

MOBILE MEDIA DEVICES AND COMMUNICATION APPLICATIONS AS A FORM OF  
AUGMENTATIVE AND ALTERNATIVE COMMUNICATION: AN ASSESSMENT OF  
FAMILY WANTS, NEEDS, AND PREFERENCES

By

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## Abstract

This study assessed the wants, needs, and preferences of families at various stages of the decision-making process relative to mobile media technology as a form of augmentative and alternative communication (AAC). A survey entitled “iDevices, AAC, and Families: A Survey of Needs” was hosted online. Families’ participation was solicited with help from organizations that support individuals with communication disabilities at national, state, and local levels. A total of 64 parents and caregivers responded to the survey and provided information about supporting their child using an iDevice and communication application(s) as an AAC system.

The data revealed that the majority of families want information and support from professionals throughout the decision-making process. In particular, families wanted information about how to use the AAC device and the support of professionals knowledgeable about AAC. The families reported ease of use and affordability as the two most influential characteristics in the purchase of both iDevices and communication applications, and they wanted support to help the AAC device meet their child’s individual needs. Families cited speech-language pathologists as the professional preferred to support both their child and themselves.

Clinical implications for speech-language pathologists who support children who use AAC and their families include the need to embrace and recognize their role as speech-language pathologists in the consumer access model for mobile media AAC technology. This includes providing knowledge and support during and before and after the families’ purchase. There is a need for professionals to keep family priorities in mind, which often include ease of use and affordability, while also focusing on device feature matching to meet the child’s communication needs. Speech-language pathologists are encouraged to actively participate in mobile media AAC technology assessment and intervention.

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## **Chapter I**

### **Introduction**

The last several decades have been marked by rapidly evolving technology in the United States. Innovative technology has changed well-established areas of experience and practice including medicine, business, education, and many others. The field of speech-language pathology, which is closely related to education, is no exception. The accelerated rate of technological advancement has affected the area of study and practice within speech-language pathology referred to as augmentative and alternative communication (AAC). Changing AAC technology has impacted speech-language pathologists, speech-language pathology service delivery models, and children and students receiving speech and language services.

#### **Augmentative and Alternative Communication**

According to American Speech-Language-Hearing Association (ASHA), AAC refers to “the field or area of clinical, educational, and research practice to improve, temporarily or permanently, the communication skills of individuals with little or no functional speech and/or writing” (ASHA, 2002, p. 2). The purpose of AAC is to facilitate an individual’s effectiveness in communicating, his or her communicative competence (Schlosser & Wendt, 2008). This is accomplished through the individual’s use of one or several modalities that supplement or take the place of natural speech (Schlosser & Wendt, 2008).

There are four components of AAC systems: symbols, aids, techniques, and strategies (Beukelman & Mirenda, 2005). AAC includes two types of symbols that can supplement or replace natural speech. Unaided symbols include manual signs, fingerspelling, gestures, and facial expressions, and do not require the use of an external aid or device (ASHA, 2002). Aided symbols include tangible objects, picture communication symbols, and line drawings

(Beukelman & Mirenda, 2005). An AAC aid can be defined as “a device, either electronic or non-electronic, that is used to transmit or receive messages” (Beukelman & Mirenda, 2005, p. 4). The use of symbols via an AAC aid facilitates an individual’s communicative intent for functional communication. In reference to AAC, a technique is the method by which messages are accessed, selected, and transmitted. Finally, AAC strategy “refers to the ways in which messages can be conveyed most effectively and efficiently (Beukelman & Mirenda, 2005, p. 4). The four components of an AAC system, which are symbols, aids, techniques, and strategies, are used in combination to assist individuals in communicating effectively (Beukelman & Mirenda, 2005).

It is estimated that more than 3.5 million Americans cannot use natural speech to communicate effectively (Beukelman & Mirenda, 2005). Individuals who use or are potential candidates for AAC include people of all ages, socioeconomic groups, and cultural backgrounds. Congenital, or acquired at birth, causes for communication disabilities include autism spectrum disorders, cerebral palsy, Down syndrome, developmental apraxia of speech, developmental delays and intellectual disability. Other individuals acquire the need for AAC later in life, including those individuals who experience stroke, traumatic brain injury, amyotrophic lateral sclerosis, and multiple sclerosis. AAC provides methods and strategies that can be used to improve the communication of the members of these populations (Beukelman & Mirenda, 2005). This chapter, as well as the research presented in latter sections, will focus on children who use AAC.

The field of AAC surfaced in the 1950s and 1960s with a simultaneous increase in public awareness of cognitive impairments and communication disabilities (Hourcade, Pilotte, West, & Parette, 2004). Legislation enacted in the United States in the 1970s, the Education for All

Handicapped Children Act (P.L. 94-142), allowed all children with disabilities the opportunity to receive a public education. The use of AAC expanded in the 1980s when individual states became responsible for providing assistive technology to all people with disabilities. P.L 94-142 was reauthorized as the Individuals with Disabilities Education Act (IDEA) in 1991, and amendments made in 1997 required that AAC be considered for each individual child within his or her Individualized Education Program. In recent years, an aim of inclusion for children with communication disabilities has caused an increase in AAC service delivery and service delivery in the general education setting (Hourcade et al., 2004).

Published prevalence estimates of AAC users vary greatly due to the heterogeneity of populations surveyed (Beukelman & Mirenda, 2005). However, Simpson, Beukelman, & Bird (1998) asked speech-language pathologists in Nebraska schools to report caseload information, and found that 44% of speech-language pathologists in Nebraska had at least one student who used AAC on his or her caseload. Similarly, in 2006, the American Speech-Language-Hearing Association solicited information from speech-language pathologists in school settings. A total of 50% of speech-language pathologists who were surveyed reported that they served students who were nonverbal and/or students who required AAC (ASHA, 2006). The presence of students in the schools who require or would benefit from AAC has necessitated the development of AAC assessment and intervention principles and practices.

**AAC Assessment and Intervention.** Assessment procedures have varied and developed through the history of AAC. Several decades ago, it was necessary for individuals to establish candidacy as an AAC user, and later, to demonstrate the need for the use of an AAC system (Hourcade et al., 2004). A contemporary model, employed largely throughout the last two decades, aligns most closely with the Participation Model (Beukelman & Mirenda, 2005;

Hourcade et al., 2004). Using the Participation Model, the child's communication access barriers and opportunities barriers are assessed in order to plan intervention for the present and future (Beukelman & Mirenda, 2005). It is important to consider the child's future needs for communication, as they are likely to change with the child's progress and as a function of the child's disability (Beukelman & Mirenda, 2005).

Speech-language pathologists are responsible for the assessment of individuals who are unable to use speech as an effective means of communication (ASHA, 2002). Assessment includes evaluation of the child's participation patterns and barriers, as well as analysis of the methods, techniques, and strategies which best meet an individual's communication needs (ASHA, 2002; Beukelman & Mirenda, 2005). The speech-language pathologist is responsible for recommending an AAC system that meets the child's needs (AAC-RERC, 2011).

The provision of AAC intervention services is also within speech-language pathologists' scope of practice according to ASHA (ASHA, 2005). The speech-language pathologist is responsible for coordinating AAC services. The coordination includes facilitating the child's and his or her family's use of AAC to foster enhanced quality of life for the child (ASHA, 2005). Following assessment, the speech-language pathologist, along with the family and professional team, develops and implements an individualized intervention plan. The plan is known as an Individualized Family Service Plan for children aged 0 to 3, and an Individualized Education Program for children older than 3 years of age (ASHA, 2002). Although each intervention plan or program is unique based on each child's needs, the ultimate goal of AAC intervention is to facilitate effective and successful communication between the child and his or her communication partner(s) and access to the educational curriculum (ASHA, 2002).

In the last two decades, intervention has abandoned the need for prerequisite skills for the use of an AAC system (Beukelman & Mirenda, 2005). Instead, AAC intervention focuses on the child's current needs while also anticipating the child's future communication needs (Beukelman & Mirenda, 2005). Current literature suggests the use of naturalistic teaching opportunities based on the child's interests and strengths (Woods, Wilcox, Friedman, & Murch, 2011). In this framework, the speech-language pathologist, along with a team of family members and professionals that can include general educators, special educators, physical therapists, and occupational therapists, is responsible for facilitating the child's communication by modifying and adapting to the child's environment (Beukelman & Mirenda, 2005). As the professional with the expertise in language facilitation and communication, the speech-language pathologist is called to collaborate with the family and team members to facilitate functional communication and embed learning opportunities in the child's daily routines (Beukelman & Mirenda, 2005).

