

January 2013

Exploring the Utilization of Applications as a Form of Augmentative and Alternative Communication by Speech-Language Pathologists

Joselyn Rae Gilbert
Eastern Kentucky University

Follow this and additional works at: <https://encompass.eku.edu/etd>



Part of the [Special Education and Teaching Commons](#)

Recommended Citation

Gilbert, Joselyn Rae, "Exploring the Utilization of Applications as a Form of Augmentative and Alternative Communication by Speech-Language Pathologists" (2013). *Online Theses and Dissertations*. 170.
<https://encompass.eku.edu/etd/170>

This Open Access Thesis is brought to you for free and open access by the Student Scholarship at Encompass. It has been accepted for inclusion in Online Theses and Dissertations by an authorized administrator of Encompass. For more information, please contact Linda.Sizemore@eku.edu.

Exploring the Utilization of Applications as a Form of Augmentative and Alternative
Communication by Speech-Language Pathologists

By

Joselyn R. Gilbert

Thesis Approved:

Charlotte A. Hubbard

Chair, Advisory Committee

Kelli C. Ellis, Ph.D., CCC/SLP

Member, Advisory Committee

Charles Hughes, Ph.D., CCC-SLP, BRSPD

Member, Advisory Committee

B. Crandall, Ph.D., CCC/SLP

Member, Advisory Committee

[Signature]

Dean, Graduate School

STATEMENT OF PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a Master's of Education degree at Eastern Kentucky University, I agree that the Library shall make it available to borrowers under rules of the Library. Brief quotations from this thesis are allowable without special permission, provided that accurate acknowledgment of the source is made. Permission for extensive quotation from or reproduction of this thesis may be granted by my major professor, or in her absence, by the Head of Interlibrary Services when, in the opinion of either, the proposed use of the material is for scholarly purposes. Any copying or use of the material in this thesis for financial gain shall not be allowed without my written permission.

Signature Joselyn R. Gilbert
Date 7/10/2013

Exploring the Utilization of Applications as a Form of Augmentative and Alternative
Communication by Speech-Language Pathologists

By

Joselyn R. Gilbert

Bachelor of Arts
The Ohio State University
Columbus, Ohio
2011

Submitted to the Faculty of the Graduate School of
Eastern Kentucky University
in partial fulfillment of the requirements
for the degree of
MASTER OF ARTS IN EDUCATION
August, 2013

Copyright © Joselyn R. Gilbert, 2013
All rights reserved

DEDICATION

I would like to dedicate this thesis to my family. To my husband, Josh, who was a constant source of support and encouragement, and helped me stay focused when I couldn't see the light at the end of the tunnel; and to my parents, Paul and Wanda, who taught me the importance of an education and doing what makes you happy. I couldn't have done it without you.

ACKNOWLEDGMENTS

I would like to take this opportunity to thank the chair of my advisory committee, Dr. Charlotte Hubbard who helped guide me on this new journey, listened to me when I started feeling overwhelmed, and offered invaluable advice and support. Also, thank you to my advisory committee, Dr. Tamara Cranfill, Dr. Kellie Ellis, and Dr. Charles Hughes. Thank you for your guidance and advice throughout this whole process. None of this would have been possible without you. Finally, I would like to thank my friends and family who were supportive and encouraging of this experience. You all helped make this possible and kept me sane throughout these past two years.

ABSTRACT

This pilot study consisted of two main purposes: 1) to examine whether SLPs who are already using augmentative and alternative communication (AAC) in therapy are using apps as a form of AAC, and within what parameters, and 2) to explore possible reasons SLPs are using apps as AAC, and possible sources for their clinical decision making using AAC apps. A nationwide survey was sent out to speech-language pathologists who were members of four ASHA Special Interest Groups. Descriptive statistics were used to analyze data gathered from the survey. Results from this study suggested some SLPs use apps as a form of AAC, and offered initial insight into what AAC apps being used, what app-capable devices are being incorporated into therapy for communicative purposes, and the clinical decision-making process behind choosing apps as a form of AAC. While definitive answers were not obtained, the study provided a foundation for future research on the topic of apps as a form of AAC.

TABLE OF CONTENTS

CHAPTER	PAGE
I. Introduction.....	1
Purpose Statement.....	2
Research Questions.....	3
Definition of Terms.....	3
II. Review of Literature.....	7
What is Augmentative and Alternative Communication (AAC)?.....	7
Who Can Benefit from AAC?.....	7
What Are the Benefits of AAC?.....	8
What Are the Different Types of AAC Devices?.....	9
Smartphones, iPads, and Applications (Apps).....	11
Opinion-based literature.....	11
The clinician’s perspective.....	12
The developer’s perspective.....	15
The public’s perspective.....	16
Research-based literature.....	17
III. Methods and Materials.....	19
Participants.....	19
Materials.....	19
Procedures.....	21
IV. Results.....	22
Participant Demographics.....	22
Are Apps Marketed as AAC Used in Therapy as a Means of Communication?.....	22
Are There Characteristics of Clinicians or Clients Who Use Apps as AAC?.....	22
Sources of education about AAC.....	22
Caseload descriptions.....	23
What AAC Apps and App-Capable Devices are Being Incorporated into Therapy For Communicative Purposes?.....	24

Why are Clinicians Using AAC Apps Versus Other Forms of AAC, and Where are They Learning About the Apps?.....	25
V. Discussion and Conclusions.....	27
Discussion of Results.....	27
Are apps marketed as AAC used in therapy as a means of communication?.....	27
Are there characteristics of clinicians or clients who use apps as AAC?.....	28
What AAC apps and app-capable devices are being incorporated into therapy for communicative purposes?.....	30
Why are clinicians using AAC apps versus other forms of AAC, and where are they learning about the apps?.....	31
Implications.....	32
Limitations.....	33
Avenues for Future Research.....	35
Conclusion.....	35
 List of References.....	 36
 Appendices.....	 48
A. Applications as AAC Devices Survey.....	48
B. Prize Participation Survey.....	56
C. Invitation to Participate in Research.....	58
D. Follow-Up Invitation to Participate in Research.....	61
E. Table 4.1 Reported Participant Demographics.....	65
F. Table 4.2 Reported Participant Work Settings.....	67
G. Table 4.3 Reported Caseload Categories and Client Age Ranges.....	69

LIST OF TABLES

TABLE.....	PAGE
4.1 Reported Participant Demographics.....	66
4.2 Reported Participant Work Settings.....	68
4.3 Reported Caseload Categories and Client Age Ranges.....	70

LIST OF FIGURES

FIGURE	PAGE
2.1 Categories of AAC devices.....	10
4.1 Apps used as a form of AAC listed under the “Other” option.....	25

Chapter I

Introduction

Communication, in its purest sense, is the exchange of information between a sender and a receiver. As humans, we can convey our ideas, emotions, and wants and needs in a variety of ways including gestures, speech, writing, and facial expressions. Approximately 10% of the total population in the United States has a communication disorder (Plante & Beeson, 2008). A communication disorder is present when a person's communication performance frequently cannot fulfill social acts or when the way a person communicates is perceived negatively by the audience or the individual speaking (Tomblin, 2002).

Communication disorders can either be related to congenital disabilities, which are present from birth, or acquired disabilities, which emerge after birth. Examples of congenital disabilities that can result in a communication disorder include cerebral palsy (CP), childhood apraxia of speech (CAS), intellectual disabilities, and the autism spectrum disorder (ASD) (Kangas & Lloyd, 2006). Examples of acquired disabilities related to communication disorders include traumatic brain injury (TBI), cerebral vascular accidents (CVA), amyotrophic lateral sclerosis (ALS), multiple sclerosis (MS), Parkinson's disease, and neurological diseases (Kangas & Lloyd, 2006). If an individual's communication disorder is severe enough, then the use of augmentative and alternative communication (AAC) may be necessary to enhance or replace their non-functional speech (American Speech-Language-Hearing Association [ASHA], n.d.).

AAC can vary in complexity, technology and expense. For example, AAC can utilize just the individual's body (e.g., facial expression or hands), or additional materials outside of the person's body (e.g., pen and paper, picture cards, or speech-generating devices) (Glennen, 1997; Kangas & Lloyd, 2006). With the development of the iPhone, iPad, and smartphones, AAC has entered into a new realm of high technology devices that can be modified for AAC purposes. There has been dramatic growth in the iPad, iPhone, smartphone, and tablet market over the past few years. Since its launch in 2010, Apple has sold over 98 million iPads around the world (Apple Inc., 2010a-2012d). Applications on iPhones, smartphones, and iPads now offer speech-language pathologists (SLPs) and clients who require AAC another option to facilitate communication (Farrall, 2012; Higginbotham & Jacobs, 2011).

Purpose Statement

Using applications (apps) as a form of AAC is still a new concept that needs further research to determine its use and efficacy in clinical treatment of communication disorders. Due to increased demands on smartphones and other digital technology, multiple purposes were targeted for this exploratory study. The primary purpose was to examine whether SLPs who are already using AAC in therapy are using apps as a form of AAC for communicative purposes, and if so, within what parameters. The secondary purpose was to explore possible reasons for using apps as AAC, and the avenues clinicians are taking to learn about apps as AAC.

Research Questions

The research questions for this study were:

- 1) Are apps marketed as AAC being used in therapy as a means of communication?
- 2) Are there general characteristics of clinicians and clients who use apps as AAC?
- 3) What AAC apps and app-capable devices are being incorporated into therapy for communicative purposes?
- 4) Why are clinicians using AAC apps versus other forms of AAC, and where are they learning about the apps?

