emerging evidence-base regarding the use of the iPad as a SGD in therapy with students with CCNs.
These preliminary findings are consistent with studies that explored training of educational teams (consisting of SLPs, OTs, and special educators), and SLPs specifically, on the use of SGDs pre-iPad generation (Beukelman & Mirenda, 2013; Costigan & Light, 2010; Johnson et al., 2006; McNaughton et al., 2008; Soto et al, 2001). Soto et al. (2001) found certain skills (operating, maintaining, and integrating AAC systems) were important for team members to understand prior to working with students. The current study provided a series of training modules regarding the iPad and the SFY! application to address these skills.

Preliminary findings also suggest training had a positive effect on practice, which supports what other researchers have alluded to regarding pre-service training and knowledge and skill attainment (Constigan & Light, 2010; Johnson et al, 2006). These researchers found related service providers (i.e., SLPs, OTs) did not receive adequate training in their academic degree programs to prepare them with the appropriate knowledge and skills regarding AAC to provide effective therapy. Two of the three SLPs in this pilot study reported a lack of knowledge and skill regarding the use of SGDs upon entering the study. One participant (Diane) reported the highest level of experience using AAC and SGDs, which she anecdotally attributed to her own self-teaching.

Role of Experience, Training, and Practice on Perceived Knowledge, Skills, and Confidence

Knowledge and skill. The preliminary findings suggest each participant showed a perceived increase in knowledge in response to the training modules,
despite their reported baseline level of experience with AAC and SGDs. The training modules were comprised of multiple video and visual examples about how to use the SFY! application, as well as the basics of the iPad operating system. The participants could access the training modules whenever needed throughout the course of the study. All three participants reported the training modules provided them with enough information to begin applying their knowledge in therapy. Having these training modules at their disposal, alongside consultation by the researcher when necessary, may have contributed to their increase in knowledge regarding use of the iPad with SFY!.

Although it may have been assumed that the least experienced participant would spend the most time practicing use of SFY!, as well as its specific features, in therapy with students, interestingly the least experienced participant (Lola), spent the least amount of time practicing use of the SFY! features than the most experienced participant (Diane). Lola's earlier low experience and overall lower use in the study may have reflected a lower tendency to participate in technology in general.

During post-PD interviews, all 3 participants responded positively regarding using the iPad as a SGD, suggestive of changes in their skill. Lola commented, "Overall it worked well." Jessica stated it helped her to “feel more confident about approaching other devices now.” She also stated the PD helped to “reduce anxiety”. Diane also reported positive feedback, stating “It makes a lot of sense” and “I love it.” These findings suggest that specific training and required practice time had positive impacts on perceived knowledge and skill. It
is possible that skill (through practice) may be easier to work towards when knowledge (through training) is provided.

**Confidence.** Considering technology is constantly improving and changing, it is important to understand the role of confidence on an SLP's willingness to approach and learn new speech-generating technology. One would expect that an SLP with a high level of experience with AAC and SGDs at baseline would report having a higher level of confidence to implement a new technology (such as the iPad) than an SLP with limited experience. Among the 3 participants, Diane reported having the most experience with AAC and SGDs and also reported the highest level of confidence prior to any specific training to implement the iPad with speech-generation in therapy. In contrast, Lola reported the least amount of experience with AAC and SGDs and also reported a low level of confidence for use of the iPad in therapy at the start of the study.

The preliminary findings suggest each participant showed an increase in their perceived confidence level following training and practice to use the iPad in general and the *SFY!* application specifically. Both of the SLPs who reported a lower level of confidence using SGDs prior to training (Lola and Jessica) made mention of feeling more confident in their ability to approach new SGDs or speech-generating applications upon completion of the study. As noted above, the training modules contributed to increased knowledge and skill to use the iPad with *SFY!* and indirectly may have contributed to the participants' reported increases in confidence. Another possible contributor to changes in perceived confidence levels was the amount of time the participants spent practicing the
use of the iPad as a SGD in therapy, including use of each of the SFY! functions. Repeated practice likely contributed to an increase in skill. As the features of SFY! became easier to use, it is possible the increase in skill corresponded to an increase in perceived confidence.

Evaluation of the Professional Development Procedures

Overall, each participant reported being pleased with the type of training they received. The videos and visuals that comprised the training modules were reported as the most helpful for obtaining the knowledge necessary to begin implementing the SFY! in therapy with students. The participants noted they appreciated being able to refer to the modules as necessary.

Each participant provided feedback for improvement of the specific components of the intervention, including the training modules, practice, and consultation provided. Four themes regarding improvement of the trainings emerged from the participants.

Carry-over. All three participants discussed the difficulty with carry-over of the iPad and SFY! application from therapy to the classroom setting. Lola and Jessica reported other staff members were hesitant to bring the new technology into the classroom. It is possible the staff members' hesitancy came from lack of knowledge, skill, confidence, and exposure to using the iPad as a SGD in their classrooms. Prior to the study, Diane expressed concern about not having enough time to train her students' teachers on this new technology. Providing specific training modules, alongside specific strategies for classroom carryover, would be a start to improving future PD procedures.
Sample Activities. Both Lola and Jessica reported having difficulty with creating activities to meet their student's individualized goals while incorporating the iPad with SFY! in therapy sessions. During the pre-interview, possible activities were discussed with both Lola and Jessica. Diane did not express a need to discuss possible activity ideas for therapy. Given her experience with other SGDs, it is possible she felt prepared. The training modules, however, did not provide video examples of possible activities. The addition of a "Sample Activities" module, demonstrating the use of the iPad with SFY! in therapy, would improve the training modules and PD as a whole. The addition of this module could provide a reference for future implementation and carryover into the classroom.