Because the area of AAC is fairly new and still developing, limited research is available to establish its efficacy. A small number of meta-analyses have been completed to determine the effects of AAC on the speech production of AAC users. The meta-analyses completed to date have concluded that further research is needed to determine the relationship between AAC intervention and speech production of children with developmental disabilities (Millar, Light, & Schlosser, 2006; Schlosser & Wendt, 2008). The research does indicate, however, that AAC use and intervention does not negatively influence speech production (Millar et al., 2006; Schlosser & Wendt, 2008). Positive effects, in terms of communicative competence and language skills, were observed in individuals across a wide range of ages and across intervention approaches (Millar et al., 2006). Investigators have suggested that future research focus on a wider range of participants and AAC interventions (Millar et al., 2006; Schlosser & Wendt, 2008).

Branson & Demchak (2009) reviewed research on the use of AAC with infants and toddlers with disabilities. The majority of infant and toddler participants used unaided AAC methods, while others used aided AAC methods that included pictures and graphic symbols. All of the 12 studies reviewed by Branson and Demchak reported degrees of improvement in the child's communication as a result of AAC intervention; however, the researchers concluded that only the methodology in seven of the 12 reviewed studies provided conclusive evidence. The researchers suggested that several types of AAC, including signs, gestures, non-electronic aided technologies, and electronic technologies, could be used to improve the communication of infants and toddlers (Branson & Demchak, 2009).

Calulator and Black (2009) sought to validate the set of evidence-based practices relevant to AAC services to students with severe disabilities in general education classrooms. The researchers identified 91 evidence-based practices and created an inventory of the practices that had eight categories. The eight categories of evidence-based practices included promoting inclusive values; collaboration between general and special educators; collaboration between educators and related service providers; family involvement; choosing and planning what to teach; scheduling, coordinating, and delivering inclusive services; assessing and reporting student progress; and instructional strategies. The researchers suggested the best practices identified and assigned to the inventory may be helpful for speech-language pathologists and parents as they work together in attempt to align students' needs with the general education curriculum (Calulator & Black, 2009).

**Families and AAC.** In the last two decades, speech-language pathologists have worked to involve the families of children with communication disabilities in the evaluation, intervention and use of AAC systems (Hourcade et al., 2004). Concerns frequently identified by families

regarding the use of AAC devices include system durability and portability, the knowledge and skills needed to operate the system, and the ease of the communication accomplished via use of the AAC device (Beukelman & Mirenda, 2005). It is important to note that families' priorities may vary among ethnic and cultural groups as a function of how culture influences independence, communication, and attitude toward disability (Beukelman & Mirenda, 2005).

Angelo and colleagues (1995, 1996) sought to determine the priorities, needs, and preferences of parents with children who use AAC devices through the use of a survey. Participants completed the Assistive Device Technology Needs Scale, and the information was reported for the parents of young children and the parents of adolescents and young adults (Angelo, Jones, & Kokoska, 1995; Angelo, Kokoska, & Jones, 1996). A total of 91 participants, 56 mothers and 35 fathers, were the parents of young children, aged 3 to 12 years (Angelo et al., 1995). The mothers and fathers both reported the need for increased knowledge of AAC devices and planning for the child's future communication needs. The priorities identified by the mothers included integration of devices in the community, development of community awareness, support for AAC users, and access to computers, trained professionals, and advocacy groups. The fathers' reported priorities included access to volunteers to work with their child, acquisition of funding sources for devices and services, knowledge of how to educate their child, and the integration of devices in the home (Angelo et al., 1995).

In a similar study, 132 parents of adolescents and young adults, 85 mothers and 47 fathers, completed the Assistive Device Technology Needs Scale (Angelo et al., 1996). The mothers and fathers reported the same primary needs as the parents of young children, which were increased knowledge of AAC devices and planning for the child's future communication needs. The mothers' reported priorities included social opportunities for the child with peers who

also use AAC devices as well as peers without disabilities, and the integration of AAC devices in the community. The priorities identified by the fathers included knowledge of how to maintain, repair, and program devices, integration of devices at home and in education environments, and access to computers for the child (Angelo et al., 1996). The researchers recommended that professionals address unique child needs and family issues in both assessment and intervention (Angelo et al., 1995; Angelo et al., 1996)

Angelo (2000) surveyed 114 families whose children acquired an AAC device and found that the majority of parents in her study were generally positive about AAC devices and the opportunities and benefits AAC devices yielded users and their families. More than half of the participants reported no restrictions on their or their spouse's lifestyle due to the implementation of the AAC device. Over half of the parents reported they had become knowledgeable about AAC devices and they believed the devices had adequate features for communication. Nearly half of the families acknowledged an increase in educational and social opportunities for the child. More importantly, "more than half of the parents reported improvements in the child's communication, quality of life, independence, and a more promising future" (Angelo, 2000, p. 42). The majority of parents surveyed indicated satisfaction with their child's device and reported they would recommend it to other families. Angelo (2000) suggested that family involvement is critical in achieving positive outcomes throughout the AAC process. She noted that further research of the impact of AAC on families is needed to help professionals address the positive and negative outcomes associated with AAC use (Angelo, 2000).

Family involvement is typically viewed as a critical component in making the AAC process a successful one for the child. Parette and colleagues (2000) used focus groups and structured interviews to obtain information from 58 family members of children who used AAC,

children who didn't use AAC, and children from multicultural backgrounds. The families reported unique priorities for the child, and that individual family members may have differing priorities, hopes, and goals for the child and his or her AAC intervention. The families reported a preference for the professional's role to include training and education components. The main needs included family-professional relationships, training, and the sharing of information and education regarding AAC devices and their implementation (Parette et al., 2000). Family members reported that they wanted information specific to their child and how to implement the AAC system within their family. Parette and colleagues (2000) suggested that professionals, including speech-language pathologists, should aim to identify individual family strengths including preferences, priorities, and communication styles to best meet the family's AAC needs.

Starble and colleagues (2005) implemented family-centered intervention with one child with a communication disability and his family. The primary investigator conducted informal observations of the child and required the family to complete AAC-related worksheets and questionnaires. Through collaboration, the investigator and the family determined the child's communication needs. Finally, the investigator implemented support, hands-on practice, and training with the family. Starble and colleagues (2005) assessed the family's satisfaction of the family-centered intervention through completion of a questionnaire. The family reported high degrees of satisfaction for the majority of training dimension, including expertise and sensitivity of the trainer, and the relevance, appropriateness, and effectiveness of the training. Although the family did not feel the training answered all questions about the child's communication or helped family members feel comfortable communicating with the AAC device, the family reported that they would recommend the AAC training to other families (Starble et al., 2005).

Bailey and colleagues (2006) conducted interviews with six family members of seven male children in middle school and high school who used AAC devices to communicate in the school setting. Family members reported that expectations of the student's use of AAC focused on increasing communicative competence and independence, as well as increased opportunities to communicate and with a larger number communication partners. The ease of AAC device use and effective teaming with professionals were the main facilitators noted by parents to improve the child's experience with AAC. The family members identified several barriers to effective AAC device use including limitations of the AAC device itself, inadequate caregiver training, and ineffective teaming and communication. The families reported that the use of AAC systems increased the child's independence and communicative competence (Bailey et al., 2006). Bailey and colleagues (2006) supported previous research that suggested that family involvement is important in achieving positive outcomes throughout the AAC process.

### **Changing Technology**

As more information has been gathered from families regarding children's use of AAC systems, the technology platforms for AAC systems have evolved immensely. AAC aids, or devices, can be classified into two groups, low technology or high technology (Beukelman & Mirenda, 2005). Low technology systems include communication that is aided by a tool that does not require a computer or other high technology equipment. Examples of low technology systems are communication books and alphabet boards. Communication books are typically in the form of a binder or folder with pictures of people, places, and actions, and the user points to or select picture(s) to communicate. Alphabet displays include the letters of the alphabet, and the user can point to or look at letters to spell words to communicate. High technology systems use processors and computer technology. Examples are text-to speech keyboards, which convert

typed text to speech output, and speech-generating devices, which contain pre-stored word, phrase, or sentence messages users can select to communicate (Beukelman & Mirenda, 2005).