Definition of Terms

- Aided techniques: AAC techniques that require the use of additional material or devices, outside of the speaker's body (Glennen, 1997; Kangas & Lloyd, 2006).
- Alphabet Boards: low tech, aided AAC devices that require users to point to letters of the alphabet as a way to augment communication by indicating the first letter of a word (Fager, 2006)
- American Sign Language (ASL): a manual way to communicate created by the Deaf population, that is separate from oral language and has its own grammatical structures (Holmes & Thomas, 2006)

- Amyotrophic lateral sclerosis (ALS): a degenerative disease of the brain and spinal cord nerve cells that control voluntary movement of the body (ALS Association, 2010)
- Applications (Apps): software installed on a computing device (e.g., iPhone, iPad, or smartphone) that provides a specific function on the host device (Black, 2013)
- Apraxia of Speech (AOS): a disorder resulting from an impairment in the ability to plan and sequence the movements of the articulators, resulting in problems of articulation and prosody (Freed, 2012)
- Augmentative and Alternative Communication (AAC): a specific domain of clinical practice, research, and education that relates to compensatory techniques and practices for individuals with temporary or permanent communication disorders severe enough to limit their participation in daily activities (ASHA, 2005)
- Autism Spectrum Disorder (ASD): a developmental disability that impacts a person's communication, social skills, and behavior (Center for Disease Control and Prevention [CDC], 2012a)
- Cerebral palsy (CP): a group of disorders impacting the movement, balance and posture of a person (CDC, 2012b)
- Cerebrovascular accident (CVA): a stroke, occurs when the blood supply to the brain is interrupted by a clot or hemorrhage and results in damage to the brain (World Health Organization, 2013)

- Childhood apraxia of speech (CAS): a pediatric neurological speech sound disorder that impairs the movement and sequence of the articulators while presenting no neuromuscular deficits (ASHA, 2007)
- Down syndrome: a disorder caused by having an extra chromosome that results in a range of mental and physical developmental delays (CDC, 2011)
- Eye Gaze Boards: low technology, aided AAC devices with pictures placed in specific locations that the user looks at to make a selection, beneficial for those who cannot point (WETA, 2013)
- High technology: aided AAC systems that are electronic and computerized (Glennen, 1997)
- Intellectual impairment: a disability that occurs before 18 years of age and significantly impacts a person's adaptive behavior and intellectual functioning (American Association on Intellectual and Developmental Disabilities, 2013)
- Low technology: aided AAC systems that are non-electronic or non-computerized (Glennen, 1997)
- Neurogenic communication disorders: communication disruptions caused by neurological diseases, trauma to the brain, or stroke (Indiana University of Pennsylvania, 2013)
- Picture Communication Boards: low technology, aided AAC devices that have pictures attached to them and allow the user to point to a specific picture to communicate (Assistive Technology Training Online Program, 2005)
- Traumatic brain injury (TBI): a head injury resulting in a disruption of typical function of the brain (CDC, 2012c)

- Unaided techniques: techniques that use only a speaker's body (e.g., gesturing) (Kangas & Lloyd, 2006; Glennen, 1997)

Chapter II

Review of Literature

What is Augmentative and Alternative Communication (AAC)?

According to the American Speech-Language-Hearing Association (ASHA), AAC is a specific domain of clinical practice, research, and education that relates to compensatory techniques and practices for individuals with temporary or permanent communication disorders severe enough to limit their participation in daily activities (ASHA, 2005). AAC can be used with an individual who has some residual speech to augment it, or with an individual who has no usable speech to replace it or act as an alternative (Kangas & Lloyd, 2006). Beukelman and Ansel (1995) stated that between 8 and 12 individuals out of every 1,000, or 0.8% to 1.2% of the total population, cannot meet their daily needs with natural speech alone and require some form of AAC. Furthermore, Soto, Huer, and Taylor (1997) estimated that in the year 2020, over three million United States (U.S.) citizens will require some form of AAC due to disabilities.

Who Can Benefit From AAC?

Any person who has difficulty being understood and communicating as a result of severe speech and/or language impairments might benefit from the implementation of AAC (ASHA, n.d.a; PBS Parents, 2013). Both children and adults make up the 0.8% to 1.2% of U.S. citizens who require AAC intervention. Of those disorders previously mentioned, the ones most likely to impact children and require the use of AAC are: CP, intellectual disabilities, ASD, CAS, developmental language disorders, and

developmental speech disorders (Ball, 2003b; DeCoste, 1997; Kangas & Lloyd, 2006; Weitz, Dexter & Moore, 1997). Adults who require AAC may have a diagnosis of CP, intellectual disabilities, ALS, multiple sclerosis (MS), or may have suffered from a CVA or TBI (Ball, 2003a; Fletcher, 1997; Kangas & Lloyd, 2006). About 80% of adults who suffer from ALS will eventually require AAC in order to communicate (Ball, 2003b)

What Are the Benefits of AAC?

Using AAC with individuals who would qualify for this type of intervention has many benefits. By definition, AAC provides a means of communication for those who are unable to effectively communicate on their own (ASHA, 2005). According to ASHA, for those who are unable to orally communicate on their own, being able to communicate with the use of AAC may increase their feelings of self-worth and social interactions.

Aside from being a means to effectively communicate in a variety of settings for different purposes, increasing social interactions, and feelings of self-worth, AAC may positively impact academic performance (ASHA, n.d.a). According to Beukelman and Mirenda, as cited by Ronski, Sevcik, and Cheslock (2003) in the MIT Encyclopedia of Communication Disorders, the use of AAC in children who are non-verbal may actually increase their vocalizations and speech intelligibility by reducing pressure to speak. Also, researchers believe that using AAC with children, who demonstrate a need for it, might aid in the early development of literacy skills and reading ability later in life (Ronski et al., 2003).

What Are the Different Types of AAC Devices?

Just as there are a variety of individuals who may benefit from AAC, there is a wide variety of available AAC systems and devices. The broadest categories of AAC are unaided and aided techniques. Unaided techniques use the speaker's body and nothing else for communication. For example, gesturing, pointing, eye gazing, and pantomiming are all forms of unaided techniques. These techniques use hands, arms, eyes, and facial features either on their own or in combination with each other to help convey a meaning. American Sign Language (ASL) is a commonly known form of unaided AAC. With unaided techniques, additional material or devices to communicate are unnecessary. Conversely, aided techniques require the use of additional material or devices, outside of the speaker's body (Glennen, 1997; Kangas & Lloyd, 2006).

Aided techniques can be divided into low technology and high technology systems. Low technology systems are aided AAC systems that are non-electronic or non-computerized. Examples of non-electronic, aided AAC devices include eye gaze boards, alphabet boards, and picture communication boards. Definitions and descriptions of these items can be found in chapter one. Electronic non-computerized, aided AAC devices include switch-activated recording devices and light/laser pointers to aid in pointing to boards (Glennen, 1997). High technology systems are aided AAC systems that are electronic and computerized. High technology systems can be subdivided into dedicated and non-dedicated systems. Dedicated AAC systems are those that were specifically developed for the sole purpose of being used as an AAC device, such as DynaVox© 2013 systems and Prentke Romich© 2013 systems. Dedicated high technology AAC devices

do not serve any other function outside of aiding communication (Accessible Technology Coalition, 2011; Glennen, 1997). Non-dedicated AAC systems are those that were not originally created to be AAC devices, but with modifications can be used as AAC for an individual, such as a laptop, iPad, or smartphone (Glennen, 1997). See Figure 2.1 for a chart on the different classifications of AAC systems.

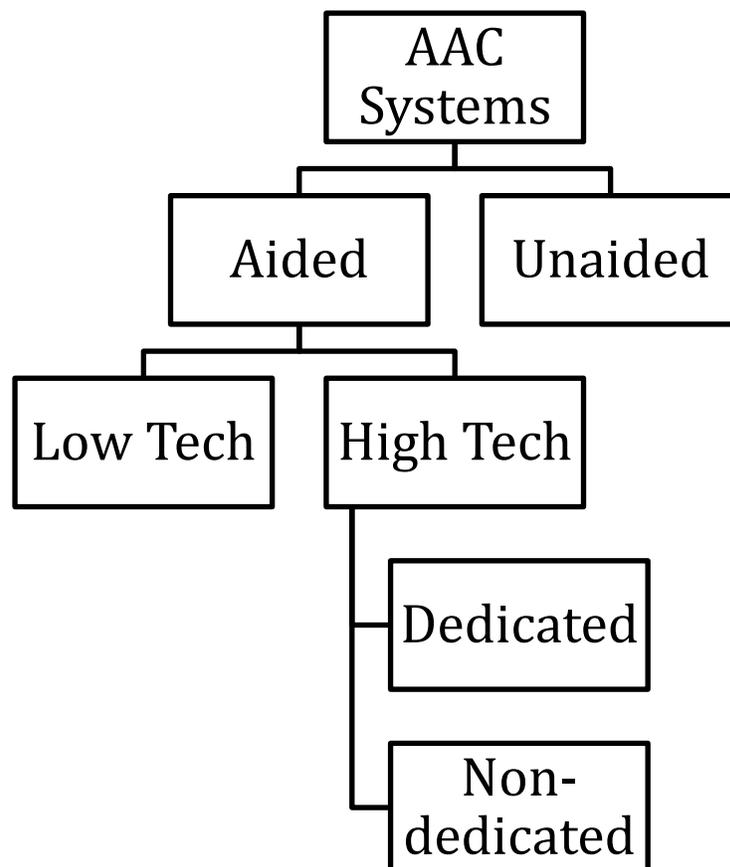


Figure 2.1. Categories of AAC devices. Chart of the different classifications of available AAC systems.

Smartphones, iPads, and Applications (Apps)

Aided, high technology systems have advanced into a new territory with the development of applications for iPads, tablets, iPhones, and smartphones (Hershberger, 2011). An application, or more commonly referred to as an “app”, is software installed on a computing device (such as iPhone, iPad, or smartphone) that provides a specific function on the host device (Black, 2013). The Pew Research Center found that as of September 2012, 85% of all U.S. adults, ages 30 and older, owned a cell phone. Of those cell phones owned, 45% were smartphones (Brenner, 2012). For young adults, ages 16 to 29 years, 95% owned a cell phone with 66% of those being smartphones (Brenner, 2012; Pew Internet & American Life Project, 2012). Portable technology such as smartphones is increasingly commonplace.

With the dramatic growth in smartphone and iPad sales, there has been an influx of available apps, including apps operating as AAC. Currently, there are about 200 apps in the iTunes store marketed as forms of AAC (Farrall, 2012). Apps marketed as AAC exist on the android market as well, but currently there are more AAC apps available on the iTunes market (Higginbotham & Jacobs, 2011). Higginbotham and Jacobs cite the lack of current guidelines and regulations on apps as a challenge in developing reputable AAC apps for the android platform.

Opinion-based literature. With the influx of apps available, along with the lack of regulations and guidelines for the creation of apps, there is a need for professional literature on the topic of apps as AAC. Dunham (2011) published an article in the *ASHA Leader* detailing the opinions of three practicing SLPs on using apps in clinical practice.

The SLPs stated that being aware of apps available for clinic, both dedicated and non-dedicated, is becoming part of a practicing SLP's responsibility, and that parents appear more open to AAC when it is presented via apps. Gosnell (2011) gave a brief overview of dedicated apps created specifically for language skills. She discussed how the photo library on the portable device can be used to create word-lists, and how non-dedicated apps, or apps not created specifically for a language function, can be incorporated into therapy as motivation. However, Gosnell cautioned that apps should not be used to replace therapy or a certified SLP.

The clinician's perspective. More recently, the *ASHA Leader* has published several opinion-based articles on AAC apps for different diagnoses (Sutton, 2012a; 2012b), how to search for and evaluate an app (Kuster, 2012; Alliano, Herriger, Koutsoftas & Bartolotta, 2012), the possibility of reimbursement for non-dedicated AAC devices (White & McCarty, 2011), increased media attention on AAC intervention via apps (DeCurtis & Ferrer, 2011), and the impact of apps as AAC (Dixon, 2011). Sutton (2012a, 2012b) discussed a variety of apps a clinician could use for different clinical purposes, including AAC, with patients who have aphasia or suffered brain injury. In 2012, Kuster detailed different ways a clinician could search for an app. In the article, links and brief descriptions were provided for different sources including websites and blogs with recommendations pertaining to apps for therapy.