Mentoring. As part of the PD procedures, the researcher was available for consultation through e-mail or by phone. Jessica and Diane each took advantage of this at least once during the course of the study. Lola and Jessica both suggested more "face-to-face" meetings throughout the study would have been helpful, particularly in regards to creating appropriate carry-over activities for using the iPad as a SGD outside of the therapy room. Diane did not mention the need for additional mentoring. This could be attributed to her level of experience pre-PD training. In addition, Diane appeared comfortable contacting the researcher for consultation through e-mail. Consideration for the integration of mentoring and/or coaching into the PD procedures would be consistent with the recommendations for effective PD as outlined by the Association of Teacher Educators (2004), Maxwell, Field, and Clifford (2005), National Association for
the Education of Young Children (1993), National Child Care Information Center (2006), Winton, McCollum, and Catlett (2008), and the National Professional Development Center on Inclusion (2008),

**Accountability.** Lola and Jessica referenced "accountability" multiple times during the post-PD interviews, stating if their participation had not been contingent upon being a part of this study, they may have not followed through with learning how to use the application or using it in therapy with students. Regularly scheduled sessions to review data regarding implementation of the iPad in therapy would support accountability procedures.

**Limitations**

There are multiple limitations to this research, which provide opportunities for further research regarding the use of the iPad as a SGD.

This research was completed as a graduate student master's thesis project, thus resources were limited. There were funds available to provide one 2nd generation iPad to only three participants. As part of the PD, the project was designed to include virtual consultation instead of face-to-face meetings given the limited availability of the researcher and funding constraints. This may have had a negative impact on fidelity of implementation, as the participants may not have attempted to access consultation as often as they needed. If regularly scheduled face-to-face meeting were an option, the researcher could have spent time assessing the participants' knowledge and skill based on their performance during that time.
The small sample size typically associated with case study research can make it difficult to generalize the findings to a larger population. While only 3 participants were included in this study, they were broadly representative of the majority of certified SLPs who responded to ASHA’s recent national surveys. According to the ASHA SLP Schools Survey (2012a), approximately 57.3% of respondents reported working in elementary schools. The SLPs selected for this study had similar years of experience working in the field as the national sample, which found SLPs reported an average of 15 (mean) or 12 (median) years working in schools. The SLPs in this study also showed other similarities to the reported characteristics of SLPs on the ASHA Member Survey (2012). Approximately 73% of SLP respondents selected their race as "white" (p. 4); just over 25% of all SLPs reported working in the Northeast region of the United States; and approximately 50% of school SLPs reported working in "suburban areas" (p. 12). Thus, the preliminary findings from this study may be useful to many SLPs in the United States who work in school settings.

Another limitation of the research design was the lack of standardization and validation of the pre- and post-survey and interview questions. While questions were designed based on prior research findings, having experts in the field of AAC verify the questions as addressing relevant PD needs would have improved the study. An initial set of questions was developed for the semi-structured interviews, depending on a participant’s answers to the survey questions, the interview questions were revised accordingly. This made it difficult to analyze the data to identify consistent themes across specific questions.
This research design did not make any direct measures of knowledge and skill regarding use of the specific functions of the SFY! application. Knowledge and skill were measured indirectly through descriptions of each participant's answers to pre- and post-PD interview questions and based on reported practice. A more direct measure over time would provide a clearer picture about whether or not a relationship may exist between training and knowledge and skill attainment. Also, it is not possible to isolate any particular aspect of the PD procedures as contributing to changes in the SLPs' reported knowledge, skill, and/or confidence, as the PD was provided as a "treatment package".

Finally, this study did not address student outcomes in relation to the effect of training and practice on SLPs' perceived knowledge, skill, and confidence levels over time. Student outcomes, or level of communication, are a critical component in understanding how PD training affects an SLP's therapy and practice.

Implications

Although this type of research is not considered the most rigorous, the present study is the first of its kind. No other study to date regarding the use of the iPad as a SGD has explored providing PD through training modules while studying the effects on SLPs' perceived knowledge, skill, and confidence via "real-time" data collection. The study itself is unique in that data were collected "live", meaning SLPs were collecting data as they were learning and implementing their knowledge.
The preliminary results suggest a link between PD training and reported practice and perceived knowledge, skill, and confidence levels of SLPs who use the iPad as a SGD in therapy. Developers of speech-generating iPad applications should consider providing training and consultation for the users of their application, including SLPs. Specific PD training – including training modules with visuals (photographs, videos, step-by-step instructions), opportunities for practice, and consultation with technical assistance – may prove to be beneficial.

The participants in this study provided feedback on how to improve the training. All three participants reported carry-over into the classroom as a barrier to the student’s use of the device outside of therapy. Suggestions included providing more training modules on possible carry-over activities and options for supporting the use of the iPad as a SGD outside of the therapy room. Providing more frequent “face-to-face” meetings to discuss progress and opportunities for mentoring would be beneficial. These suggestions provide direction for thinking about developing future training protocols regarding new technology.

Additionally, school administrators should consider the benefit of specific training for staff prior to, or alongside, providing new technology such as the iPad. These preliminary findings suggest SLPs, despite their level of experience, can benefit from training prior to implementing new technology in therapy with students who have CCNs. Although Diane had a higher level of experience in relation to the other two participants prior to entering this study, she reported an increase in confidence in using the SFY! application. Diane also reported the
training modules had a positive impact on her ability to quickly implement the iPad with SFY! in therapy. Therefore, it would be advantageous for school administrators to consider the impact of PD training on implementation of the iPad as a SGD in therapy with students. In addition, school administrators may find practice to be an essential component of a technology PD training program as a means to increase fidelity of implementation in therapy.