Since the emergence of AAC, individuals with communication impairments have used both low and high technology devices. With the invention and advancement of microprocessor technology, the popularity and use of high-tech AAC devices increased among AAC users (AAC-RERC, 2011). These devices became mass-produced by a small industry of developers and creators. As the use of personal computers became widespread, developers used this technology as a platform for a more accessible form of high-tech AAC technology. Personal computers allowed for the creation of more portable speech generating devices, and medical insurance companies, including Medicare and Medicaid, began an initiative to fund AAC devices recommended and implemented under the direction of a speech-language pathologist (AAC-RERC, 2011).

The recent emergence of mobile media technology appears to have changed the speech-language pathologists' service delivery models and families' needs for AAC. Mobile media devices include hardware tablets such as the iPad, iPod, Kindle, or Nook, and smartphones such as the iPhone, Droid, or Blackberry. While individual device features vary, all mobile media devices can be used to access information and communicate (Dunham, 2011). Applications, or software "apps," for mobile media devices are being used in speech-language pathology as platforms for stimulus item presentation, visual schedules, and AAC. The increased popularity of mobile media devices has brought about their function as AAC devices when applications that augment or replace a child's communication system are purchased in addition to the mobile media device (Gosnell, 2011).

It is currently estimated that approximately 20% of all individuals who receive speech and language services use a handheld computer in the form of a mobile media device (Dunham, 2011). This number may be an underestimation because many children, although they do not have mobile media devices of their own, have access to their parents' device(s) (Gosnell, 2011).

The markets for both mobile media devices and communication applications are rapidly growing (AAC-RERC, 2011). The number of commercially available devices and applications are growing at a significantly faster rate than the development of speech-generating devices in the past. Speech-language pathologists, professionals, parents of children with communication disabilities, and consumers are among the many who develop communication applications. At this time, more than 100 AAC applications are available to consumers (Gosnell, 2011).

**Speech-language pathologists, service delivery, and mobile media.** The introduction of mobile media technology has made AAC available to more people and heightened the awareness of AAC to the general public. The emergence of mobile media technology has also shifted the service delivery model from one of clinician-guided access to consumer access (Gosnell, Costello, & Shane, 2011). In the current model, the consumer has direct access to technology and information, rather than access through a speech-language pathologist, application developer, AAC researcher, educator, or other AAC stakeholder (AAC-RERC, 2011). It should be noted that the current model enables family advocacy and independence; however, it is important that speech-language pathologists with an understanding of mobile media AAC discuss communication and facilitation of language learning and use with families considering its use (Dunham, 2011).

A survey completed within ASHA Speech Interest Group 12 and Quality Indicators in Assistive Technology email group suggested that the AAC evaluation process as it was once

completed is being abandoned with mobile media technology (McBride, 2011). Selecting a mobile media AAC system without an assessment increases the possibility of making decisions without experience and clinical judgment and knowledge (Gosnell, 2011). Regardless of the evaluation process or lack thereof, it is imperative that AAC system selection is based on device feature matching and the child's communication needs (Gosnell, 2011; McBride, 2011). In addition, critical components of the evaluation process are the training, funding assistance, and follow-up provided by speech-language pathologists (AAC-RERC, 2011).

According to ASHA, it is a responsibility of speech-language pathologists to “advocate with and for individuals who can or already benefit from AAC, their families, and significant others to address communication needs” (ASHA, 2005, p. 1). Based on a survey of school-based speech-language pathologists by Fernandes (2011), 40% of the speech-language pathologists who reported using iDevices in the schools were using the devices for AAC purposes. A total of 49.3% of the 302 participants reported that the school district that employed them had discussed using iDevices as a therapy tool; however, only 19% of the speech-language pathologists surveyed had received training on the use of iDevices and applications (Fernandes, 2011).

In early intervention services and the public school system, there is a need for speech-language pathologists with AAC expertise who are willing to collaborate and advocate for adequate time and high-quality services for AAC users (Fallon, 2008). This is especially necessary for speech-language pathologists supporting families and children using mobile media technology as these children need to access the academic curriculum and are facing increased challenges associated with new AAC technology. The shift in service delivery model from one of clinician access to consumer access has increased the families' independence throughout the

decision making process, which in turn has raised many questions and concerns from regarding the advantages and disadvantages of mobile media AAC technology (AAC-RERC, 2011).

**Family needs.** There are a number of advantages and disadvantages of the mobile media technology platform for AAC users and their families to consider. A commonly cited advantage of mobile media devices and AAC applications is that the platform is more affordable when compared to other devices available from established AAC companies. The mobile devices and applications in combination can be used for multiple functions such as access to information, entertainment, and social opportunities (AAC-RERC, 2011). In addition, because mobile media devices are popular with the general population, this platform provides a “cool” factor for AAC users. Children who use mobile media technology do not look different from their peers, and may be more likely to be accepted or included (Sennott, 2009).

While mobile media technology has its advantages, some of the disadvantages include loss of technical support for the consumer, lack of quality control of applications, and less customization than other devices (AAC-RERC, 2011). Most mobile media devices have a touch screen, which may be challenging for children with difficulties with motor access, including children with cerebral palsy. Finally, limited research is available to evaluate the effectiveness of mobile media technology as a form of AAC.

Because the development of mobile media devices and communication applications is relatively new and quickly expanding, there is little education and technical support available for the consumers or families. The family may need training and information on how to support the child’s language and communication development (AAC-RERC, 2011).

Dunst and Trivette (2011) found a combination of practices to be the most effective in training parents to use and promote assistive technology. Although active family involvement

and the child's use of technology during training are common themes, each family and child has different needs that should be addressed by a speech-language pathologist (Dunst & Trivette, 2011). Bailey and colleagues (2006) found that families reported that AAC teams of professionals were vital in their child's AAC assessment and intervention. It is important that speech-language pathologists support family-centered decision-making and collaboration with families, as these processes facilitate family and children's success with AAC (Bailey et al., 2006).

The relatively recent increase in the use of mobile media devices and communication applications coupled with rapid technology development has introduced a new area of need to the field of speech-language pathology. To date, little empirical research is available to evaluate the effectiveness of mobile media devices and applications as an AAC system; nor is there a wealth of information from the families' perspective regarding the decision-making process from consideration to evaluation to implementation. Mobile media technology is a promising platform for AAC that has been embraced by families. Additional information about family needs and preferences is needed.

### **Purpose**

The purpose of the study is to assess the wants, needs, and preferences of families who are at various stages in the decision-making process relative to mobile technologies. The information attained will assist speech-language pathologists in their support of families considering or using mobile media technology as a form of AAC for their children.

## **Chapter II**

### **Method**

This research sought to explore the wants, needs, and preferences of families relative to their children's use or future use of mobile devices and applications for AAC purposes. Speech-language pathologists who support children and their families will use the information obtained to better serve children using this technology to improve communicative competence.

#### **Participants**

The participants in the study were 64 parents or caregivers of children with communication-related disabilities. The participants belonged to one of three groups at the time of survey completion: (a) the participant was considering the purchase of an iDevice and communication application(s) for his or her child, (b) the participant or participant's family had an iDevice but was considering the purchase of a communication application(s) for his or her child, or (c) the participant's child was using a mobile media device and communication application(s) to communicate.

Demographic information obtained through the survey included the participants' age, region of residence, comfort level with technology, as well as his or her child's age, diagnosis, and spoken vocabulary. Of the 64 participants in the study, one participant was between the ages of 18 and 24 years old, 12 participants were between 25 and 34 years old, 26 were between 35 and 44 years old, 12 participants were between 45 and 54 years old, and ten participants were older than 54 years old at the time of data collection. Three participants did not provide information regarding age.

The participants reported region of residence in the United States. In addition, two participants reported residence in Canada, and one reported residence in the United Kingdom.

Three participants did not provide information regarding location of residence. Table 1 presents the participants' reported regions of residence in the United States.

Table 1

*Participants' Region of Residence in the United States*

Region	States in the Region	Number of Participants
Midwest	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin	28
Northeast	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont	8
South	Alabama, Arkansas, Delaware, Washington D.C., Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia	18
West	Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming	4

## Survey

After developing a pilot version of the research survey hosted on the Survey Monkey website (<http://www.surveymonkey.com>), the researcher shared it with a family for feedback. The investigator received the completed pilot survey and feedback from the family, and revised the online layout of the survey; however, the instrument questions were not revised.