Alliano, Herriger, Koutsoftas, and Bartolotta (2012) reviewed 21 different apps marketed as AAC. Alliano and colleagues divided the 21 apps into three different groups: *symbols/pictures only*, *text-to-speech only*, and *symbols and text-to-speech*. The apps

classified as *symbols/pictures only* have only pictures or symbols for the client to use and do not have a keyboard function. For example, to use the *symbols/pictures only* app called iComm, the user selects a picture that came pre-loaded or was added to the symbol inventory after purchase. The device (iPad, iPhone, smartphone) then produces a voiced message. The *symbols/pictures only* group included the apps Answers Yes/No (SimplifiedTouch, 2012), iComm (Bappz, 2012), Expressive (Smarty Ears, 2013), Scene Speak (Good Karma Applications, 2012), TapSpeak Button, (Conley, 2010) TapSpeak Sequence (Conley, 2012), and TapSpeak Choice (Conley, 2013).

Text-to-speech only apps have a keyboard and allow the user to type out the message, but do not have pictures or symbols from which the user can choose. Included in this category were Assistive Chat (assistive apps, 2013), Easy Speak (Pocket Apps Canada Inc., 2011), EZSpeech Male/Female (Gus Communications Inc., 2011), Locabulary Lite (Red Mountains Lab Inc., 2011), New Voice (Remedy Mobile, 2011), Predictable (Therapy Box Limited, 2011), Speak It! (Future Apps Inc., 2013), Typ-O (SecondGuess ApS, 2013), and Verbally (Intuary, 2013).

Apps classified as *symbol and text-to-speech* provided the app user with both symbols and a keyboard, allowing a choice from pictures or typed out message. The apps AutoVerbal Sound Board Pro (No Tie LLC, 2011), MyTalkTools Mobile (2nd Half Enterprises LLC, 2013), OneVoice (Legend, 2012), Proloquo2go (AssistiveWare, 2013), and TouchChat (Silver Kite, 2013) were included in this group.

Alliano et al. (2012) evaluated each app using a framework of 11 clinical features developed by Gosnell, Costello, and Shane (2011) to match apps to client needs.

According to Gosnell and colleagues, the appropriateness of an AAC app for a client should be evaluated using the following aspects:

1. Why the app was created (purpose of use)
2. The output of the app (synthetic speech or just text/pictures)
3. Volume control and voice options
4. How the symbols and pictures are represented and whether or not they can be customized
5. How the app displays available options and if the display can be customized
6. Feedback features (picture/symbol/letter highlighted or increasing in size when selected)
7. Rate enhancement capabilities (e.g., word/grammar predictions, recently used list)
8. How the user is able to interact with the app (pointing, scanning, etc.)
9. Required fine motor capabilities (e.g., using multiple fingers, pinching screen)
10. Available user support
11. Miscellaneous features (using the app to text, web-based features).

The same 11-feature process was recommended to review other apps when determining which AAC app would be best for a specific client.

White and McCarty (2011) addressed different reimbursement questions pertaining to AAC devices, including reimbursement for non-dedicated AAC devices. White and McCarty noted Medicare, Medicaid, and private insurance companies are hesitant to reimburse for non-dedicated devices due to a potential for insurance fraud and misuse of the device. They went on to state a need for investigation into what would need to occur for non-dedicated devices to be reimbursed. They also noted that ASHA is considering adding new forms of technology to a list of AAC devices for which a clinician could be reimbursed.

The developer's perspective. Steele and Woronoff (2011), app developers for Lingraphica, discussed different aspects that developers should consider when creating apps for individuals with aphasia. These different areas include understanding the consumer to whom the app will be marketed, interface models that will be most effective, and the future of apps as AAC. Steele and Woronoff noted the importance of knowing and understanding the target demographic population. Lingraphica users are typically individuals diagnosed with acquired aphasia, a disorder of language not intellect. The authors went on to state that knowing the common strengths of individuals with acquired aphasia enabled the app developers to capitalize on the users' abilities. Understanding the app users' daily demands, wants, preferences, and past experiences were all critical to creating an app more appropriate for the targeted users with aphasia.

Steele and Woronoff (2011) discussed successful interface models on other forms of AAC created by Lingraphica. Past research, design, and experience had shown single-click activation options on computers to be superior to multi-click options, because they

were less demanding on the user. Multimodality outputs, using text, pictures, and an auditory component were consistently shown to be engaging, easy to learn, and easy to remember for AAC users. Steele and Woronoff discussed the value of projection, when an object clicked drastically increased in size. Projection was demonstrated to be important for redirection and capturing the attention of the AAC user.

The challenge of transitioning computer-based AAC devices already created by Lingraphica to smaller devices via apps was also considered (Steele & Woronoff, 2011). Transfer of the above mentioned interface models from computer AAC devices to smaller, app-run systems was possible with considerations for the size differential. A smaller-sized device may present challenges for the app users. However, the projection interface may help overcome this issue. Steele and Woronoff, while noting possible difficulties for transitioning AAC to apps, also highlighted the importance of apps as a way to offer new functionality of AAC devices, and support and extend current AAC rehabilitation.

The public's perspective. Other articles in the *ASHA Leader* discussed the public's perceived impact of apps as a form of AAC. DeCurtis and Ferrer (2011) discussed the utilization of apps with children one through five years of age in the therapy setting. They noted that while app-capable devices were not originally intended for therapy, mainstream media such as the *Wall Street Journal* and *San Francisco Weekly* have run articles about iPads and other app-capable devices being used for communicative purposes. An increase of attention from mainstream media may contribute to an increase in app usage for AAC purposes.

The public's perception of AAC apps was also discussed in an interview conducted by Deborah Dixon (2011). She interviewed Samuel Sennott, a PhD candidate in special education. Sennott stated he believed the most prominent changes that occurred with apps and the use of technology took place in the area of AAC. Sennott stated there was a dramatic increase in the number of individuals obtaining AAC devices (Dixon, 2011). He cited the cost of app-capable devices and a perceived "coolness" factor they offer as reasons why he believed apps had such a large impact on AAC intervention (Dixon, 2011, para. 3). Although Sennott stated there was an increase in the number of individuals receiving AAC and cited apps for this reason, he did not give specific numbers to backup his claims.

Research-based literature. Currently, there is only one research-based article on the topic of using an app-capable device as AAC, a case study by Flores et al. (2012). In this study, Flores et al. (2012) compared the communication of five children with ASD, intellectual disabilities, and/or multiple disabilities, when communicating with a picture-based system and an iPad-based app. All children were communicating with a picture-based system at the start of the study. The children were then trained to communicate using an app created for the iPad. During snack time, the children were instructed to communicate their wants and needs, initially with the picture-based system and later with the iPad. At the end of the study, staff members were given surveys about the students' communication and instructors' preferences. All staff members answered true or somewhat true for the following statements: the iPad resulted in faster communication than the picture-based system, the iPad was easier for the students to manipulate, and the students appeared to like the iPad. Data revealed that instructors preferred the iPad to the

picture-based communication system because it was quicker, increased the students' communication speed, required less time to prepare materials, fewer materials were needed for implementation, and the ease of use of the iPad. While this case study was promising, it provided limited viable support for using the iPad as AAC because of the small sample size and the lack of clearly established patterns (Flores et al., 2012). Based on the limited current professional literature on the topic of using apps as a form of AAC, especially in the realm of research, exploratory research in this area is warranted.

Chapter III

Methods and Materials

This was an IRB approved pilot study designed to examine the utilization of apps as AAC in the clinical setting, including clinician and client demographics, clinician education, and the clinical decision-making process. Participant recruitment, inclusion criteria, survey materials, and research procedures are discussed in this chapter.

Participants

A 16-question survey was made available to American Speech-Language-Hearing Association (ASHA) members of four Special Interest Groups (SIGs). Inclusion criteria for survey participation were that the clinicians had a current Certificate of Clinical Competency (CCC) from the ASHA or were currently working toward certification during a clinical fellowship (CF), and participants had to use AAC in therapy with clients. All participants were members of ASHA and at least one of the following SIGs: SIG 1 Language Learning and Education, SIG 2 Neurophysiology and Neurogenic Speech and Language Disorders, SIG 12 Augmentative and Alternative Communication, and SIG 16 School-Based Issues.

Materials

An electronic survey was created on SurveyMonkey.com for this study (See Appendix A). It consisted of 16 total questions created from current literature on AAC, literature on apps, and advisory committee input. The survey included: seven multiple-choice single-answer questions, eight multiple-choice multiple-answer questions, and one

open-ended question. Seven of the eight multiple-choice multiple-answer questions included the option to write-in an answer as needed under an “other” option. At the end of the survey was an invitation and link for participants to enter their email address into a separate and voluntary survey site for the chance to win a \$50.00 iTunes or prepaid MasterCard gift card (See Appendix B).

The survey was divided into three main sections. The first section consisted of nine questions that collected demographic information about the participant and their caseloads. Requested information about the participant included age, gender, number of years practicing, employment setting, and education received pertaining to AAC, if they use AAC in therapy, and status of ASHA certification (CCC or CFY). Caseload demographic information included age range and disorder(s) of clients. This section addressed the second research question of this study. The second section, with four questions, collected information about apps as AAC. Questions examined whether or not participants were using apps as AAC, the percentage of their caseload using this technology, devices running the apps, and the specific apps used as AAC. These questions addressed research questions one and three. The last section of the survey contained two questions about the participants’ clinical decision-making process for using apps as AAC. The questions sought to discover where SLPs were obtaining information about apps as AAC, and why they were using Apps as AAC with their clients, obtaining answers for the fourth research question.

Procedures

The participants were invited to respond to this study based on their membership to one of the SIGs listed above. These four SIGs were chosen as recruitment pools because of the likelihood that their members were utilizing AAC technology and the convenience of faculty membership. Participants were contacted using the listserv discussion board posting for each of the four SIGs. A request to participate in the study was posted on each SIG discussion board (See Appendix C). A follow-up request to participate was posted one month following the initial request (See Appendix D). Postings described the study's purpose, participation and survey procedures, confidentiality protocol, payment, and potential risks. Furthermore, the postings informed participants of the option to enter into a drawing for one \$50.00 iTunes or MasterCard gift card following completion of the survey. At the end of the two-month period, the survey was closed to the participants and the data collected. Descriptive statistics, including frequency counts and percentages, were calculated for the results of each survey question and trends in the data identified.

Chapter IV

Results

Of the 36 SLPs who responded to the survey, five did not meet the initial inclusion criteria. Of the remaining 31 participants, four did not meet post-survey criteria of using apps as a form of AAC for communicative purposes, leaving the results of 27 participants for analysis. Reporting of data will be organized by research questions.

Participant Demographics

Table 4.1¹ presents participant demographic data. Twenty-six of the 27 participants who met initial and post-survey inclusion criteria were female; one was male. One participant was in the process of completing a Clinical Fellowship period, with the remaining 26 reporting current certification from ASHA. The majority of participants (13 of 27) reported professional experience of 21 or more years. Seven of 27 reported less than five years work experience

Are Apps Marketed as AAC Used in Therapy as a Means of Communication?