Further Research

Given the findings of this pilot study are preliminary, there are multiple opportunities for further research to expand the research regarding PD for use of iPad technology. Further research should explore the use of a control group with staggered training. Participants could be matched by experience with SGDs, including the iPad. Using two groups, one group that receives the training initially, and a second group that would receive the training once the study is complete would allow the researchers to gather comparative information related to practice, knowledge, skill, and confidence based on data collected at various points during the study, in addition to pre- and post-surveys. Direct measures of knowledge and skill should be obtained in future studies.

In addition, further research should look at the communication outcomes of students with CCNs who use SGDs in relation to staff PD training. Often, research explores the effect of training or the outcomes of students when provided with a specific intervention. There has yet to be research conducted on the effect of PD of SLPs for use of speech-generating applications using the iPad on student language outcomes. Completing this type of research could provide
insights regarding what training components are effective (and ineffective) for supporting improved student outcomes, leading to improvements in future training programs. Although this research focused on an iPad-based application, application software is becoming increasingly more prevalent, particularly for tablet devices. It is advantageous to provide professionals with professional development for any new type of technology. More research needs to be completed to explore the effectiveness and use of other tablets and applications as SGDs, particularly when provided PD, in order to better generalize the findings of the current study.

Conclusion

The iPad, with its "application" technology, has the potential to transform the way in which students with CCNs communicate with others. This new, lightweight, affordable, and socially acceptable technology may very well begin taking the place of more costly SGDs previously used with students (Baker, 2012; Furie, 2010; Griffey, 2012; Hager, 2012; Murray et al, 2011; Stone, 2010). With this technology at our fingertips, and over 50 speech-generating applications available for purchase to date, there are incredible opportunities that exist with iPad technology. This emerging technology, and continued creation of speech-generating applications, lends the opportunity for the development of specific PD training programs for SLPs and their educational teams.

The SLP participants in this pilot study reported the training modules and required practice positively impacted their perceived increase in knowledge, skill, and confidence. These findings support the work of others who stressed the
need for SLPs to be fully prepared in regards to AAC devices, prior to working as part of an AAC team (see for example, Soto et al, 2001). If an SLP lacks knowledge, skill, and confidence, he or she may be unable to effectively use the SGD, which in turn, could lead to a compromised situation for the student with CCNs and the educational team. With advancements and changes in technology happening rapidly, it is difficult to keep up with the most appropriate form of communication for students, particularly because each student has different strengths and areas of need. It is the responsibility of SLPs, their educational teams, and school administrators to seek out and/or invest in PD training in order to provide the most effective, efficient, and natural mode of communication possible to our students who have CCNs so they, too, can achieve their full potential.
References


Blackstone, S.W., Williams, M.B., & Wilkins, D. P. (2007). Key principles underlying research and practice in AAC. Augmentative and alternative communication. 23 (3) pp. 191-203.


Gosnell, J. (2011, October 11). Apps: An emerging tool for SLPs: A plethora of apps can be used to develop expressive, receptive, and other language skills. *The ASHA Leader*.


Appendix A

Recruitment Flyer

Are you a SLP with access to iPads?
Do you want to implement them in therapy but are not sure how?
Do you want free professional development and a FREE iPad 2?

Consider participating in this graduate research project!

Two graduate students from the University of New Hampshire are recruiting participants for an upcoming study regarding the use of iPads as speech generating devices with certified CCC-SLPs in educational settings with elementary-aged students who qualify for or could benefit from the use of Augmentative and Alternative Communication.

You may be eligible to participate in this study if:
- Are a practicing CCC-SLP
- Work within in academic setting that allows research
- Have a caseload of elementary-aged students who qualify for or could benefit from AAC
- Have previous experience using AAC devices with a Unity-based or Windows system
- Have knowledge of navigating the iPad operating system

STUDY PARTICIPANTS WILL RECEIVE A FREE iPad AND PROFESSIONAL DEVELOPMENT**

**Participants must complete all study sessions in order to keep the free iPad.

IF INTERESTED, PLEASE CONTACT: Kelsey Hall at (860-573-6788), Amber Szilagyi at (609-647-1351)
Appendix B

Recruitment Letter

Dear [Mr. / Ms. LAST NAME],

We are writing to tell you about a research study looking at the use of iPads as Augmentative and Alternative Communication (AAC) as part of therapy within the academic setting. Two speech-language pathology graduate student researchers at the University of New Hampshire in Durham, NH are conducting this study. We received your name through [EXPLAIN KNOWN CONTACT].

The purpose of this research study (in two parts) is to obtain information through interview, case study questions, and data regarding usage, to find how current, practicing speech-language pathologist's use the iPad in a therapeutic setting and how specific training affects usage and clinical reasoning post-training. Additionally, data regarding the implementation of a specific speech-generating application in therapy with designated students will be collected to measure for gains in functional communication facilitated by the use of this application.

You may be eligible for this study if you are a practicing CCC-SLP, work with elementary-aged students who have complex communication needs and would qualify for or would benefit from an AAC device within an academic setting (where research can take place), and have familiarity with AAC devices using Unity-based or Minspeak systems.

If you are interested in learning more about this study, please review the attached recruitment and study information, complete the enclosed form, and e-mail it back as an attached document to the provided e-mail address. You can also call us at 860-573-6788 or 609-647-1351.

We appreciate your interest in participating in our research study. We will be in contact soon regarding a time to schedule an informational session. This session will provide a time for you to ask any questions or raise concerns about the study. In addition, we will discuss the requirements of the study. Finally, we will review the consent form you will need to sign in order to participate. Your participation in this study is voluntary. Whether or not you participate in this study will have no effect on your relationship with the University of New Hampshire or any of its affiliates.

Please return the “consent-to-be-contacted” form attached to this letter indicating whether or not you wish to be considered for participation in this study. You may receive a follow-up email reminder about the study. If you are not interested in participating in the study, you will not be contacted again for any reason. Thank you for your time and consideration. We look forward to hearing from you.
Please complete this form and attach it in a reply e-mail to the e-mail address provided.