The research survey entitled “iDevices, AAC, and Families: A Survey of Needs” was used for the investigation (see Appendix A). The survey was an 18 page online questionnaire that was designed to obtain information about families' wants in regards to support for their child using an iDevice and communication application(s) as an AAC device to communicate. The survey included four sections. The first section solicited demographic information about the

participants and their child with a communication-related disability, as well as information about the family's possession of an iDevice and/or communication application(s). The next section was designed to obtain information regarding assessment and funding for the iDevice and communication application(s). The third section solicited information about the information that guided and the factors that influenced the families' purchase or possession of an iDevice and communication application(s). Examples of the information which guided the decision making process included consumer reviews, professional opinions, information about professional support, information about other commercially available devices or applications, or information about AAC in general. Examples of the factors that influenced the families' decision making included affordability, durability, portability, functionality, and technical support, among many others. The fourth, and final section, requested information about the types and amount of support the participants would like to receive for their child with a communication-related disability and for himself or herself, as the parent or caregiver. The survey used a variety of question types to obtain information including yes or no questions, multiple choice questions, free response questions, and rating scales.

### **Procedure**

The researcher contacted national and local organizations dedicated to supporting individuals who have communication disabilities through email to assist with survey distribution. The following organizations aided in soliciting participants for the research study: Autism Society of America, Down Syndrome Guild, Families Together, Inc., United Cerebral Palsy, and Organization for Autism Research. In addition, the researcher posted the survey to the Facebook pages of multiple state and city chapters of the national organizations.

The researcher solicited participants by having a link and short description of the research study survey posted on the participating organizations' websites, Facebook pages, electronic newsletters, and organization emails.

The link directed subjects to the research survey, which was hosted on the SurveyMonkey website (<http://www.surveymonkey.com>). Participants were first directed to the information statement for the study, which explained the purpose and procedures of the study. The Information Statement informed participants that continuing and completing the survey provided the subject's consent for participation in the research. The participants were not asked to provide their names, the names of their children, or other personal information. Therefore, participants' identity remained confidential throughout their participation in the study. The researcher had no direct contact with the families involved in the study.

## **Chapter III**

### **Results**

This study assessed the wants, needs, and preferences of families who were at various stages in the decision-making process relative to mobile technology AAC devices. Participation in the study involved completion of an online survey. Data representing participants' survey responses will be presented. Although 64 participants were involved in the study, 28 participants responded to all 36 questions; therefore, the survey completion rate for the entire survey was 43.8%. Participants had the option to skip a question without answering it and continue on to the remaining survey questions. The number of participants who answered each question ranged from 33 to 61. The mean number of responses on the survey was 46.9. Participation generally decreased as participants progressed through the survey, and in particular on free response questions, which were questions that required the participant to type a response. When a percentage is reported, it should be assumed that this percentage has been calculated using the number of participants who responded to that question in particular, rather than the number of participants who responded to the survey in its entirety.

The survey included four sections to solicit information from participants. The sections solicited demographic information, information regarding assessment and funding for the device and application(s), the information that guided and the factors that influenced the families' purchase or possession of an iDevice and communication application(s), and information about the types and amount of support the participants would like to receive for their child with a communication-related disability and for himself or herself, as the parent or caregiver.

#### **Demographic Information**

60 participants provided information regarding personal level of comfort in using technology. Table 2 presents the participants' reported level of comfort with technology.

Table 2

*Participants' Comfort Level with Technology*

Response to the Statement "I am comfortable using technology."	Number of Participants	Percentage of Participants Who Responded to this Question
Strongly Disagree	3	5.0
Disagree	1	1.7
Neither Disagree nor Agree	1	1.7
Agree	24	40.0
Strongly Agree	31	51.7

The participants reported the age of their child with a communication-related disability. It should be noted that two participants reported having multiple children with a communication-related disability. Table 3 presents the age of the child with a communication-related disability.

Table 3

*Age of Child with a Communication-Related Disability*

Child's Age	Number of Children
Between 0 and 5 years	24
Between 6 and 10 years	16
Between 11 and 15 years	8
Between 16 and 20 years	3
Older than 20 years	5

Twenty of the children were diagnosed with autism, five children were diagnosed with cerebral palsy, twenty-one were diagnosed with Down syndrome, and five were diagnosed with other communication-related disabilities, including Angelman syndrome, Attention Deficit

Hyperactivity Disorder, Childhood Apraxia of Speech, “Global Speech Delay, Unknown Genetic Syndrome,” and Prader-Willi syndrome. Five of the participants’ children were diagnosed with the communication-related disability prenatally, fifteen of the children were diagnosed at birth, thirteen of the children were diagnosed between the ages of 0 and 2 years old, fourteen children were diagnosed between the ages 3 and 5 years old, three of the children were diagnosed between the ages of 6 and 10 years old, and one child was diagnosed when he or she was older than 10 years old.

The current status of the child’s spoken vocabulary was solicited. Table 4 presents the number of spoken words used by the children of the participants.

Table 4

*The Children’s Spoken Vocabulary*

Number of Spoken Words in the Child’s Vocabulary	Number of Children
0 to 10 words	14
11 to 30 words	6
31 to 50 words	4
More than 50 words	26

Sixteen parents and caregivers reported that their child had previously or was currently using a different AAC device for communication at the time of data collection. Of the children who had or were using a different device, six children used a device for less than 6 months, one child used a device for 7 months to 1 year, two children used a device for 1 to 2 years, six children used a device for 2 to 5 years, and two children used a device for more than 5 years.

The participants reported information about their family and personal ownership of iDevices and communication applications. A total of 22 participants reported ownership of an

iDevice with communication application(s). A total of 35 participants reported ownership of an iDevice, but did not own communication application(s). A total of 15 participants were considering the purchase of an iDevice, and twenty participants were considering the purchase of communication application(s) at the time of data collection.

Of the 22 participants who reported ownership of an iDevice with communication application(s), 20 participants reported that their child was using the iDevice and communication application system to communicate. Participants indicated how long their child had been using the iDevice and communication application(s) to communicate. Three children had used the system for between 1 day and 1 month, five children had used the system for 2 to 3 months, five children had used the system for 4 to 6 months, three children had used the system for 7 months to 1 year, and six children had used the system for more than 1 year. Twenty-five participants indicated that other family members such as parents and siblings had access to and used the iDevice and/or communication application(s).

### **Assessment and Funding**

Information was solicited regarding AAC or iDevice assessment and funding for the device and communication application(s). A total of 64.6% of the participants reported that the child had not received an assessment. Conversely, 35.4% reported that the child received an assessment. The 17 participants who reported their children received an assessment also reported information about the agency that provided the assessment. A total of 12 participants reported that their child received an assessment through the child's school district, 3 reported through a speech-language pathologist in a clinic, hospital outpatient, or private practice, and 2 reported through a different agency not listed.

The participants reported the funding source for the iDevices and communication application(s). Table 5 presents this data.

Table 5

*Funding Sources for iDevices and Communication Application(s)*

Funding Source	Number of Participants	Percentage of Participants
Out of pocket	30	73.2
School district	6	14.6
Family's insurance	3	7.3
Other	2	4.9

**Information and Factors that Influenced Family Decision Making**

**iDevices.** Participants were asked to report the information that guided them and the factors that influenced their family's purchase or possession of an iDevice and communication application(s). Participants first reported any information that guided or the families would like to guide the purchase of only the iDevice. For this question, participants had the option to select multiple answers from those provided. Then, the participants reported only the single most helpful information by selecting one answer choice from those provided. Tables 6 and 7 present the data regarding information used to purchase iDevices.

Table 6

*Information that Guided Families' Decision to Purchase an iDevice*

Information Type	Number of Participants
Information about how the child can use the device (motor access)	31
Professionals' opinions about the device	24
Comparison information about devices	22
Information about professional support for the child using the device	22
Consumer reviews of the device	19
General information about AAC	19
Information about other commercially available devices or tablets	12
Other	9

Table 7

*Most Helpful Information in iDevice Purchase*

Information Type	Number of Participants	Percentage of Participants
Professionals' opinions about the device	16	34.0
Information about how the child can use the device (motor access)	12	25.5
Other	6	12.8
Consumer reviews of the device	5	10.6
Comparison information about devices	4	8.5
General information about AAC	3	6.4
Information about professional support for the child using the device	1	2.1
Information about other commercially available devices or tablets	0	0.0

The survey solicited information regarding the iDevice characteristics including affordability, ease of use, and several others. Participants were asked to rank their top three mobile media platform characteristics to determine the single most influential characteristic in the purchase of an iDevice. Table 8 presents the frequency with which a characteristic was reported as the most influential characteristic.