Twenty-seven of the original 31 (87%) participants who responded to the survey and met initial inclusion criteria reported using apps marketed as AAC with clients for communicative purposes. This suggests that at least some SLPs are using apps marketed as AAC as a means of communication with clients.

Are There Characteristics of Clinicians or Clients Who Use Apps as AAC?

Sources of education about AAC. Education and training received in the area of AAC varied among the 27 participants. Participants were permitted multiple options

¹ Tables are in the Appendices of the manuscript.

applicable to their educational experience. Twenty-two of the participants gained at least part of the AAC education through continuing education activities (CEUs). Non-CEU professional journal articles were selected as a source of AAC education by 14 of the 27 participants. Participants also selected educational opportunities while in undergraduate and/or graduate school, with 13 stating they received a designated class on AAC and eight a module on the topic. Seven participants selected "other" for sources of AAC education and listed vendor trainings, conferences, and on the job training for this category. One participant reported receiving no training on the topic of AAC.

Of the 27 participants who reported using apps as a form of AAC, 12 worked in public schools, six in private schools, four stated they worked in university speech and hearing clinics, hospitals or private practice, three worked in a private clinic, two in outpatient clinics or skilled nursing facilities, and one participant worked in home health or selected "other". Due to the nature and flexibility of speech-language pathology jobs, participants were allowed to select multiple options if they worked in more than one setting. Table 4.2 summarizes the multiple work settings each participant selected.

Caseload descriptions. Age ranges and diagnoses of clients with whom participants reported using AAC were obtained. Twenty-five of the 27 participants reported using AAC with clients six to 12 years old. Twenty-three participants reported they used AAC with clients ages 13 to 17. Clients two to five years old received AAC intervention from 19 of the 27 participants, and clients 18 to 29 years old received AAC treatment from 18 participants. Eight participants reported AAC intervention with clients 60 to 64 years of age, and seven participants reported using AAC with clients 30 to 59 years and 65 years or older. Twenty-four of the 27 participants reported using AAC with

patients diagnosed with ASD, 22 used AAC with patients who had intellectual impairments, and 21 with clients who were diagnosed with CP. Clients who had suffered a TBI received AAC intervention from 16 of the 27 participants. Individuals with Down syndrome, adult neurogenic communication disorders, or CAS each received AAC intervention from 15 of the participants. Eleven of the 27 participants reported using AAC with clients who had AOS, five used AAC with individuals who had acquired childhood aphasia, and two participants selected "other" listing Rhett's syndrome and other genetic syndromes. Table 4.3 provides caseload categories and age groups reported by participants.

What AAC Apps and App-Capable Devices Are Being Incorporated into Therapy for Communicative Purposes?

The iPad was used by all (n=27) participants who reported using apps as a form of AAC. Nine of the 27 participants reported using an iPod Touch for AAC purposes. iPhones were used to run the AAC apps by three of the participants, android-based tablets were used by two participants and smartphones by one participant.

The survey showed a variety of apps were being used as AAC for communicative purposes. Twenty-three of the 27 participants indicated they used Proloquo2Go. Fifteen participants selected "other" and listed other apps used for AAC (see Figure 4.1). Ten of the 27 participants stated they used the app Verbally. Text to Speech was used by eight of the participants, seven used Pictello, and six used MyTalk. iCommunicate and Pocket Talk – Type to Talk were each used by five of the participating SLPs. Two of the 27 participants noted use of My First AAC, Speakit, and Talking Tom for communicative purposes with their clients, while one participant used Drawing Board and

VocaBeansLite. No participants indicated that they used Voice4U, PocketMe, Easy Speak, Easy Write, SpeakPad, or Talk Assist.

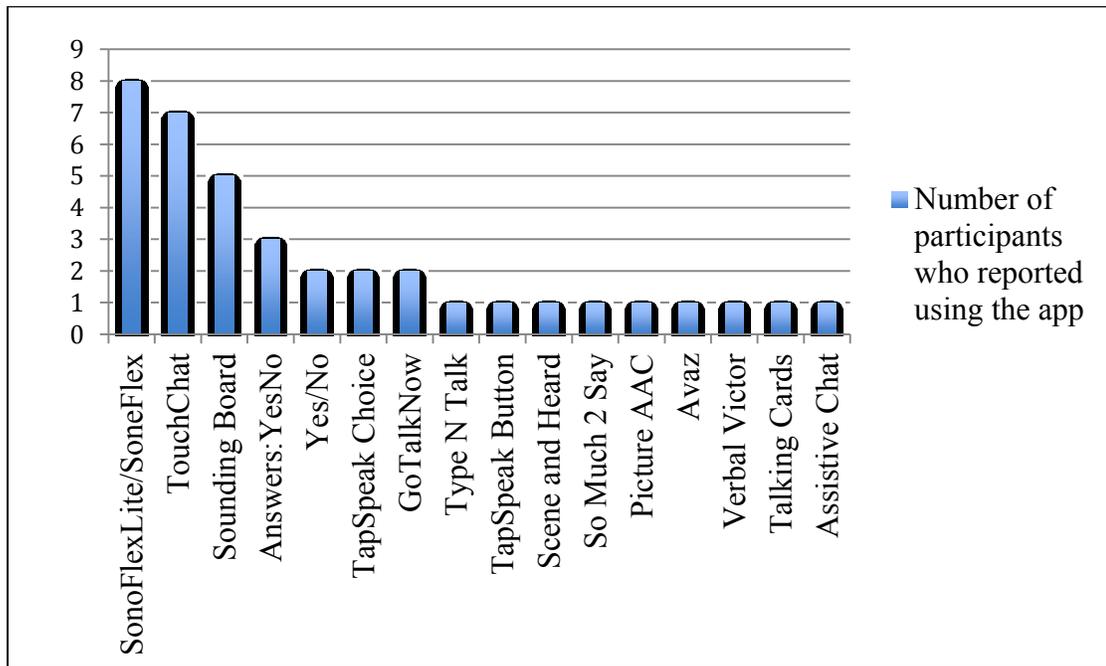


Figure 4.1. Apps used as a form of AAC listed under the “Other” option. Number of participants (y-axis) who reported using specific AAC apps (x-axis) during therapy. Participants were able to list multiple apps under the “Other” option.

Why Are Clinicians Using AAC Apps Versus Other Forms of AAC, and Where Are They Learning About the Apps?

Participants listed multiple reasons for using AAC apps instead of traditional AAC methods. Twenty of the 27 participants reported using apps as AAC because their use is more socially acceptable. Eighteen indicated the cost of apps as compared to other

AAC devices directed their clinical decision making. Fifteen participants reported using AAC apps due to the ease of obtaining them. Eleven participants selected “other” and listed additional reasons, while eight of the 27 participants stated they used AAC apps because of their opinion that the apps would generalize to other settings easier than other AAC devices.

Education on apps differed from that of education about AAC in general. Participants reported a variety of sources for information and education on the apps they used with clients. Twenty-two of the participants reported learning about AAC apps through their own informal research. Others sought recommendations from other SLPs (17/27), through non-ASHA blogs (12/27), and through ASHA’s blog (9/27). The seven participants who selected “other” listed additional resources for learning about apps for AAC purposes. Five participants obtained AAC app information from state conventions, four of the 27 participants reported obtaining AAC app information from the ASHA Leader, and three from ASHA conventions.

Chapter V

Discussion and Conclusions

This study had two primary areas of interest with regard to AAC use: 1) to examine whether SLPs who are already using AAC in therapy are using apps as a form of AAC, and within what parameters, and 2) to explore possible reasons SLPs are using apps as AAC, and possible sources for their clinical decision making using AAC apps. Survey results, implications for clinical practice and future research, as well as, limitations of the current study are discussed in this chapter. Survey results will be discussed in the order of the research questions.

Discussion of Results

Are apps marketed as AAC used in therapy as a means of communication?

The data revealed SLPs are using apps as a form of AAC in therapy. The extent to which AAC apps are being used and the interest in this technology could not be determined from the results of this study due to the small sample size. However, the topic of app utilization as AAC is reflected in an increased number of articles in the *ASHA Leader*. The *ASHA Leader* is a professional, peer-reviewed publication that highlights advances in research and practice in speech-language pathology, audiology, and communication science, specifically targeting aspects of professionals' day-to-day experiences (Dunham, 1999). Currently, there have been eight articles in the *ASHA Leader* on the topic of apps as AAC since 2011 (DeCurtis & Ferrer, 2011; Dixon, 2011; Dunham, 2011; Gosnell, 2011; Kuster, 2012; Sutton, 2012a; Sutton, 2012b; White & McCarty, 2011). In the January issue of the *ASHA Leader*, a survey revealed that, 21-35% of the 1,199 SLP

respondents were using apps as a form of AAC and 55-61% were interested in AAC apps (ASHA, 2013). Despite a reported interest in utilization of apps as a form of AAC, the small response rates to the current study and the survey in the *ASHA Leader*, along with the limited number of articles on the topic suggest otherwise. Data were unable to definitively suggest that apps are widely used as a form of AAC for communicative purposes.

Are there characteristics of clinicians or clients who use apps as AAC? The survey revealed trends among the 27 participants and their clients with whom they use AAC. CEUs were needed as a source for AAC education by 22 of the 27 participants. About half of the participants received some AAC education through a designated graduate course, and almost one-third of the participants had only a module about the topic in another class. With only about half of the participants receiving pre-service education and training in an AAC course, clinicians may not feel competent providing AAC therapy. This is supported by results from a survey conducted by the Assistive Technology Industry Association (2012). Data revealed 74% of the SLPs in the study reported inadequate preparation in their undergraduate and/or graduate coursework for AAC provision without emphasis on apps. SLPs may feel increasingly inadequate in the area of AAC due to the speed at which AAC technology advances, multiple sources of AAC technology, and their overall comfort level with technology.

With regard to work settings in which apps were used as AAC, 18 of the 27 respondents worked in a school setting, either public or private. This finding would seem intuitive given that work setting statistics showed that most SLPs work in schools (U.S.

Department of Labor, 2012). However, due to sample size, definitive conclusions about work settings that use AAC apps cannot be drawn from these data.

Results showed that the majority of clients who worked with the 27 participating SLPs were between six and 17 years old, or school-aged. This age group corresponded to the most commonly reported work place associated with this study.

Clients who received AAC intervention had varying disorders. Participants in this study reported individuals with diagnoses such as ASD, CP, Down syndrome, TBI, and adult neurogenic communication disorders frequently benefitted from AAC intervention. Results from this study regarding clients with whom AAC and apps as AAC are used corroborate articles that listed AAC apps recommended for these client populations (Sutton 2012a; 2012b). While numerous bodies of literature cite the above disorders as frequent disorders that utilize AAC therapy, literature that ranks disorders for frequency of AAC intervention is not available (Ball, 2003b; DeCoste, 1997; Fletcher, 1997, Kangas & Lloyd, 2006; Weitz, Dexter & Moore, 1997).