☐ I am interested in learning more about this study. Please contact me using the following information:

Name:

________________________________________________________________________

Telephone(s):

________________________________________________________________________

Best time and day to call:

________________________________________________________________________

Email:

________________________________________________________________________

@

☐ I am not interested in participating in this study and do not wish to receive any further contacts.

Name:

________________________________________________________________________
Hello [Mr./Ms. LAST NAME],

My name is [name of caller], and I am a speech-language pathology graduate student at the University of New Hampshire.

I am calling you today to tell you about a research study looking at the use of iPads as Augmentative and Alternative Communication (AAC) as part of therapy within the academic setting. I am conducting this study in collaboration with another graduate student. We received your name and contact information through [EXPLAIN KNOWN CONTACT].

The purpose of this research study (in two parts) is to obtain information through interview, case study questions, and data regarding usage, to find how current, practicing speech-language pathologist’s use the iPad in a therapeutic setting and how specific training affects usage and clinical reasoning post-training. Additionally, data regarding the implementation of a specific speech-generating application in therapy with designated students will be collected to measure for gains in functional communication facilitated by the use of this application.

You may be eligible for this study if you are a practicing CCC-SLP, work with elementary-aged students who have complex communication needs and would qualify for or would benefit from an AAC device within an academic setting (where research can take place), and have familiarity with AAC devices using Unity-based or Minspeak systems.

It is important to know that your participation in this study is completely voluntary. This phone call is not to tell you to join this study. It is your decision. Whether or not you participate in this study will have no effect on your relationship with the University of New Hampshire or any of its affiliates.

We recently sent you an e-mail with information about the study, as well as a voluntary “opt-in” form. We did not receive a response and wanted to follow-up with you to make sure you received the information. If you are interested in learning more about this study, I would like to send you our recruitment and study information along with the “opt-in” form for you to look over. If you decide to not participate in this study, you will not be contacted again for any reason.

Would you like to receive an e-mail with more information?

If yes:

What is the best e-mail address where I can send the information to you?
We appreciate your interest in participating in our research study. We will be in contact soon regarding a time to schedule an informational session. This session will provide a time for you to ask any questions or raise concerns about the study. In addition, we will discuss the requirements of the study. Finally, we will review the consent form you will need to sign in order to participate. If you have any questions in the meantime, please do not hesitate to contact either researcher at [emails].

Again, we thank you for your time and appreciate your interest! We look forward to talking to you soon. Have an excellent day!

If no:
Thank you for your time and have a great day!
Appendix D

Informed Consent

Title of Research Study
The title of this study is “The Effect of Specific Professional Development on Speech-Language Pathologists’ Perceptions of Their Knowledge, Skill, and Confidence in using the iPad as a Speech-Generating Device with Students who have Complex Communication Needs”.

I am a speech-language pathology graduate student at the University of New Hampshire.

What is the purpose of this study?
The purpose behind this research study is to understand how practicing speech-language pathologists (SLPs) use the iPad in a therapeutic, clinical setting through:

- Pre/Post Interviews & Survey Questions
- Data tracking

In addition, this study is interested in how specific training regarding the use of the iPad and a speech generating application affects SLPs knowledge, skill, and confidence levels post-training.

There will be approximately 3 participants who will be involved in the study.

What does your participation in this study involve?
As an SLP, your participation in this study involves the following:

1. Pre-Training Interview: You will be asked to complete a short on-line survey followed by an initial face-to-face interview regarding your current knowledge, skills, and perceptions of the iPad and its use as an AAC device (see appendix for initial interview questions). Responses from the interview will be audio recorded and transcribed using a computer. (Approximately 1 hour)

2. Module Training: You will be asked to complete a series of module trainings to educate you about how to properly use the iPad application Speak for Yourself! These modules will be completed online and will take approximately 3 hours to complete. You may complete these modules in multiple sessions at your discretion.

3. Implementation of iPad Application: You will be asked to implement use of the iPad with the Speak for Yourself! application with one student who has complex communication needs as part of your regularly scheduled therapy sessions for a total of 12 weeks.

4. Data Collection: You will be asked to keep weekly records of your iPad use (both personally and professionally) through a provided tracking sheet (Implementation is technically part of therapy – tracking sheets should take approximately 10 minutes per week to fill out)
5. **Post-Training Interview:** Upon completion of the data collection period, you will be asked to complete a final on-line survey and face-to-face interview with one of the researchers regarding your usage and perceptions of the iPad and its use as an AAC device. Responses from the interview will be audio recorded and transcribed using a computer. *(Approximately 1 hour)*

The projected timeline for the research study is as follows: *(September 2012- February 2013)*

<table>
<thead>
<tr>
<th>Early September</th>
<th>Mid Sept–Mid-Oct</th>
<th>Mid-October – Mid-January</th>
<th>End of January</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Data Collection (Pre-training Interview)</td>
<td>Intervention (Module Trainings)</td>
<td>Implementation of Training <em>(Speak For Yourself!)</em> in regularly scheduled weekly therapy sessions and Data tracking</td>
<td>Final Data Collection (post-training interview)</td>
</tr>
</tbody>
</table>

**What are the possible risks of participating in this study?**
There are minimal risks associated with participation in this study. The mostly likely risk is breach of confidentiality because there are so few participants in the study. In order to reduce confidentiality risk, I will collect only information that cannot be used to identify participants. Further, any form of communication via the Internet poses minimal risk of a breach of confidentiality. For example, most SLPs are women so gender should not be an issue. If, however, we recruit a male SLP, we will not report gender. All participants will be given a pseudonym. In addition, some participants may feel increased amount of work, extra burden, or time lost. These risks will be addressed during the question and answer process. In addition, they will appear within the informed consent form.