Table 8

*Most Influential iDevice Characteristic in iDevice Purchase*

iDevice Characteristic	Number of Participants	Percentage of Participants
Ease of use	15	33.3
Affordability	13	28.9
Multiple functions	7	15.6
Durability	4	8.9
Positive reviews	3	6.7
Professional support	2	4.4
Screen size	1	2.2
Portability	0	0.0
Technical support	0	0.0

**Communication application(s).** The participants reported information exclusive to communication application(s). Data obtained included the information that guided them and the factors that influenced their family's purchase or possession of communication application(s). Participants first reported any information that guided or the families would like to guide the purchase of only applications. For this question, participants had the option to select multiple answers from those provided. Then, the participants reported only the single most helpful information by selecting one answer choice from those provided. Tables 9 and 10 present the data regarding information used to purchase applications.

Table 9

*Information that Guided Families' Decision to Purchase Communication Application(s)*

Information Type	Number of Participants
Information about how the child can use the application (motor access)	29
Professionals' opinions about the application	24
Information about professional support for the child using the application for communication	19
Consumer reviews of the applications	17
General information about AAC	13
Comparison information about applications	12
Information about other commercially available communication applications	12
Other	5

Table 10

*Most Helpful Information in Communication Application(s) Purchase*

Information Type	Number of Participants	Percentage of Participants
Professionals' opinions about the application	17	38.6
Information about how the child can use the device (motor access)	9	20.5
Other	5	11.4
Consumer reviews of the device	4	9.1
Comparison information about devices	4	9.1
General information about AAC	3	6.8
Information about professional support for the child using the device	2	4.5
Information about other commercially available devices or tablets	0	0.0

The survey solicited information regarding the communication application characteristics, which included some of the device characteristics such as affordability and professional support, but also others specific to the applications such as the ability to edit icons and speech output. Participants were asked to rank their top three characteristics to determine the most influential characteristic in the purchase of communication applications. Table 11 presents the frequency with which a characteristic was reported as the most influential characteristic in the purchase of communication applications.

Table 11

*Most Helpful Application Characteristic in Communication Application(s) Purchase*

iDevice Characteristic	Number of Participants	Percentage of Participants
Ease of use	15	36.6
Affordability	9	22.0
Visually appealing to child	5	12.2
Number of preprogrammed icons, words, or phrases	3	7.3
Professional support	2	4.9
Other	2	4.9
Ability to edit icons	1	2.2
Ability to edit pages	1	2.4
Icon characteristics	1	2.4
Speech output	1	2.4
Technical support	0	0.0

**Desired Types and Amounts of Support**

Information was solicited relative to the types and amounts of support families were receiving and would like for the child and themselves or other family members. Table 12 presents the individuals supporting the children in their use of AAC at the time of survey completion.

Table 12

*Professionals Supporting Children in their Use of AAC*

Professional	Number of Participants
Speech-language pathologist at school	16
No professional	12
Family member or friend with experience in communication	11
Other school professional	8
AAC specialist	5
Occupational therapist	5
Other	5
Speech-language pathologist at clinic, hospital outpatient, or private practice	3
Physical therapist	2
Behavioral specialist	1

The participants reported information regarding the professional support they would like their children to receive in using the iDevice and communication application(s) as an AAC system. Data was obtained about all the professional support types the families would like to be involved, as well as the singular support type the participant would most like to support the child. Speech-language pathology services were cited with the most frequency, as well as the most desired support. Tables 13 and 14 present the data regarding professional support types desired by families for their children.

Table 13

*Professional Support Types Families Want for their Children*

Professional Support Type	Number of Participants
Speech-language pathology services	34
Special education services	28
Occupational therapy services	19
Physical therapy services	7
Other	3

Table 14

*The Most Wanted Professional Support Type*

Professional Support Type	Number of Participants	Percentage of Participants
Speech-language pathology services	24	61.5
Special education services	9	23.1
Occupational therapy services	2	5.1
Physical therapy services	2	5.1
Other	2	5.1

Participants were asked to provide information regarding the types and amounts of support they would like to receive themselves to support of the child's use of the iDevice and communication application(s) AAC system. A total of 10 participants, or 25% of participants who responded to the question, reported feeling that they had all the knowledge they needed to support the child's use of the iDevice and communication application(s); however, 30 participants, or 75% of participants who responded to the question, did not feel effective in helping the child use the iDevice and/or communication application(s). The participants who did

not feel effective reported the reasons that prevented them from feeling effective in supporting the AAC system. Table 15 presents this data.

Table 15

*Reasons Preventing Participants from Feeling Effective in Supporting the AAC System*

Reason	Number of Participants
I need to learn how to use the communication app(s).	18
I need to learn how to use the iDevice.	8
Other	8
I don't understand how the iDevice and/or communication application(s) can help my child communicate	6

Further data obtained included the kinds of support participants would like to receive help with using the iDevice and communication application(s) and the singular kind of support participants would like to receive most. Help with supporting the child's use of the device for communication purposes was reported by the greatest number of participants, and it was also reported to be the kind of support families desired most. Tables 16 and 17 reported the kinds of support participants' desired.

Table 16

*Kinds of Support Families Want*

Support	Number of Participants
Help with supporting the child's use of the device for communication purposes	30
Help with the application	21
Help with customizing the device	16
Help with navigating the application	10
Help with navigating the device	8
Technical support for the device	8
Technical support for the application	7
Other	3

Table 17

*The Most Wanted Kind of Support*

Support	Number of Participants	Percentage of Participants
Help with supporting the child's use of the device for communication purposes	23	59.0
Help with customizing the device	5	12.8
Technical support for the application	4	10.3
Help with customizing the application	3	7.7
Technical support for the device	2	5.1
Help with navigating the device	1	2.6
Help with navigating the application	1	2.6

Participants were asked to provide information regarding amounts of support they would like to receive to support the child's use of the iDevice and communication application(s) AAC

system. The families reported 1 to 2 one-hour sessions with a professional with the greatest frequency. The data is presented in Table 18.

Table 18

*Amount of Support Desired by Families*

Amount of Support	Number of Participants	Percentage of Participants
1-2 one-hour sessions with a professional familiar with the iDevice and/or communication application(s)	19	50.0
3-4 one-hour sessions with a professional familiar with the iDevice and/or communication application(s)	10	26.3
Other	5	13.2
An all day in-service with a professional familiar with the iDevice and/or communication application(s)	2	5.3
5+ hours with a professional familiar with the iDevice and/or communication application(s)	2	5.3

The participants reported information regarding the professional support they would like to receive themselves to help the child use the iDevice and communication application(s) as an AAC system. Data was obtained about all professionals the families would like to be involved as well as the singular professional whose support the participant would most like. Tables 19 and 20 present the data regarding professional support types desired by families for themselves.

Table 19

*Professional Support Types Families Want for Themselves*

Professional	Number of Participants
Speech-language pathologist at school	22
AAC specialist	15
Speech-language pathologist at clinic, hospital outpatient or private practice	12
Behavioral specialist	10
Occupational therapist	9
Other school professional	6
Family member or friend with experience in communication	5
Other	3
Physical therapist	2

Table 20

*The Most Wanted Professional Support Type*

Professional	Number of Participants	Percentage of Participants
Speech-language pathologist (unspecified setting)	8	24.2
Speech-language pathologist at school	8	24.2
AAC specialist	7	21.2
Family	2	6.1
Behavioral specialist	2	6.1
Other	2	6.1
Speech-language pathologist at clinic, hospital outpatient or private practice	1	3.0
Occupational therapist	1	3.0
Other school professional	1	3.0
Physical therapist	1	3.0

It should be noted that the question used to obtain the data regarding professional support for families represented in Table 20 was a free response question. Participants were asked to type their own responses; therefore, eight participants reported speech pathologist or speech-language pathologist without specifying a work environment. Regardless, the speech-language pathologist was reported by the greatest number of participants, and was also reported to be the professional whose support families desired most.