While results from this study revealed trends among the 27 participants and their clients who require AAC intervention, the sample size limits generalizations to be made. Instead, a need for continued research into clinician and client characteristics of those using AAC apps for communicative purposes is highlighted.

What AAC apps and app-capable devices are being incorporated into therapy for communicative purposes? The iPad was a commonly used app-supporting device with participants of this study. All reported using iPads to run apps as a form of AAC. Even though other Apple and Android products were used by some respondents, none were identified by the same number of participants as the iPad. Dunham (2011) interviewed three SLPs to examine their interest in iPad use. They reported using an iPad in therapy, including for AAC. The SLPs also indicated that requests by parents for therapy that involves an iPad was increasing. No other app-capable devices were mentioned in this article.

The current survey revealed the more commonly used AAC apps by this population sample. Proloquo2go was the more frequently used AAC app, followed by the app Verbally. Farrall (2013), AAC consultant and SLP, rated both Proloquo2go and Verbally as two of the top AAC apps available, giving each of them three out of three possible stars. Farrall (2013) evaluated AAC apps on many different aspects, including ease of programming and use, quality and choice of voices, and alternative access options (e.g., adaptations for double-clicking). In a review by Alliano et al. (2012), Proloquo2go and Verbally met the inclusion criteria of receiving a rating of two or three stars by Farrall and 3.5 out of five or higher in the iTunes user review. The apps were then evaluated based on the 11 aspects established by Gosnell and colleagues (2011) to aide in the clinical decision-making process when determining if an app is an appropriate form of AAC for a client. Proloquo2go and Verbally have been recommended as AAC apps for clients with aphasia and TBI (Sutton, 2012a; 2012b). Findings from the current study supported findings from Alliano et al.'s (2012) review of 21 different AAC applications,

and the continued use and preference of specific AAC apps as mentioned by Sutton (2012a; 2012b).

Why are clinicians using AAC apps versus other forms of AAC, and where are they learning about the apps? Data revealed reasoning for clinical-decision making when choosing AAC apps and app-capable devices over other well-established dedicated AAC devices. The more frequently cited reason for using apps as AAC among the participants was social acceptance. Social acceptance of individuals who use AAC is already a concern for practicing clinicians and a topic of research (O’Keefe, Kozak & Schuller, 2007). Studies have shown that social acceptance in both adults and children who utilize AAC is a topic in need of further research (Beck, Bock, Thompson, Bowman & Robbins, 2006; O’Keefe, Kozak & Schuller, 2007).

One theory of social acceptance in peers states that identifying similarities between individuals promotes peer acceptance and a greater likelihood of peer acceptance, if the peers share more things in common (Cook & Semmel, 1999). Dixon (2011) also noted a “coolness factor” associated with iPads as AAC that traditional AAC devices do not necessarily have, and may be partially responsible for the iPad being more socially acceptable than traditional AAC. Participants from the current study, and possibly their clients and peers, viewed apps on iPads, iPhones, iPod Touches, Android-based smartphones, and Android-based tablets as more socially acceptable than other forms of AAC. One possible explanation is the prevalence of the devices in our society and how the devices are viewed. If children and adults already use iPads or other app-capable devices, then an individual using that device for AAC would share this

commonality. They may be viewed more positively due to how others perceive iPads and other devices, possibly creating a feeling of social acceptance.

Data also revealed how the participants obtained AAC app education. Twenty-two of the 27 participants sought information through their own informal research (e.g., internet searches) and by networking with other clinicians. Almost half (12/27) of the participants reported they found information through non-ASHA blogs (such as blogs created by other SLPs). One-third sought education on the topic through ASHA's blog. Kuster (2012) recommended and listed several internet searchers and blogs for clinicians to use when learning about apps, including AAC apps. Results about AAC app education indicated that clinicians are relying on resources other than evidence-based sources. This is supported by Kuster's findings and suggestions for learning about therapy apps. It is unclear whether these sources may be influenced by the consumer and advertising markets distributing the products. Therefore, clinicians looking for information about AAC apps may not be receiving reliable information.

Implications

A need for valid and reliable research-based information about AAC apps that is accessible to practicing clinicians was indicated by this pilot study. Many SLPs appear to obtain information on AAC apps through their informal searches, recommendations from other SLPs, or from non-ASHA blogs. ASHA (2004) defines evidence-based practice (EPB) as a combination of clinical expertise/expert opinion, patient/caregiver perspectives, and external scientific evidence. In order for clinicians to use AAC apps with clients while following ASHA's EBP guidelines, the external scientific evidence

needs to be expanded to permit incorporation into clinical decision-making. Currently, only one study has described the effectiveness of communication with an iPad compared to a communication system using picture cards (Flores et al., 2012). Clinicians cannot be expected to make effective and ethical decisions regarding implementation of apps into practice with a single article on the topic. Current research in this area is needed to permit clinical decision-making based on more than opinion.

Further examination of the primary goals of this pilot study is warranted. Data suggest further efficacy and effectiveness research is needed on the commonly identified AAC apps. This would include a need to study client population(s) for which apps as AAC would be most appropriate. Understanding the perceived impact of social/peer acceptance influencing use of AAC apps needs further examination.

Possible clinical implications from continued research on the topic of apps as AAC may include: informing clinicians which app-capable choices are available, determining with which diagnoses to use apps as AAC, and reasons to choose AAC apps over other forms of AAC (e.g., more socially acceptable, cost, generalization, etc.).

Limitations

Limitations of this study included research questions, number of SIGs targeted, and number of participants. Not uncommon in survey research, the wording of the questions did not elicit the depth of information as originally intended. This resulted in an increased level of inference from the responses to completely answer initial research questions.

Using only four Special Interest Groups (SIGs) for a participant pool limited the number of potential respondents. ASHA has a total of 18 different SIGs. Accessing all 18 SIGs could have provided a larger sample for this study. Additionally, membership in a SIG is not mandatory for ASHA Certification or clinical practice (ASHA, n.d.a). This resulted in limiting potential participants to those engaged in the SIGs rather than all ASHA members through the ASHA listserv. In addition, clinicians are permitted membership in as many SIGs as desired. One clinician could have been a member of all four targeted groups. This, too, would limit the volume of potential respondents.

The small sample for the survey is a significant limitation. Out of the possible members of the four-targeted SIGs, only 36 SLPs responded to the survey. Of those, only 31 met the initial inclusion criteria for this study and only 27 met post-survey criteria. The small number of participants may be due to the two-month timeframe the survey was open. The researcher posted only two invitations to the survey. Invitations were only posted on listserves instead of being sent to the SLPs' email accounts. Also, participants had to be using AAC at the time of participation, thus eliminating potential participants if they were not working with clients who required AAC intervention at the time of the study. Lastly, the small sample size may be due to a lack of utilization of apps as a form of AAC. SLPs who saw the invitation to the study may have not been using apps in therapy and, therefore, did not choose to participate. Replication of this study with a larger sample size is recommended to clarify AAC use and decision-making.

Avenues for Future Research

Examining apps as AAC is an area that should be explored further. With over 200 AAC apps available on the iTunes market alone, it is important for viable research on the effectiveness and efficacy of apps to be available for clinicians. A call for research papers on the topic of apps as AAC by ASHA may help increase the available literature. This study could be replicated on a larger sample to allow for increased generalizations to be made. Recreating the original survey with the changes mentioned above would allow for more participants and determine more information about what populations are actually using apps as AAC for communicative purposes.

Conclusion

This study sought pilot information on the topic of apps marketed as AAC in the clinical setting. Questions examined whether clinicians were using apps as a form of AAC, clinician and client demographics of those who use AAC apps, clinicians' AAC and AAC app education, what specific apps and app-capable devices they were using, and why clinicians were choosing apps as AAC. Results suggested that some practicing SLPs are using apps as AAC for children and adults with varying disorders, but to what extent cannot be determined. The iPad was identified as the main app-capable device used for AAC purposes among the 27 participants, along with the most utilized AAC apps of the sample population. This survey offered initial insight into the clinical decision-making process, as whether or not to use AAC apps, including where clinicians obtain their information on AAC apps and why they use apps over other well-established AAC devices. Definitive answers were not obtained from the results. Instead, the study provided a foundation for future research on the growing topic of apps marketed as AAC.

References

- 2nd Half Enterprises LLC (2013). Mytalktools mobile (Version 4.0.0) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/mytalktools-mobile/id324286288?mt=8>
- Accessible Technology Coalition. (2011). Dedicated AAC devices. Retrieved from <http://atcoalition.org/article/dedicated-aac-devices>
- Alliano, A., Herriger, K., Koutsoftas, A.D., & Bartolotta, T.E. (2012). A review of 21 iPad applications for augmentative and alternative communication purposes. *Perspectives on Augmentative and Alternative Communication*, 21(2), 60-71. doi: 10.1044/aac21.60
- ALS Association. (2010). About ALS. Retrieved from <http://www.alsa.org/about-als/>
- American Association on Intellectual and Developmental Disabilities. (2013). Definition of intellectual disability. Retrieved from http://www.aaid.org/content_100.cfm
- American Speech-Language-Hearing Association. (2002). 2002 omnibus survey caseload report: Slp. Retrieved from <http://www.asha.org/research/memberdata/caseloads.htm>
- American Speech-Language-Hearing Association. (2004). Evidence-based practice introduction. Retrieved from <http://www.asha.org/Members/ebp/intro/>
- American Speech-Language-Hearing Association. (2005). Roles and responsibilities of speech-language pathologists with respect to augmentative and alternate communication: position statement [Position Statement]. Retrieved from <http://www.asha.org/docs/html/PS2005-00113.html>

American Speech-Language-Hearing Association. (2007). Childhood apraxia of speech [Position Statement]. Retrieved from <http://www.asha.org/policy/PS2007-00277.htm#sec1.2>

American Speech-Language-Hearing Association. (2013). At a glance: January 2013. Retrieved from <http://www.asha.org/Publications/leader/2013/130101/At-a-Glance--January-2013.htm>

American Speech-Language-Hearing Association. (n.d.a). ASHA special interest groups. Retrieved from <http://www.asha.org/SIG/>

American Speech-Language-Hearing Association. (n.d.b). Augmentative and alternative communication (aac). Retrieved from <http://www.asha.org/public/speech/disorders/AAC/>

Apple Inc. (2010a, July 20). *Q3 2010 unaudited summary data* [Earnings Report]. Retrieved from http://images.apple.com/pr/pdf/q310data_sum.pdf

Apple Inc. (2010b, October 18). *Q4 2010 unaudited summary data* [Earnings Report]. Retrieved from http://images.apple.com/pr/pdf/q410data_sum.pdf

Apple Inc. (2011a, January 18). *Q1 2011 unaudited summary data* [Earnings Report]. Retrieved from http://images.apple.com/pr/pdf/q111data_sum.pdf

Apple Inc. (2011b, April 20). *Q2 2011 unaudited summary data* [Earnings Report]. Retrieved from http://images.apple.com/pr/pdf/q211data_sum.pdf

Apple Inc. (2011c, July 19). *Q3 2011 unaudited summary data* [Earnings Report]. Retrieved from http://images.apple.com/pr/pdf/q311data_sum.pdf

Apple Inc. (2011d, October 18). *Q4 2011 unaudited summary data* [Earnings Report]. Retrieved from http://images.apple.com/pr/pdf/q411data_sum.pdf

Apple Inc. (2012a, January 24). *Q1 2012 unaudited summary data* [Earnings Report].