**What are the possible benefits of participating in this study?**
While there are no direct benefits associated to participating in this study, you may experience some of the following:

- You may feel more confident in using and teaching the use of the iPad, or more specifically, the speech-generating iPad application *Speak for Yourself!* in therapy with students.
- The training may provide you and other school personnel with more in depth information and trainings surrounding the use of the iPad (specifically *Speak for Yourself!*) as a speech-generating device.

**If you choose to participate in this study, will it cost you anything?**
There are no financial costs associated with participating in this study. There are costs related to the time associated with participating in the pre/post interviews, responding to the pre/post case study, completing the module trainings, and data collection.
Will you receive any compensation for participating in this study?

As a participant, upon completion of the study you will receive a free iPad 2. This may provide further opportunity for professional development and continued use of this emerging technology.

Participants incur the penalty of not receiving an iPad if they do not participate or complete the study. Instead, they will receive $25 if they withdraw without completing the study.

What other options are available if you do not want to take part in this study?

You understand that your consent to participate in this research is entirely voluntary. If you choose to not participate, you will not receive an iPad or gift certificate.

Can you withdraw from this study?

If you consent to participate in this study, you are free to stop your participation in the study at any time. If you withdraw from the study, you will be required to return the iPad to the researchers. You will receive a $25 gift card for your time.

How will the confidentiality of your records be protected?

Data will be kept secure via password-protected folders stored on a password-protected external hard-drive. Primary and secondary researchers, along with Rae Sonnenmeier (our graduate research advisor and professor at the University of New Hampshire), will have the passwords to access data. Participants’ personal information and corresponding data will be kept confidential by assigning each with a non-descriptive pseudonym. Each pseudonym will be linked to a list of participants. If any password holders are to exit the study prior to completion, new passwords will be assigned. For web-based surveys (Qualtrics), IP addresses will not be collected. Participants’ first names will be collected via Qualtrics in order to accurately track change over time for each clinician. The database for data analysis will identify participants by pseudonym only. Upon completion of study, data will be kept for a period of five years. Data will be used for a thesis project, as well as the potential for use in future presentations and publications.

You should understand, however, there are rare instances when the researcher is required to share personally identifiable information (e.g., according to policy, contract, regulation). For example, in response to a complaint about the research, officials at the University of New Hampshire, designees of the sponsor(s), and/or regulatory and oversight government agencies may access research data.

You also should understand that the researcher is required by law to report certain information to government and/or law enforcement officials (e.g., child
abuse, threatened violence against self or others, communicable diseases). Further, any form of communication via the Internet poses minimal risk of a breach of confidentiality.

Whom to contact if you have questions about this study:
If you have any questions pertaining to the research you can contact the primary researcher.

If you have questions about your rights as a research subject you can contact Dr. Julie Simpson in UNH Research Integrity Services, 603-862-2003 or Julie.simpson@unh.edu to discuss them.

I, _____________________________ have read the previous information thoroughly and CONSENT/AGREE to participate in this research study.

Signature of Participant ___________________________ Date ___________________________
Building Administrator Consent

Dear [Administrator],

I am writing to tell you about a research study looking at the use of iPads as Augmentative Alternative Communication (AAC) as part of therapy within the academic setting. One speech-language pathology graduate student researcher at the University of New Hampshire in Durham, NH is conducting this research. One speech-language pathologist who provides speech and language services in your building have expressed interest in participating in this study.

This research study is to obtain information through interview and data collection regarding iPad usage, to understand how current, practicing speech-language pathologists use the iPad in a therapeutic setting. In addition, this study is interested in how specific educational training affects usage and clinician knowledge, skill, and confidence levels post-training.

As this research would be taking place in your academic building, we require your knowledge of the research and permission for the study to occur in full. At the conclusion of this letter, you will find a place to sign that will signify your knowledge and approval of this research.

Participation in this study will benefit your academic setting in the following ways:

- Upon completion of the study, participating speech language pathologists will receive a free iPad 2.
- Throughout the study, participants will receive free professional development regarding use of the iPad as a speech-generating device.
- Emerging technology will be used with students who have complex communication needs in your building as part of provided services.

I thank you in advance for reviewing this document and look forward to speaking with you about this study. Please contact either me if you have any questions, concerns, or if you require more clarification of this request for permission. I will conduct a follow-up phone call to ensure delivery of these materials.

Sincerely,

Kelsey S. Hall, Ed.M.

The projected timeline for the research study is as follows: (September 2012-February 2013)
| Initial Data Collection (Pre-training Interview) | Intervention (Module Trainings) | Implementation of Training (Speak For Yourself!) in regularly scheduled weekly therapy sessions and Data tracking | Final Data Collection (post-training interview) |

I, ____________________________ have read the previous information thoroughly and GIVE PERMISSION to allow this research study to take place at (name of school) ________________________.

____________________________  ________________________
Signature of Building Administrator  Date

____________________________
Title / Role
Appendix E

Training Modules

Module 1

Introduction

AAC Overview: User's Standpoint

- There is growing evidence that speech-generating devices (SGDs) can be used effectively to support the communication needs of students with AOD (Mirenda, 2003).
- Korskes et al. 2007.
- A variety of SGDs, such as the Dynavox, ECO, and Vantage, have been around for years. Manufacturers produce these devices and provide training to schools of the devices and those who will teach the children how to communicate using the device.
- Though expensive (prices can range from $1200-$14,000 and Alphon), these devices are quite popular in educational settings.
- The world of SGDs changed with the release of the first iPad in April 2010.