## **Chapter IV**

### **Discussion**

The purpose of this study was to determine the wants, needs, and preferences of families who are at various stages in the decision-making process relative to mobile technologies. Data were collected through an online survey and were analyzed to assist speech-language pathologists in their support of families considering or using mobile media technology as a form of AAC for their children.

#### **Assessment and Funding**

A majority of the participants in this study, 64.6%, reported that their child had not received an assessment. The families' own out-of-pocket purchases were the participants' most frequently reported funding source for iDevices and communication applications which likely reflects the affordability of mobile media technology when compared to AAC devices marketed by established companies. Therefore, some families were considering the purchase of devices and applications, and some children were already using these devices, without a formal assessment.

Although 12 participants reported that their child received an assessment through the school district, only six participants reported that the school district funded the device and/or communication application(s). This data reflects a greater percentage of school district purchases when compared to a survey by Fernandes (2011). Fernandes (2011) reported that only 17.5% of school-based speech-language pathologists reported that their school district has implemented a process for purchasing applications, and 36.8% of districts had already purchased devices. There are several possible reasons for this discrepancy. The family may have already owned the iDevice and brought it to the early intervention program or school district to include in the

child's IFSP or IEP as a form of assistive technology. The school district may not have wanted to assume liability for the device and offered to support its use if the family purchased it and assumed responsibility for any damages. Finally, the district may have completed an assessment and recommended a different AAC device. In this case, the professionals at school may support the use of one device at school, while the family supports another in the home.

These families' purchase or future purchase of iDevices and communication application(s) reflect the consumer access model rather than the professional-guided model of the past. The accessibility of mobile technology is currently driving service delivery and families are selecting it as an AAC option without considering the child's communication goals until after the purchase. This presents a challenge for speech-language pathologists and other service providers who aim to match AAC technology with the individual's communication goals. School-based speech-language pathologists and other professionals are responsible for considering each child's need for assistive technology and implementing AAC systems(s)' use in education settings. The speech-language pathologist may be required, by the child's IEP or IFSP, to use mobile media AAC technology to support the child's communication, even if the device is not optimal for supporting the child's communication goals. This may occur if the family is adamant about including the iDevice in the child's IEP or IFSP, with or without the encouragement of school professionals.

Of the 17 participants whose children had received an assessment, the majority of participants reported that their child received an assessment through the child's school district. As reported by ASHA (2006), 50% of surveyed school-based speech-language pathologists reported serving students who required AAC. Speech-language pathologists in school settings may have more experience with, or at least more exposure to, AAC when compared to

professionals in other work settings. Therefore, these professionals may be the most likely professional to complete AAC assessments, including assessments that consider iDevices and communication applications. However, there is a need for speech-language pathologists in all settings to become aware of the shift from the clinician-guided assessment model to the consumer access model in mobile media AAC technology. It is important that speech-language pathologists and other service providers gain the knowledge and skills necessary to meet each family's needs in terms of information, knowledge, and support, which is especially critical for families who purchase the mobile media technology themselves.

### **Family Wants, Needs, and Preferences: Support**

When asked to provide information about the professional(s) that family members would want to support them, the families' most frequent response was a speech-language pathologist. The families reported that they wanted the support of speech-language pathologists, and some participants were not specific about the professional's work environment. The families may have reported the desire for the support of a speech-language pathologist because they are the professionals with which the majority of families are familiar. In addition, the survey information statement stated the purpose of this study, which was to help speech-language pathologists support families. The participants may have responded in this way because the researcher is a member of the field of speech-language pathology. Also, speech-language pathologists are likely assumed to be the professional with the most knowledge about AAC and communication. The data demonstrates a need for speech-language pathologists to take an active role in assessment, intervention, and family support related to mobile media AAC technology.

The majority of participants, 76.3%, reported that they would need between one and two or between three and four one-hour sessions with a professional trained in AAC to feel effective

in helping the child use the iDevice and communication application(s) to communicate. The more time consuming options, including five or more hours or an all day in-service with a professional, were not chosen with as great of frequency. It is possible that families with children with communication-related disabilities may not feel they have the time for the more time-consuming training options. Also, families may have questions for a speech-language pathologist or the desire to observe a professional use the AAC device, but not feel as though the training will take more than a few hours to complete. This is helpful information for speech-language pathologists, as many have time-consuming caseloads that do not allow for the scheduling of indirect services, which include family education and training.

The parents and caregivers provided information about the support they would like for themselves. The majority of the participants reported that they needed to learn to use the communication application(s). A total of 15% of participants reported a lack of understanding of how communication application(s) can be used to communicate. Due to the popularity of iDevices and other mobile media technology, it is possible that families feel relatively comfortable with using the devices; however, communication application(s) are likely less familiar to families. The lack of familiarity and public awareness of how to use the application(s) as AAC may leave families feeling unsure how to support their child's communication with an iDevice and communication application(s). This should be a component of the speech language pathologist's role in the support of families.

The families reported the kinds of support they wanted for themselves and the most frequently reported supports were shared for both iDevices and communication application(s). They included help with using the tools for communication, help with customization, and help with navigation. The families desire for help with customizing the iDevice and communication

application(s) for the child supported the findings of Parette and colleagues (2000) which reminded professionals of the importance of identifying individual family and child strengths including preferences, priorities, and communication styles when selecting an AAC device.

### **Family Wants, Needs, and Preferences: Information and Device Characteristics**

If speech-language pathologists are to provide the support that families want, it is important that they understand family wants, needs, and preferences. The family reports obtained in this study accentuate the need for a variety of information types and support both during and after the purchase. The information desired by the most parents for both devices and applications was information on how the child can use the device, and professionals' opinions. Families who participated in the consumer access model also demonstrate the need for an understanding of AAC and its components.

A large number of participants indicated the need for professionals' opinion on the iDevice and communication application(s), as it was reported with the second greatest frequency when families were asked to report the single most important information. The data suggest the families' desire to include a professional in the decision-making process. This introduces a disparity, as families want professionals to be involved in the purchase and evaluation process, but the majority of children are not receiving assessments. This demonstrates the need for an increase in public awareness of speech-language pathologists' role in AAC and mobile media technology. Speech-language pathologists, as stakeholders in the AAC field, need to advocate for children who would benefit from AAC and determine whether or not mobile media AAC technology meets their individual communication needs.

The families reported information about supporting their child's use of the device was influential information in their purchase of AAC tools, which suggests that families are looking

to the future during the decision-making process. This is consistent with the results of two studies by Angelo and colleagues (1995, 1996), in which parents reported the need to plan for the child's future communication needs. It is likely that many families want to know more about how the child will use the device and how the family can support the child before the device and application(s) are purchases, especially if the family is funding the purchase(s).

Although they may not be knowledgeable about or understand AAC, families are looking to professionals for information about how to support their child's language and communication skill development using mobile media AAC technology. The answer choice "information on how my child can use the device" was originally written with motor access in mind, but it is likely that families interpreted this answer choice in terms of communication due to a lack of knowledge about the term motor access. It is important that speech-language pathologists are educated and trained in the skills relative to AAC to become competent in supporting families.

The families reported characteristics of iDevices and communication applications that influenced their decisions. The characteristics of both tools that were reported by the greatest number of participants to be the most influential were the ease of use and affordability. The greatest number of participants reported ease of use to be the single most influential characteristic of iDevices and communication application(s). This may reflect the families' desire for the device and application(s) to be easy to use if the family and child do not receive professional support, especially if the family is invested in personally supporting use of the device at home.

The iDevice characteristic reported with the third greatest frequency was multiple functions, which includes access to information, social opportunities, and entertainment. This finding is supported by the AAC-RERC (2011), who suggested that an advantage of mobile

devices and applications in combination is that they can be used for more functions when compared to other speech-generating devices (AAC-RERC, 2011). An iDevice with communication application(s) and other application(s) can offer more flexibility and ongoing, direct access to information than other dedicated speech-generating devices that contain only AAC language software. However, devices with multiple functions are currently less likely to be funded by insurance companies or other agencies that fund AAC systems dedicated to communication purposes.