Retrieved from http://images.apple.com/pr/pdf/q112data_sum.pdf

Apple Inc. (2012b, April 24). *Q2 2012 unaudited summary data* [Earnings Report].

Retrieved from http://images.apple.com/pr/pdf/q212data_sum.pdf

Apple Inc. (2012c, July 24). *Q3 2012 unaudited summary data* [Earnings Report].

Retrieved from http://images.apple.com/pr/pdf/q312data_sum.pdf

Apple Inc. (2012d, October 25). *Q4 2012 unaudited summary data* [Earnings Report].

Retrieved from http://images.apple.com/pr/pdf/q412data_sum.pdf

AssistiveWare (2013). Proloquo2go (Version 3.0.2) [Mobile application software].

Retrieved from <https://itunes.apple.com/us/app/proloquo2go/id308368164?mt=8>

assistive apps (2013). Assistive chat (Version 3.4) [Mobile application software].

Retrieved from <https://itunes.apple.com/us/app/assistive-express/id379891874?mt=8>

Assistive Technology Industry Association. (2012, September 9). The critical need for knowledge and usage of AT and AAC among speech-language pathologists. *Survey White Paper*, Retrieved from

http://www.atia.org/files/public/ATIA_SLP_White_Paper_9-18-12.pdf

Assistive Technology Training Online Program. (2005). Communication needs:

Alternative & augmentative communication: Overview. Retrieved from

<http://atto.buffalo.edu/registered/ATBasics/Populations/aac/usingDevices.php>

Ball, L. J. (2003a). Augmentative and alternative communication approaches in adults. In

R. Kent (Ed.), *The MIT encyclopedia of communication disorders* (pp. 110-112).

Cambridge, MA: The MIT Press.

- Ball, L. J. (2003b). Augmentative and alternative communication approaches in children. In R. Kent (Ed.), *The MIT encyclopedia of communication disorders* (pp. 112-114). Cambridge, MA: The MIT Press.
- Bappz (2012). iComm (Version 1.4) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/icommm/id351726761?mt=8>
- Beck, A. R., Bock, S., Thompson, J. R., Bowman, L., & Robbins, S. (2006). Is awesome really awesome? How the inclusion of formal terms on an AAC device influences children's attitudes toward peers who use AAC. *Research in Developmental Disabilities, 27*, 56-69.
- Beukelman, D. R., & Ansel, B. M. (1995). Research priorities in augmentative and alternative communication. *AAC Augmentative and Alternative Communication, 11*, 131-134.
- Beukelman, D. R., & Mirenda, P. (2006). Principles of assessment. In D.R. Beukelman & P. Mirenda (Eds.), *Augmentative & alternative communication, supporting children & adults with complex communication needs*. (3rd ed., pp. 133-157). Baltimore, MD: Paul H Brookes Pub Co.
- Black, K. (2013, April 28). What is an iPhone app?. Retrieved from <http://www.wisegeek.com/what-is-an-iphone-app.htm>
- Brenner, J. (2012, September 14). Pew internet: Mobile. Retrieved from <http://pewinternet.org/Commentary/2012/February/Pew-Internet-Mobile.aspx>
- Center for Disease Control and Prevention. (2011, June 8). Birth defects, Down syndrome. Retrieved from <http://www.cdc.gov/ncbddd/birthdefects/DownSyndrome.html>

- Center for Disease Control and Prevention. (2012a, August 7). Autism spectrum disorders. Retrieved from <http://www.cdc.gov/ncbddd/autism/index.html>
- Center for Disease Control and Prevention. (2012b, September 7). Cerebral palsy. Retrieved from <http://www.cdc.gov/ncbddd/cp/index.html>
- Center for Disease Control and Prevention. (2012c, September 26). Traumatic brain injury. Retrieved from <http://www.cdc.gov/TraumaticBrainInjury/>
- Conley, T. (2010). TapSpeak Button (Version 1.0) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/tapspeak-button/id359998293?mt=8>
- Conley, T. (2012). TapSpeak Sequence (Version 2.0.2) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/tapspeak-sequence-standard/id379541810?mt=8>
- Conley, T. (2013). TapSpeak Choice (Version 5.0.1) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/tapspeak-choice/id408507581?mt=8>
- Cook, B., & Semmel, M. (1999). Peer acceptance of included students with disabilities as a function of severity of disability and classroom composition. *The Journal of Special Education, 33*, 50-61.
- DeCoste, D. C. (1997). AAC and individuals with physical disabilities. In S. Glennen & D. DeCoste (Eds.). *Handbook of augmentative and alternative communication* (pp. 362-394). San Diego, California: Singular Publishing Group, Inc.
- DeCurtis, L.L., & Ferrer, D. (2011, September 20). Toddlers and technology: Teaching the techniques. *The ASHA Leader*, Retrieved from

<http://www.asha.org/Publications/leader/2011/110920/Toddlers-and-Technology.htm>

Dixon, D. (2011, October 11). School matters: The future of apps in the classroom. *The ASHA Leader*, Retrieved from

<http://www.asha.org/Publications/leader/2011/111011/School-Matters--The-Future-of-Apps-in-the-Classroom.htm>

Dunham, G. (1999). Who we are: The ASHA Leader. Retrieved from

<http://www.asha.org/publications/leader/who-we-are/>

Dunham, G. (2011, April 5). The future at hand: Mobile devices and apps in clinical practice. *The ASHA Leader*, Retrieved from

<http://www.asha.org/Publications/leader/2011/110405/The-Future-at-Hand--Mobile-Devices-and-Apps-in-Clinical-Practice.htm>

Fager, S. (2006). Individuals with traumatic brain injury. In D.R. Beukelman & P.

Miranda (Eds.), *Augmentative & alternative communication, supporting children & adults with complex communication needs*. (3rd ed., pp. 524). Baltimore, MD: Paul H Brookes Pub Co.

Farrall, J. (2012, May). *Speaking appropriately: AAC apps for iPad*. Paper presented at the Inclusive Learning Technologies Conference, Gold Coast, Queensland, Australia.

Farrall, J. (2013, April 21). iPhone/iPad apps for AAC. Retrieved from

<http://www.spectronicsinoz.com/article/iphoneipad-apps-for-aac>

- Fletcher, P. P. (1997). AAC and adults with acquired disabilities. In S. Glennen & D. DeCoste (Eds.), *Handbook of augmentative and alternative communication* (pp. 481-523). San Diego, California: Singular Publishing Group, Inc.
- Flores, M., Musgrove, K., Renner, S., Hinton, V., Strozier, S., Franklin, S., & Hill, D. (2012). A comparison of communication using the Apple iPad and a picture-based system. *Augmentative and Alternative Communication, 28*(2), 74-84. doi: 10.3109/07434618.2011.644579
- Freed, D. B. (2012). *Motor speech disorders, diagnosis & treatment*. (2 ed., p. 282). Clifton Park, NY: Delmar Pub.
- Future Apps Inc. (2013). Speak it! (Version 2.6) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/speak-it!-text-to-speech/id308629295?mt=8>
- Glennen, S. L. (1997). Augmentative and alternative communication systems. In S. Glennen & D. DeCoste (Eds.), *Handbook of augmentative and alternative communication* (pp. 59-96). San Diego, California: Singular Publishing Group, Inc.
- Good Karma Applications, Inc (2012). Scene Speak (Version 2.03) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/scene-speak/id420492342?mt=8>
- 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*, Retrieved from <http://www.asha.org/Publications/leader/2011/111011/Apps--An-Emerging-Tool-for-SLPs/>

- Gosnell, J., Costello, J., & Shane, H. (2011). Using a clinical approach to answer “what communication apps should we use?”. *Perspectives on Augmentative and Alternative Communication*, 20(3), 87-96. doi: 10.1044/aac20.3.87
- Gus Communications, Inc. (2011). Ezspeech male/female (Version 6.5) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/ezspeechpro-male-us/id413623128?mt=8>
- Hershberger, D. (2011). Mobile technology and aac apps from an aac developer’s perspective. *Perspectives on Augmentative and Alternative Communication*, 20(1), 28-33. doi: 10.1044/aac20.1.28
- Higginbotham, J., & Jacobs, S. (2011). The future of the android operating system for augmentative and alternative communication. *Perspectives on Augmentative and Alternative Communication*, 20(2), 52-56. doi: 10.1044/aac20.2.52
- Holmes, A.E., & Thomas, C.N. (2006). Audiological rehabilitation. In N. Anderson & G. Shames (Eds.), *Human communication disorders an introduction* (7th ed., pp. 539-563). Boston, MA: Pearson Education, Inc.
- Indiana University of Pennsylvania. (2013). Acquired neurological disorders. Retrieved from <http://www.iup.edu/page.aspx?id=128958>
- Intuary (2013). Verbally (Version 2.4) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/verbally/id418671377?mt=8>
- Kangas, K. A., & Lloyd, L. L. (2006). Augmentative and alternative communication. In N. Anderson & G. Shames (Eds.), *Human communication disorders an introduction* (7th ed., pp. 437-470). Boston, MA: Pearson Education, Inc.

- Kuster, J.M. (2012, April 3). Internet: In search of the perfect speech-language app?. *The ASHA Leader*, Retrieved from <http://www.asha.org/Publications/leader/2012/120403/Internet--In-Search-of-the-Perfect-Speech-Language-App.htm>
- Legend (2012). Onevoice (Version 1.5.1) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/onevoice-aac/id412448074?mt=8>
- No Tie, LLC (2011). Autoverbal sound board pro (Version 4.0) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/autoverbal-pro-talking-soundboard/id368727888?mt=8>
- O'Keefe, B. M., Kozak, N. B., & Schuller, R. (2007). Research priorities in augmentative and alternative communication as identified by people who use AAC and their facilitators. *Augmentative and Alternative Communication*, 23(1), 89-96.
- PBS Parents. (2013). Augmentative and alternative communication. Retrieved from <http://www.pbs.org/parents/education/learning-disabilities/strategies-for-learning-disabilities/communication-strategies/aac/>
- Pew Internet & American Life Project. (2012, September 17). Smartphone research: Infographic. Retrieved from <http://pewinternet.org/Infographics/2012/Our-Smartphone-Habits.aspx>
- Plante, E., & Beeson, P. M. (2008). *Communication and communication disorders a clinical introduction*. (3rd ed., pp. 1-22). Boston, MA: Pearson Education, Inc.
- Pocket Apps Canada Inc. (2011). Easy speak (Version 1.2) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/easy-speak-aac/id449435222?mt=8>

- Red Mountains Lab, Inc. (2011). Locabulary lite (Version 2.0) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/locabulary-lite/id322448547?mt=8>
- Remedy Mobile (2011). New voice (Version 1.02) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/new-voice/id399054382?mt=8>
- Romski, M. A., Sevcik, R. A., & Cheslock, M. (2003). Augmentative and alternative communication: General issues. In R. Kent (Ed.), *The MIT encyclopedia of communication disorders* (pp. 277-278). Cambridge, MA: The MIT Press.
- SecondGuess ApS (2013). Typ-o (Version 3.49) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/typ-o-writing-for-everybody!/id516901569?mt=8>
- Sevcik, R.A., & Romski, M. (n.d.). AAC: More than three decades of growth and development. Retrieved from <http://www.asha.org/public/speech/disorders/AACThreeDecades.htm>
- Silver Kite (2013). Touchchat (Version 1.3.3) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/touchchat-hd-aac/id398860728?mt=8>
- SimplifiedTouch (2012). Answers:YesNo (Version 3.2) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/answers-yesno/id337470555?mt=8>
- Smarty Ears (2013). Expressive (Version 3.1.1) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/expressive/id398345416?mt=8>
- Soto, B., Huer, M.B., & Taylor, O. (1997). Multicultural issues in augmentative and alternative communication. In L.L. Lloyd, D.R. Fuller, & H.H. Arvidson (Eds.),

Augmentative and alternative communication: A handbook of principles and practices (pp. 406-413). Boston: Allyn and Bacon.