However, adequate research has not been performed to create an evidence-based supporting the efficacy of the use of an iPad as a

AAC Overview: The Professional’s Standpoint

- On April 3rd, 2010, the face of technology changed with the release of the first iPad tablet device.
- Despite the lack of research, schools are purchasing iPads for their students' use, with some in places of absence speech generating devices such as Dynavox, ECO, and Vantage, which have been around for years.
- Often, speech-generating technology in schools falls into the hands of the Speech Language Pathologists (SLPs).
- Although the technology has its merits, the field requires a great deal of training and understanding to use - especially with the variety of applications available to the public.
- Many SLPs, educators, and support staff in schools struggle to become confident in their usage of speech-generating (SG) technology (Mitchell et al., 2008; Johnson et al., 2008; Geshen & Gifford, 2012; Goldstein et al., 2007), often stating they need more training.

Speak For Yourself!

A new speech-generating application, Speak for Yourself (Logicares & Colloquy, 2012), was released in January 2012.

- This app is an adaptation of Unity Language software (Presale Research Company, 2012) designed for the ECO and Vantage.

- The apps of this research are:
  - To conduct a study to evaluate whether speech generation technology can improve speech and language skills of students with SG technology in an educational setting.
  - To measure how using this application affects the communication needs of students with complex communication needs.

MODULE #1 COMPLETED!

88
Module 2

What is Speak For Yourself? 

- SFY is an application that allows an iPad to act as a speech-generating device (SGD). This application is modeled after the Unity language system but uses Charity Symbols.
- This application is consistent with motor learning principles, uses a core vocabulary of 300-500 of the most frequently used words in communication while allowing the personalized vocabulary to be added.
- The main screen of SFY holds 11 of these core words. Each of these buttons links to additional related core vocabulary words.

About the developers:

- The application was designed by two ASHA certified speech-language pathologists (SLPs) who are experienced in the use of AAC devices and their implementation.
- Heidi Lechman, MS, CCC-SP and Renee Colletti, MA, CCC-SP have worked together for several years teaching children with complex communication needs to use Augmentative and Alternative Communication.
- Although not a requirement of this module, for more information you can visit their website at www.speakforyourself.org

MODULE #2 COMPLETED!
Unlocking Speak For Yourself!

1. When you first open the Speak For Yourself Application, you will notice several new features that are not available in the trial version.
2. The features included are:
   - The Open/Close Feature
   - The Babble Feature
   - The Lock Edit Feature
3. To access these features, you will need to sign up and purchase the full version of the application. The application will prompt you to enter your payment information.
4. Once you have signed up, you will have access to:
   - The Open/Close Feature
   - The Babble Feature
   - The Lock Edit Feature
5. These features allow you to customize the application to better suit your needs and preferences.

Open/Close Feature

- This feature allows the user to quickly navigate between different screens or sections of the application. The user can select which screen or section they wish to open or close.
- The feature provides a simple and intuitive way to access different parts of the application.
- The user can customize the feature to suit their needs and preferences.

Babble Feature

- This feature allows users to customize the application's speech by selecting the desired words and phrases.
- The feature provides a simple and intuitive way to customize the application's speech.
- The user can customize the feature to suit their needs and preferences.

Lock Edit Feature

- This feature prevents the user from editing the application's settings or making changes to the application's settings.
- The feature provides a simple and intuitive way to protect the application's settings from unintended changes.
- The user can customize the feature to suit their needs and preferences.

Module #3: Speak For Yourself! Features

- The Open/Close Feature
- The Babble Feature
- The Lock Edit Feature

Learning Outcomes For Module #3:

1. How to Unlock SPY
2. Using The Open and Close Features
3. Using The Babble Feature
4. How To Edit or Add Words
5. Finding a Word in Duplicate Feature
6. Locking the Edit Function
**How to Edit and Add Vocabulary**

- This feature allows you to edit existing vocabulary and add customized vocabulary for each individual user.
- The application comes ready with objects to associate with vocabulary, but also allows the programmer to provide original photos to make communication more functional and personal for the user.

**No Duplication/How to locate an Existing Vocabulary Word**

- This feature prevents a vocabulary word from being added to multiple locations within the application.
- When an emergent language learner is exposed to their individually synthesized vocabulary, a single, less than accurate distributed word may cause an emergent language learner to misinterpret.
- In addition, you can see "Find a Word" within the application. This allows an individual to search for a word to attach to a location within the application and prevent duplication of words, as well as errors in locational vocabulary.

---

**MODULE #3 COMPLETED!**
Appendix F

Data Tracking Sheet

This week I used the iPad for the following:
(Please check all that apply)

<table>
<thead>
<tr>
<th>Types of Activities</th>
<th>Amount of Time Dedicated to Each Activity PER WEEK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-30 min</td>
</tr>
<tr>
<td>□ Personal Use (e-mail, word processing, research, etc.)</td>
<td></td>
</tr>
<tr>
<td>□ Games (coloring, puzzles, etc.)</td>
<td></td>
</tr>
<tr>
<td>□ Stories (Dr. Seuss books, Wheels on the Bus, etc.)</td>
<td></td>
</tr>
<tr>
<td>□ Speech-Language Therapy (general)</td>
<td></td>
</tr>
<tr>
<td>□ Articulation</td>
<td></td>
</tr>
<tr>
<td>□ Phonology</td>
<td></td>
</tr>
<tr>
<td>□ Fluency</td>
<td></td>
</tr>
<tr>
<td>□ Language</td>
<td></td>
</tr>
<tr>
<td>□ Pragmatics</td>
<td></td>
</tr>
<tr>
<td>□ Other:</td>
<td></td>
</tr>
<tr>
<td>□ AAC General Use (visual schedule, PECs-like apps, etc.)</td>
<td></td>
</tr>
<tr>
<td>Name(s) of app(s) used:</td>
<td></td>
</tr>
<tr>
<td>□ Speech Generation (excluding the Speak for Yourself! app.)</td>
<td></td>
</tr>
<tr>
<td>Name(s) of app(s) used:</td>
<td></td>
</tr>
<tr>
<td>□ Speak for Yourself! Application</td>
<td></td>
</tr>
<tr>
<td>□ Opening &amp; Closing buttons (&quot;masking&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