Therefore, speech-language pathologists' efforts to develop their mobile media AAC technology knowledge and skills base should include an effort to keep up with changing technology and the introduction of new communication devices and applications. Speech-language pathologists should be flexible and willing to learn about mobile media devices and communication applications keeping family priorities like ease of use, affordability, and multiple functions, in mind while also considering individual communication strengths and needs.

### **Clinical Implications**

This study was designed to help speech-language pathologists better support the families of children using mobile media technology and communication application(s) to communicate. Speech-language pathologists and other related service professionals employed in a variety of work environments could use the data obtained in this study to improve the service delivery models for these children and their families by expanding and adjusting their knowledge and skills related to mobile media AAC technology.

Speech-language pathologists who provide iDevice and communication application assessments should have knowledge and experience in AAC in general and with the mobile media technology AAC platform. Speech-language pathologists should also collaborate with

other professionals and administrators in the school districts to implement a process for purchasing devices and applications. A defined process will increase the probability that more families can gain access to this form of AAC when it is deemed appropriate for the child.

Families are looking to and value professionals' opinions in the purchase of iDevices and communication applications. They want help from professionals with understanding device and application characteristics and with planning for their child's future communication needs. Family members want information and support in a time-effective format for themselves and the speech-language pathologist. To help with this process, speech-language pathologists need to keep up to date with the information available on mobile media technology and applications. The speech-language pathologist should keep the family's priorities in mind, which likely include ease of use and affordability, while also focusing on device feature matching to fit the child's communication needs.

The speech-language pathologist should embrace and recognize his or her role in the consumer access model because many families are purchasing iDevices and communication applications, and some children are using the devices, without a formal assessment. Because these families want and need a variety of information and support at a number of points in the decision-making process, speech-language pathologists should acquire the knowledge and experience necessary to train and educate family members and other professionals to use, customize, and navigate AAC mobile media technology. Speech-language pathologists should embrace the consumer driven model, and adapt assessment, intervention, and support practices to meet individual family needs.

### **Limitations**

Limitations of this study include the families' reporting of data for all questions, the participants' understanding of and experience with AAC, and the generalizations of results to other families. A total of 43.8% of participants who completed the survey answered all of the questions. The families' participation generally decreased as they progressed through the survey. Fewer participants completed the final three sections of the survey that solicited information about families' wants, needs, and preferences, when compared to the number of participants who completed the demographic information section. Although the survey was designed to solicit information from parents and caregivers at various stages in the decision making process, it is possible that families who did not report ownership of a device or application felt the latter sections of the survey did not apply to them.

The families' responses to survey questions, especially those to free response questions, suggested that some of the families may not have had a clear understanding of AAC in general, and how iDevices with communication application(s) can be used as a form of AAC. This was likely due to a lack of information defining and explaining AAC as a part of the survey as well as a general lack of public awareness about AAC. The participants' lack of knowledge and experience of AAC may have affected ability to provide accurate information about AAC.

More than 90% of participants agreed or strongly agreed to the statement "I am comfortable using technology." Therefore, the results of this study may not generalize to families who do not feel comfortable using technology, which includes iDevices and communication applications. It is possible that families who are not comfortable using technology have different wants, needs, and preferences in the decision-making process, when compared to families, like those in this study, who are more comfortable with technology.

Because participation was solicited from organizations that support individuals with autism, Down syndrome, and cerebral palsy, it was anticipated that family members of children with these diagnoses would participate in the study. Five participants reported that their child was diagnosed with cerebral palsy. Because the majority of the participants reported their child was diagnosed with autism and Down syndrome, the survey results may not generalize to families of children with different diagnoses. In addition, the families with children age 11 and older comprised only 28.6% of the sample, suggesting that this age group was minimally represented when compared to families with children aged 0 to 5 and 6 to 10.

### **Future Research**

This research should be expanded to a larger sample of participants at various points in the decision-making process to better generalize to other families. Future research should focus on determining families' preferences of speech-language pathologists' involvement at specific points in the decision-making process and implementation. Future research might also focus on the speech-language pathologist's role in the assessment and funding of mobile media technology in both consumer access and clinician-guided access models from a family perspective. It would likely be helpful to obtain data on speech-language pathologists' knowledge of and experience with mobile media technology over time.

Future research should focus on learning more about the device and application features and characteristics that are important in both families' use and abandonment of mobile media AAC technology. It would be helpful to obtain information about the features and characteristics that predict successful use of the device or application. Finally, further research should focus on specific education and training programs for families supporting children who use mobile media

AAC technology. Additional information about families' desired content, format, and amount of time for education and training would be helpful in this endeavor.

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## Appendix A

### iDevices, AAC, and Families: A Survey of Needs

## iDevices, AAC, and Families: A Survey of Needs

### Information Statement

The following information statement is approved by the Human Subjects Committee University of Kansas, Lawrence Campus (HSCL). Approval expires one year from 10/5/2011. HSCL #19622

The Department of Speech-Language-Hearing: Sciences and Disorders at the University of Kansas supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You should be aware that even if you agree to participate, you are free to withdraw at any time without penalty.

We are conducting this study to better understand the types and amount of support families want for their child using an iDevice(s) (e.g., iPad, iPod, iPhone) and communication application(s) to communicate. This will entail your completion of a survey. The survey is expected to take approximately 15 to 30 minutes to complete.

The content of the survey should cause no more discomfort than you would experience in your everyday life. Although participation may not benefit you directly, we believe that the information obtained from this study will help us gain a better understanding of the types and amount of support families want for their child using an iDevice(s) (e.g., iPad, iPod, iPhone) and communication application(s) to communicate. This information will help speech-language pathologists better understand how they can support these families.

Your participation is solicited, although strictly voluntary. Your name will not be associated in any way with the research findings. It is possible, however, with internet communication, that through intent or accident someone other than the intended recipient may see your response. If you would like additional information concerning this study before or after it is completed, please feel free to contact us by phone or mail.

Completion of the survey indicates your willingness to participate in this project and that you are at least age eighteen. If you have any additional questions about your rights as a research participant, you may call (785) 864-7429, write the Human Subjects Committee Lawrence Campus (HSCL), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, or email [irb@ku.edu](mailto:irb@ku.edu).

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**iDevices, AAC, and Families: A Survey of Needs****Demographic Information****1. To which age group do you belong?**

- 18-24  
 25-34  
 35-44  
 45-54  
 55+

**2. Please rate how strongly you agree or disagree with the following statement: I am comfortable using technology.**

	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
I am comfortable using technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**3. Where does your family live in the United States?**

- Midwest (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin)  
 Northeast (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont)  
 Pacific (Alaska, Hawaii)  
 South (Alabama, Arkansas, Delaware, Washington D.C., Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia)  
 West (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming)  
 Other (please specify)

**iDevices, AAC, and Families: A Survey of Needs****Demographic Information, continued**

**4. What is the age, in years, of your child with a communication disability?**

**5. What is your child's diagnosis?**

- Autism
- Cerebral Palsy
- Down Syndrome
- Other (please specify)

**iDevices, AAC, and Families: A Survey of Needs****Demographic Information, continued**

**6. What age was your child when his or her diagnosis was made?**

**7. How many words are in your child's spoken vocabulary?**

- 0-10 words
- 11-30 words
- 31-50 words
- 50+ words

**iDevices, AAC, and Families: A Survey of Needs****iDevices (iPads, iPods, iPhones)**

**8. Does your family have an iDevice (iPad, iPod, iPhone)?**

Yes

No

**9. If your family does not have an iDevice, are you considering purchasing one? (If your family has an iDevice, please select N/A)**

Yes

No

N/A

**iDevices, AAC, and Families: A Survey of Needs****Communication Applications (ProLoQuo2Go, TouchChat, etc.)**

**10. If your family has an iDevice, does your family have communication application(s) for the iDevice? (If your family does not have an iDevice, please select N/A)**

Yes

No

N/A

**11. If your family does not have a communication app(s), are you considering purchasing one or multiple apps? (If your family has a communication app(s), please select N/A)**

Yes

No

N/A

**iDevices, AAC, and Families: A Survey of Needs****Communication Applications (ProLoQuo2Go, TouchChat, etc.), continued**

**12. If your family has an iDevice and communication app(s), does your child use the system for communication? (If your family does not have an iDevice or communication app(s) please select N/A)**

- Yes  
 No  
 N/A

**13. How long has your child been using the iDevice and communication application(s) for communication? (If your family does not have an iDevice or communication app(s) please select N/A)**