Steele, R., & Woronoff, P. (2011). Design challenges of AAC apps, on wireless portable devices, for persons with aphasia. *Perspectives on Augmentative and Alternative Communication*, 20(2), 41-51. doi: 10.1044/aac20.2.41

Sutton, M. (2012a, June 5). App-titude: Apps to aid aphasia. *The ASHA Leader*, Retrieved from <http://www.asha.org/Publications/leader/2012/120605/App-titude--Apps-to-Aid-Aphasia.htm>

Sutton, M. (2012b, July 3) App-titude: Apps for brain injury rehab. *The ASHA Leader*, Retrieved from <http://www.asha.org/Publications/leader/2012/120703/APP-titude--Apps-for-Brain-Injury-Rehab.htm>

Therapy Box Limited (2011). Predictable (Version 2.0) [Mobile application software]. Retrieved from <https://itunes.apple.com/us/app/predictable/id4044445007?mt=8>

Tomblin, J. B. (2002). Perspectives on diagnosis. In J. Tomblin, H. Morris & D. Priestersbach (Eds.), *Diagnosis in speech-language pathology* (2nd ed., pp. 3-33). San Diego, CA: Delmar.

U.S. Department of Labor, Bureau of Labor Statistics. (2012). *Occupational outlook handbook, 2012-13 edition, speech-language pathologists*. Retrieved from: <http://www.bls.gov/ooh/Healthcare/Speech-language-pathologists.htm>

Weitz, C., Dexter, M., & Moore, J. (1997). AAC and children with developmental disabilities. In S. Glennen & D. DeCoste (Eds.), *Handbook of augmentative and*

alternative communication (pp. 395-444). San Diego, California: Singular Publishing Group, Inc.

WETA. (2013). Assistive technology glossary. Retrieved from

http://www.brainline.org/content/2009/11/assistive-technology-glossary_page3.html

White, S.C., & McCarty, J. (2011, October 11). Bottom line: Reimbursement for AAC devices. *The ASHA Leader*, Retrieved from

<http://www.asha.org/Publications/leader/2011/111011/Bottom-Line--Reimbursement-for-AAC-Devices.htm>

World Health Organization. (2013). Stroke, cerebrovascular accident. Retrieved from

http://www.who.int/topics/cerebrovascular_accident/en/

APPENDIX A
Applications as AAC Devices Survey

**The Utilization of Applications as Augmentative and Alternative Communication
Devices by Speech-Language Pathologists**

1. Consent to Participate in Research

You are asked to participate in a research study conducted by Joselyn Gilbert, a graduate student from the Department of Communication Disorders at Eastern Kentucky University. Results will contribute to a graduate thesis. You were selected as a possible participant in this study because of your membership in ASHA's Special Interest Group 1, 2, 12, or 16.

Purpose of the Study

To gather information and perspectives from speech-language pathologists who use Augmentative and Alternative Communication devices in therapy on Applications, or Apps, as a form of AAC. Specifically, this survey will gather information to see if Apps are used as a form of AAC, if they are used with/within a certain demographic (clinician and/or client), and the decision-making process of the clinician.

Procedures

If you volunteer to participate in this study, you will do the following things:

You will electronically complete this brief survey, which should take approximately 15-20 minutes. You may complete the survey any time of day from your home or office. You may complete the survey only one time. This information will then be automatically sent to the researcher. You must complete the survey to submit any/all answers.

Potential Risks

There are no foreseeable risks associated with completing this survey. If you choose to withdraw from, or not participate in the survey, you will not be entered into the prize drawing.

Payment for Participation

Upon completion of this survey, you may choose to be included in a drawing for one \$50 iTunes or prepaid MasterCard gift card that may be used to purchase AAC Apps.

Confidentiality

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as

required by law during the duration of this study. After the conclusion of this study, any identifying information will be destroyed.

Participation and Withdrawal

You may choose whether to be in this study or not. Participation in this survey is voluntary, that refusal to participate will involve no penalty or loss of benefits to which the subject is otherwise entitled and that the subject may discontinue participation at any time without penalty or loss of benefits to which the subject is otherwise entitled. The investigator may withdraw you from this research if circumstances arise which in the opinion of the researcher warrant doing so.

Identification of Investigator

If you have any questions or concerns about the research, please feel free to contact Joselyn Gilbert, graduate student and researcher, 937-313-1490, joselyn_gilbert61@mymail.eku.edu.

Rights of Research Subjects

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact the Division of Sponsored Programs, Jones 414/Coates CPO 20, 521 Lancaster Avenue, Richmond, KY 40475-3102; Telephone: (859) 622-3636.

SIGNATURE OF RESEARCH PARTICIPANT

- I understand and agree to the procedures and conditions of my participation described above. My questions have been answered to my satisfaction, and I agree to participate in this study.

- I do not agree to participate in this study. (will direct the participant to a “thank you” page and end the survey)

2. What is your gender?

- Male

- Female

- Other

3. What is your age?

4. Do you have your CCC's?

- No, I am currently in my CFY.
- Yes, I have my CCC's

5. How many years have you been practicing?

- 0 – 5 years
- 6 – 10 years
- 11 – 15 years
- 16 – 20 years
- 21 or more years

6. In what setting do you work?

- Public School
- Private School
- Private Clinic
- Public Health Department
- Outpatient Clinic
- University Speech and Hearing Clinic
- Hospital
- Home Health
- Private Practice
- Skilled Nursing Facility (SNF)
- Other (please specify)

7. Do you currently use any method of Augmentative and Alternative Communication (AAC)?

- Yes
- No

8. What type of education did you receive about AAC? (Select all that apply)

- A module in another class during graduate school
- An entire class during graduate school
- Continuing Education Courses
- Journal articles not counted as continuing education
- None
- Other (please specify)

9. What is the range of your clients? (Select all that apply)

- 2 - 5 years
- 6 - 12 years
- 13 - 17 years
- 18 - 29 years
- 30 - 39 years
- 40 - 49 years
- 50 - 59 years
- 60 - 64 years
- 65 + years

10. Of the clients with whom you use AAC, what disorders do they present? (Select all that apply)

- Autism Spectrum Disorder (ASD)
- Apraxia of Speech (AOS)
- Childhood Apraxia of Speech (CAS)
- Acquired Childhood Aphasia
- Cerebral Palsy (CP)
- Down Syndrome

- Intellectual Impairments
- Neurogenic Communication Disorders
- Traumatic Brain Injury (TBI)
- Other (please specify)

11. Are you currently using Applications, or Apps, as a form of AAC?

- Yes
- No (this will prompt them to end the survey)

12. With what percentage of your clients do you use Apps as a communication tool?

- 0-5%
- 6-9%
- 10-19%
- 20-29%
- 30-39%
- 40-49%
- 50-59%
- 60-69%
- 70-79%
- 80-89%
- 90-99%
- 100%

13. What device are you using to run Apps as a communication tool?

- iPad
- iPod Touch
- iPhone

- Droid-based Smartphone
- Droid-based Tablet
- Other (please specify)

14. What Apps are you using as a form of AAC?

- Proloquo2Go
- MyTalk
- iComm
- iCommunicate
- Smalltalk
- SpeakIt
- Voice4u
- PocketMe
- Verbally
- My First AAC
- Easy Speak
- Easy Write
- Dragon Diction
- Drawing Board
- Pictello
- SpeakPad
- Talk Assist
- Talking Tom
- Tap To Talk
- VocaBeansLite

- Text to speech
- Other (please specify)

15. Why are you using Apps as a form of alternative communication?

- The cost of using Apps as compared to other AAC devices
- The ease of obtaining AAC Apps
- Clients and/or peers find it more socially acceptable
- It is easier to generalize to other settings
- Other (please specify)

16. Where did you learn about the Apps you are using as a form of AAC?

- ASHA Leader
- ASHA Blogs
- ASHA Conventions
- State Conventions
- Other Blogs
- Other SLPs
- Through your own research (please specify)
- Other (please specify)

Thank You Page

Thank you for participating! If you would like to be entered into the prize drawing for the chance to win one (1) \$50.00 iTunes gift card or pre-paid MasterCard Credit Card please click on the following link. Upon clicking the link, you will be taken to single-question survey requesting your email address. Please note, this is optional and not a required portion of the initial survey.

APPENDIX B
Prize Participation Survey

1. Thank you for participating in my survey. If you wish to be entered into the drawing for a \$50 iTunes or prepaid MasterCard gift card please enter your email address and gift card preference below. If your name is selected, you will be contacted via email by Joselyn Gilbert to verify your gift card preference and obtain an address to which the card should be mailed. (Note, this is optional; it is not a requirement of the survey.)

APPENDIX C

Invitation to Participate in Research

My name is Joselyn Gilbert and I am a graduate student in Communication Disorders at Eastern Kentucky University. I'm currently completing my Master's Thesis in the utilization of Applications, or Apps, as a form of Augmentative and Alternative Communication (AAC) devices and will be using a survey that will serve to create part of a foundation of literature for future studies on the use of Apps as AAC devices.

If you are a practicing speech-language pathologist with a Certificate of Clinical Competence or are currently in your Clinical Fellowship, you are invited to participate in my survey. The link is below.

<https://www.surveymonkey.com/s/UtilizationOfAppsAsAAC>

Purpose of the Study

To gather information and perspectives from speech-language pathologists who use Augmentative and Alternative Communication devices in therapy on Applications, or Apps, as a form of AAC. Specifically, this survey will gather information to see if Apps are used as a form of AAC, if they are used with/within a certain demographic (clinician and/or client), and the decision-making process of the clinician.