Week of: __________/________/________
Clinician: __________________________
<table>
<thead>
<tr>
<th>Activity</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referred to training modules (circle one)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contacted researchers for support (circle one)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of &quot;babble&quot; function with a client</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Editing vocabulary (adding/deleting/moving buttons)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Editing/changing voice and voice quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General exploration of the application</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other(s):</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

93
Appendix G

Surveys

Pre-Survey

Professional Information

Please provide the following information about yourself:
Highest Degree Earned & Discipline:
Professional Certifications and Licenses:
Years of Experience as a CCC-SLP:

Please list any coursework related to AAC (augmentative & alternative communication) and/or AT (assistive technology):

Please list any continuing education you've had with AAC, AT, and/or the iPad:

Please list your average, over-all years of experience with:
AAC
AT
iPad

SG/AT Usage & Trainings

Have you used any kind of high or low-tech SG devices in therapy with students?
- Yes
- No

What speech generating (SG) devices have you used in therapy with students?
How old were the students? (check all that apply)
☐ Preschool aged
☐ Elementary School aged
☐ Middle School aged
☐ High School or Adult aged

What types of high-tech SG devices have you used?
☐ Vantage
☐ Dynavox
☐ Tobii
☐ iPad
☐ Other (please list) [ ]

What types of professional training(s) did you receive for those devices? (please check all that apply)
☐ None
☐ Webinar(s)
☐ Workshop(s)
☐ Classes
☐ Other (please explain) [ ]

Where did you receive training for those devices? (please check all that apply)
☐ N/A
☐ On-line
☐ My place of employment
☐ Convention/Workshop
☐ College/University
☐ Other (please specify) [ ]

How confident do/did you feel using each of the SG devices?
☐ Not at all confident
☐ Somewhat confident, able to do basic tasks
☐ Confident
☐ Very confident, able to teach others

95
How do/did you perceive the ease of implementation of SG devices into therapy?
☐ Very difficult to implement  
☐ Somewhat difficult to implement  
☐ Somewhat easy to implement  
☐ Very easy to implement

What other tasks were you expected to implement related to the device(s)? (e.g., programming)

Training Others on SG/AT

Have you ever been responsible for training another staff member to use a SG device (the iPad or any other device)?
☐ Yes  
☐ No

How prepared were you to train others on the use of the device(s)?
☐ Not at all prepared to train others  
☐ Somewhat prepared to train others  
☐ Prepared to train others  
☐ Very prepared to train others

What type(s) of knowledge and skill training did you provide others regarding SG/AT devices? (check all that apply)
☐ Programming/Customizing  
☐ Masking  
☐ Adding/Deleting Buttons  
☐ Therapy Ideas  
☐ Other (please explain) [ ]

How effective do you think the training was?
☐ Very Ineffective
Thinking back to that circumstance, do those individuals still use the skills you taught them currently in their practice/etc.?

- I don't know
- Never
- Not often
- Sometimes
- Often

Personal Confidence with the iPad

How would you describe your confidence level when using the iPad in general?

- Not at all confident
- Somewhat confident, able to do basic functions
- Confident
- Very confident, able to teach others

How would you describe your confidence level when using the iPad for personal use?

- Not at all confident
- Somewhat confident, able to do basic functions
- Confident
- Very confident, able to teach others

How would you describe your confidence level when using the iPad for games?

- Not at all confident
- Somewhat confident, able to do basic functions
- Confident
- Very confident, able to teach others

How would you describe your confidence level when using the iPad for communication/speech generation?
Not at all confident
Somewhat confident, able to do basic functions
Confident
Very confident, able to teach others

How would you describe your confidence level when using the iPad for speech therapy?
Not at all confident
Somewhat confident, able to do basic functions
Confident
Very confident, able to teach others

How would you describe your confidence level when using the iPad for educational purposes?
Not at all confident
Somewhat confident, able to do basic functions
Confident
Very confident, able to teach others

How would you perceive the ease of implementation of the iPad as SG into therapy with students?
Very difficult to implement
Somewhat difficult to implement
Somewhat easy to implement
Very Easy to implement

Identifying Information

Please enter your first and last name initials (i.e., K.H.)
Post-Survey

Please enter your first and last name initials (i.e., K.H.):

iPad Knowledge

Can you turn on the iPad?
- I don't know
- Yes
- No

Can you alter settings (i.e., brightness, volume, etc.)?
- I don't know
- Yes
- No

Can you download and install an application?
- I don't know
- Yes
- No

iPad Use in Therapy

How confident do you feel about using the iPad in therapy with students?
- Not at all confident
- Somewhat confident
- Confident
- Very confident

Do you currently use the iPad in therapy with students other than the one who participated in this study?
- Never
- Not often
- Sometimes
- Often
What application(s) do you use the most in therapy? (please list)

Are the students allowed to bring the iPad home?
- Yes
- No

Does the iPad belong specifically to the student, the school, or other?
- Student
- School
- Other (please specify)

Confidence Using the iPad

How would you describe your confidence level when using the iPad for personal use?
- Not at all confident
- Somewhat confident, able to do basic functions
- Confident
- Very confident, able to teach others

How would you describe your confidence level when using the iPad for games?
- Not at all confident
- Somewhat confident, able to do basic functions
- Confident
- Very confident, able to teach others

How would you describe your confidence level when using the iPad for speech generation?
- Not at all confident
- Somewhat confident, able to do basic functions
Confident
Very confident, able to teach others

How would you describe your confidence level when using the iPad for speech therapy?
Not at all confident
Somewhat confident, able to do basic functions
Confident
Very confident, able to teach others

How would you describe your confidence level when using the iPad for educational purposes?
Not at all confident
Somewhat confident, able to do basic functions
Confident
Very confident, able to teach others

iPads and Your Educational Setting

Does your educational setting provide iPads for use?
Yes
No

Does your educational setting provide funds for applications?
Yes
No

Does your educational setting provide opportunities for training?
Yes
No

Have you attended any opportunities for training through your educational setting?
Yes
No
What was the nature of the trainings (word processing, specific applications, etc.)?