- 1 day - 1 month  
 2 months - 3 months  
 4 months - 6 months  
 7 months - 1 year  
 More than 1 year  
 N/A  
 Other (please specify)

**14. Do other family members use the iDevice or communication app(s)?**

- Yes  
 No  
 N/A

Comment

**iDevices, AAC, and Families: A Survey of Needs****Other AAC Devices Used for Communication**

**15. Has your child previously used a different augmentative and alternative (AAC) device for communication?**

- Yes  
 No

**16. If your child has used a different AAC device for communication, what is the name of the device?**

- N/A  
 Name of Other Communication Device

**17. If your child used a different device for communication, how long has/did he or she use that device? (If your child has not previously used a different AAC device for communication, please select N/A)**

- Less than 6 months  
 Between 7 months and 1 year  
 Between 1 year and 2 years  
 Between 2 years and 5 years  
 More than 5 years  
 N/A

**iDevices, AAC, and Families: A Survey of Needs****iDevice Assessment and Funding**

**18. Has your child received an augmentative and alternative communication (AAC) or iDevice assessment?**

- Yes  
 No

**19. If your child received an AAC/iDevice assessment, which agency provided the assessment? (If your child has not received an assessment, please select N/A)**

- The child's school district  
 A speech-language pathologist in clinic, hospital outpatient, or private practice  
 N/A  
 The child received an assessment through another agency (please specify)

**20. How did your family fund the purchase of the iDevice and/or communication app(s) for your child? Please check all that apply.**

- Our family purchased the item(s) out of pocket.  
 Our child's school district purchased the item(s).  
 Our family's insurance paid for some or all of the purchase of the item(s).  
 Other (please specify)

**iDevices, AAC, and Families: A Survey of Needs****Purchasing the iDevice**

**21. What kind of information guided you or would you like to guide you in your decision to purchase an iDevice? Please check all that apply.**

- Comparison information about devices
- Consumer Reviews of the device
- General information about augmentative and alternative communication (AAC)
- Information about how your child can use the device (motor access)
- Information about other commercially available devices or tablets
- Information about professional support for the child using the device
- Professionals' opinions about the device
- Other (please specify)

**22. Of the answer choices in the previous question, which was/would be the most helpful during the decision making process?**

- Comparison information about devices
- Consumer Reviews of the device
- General information about augmentative and alternative communication (AAC)
- Information about how your child can use the device (motor access)
- Information about other commercially available devices or tablets
- Information about professional support for the child using the device
- Professionals' opinions about the device
- Other

**iDevices, AAC, and Families: A Survey of Needs****Purchasing the iDevice, continued****23. -Affordability****-Durability****-Ease of use****-Portability****-Positive reviews****-Multiple functions of device (information, social use, games, entertainment)****-Professional (SLP/OT/PT/Educator/Special Educator) support****-Screen size****-Technical support**

**Please rank the 3 characteristics of those listed above which were/would be the most influential when purchasing an iDevice for your child's communication.**

1st

2nd

3rd

**iDevices, AAC, and Families: A Survey of Needs****Purchasing the Communication App(s)**

**24. What kind of information guided you or would you like to guide you in your decision to purchase a communication app(s)? Please check all that apply.**

- Comparison information about applications
- Consumer reviews of the applications
- General information about augmentative and alternative communication (AAC)
- Information about how your child can use the application (motor access)
- Information about other commercially available communication applications
- Information about professional support for the child using the application for communication
- Professionals' opinions about the application
- Other (please specify)

**25. Of the answer choices in the previous question, which was the most helpful during the decision making process?**

- Comparison information about applications
- Consumer reviews of the applications
- General information about augmentative and alternative communication (AAC)
- Information about how your child can use the application (motor access)
- Information about other commercially available communication applications
- Information about professional support for the child using the application for communication
- Professionals' opinions about the application
- Other

**iDevices, AAC, and Families: A Survey of Needs**

**Purchasing the Communication App(s), continued**

- 26. -Affordability**
- Ability to edit icons**
- Ability to edit pages**
- Ability to edit voice**
- Ease of use**
- Icon characteristics (photographs vs. drawings)**
- Number of pre-programmed icons, words, or phrases**
- Professional (SLP/OT/PT/Educator/Special Educator) support**
- Speech output (computerized speech vs. record your own speech)**
- Technical support**
- Visually appealing to child**

**Please rank the 3 characteristics of those listed above which were/would be the most influential when purchasing a communication app(s) for your child's communication.**

1st	<input type="text"/>
2nd	<input type="text"/>
3rd	<input type="text"/>

## iDevices, AAC, and Families: A Survey of Needs

### Support for Your Child

**27. What kinds of support is your child currently receiving? Please check all that apply.**

- Occupational therapy services
- Physical therapy services
- Speech-language pathology services
- Special education services
- Other (please specify)

**28. Who is currently supporting your child's use of the iDevice or other communication device? Please check all that apply.**

- Augmentative and Alternative Communication (AAC) Specialist
- Behavioral Specialist
- Family member or friend with experience in communication
- Physical Therapist
- Occupational Therapist
- Speech-language Pathologist at school
- Speech-language Pathologist at clinic, hospital outpatient, or private practice
- Other school professionals
- No one is currently supporting my child's use of the iDevice and communication app(s)
- Other (please specify)

**29. What kinds of support would you like your child to receive to help with using the iDevice and communication app(s)? Please check all that apply.**

- Occupational therapy services
- Physical therapy services
- Special education services
- Speech-language pathology services
- Other (please specify)

**iDevices, AAC, and Families: A Survey of Needs**

**30. Of the answer choices in the previous question, which would you most like your child to receive to support his or her use of the iDevice and communication app(s)?**

- Occupational therapy services
- Physical therapy services
- Special education services
- Speech-language pathology services
- Other (please specify)

**iDevices, AAC, and Families: A Survey of Needs****Support for You, the Caregiver**

**31. What is preventing you from feeling effective in helping your child use the iDevice and/or communication application(s)? Please check all that apply.**

- I feel I have all the knowledge I need to support my child's use of the iDevice and communication application(s).
- I need to learn how to use the iDevice.
- I need to learn how to use the communication app(s).
- I don't understand how the iDevice and/or communication application(s) can help my child communicate.
- Other (please specify)

**iDevices, AAC, and Families: A Survey of Needs****Support for You, the Caregiver, continued**

**32. What kinds of support would you like to receive to help with using the iDevice and communication app(s)? Please check all that apply.**

- Help with customizing the device
- Help with customizing the application
- Help with navigating the device
- Help with navigating the application
- Technical support for the device
- Technical support for the application
- Help with supporting your child's use of the device for communication purposes
- Other (please specify)

**33. Of the answer choices you selected in the previous question, which is the most important to you?**

- Help with customizing the device
- Help with customizing the application
- Help with navigating the device
- Help with navigating the application
- Technical support for the device
- Technical support for the application
- Help with supporting your child's use of the device for communication purposes

## iDevices, AAC, and Families: A Survey of Needs

### Support for You, the Caregiver, continued

**34. How much support do you feel you need in order to be effective in helping your child use the iDevice and communication app(s) to communicate?**

- 1-2 one-hour sessions with a professional who is familiar with the iDevice and/or communication app(s)
- 3-4 one-hour sessions with a professional who is familiar with the iDevice and/or communication app(s)
- 5+ hours with a professional who is familiar with the iDevice and/or communication application(s)
- An all day in-service with a professional who is familiar with the iDevice and/or communication application(s)
- Other (please specify)

**35. From whom would you like to receive support to learn how to help your child use the iDevice and communication applications to communicate?**

- AAC specialist
- Behavioral Specialist
- Family member or friend with experience in communication
- Physical Therapist
- Occupational Therapist
- Speech-language Pathologist at school
- Speech-language Pathologist at clinic, hospital outpatient, or private practice
- Other school professionals
- Other (please specify)

**36. Of the answer choices you selected in the previous question, please rank the 3 choices you think were/would be the most helpful in learning how to help your child use the iDevice and communication applications to communicate**

1st	<input type="text"/>
2nd	<input type="text"/>
3rd	<input type="text"/>

## iDevices, AAC, and Families: A Survey of Needs

### Thank You!

Thank you for your participation in our research study. Your time and effort is greatly appreciated!

If you have questions or comments for the researchers, please contact us using the information below.

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