Procedures

If you volunteer to participate in this study, you will do the following things:

You will electronically complete this brief survey, which should take approximately 15-20 minutes. You may complete the survey any time of day from your home or office.

You may complete the survey only one time. This information will then be automatically sent to the researcher. You must complete the survey to submit any/all answers.

After completing the initial survey, you will then be given an option to enter your email address in a separate survey to be entered in to the prize drawing. This additional survey is completely optional and not part of the initial survey.

Potential Risks

There are no foreseeable risks associated with completing this survey. If you choose to not participate in the survey, you will not be entered into the prize drawing.

Payment for Participation

Upon completion of this survey, you may choose to be included in a drawing for one \$50 iTunes or prepaid MasterCard gift card that may be used to purchase AAC Apps.

Confidentiality

Due to the nature of SurveyMonkey, the initial survey is entirely confidential and collects no identifying information because the link to the survey is not connected to your email address in any way. Also, providing a separate survey link to participate in the prize drawing ensures that your answers to the initial survey cannot be connected to you the participant.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law during the duration of this study. After the conclusion of this study, any identifying information will be destroyed.

Participation and Withdrawal

You may choose whether to be in this study or not. Participation in this survey is voluntary, that refusal to participate will involve no penalty or loss of benefits to which the subject is otherwise entitled and that the subject may discontinue participation at any time without penalty or loss of benefits to which the subject is otherwise entitled. The investigator may withdraw you from this research if circumstances arise which in the opinion of the researcher warrant doing so.

Rights of Research Subjects

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact the Division of Sponsored Programs, Jones 414/Coates CPO 20, 521 Lancaster Avenue, Richmond, KY 40475-3102; Telephone: (859) 622-3636.

I would like to thank you in advance for your time and participation.

Questions regarding this study should be directed to:

Joselyn Gilbert
Graduate Student
Communication Disorders Program
Eastern Kentucky University
joselyn_gilbert61@mymail.eku.edu

Dr. Charlotte Hubbard
Assistant Professor/Director
Communication Disorders Program
Eastern Kentucky University
Charlotte.Hubbard@eku.edu

APPENDIX D

Follow-Up Invitation to Participate in Research

My name is Joselyn Gilbert and I am a graduate student in Communication Disorders at Eastern Kentucky University. I'm currently completing my Master's Thesis in the utilization of Applications, or Apps, as a form of Augmentative and Alternative Communication (AAC) devices and will be using a survey that will serve to create part of a foundation of literature for future studies on the use of Apps as AAC devices.

A month ago, I sent out an invitation to participate in my survey regarding Apps as AAC devices. If you have already participated, thank you for your input and time. I greatly appreciate your help. If you have not yet been able to participate, I would like to extend this invitation to you again. If you are a practicing speech-language pathologist with a Certificate of Clinical Competence or are currently in your Clinical Fellowship, you are invited to participate in my survey. The link is below.

<https://www.surveymonkey.com/s/UtilizationOfAppsAsAAC>

Purpose of the Study

To gather information and perspectives from speech-language pathologists who use Augmentative and Alternative Communication devices in therapy on Applications, or Apps, as a form of AAC. Specifically, this survey will gather information to see if Apps are used as a form of AAC, if they are used with/within a certain demographic (clinician and/or client), and the decision-making process of the clinician.

Procedures

If you volunteer to participate in this study, you will do the following things:

You will electronically complete this brief survey, which should take approximately 15-20 minutes. You may complete the survey any time of day from your home or office.

You may complete the survey only one time. This information will then be automatically sent to the researcher. You must complete the survey to submit any/all answers.

After completing the initial survey, you will then be given an option to enter your email address in a separate survey to be entered in to the prize drawing. This additional survey is completely optional and not part of the initial survey.

Potential Risks

There are no foreseeable risks associated with completing this survey. If you choose to not participate in the survey, you will not be entered into the prize drawing.

Payment for Participation

Upon completion of this survey, you may choose to be included in a drawing for one \$50 iTunes or prepaid MasterCard gift card that may be used to purchase AAC Apps.

Confidentiality

Due to the nature of SurveyMonkey, the initial survey is entirely confidential and collects no identifying information because the link to the survey is not connected to

your email address in any way. Also, providing a separate survey link to participate in the prize drawing ensures that your answers to the initial survey cannot be connected to you the participant.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law during the duration of this study. After the conclusion of this study, any identifying information will be destroyed.

Potential Risks

There are no foreseeable risks associated with completing this survey. If you choose to not participate in the survey, you will not be entered into the prize drawing.

Payment for Participation

Upon completion of this survey, you may choose to be included in a drawing for one \$50 iTunes or prepaid MasterCard gift card that may be used to purchase AAC Apps.

Confidentiality

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law during the duration of this study. After the conclusion of this study, any identifying information will be destroyed.

Participation and Withdrawal

You may choose whether to be in this study or not. Participation in this survey is voluntary, that refusal to participate will involve no penalty or loss of benefits to which the subject is otherwise entitled and that the subject may discontinue participation at any time without penalty or loss of benefits to which the subject is otherwise entitled. The investigator may withdraw you from this research if circumstances arise which in the opinion of the researcher warrant doing so.

Rights of Research Subjects

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact the Division of Sponsored Programs, Jones 414/Coates CPO 20, 521 Lancaster Avenue, Richmond, KY 40475-3102; Telephone: (859) 622-3636.

I would like to thank you in advance for your time and participation.

Questions regarding this study should be directed to:

Joselyn Gilbert

Dr. Charlotte Hubbard

Graduate Student
Communication Disorders Program
Eastern Kentucky University
joselyn_gilbert61@mymail.eku.edu

Assistant Professor/Director
Communication Disorders Program
Eastern Kentucky University
Charlotte.Hubbard@eku.edu

APPENDIX E

Table 4.1 Reported Participant Demographics

Table 4.1

Reported Participant Demographics

Participant	Gender	Certification/Clinical Fellowship	Professional Experience
1	Female	ASHA Certification	0-5 years
2	Female	ASHA Certification	11-15 years
3	Female	ASHA Certification	0-5 years
4	Female	ASHA Certification	0-5 years
5	Female	ASHA Certification	21 or more years
6	Female	ASHA Certification	16-20 years
7	Female	ASHA Certification	21 or more years
8	Female	ASHA Certification	0-5 years
9	Female	ASHA Certification	6-10 years
10	Female	ASHA Certification	21 or more years
11	Female	ASHA Certification	21 or more years
12	Female	ASHA Certification	21 or more years
13	Female	ASHA Certification	21 or more years
14	Female	ASHA Certification	0-5 years
15	Female	ASHA Certification	11-15 years
16	Male	ASHA Certification	6-10 years
17	Female	ASHA Certification	21 or more years
18	Female	ASHA Certification	21 or more years
19	Female	ASHA Certification	21 or more years
20	Female	ASHA Certification	21 or more years
21	Female	ASHA Certification	21 or more years
22	Female	ASHA Certification	11-15 years
23	Female	ASHA Certification	21 or more years
24	Female	ASHA Certification	21 or more years
25	Female	ASHA Certification	16-20 years
26	Female	Clinical Fellowship	0-5 years
27	Female	ASHA Certification	0-5 years

APPENDIX F

Table 4.2 Reported Participant Work Settings

Table 4.2

Reported Participant Work Settings

Participant	Work Setting(s)
1	Outpatient Clinic, Hospital
2	Private Practice
3	Private Clinic, Skilled Nursing Facility
4	Private School
5	University Speech and Hearing Clinic
6	Private School
7	Public School
8	Public School, Private School
9	Private Clinic
10	Public School
11	Public School, Private School, Private Clinic, Private Practice
12	Public School
13	Public School
14	Outpatient Clinic, Hospital
15	Public School
16	Public School, Hospital
17	Public School
18	Public School, Private Practice
19	Home Health
20	University Speech and Hearing Clinic
21	University Speech and Hearing Clinic
22	Private School
23	Hospital
24	University Speech and Hearing Clinic
25	Public School, Private School
26	Outpatient Clinic
27	Public School, Private Practice, Skilled Nursing Facility

APPENDIX G

Table 4.3 Reported Caseload Categories and Client Age Ranges

Table 4.3

Reported Caseload Categories and Client Age Ranges

Participant	Caseload Categories	Age Ranges
1	ASD, AOS, CAS, CP, Down syndrome, intellectual impairment, TBI, acquired childhood aphasia, adult neurogenic communication disorders	2-29 years
2	ASD	2-17 years
3	ASD, adult neurogenic communication disorders	2-12 and 60+ years
4	ASD, AOS, CP, Down syndrome	2-29 years
5	ASD, CAS, CP, Down syndrome, intellectual impairment, adult neurogenic communication disorders	2-29 years
6	ASD, AOS, CAS, CP, Down syndrome, intellectual impairment, acquired childhood aphasia, TBI	6-17 years
7	ASD, CAS, CP, Down syndrome, intellectual impairment, acquired childhood aphasia, TBI, adult neurogenic communication disorders	2-29 years
8	ASD, CP, intellectual impairment, TBI, adult neurogenic communication disorders	6-29 years
9	ASD, AOS, CAS, intellectual impairment	2-17 years
10	ASD, AOS, intellectual impairment	6-17 years
11	ASD, AOS, CP, Down syndrome, intellectual impairment, adult neurogenic communication disorders	2-65+ years
12	ASD, CAS, CP, intellectual impairment, TBI, adult neurogenic communication disorders	2-29 years
13	CP, intellectual impairment	6-17 years
14	ASD, CAS, CP, Down syndrome, intellectual impairment, TBI	2-17 years
15	ASD, CAS, CP, intellectual impairment	2-29 years
16	ASD, Down syndrome	6-12 years
17	ASD, CAS, CP, Down syndrome, intellectual impairment, TBI, other (Rett's syndrome)	2-29 years
18	ASD, AOS, CAS, CP, Down syndrome, intellectual impairment, TBI	2-29 years
19	ASD, CP, Down syndrome, intellectual impairment	6-64 years
20	ASD, AOS, CP, intellectual impairment, TBI, adult neurogenic communication disorders	6-65+ years

Table continues

Table 4.3 Continued

Reported Caseload Categories and Client Age Ranges

Participant	Caseload Categories	Age Ranges
21	ASD, AOS, CP, Down syndrome, intellectual impairment, TBI, adult neurogenic communication disorders	2-65+ years
22	ASD, AOS, CAS, CP, Down syndrome, intellectual impairment, TBI, adult neurogenic communication disorders	2-39 years
23	TBI, adult neurogenic communication disorders	13-65+ years
24	ASD, AOS, CAS, CP, intellectual impairment, TBI, adult neurogenic communication disorders	2-65+ years
25	ASD, AOS, CAS, CP, Down syndrome, intellectual impairments, acquired childhood aphasia	2-29 years
26	CAS, CP, Down syndrome, intellectual impairments, acquired childhood aphasia	2-5 years
27	ASD, CP, Down syndrome, intellectual impairments, TBI, adult neurogenic communication disorders, other (other genetic syndromes)	2-12, 18-29, 40-65+ years