———

How long did the training(s) last?

———

Who implemented the trainings?

☐ School personnel
☐ Outside contractor
☐ Other (please specify):

Perceptions of Implementing the iPad in Therapy

How do you perceive the ease of implementation of the iPad as a SG device into therapy with students?

☐ Very difficult to implement
☐ Somewhat difficult to implement
☐ Somewhat easy to implement
☐ Very easy to implement

General iPad Use

How often do you currently use the iPad for personal use?

☐ Never
☐ Not often
☐ Sometimes
☐ Often

How often do you currently use the iPad for professional use?

☐ Never
☐ Not often
Sometimes  
Often  

Please list and describe any other ways in which you use the iPad:

Training Modules

How often did you reference the modules during the course of the study?

- Never  
- Less than Once a Month  
- Once a Month  
- 2-3 Times a Month  
- Once a Week  
- 2-3 Times a Week  
- Daily  

How do you perceive the Speak for Yourself! training modules affected your knowledge and skill level when using the application?

- Greatly affected my knowledge and skill  
- Somewhat affected my knowledge and skill  
- Barely affected my knowledge and skill  
- Did not affect my knowledge and skill  

Which aspects of the training modules did you find helpful? (check all that apply)

- Powerpoint format  
- Videos  
- Visual aids/pictures  
- Text explanations  
- Other (please explain)
Appendix H

Interview Questions

Pre-Interview Questions

1. Have you ever completed an assessment and evaluation for a SGD for a child?
2. What do you perceive as the greatest challenge(s) with implementing SGDs in your academic setting?
3. What do you perceive as the greatest benefit(s) of implementing SGDs in your academic setting?
4. Do you currently use the iPad?
   a. For personal use?
   b. For professional use?
   c. How did you learn to use the iPad?
5. How would you describe your knowledge of operating the iPad?
   a. Can you turn it on?
   b. Can you alter settings?
   c. Can you install an application?
6. How do you feel, in regards to confidence, in using the iPad in therapy with students?
7. How confident are you in regards to using the iPad as a SGD?
   a. What speech-generating applications have you used or seen being used?
   b. How might the use of speech-generating applications be beneficial to students in your setting?
8. Is there any other information you can share about your experience(s) with the iPad or other forms of SGDs in your academic setting?
9. Currently, if you were asked to train someone to use a SGD that you’ve had experience with, how confident would you feel?
10. Does your educational setting provide iPads for use?
    a. Do they provide the funds?
    b. Do they provide trainings?
    c. How long did the trainings last?
    d. Who implemented the trainings?
11. What type of trainings do you perceive would be the most helpful in boosting confidence in regards to using the iPad in your educational setting?
12. What aspects of participation in this study, if any, concern you the most?
13. What aspects of participation in this study, if any, are you most excited about?
14. What do you hope to gain from your participation in this research study?
15. How old are you?
Post-Interview Questions

1. How do you feel about the iPad as a SGD?
   a. Do you feel students could make successful gains by using this technology?
2. What do you perceive as the greatest challenge(s) with implementing SGDs in your academic setting?
   a. The iPad specifically?
3. What do you perceive as the greatest benefit(s) of implementing SGDs in your academic setting?
   a. The iPad specifically?
4. How do you feel about using the SFY! application in therapy with students as a speech-generating application?
5. What was the impact of the module trainings on your practice?
   a. What was it about the training that affected your knowledge and skills?
   b. What would you have added or changed to the modules?
6. What was the impact of implementing the iPad with the SFY! application on your practice?
7. What was the impact on the communication skills of the student who used the iPad with the SFY! application?
8. Was there any "spread" of the use of the iPad and/or SFY! application outside the scope of this project? If yes, describe.
9. Do you attribute your knowledge and skill to training and/or continues use? Please explain.
10. What did you find beneficial about the training you received?
11. What other recommendations do you have regarding this project?
12. Is there any other information you can share about your experience(s) with the iPad (and SFY! application) or other forms of AAC (SGDs) in your academic setting?
13. Is there any information you can share about your experience(s) with the iPad or other forms of SGDs or AAC in your academic setting?
14. Does your educational setting provide iPads for use?
   a. If so, provide funding?
   b. Opportunities for training?
      i. Nature of the training?
      ii. How long did they last?
      iii. Who implemented the training?
15. Do you currently/have you recently used the information you learned in the training? In what capacity?
16. What did you find beneficial about the training you received?
17. What would you have changed about the training you received?
Appendix I

Speak for Yourself! Screen Shot
Appendix J

Student Assent Board

Do you want to play a game on the iPad?

yes

no
16-May-2013

Hall, Kelsey
Com. Sci. & Disorders, Hewitt Hall
235 Locust Street
Dover, NH 03820

IRB #: 5467
Study: Emerging Technology Part 1: Speech Language Pathologists Using iPads as Speech Generating Devices with Students Who Have Complex Communication Needs in Academic Settings

Review Level: Expedited
Approval Expiration Date: 12-Jun-2014

The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved your request for time extension for this study. Approval for this study expires on the date indicated above. At the end of the approval period you will be asked to submit a report with regard to the involvement of human subjects. If your study is still active, you may apply for extension of IRB approval through this office.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the document, Responsibilities of Directors of Research Studies Involving Human Subjects. This document is available at http://unh.edu/research/irb-application-resources or from me.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or julie.simpson@unh.edu. Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,

Julie F. Simpson
Director

cc: File
Sonnenmeier, Rae
Szilagyi, Amber