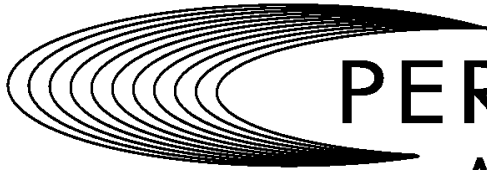


Unless otherwise noted, the publisher, which is the American Speech-Language-Hearing Association (ASHA), holds the copyright on all materials published in Perspectives on Augmentative and Alternative Communication, both as a compilation and as individual articles. Please see Rights and Permissions for terms and conditions of use of Perspectives content:

<http://journals.asha.org/perspectives/terms.dtl>

Vol. 20, No. 1, pp. 1-37
April 2011



PERSPECTIVES_{on} Augmentative and Alternative Communication



SPECIAL INTEREST GROUP 12

In This Issue. . .

From the Coordinator by Amy Goldman.....	2
An Introduction to the Special Issue on New Mobile AAC Technologies by Samuel Sennott.....	3-6
There Isn't Always an App for That! by Jessica Gosnell, John Costello, and Howard Shane	7-8
AAC Evaluations and New Mobile Technologies: Asking and Answering the Right Questions by Debby McBride	9-16
Game Changer by Lateef McLeod.....	17-18
A Revolution at Their Fingertips by Robert Rummel-Hudson.....	19-23
The iPad: A Cool Communicator on the Go by Glenda Watson Hyatt	24-27
Mobile Technology and AAC Apps From an AAC Developer's Perspective by Dave Hershberger.....	28-33
The Evolution of Augmentative Communication and the Importance of Alternate Access by David Chapple.....	34-37

Coordinator's Column

Amy Goldman

This issue of *Perspectives* addresses the “growing” possibilities for individuals with complex communication needs offered through generic mobile computing solutions. Communication apps are “springing up” all over, presenting both opportunities and challenges for the AAC community of users and professionals. Interest in and concerns about these new options were “pollinated” by several stimulating presentations at the recent DAAC 2011 conference.

We are delighted to introduce Sam Sennott as guest editor for this issue. As you may know, Sam was a co-developer of Proloquo2go and helped introduce many of us to the wonders of iOS devices and applications. Sam is committed to helping SLPs and the people they serve make appropriate, evidence-based decisions in selecting and using these newest additions to our AAC toolkit. This issue will provide you with user (McLeod; Chapple; Hyatt), family (Rummel), developers (Hershberger), and clinicians (Gosnell et al.; McBride) perspectives on the options that are “blooming” before our eyes!

Please note we are now ASHA's Special Interest Group on AAC, reflecting an organization-wide shift to remind us we are a part of, not divided from, our national body.

Enjoy the bouquet of articles on the following pages!

An Introduction to the Special Issue on New Mobile AAC Technologies

Samuel Sennott

The Pennsylvania State University
State College, PA

I will always remember the feeling I had when I first started pitching my idea to build an augmentative and alternative communication application for the iPhone and iPod touch (the iPad did not yet exist). The scene was a national conference, and I met with a few “big” companies and a few independent software developers who all said “no” or that it can’t be done (including some that I would later collaborate with). One conversation in particular always will stick with me. In a meeting focused on pitching my idea to one of those larger companies, I was asked, “But what’s so special about the iPhone; why is it any different than the PDA-based communication devices out there now?” Being a bit sheepish about the question, because it was one of my first big meetings in the field, I hesitantly answered something about how it was Apple and was cooler. Little did I know that less than a year later I would be able to come back to one of those developers with a proposition to collaborate and less than a year after that the vision would become a reality.

David Niemeijer of Assistiveware and I built what would become Proloquo2Go, and it was officially released in April 2009 (Sennott & Bowker, 2009). It came about because a small group of people believed in it and because David and I were able to come together with complementary skills at the right place and the right time.

The first major story about Proloquo2Go (and about the iPhone and autism for that matter) was in *USA Today*. It was about a young boy with autism who was able for the first time to tell his mom that he loved Chinese food. My fiancé would later remind me about how clearly that showed how simple random things you would be hard pressed to know about someone are revealed when there is a communication system that works.

Things really took off quickly, with feature stories about users of Proloquo2Go by ABC News, and IEEE. Then, the dam broke. A full color photo of a mom with ALS and her young son with Down syndrome, both Proloquo2Go users, appeared on the front page of *The New York Times*, just below President Obama and former President Bill Clinton. The world was talking about augmentative and alternative communication (AAC). There was public outrage that the Centers for Medicare and Medicaid Services (CMS) would purchase devices and equipment at the near \$7,000 funding level (each), but not provide these two individuals with iPod touches for a few hundred dollars.

It started to feel a bit like a revolution was happening. We were getting streams of e-mails from people who would say that, for the first time, their sons or daughters were communicating. At the peak, Proloquo2Go hit number 4 in the top grossing section of the Apple iTunes Store. Literally thousands of people were getting access to communication tools.

Sometimes I would be moved to tears hearing these stories or seeing the analytics on the numbers of people served. At one point, my father shared with me a quote by Buckminster Fuller that read, “You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete” (Fuller, n. d.). AAC

software was not created with the Apple iPhone, iPod touch, and iPad. In fact, there is a rich tradition of high quality AAC software. Instead, iOS devices and the iOS platform have made AAC software personal and spiking towards ubiquitous.

At this moment in time, we can see that technology is changing our lives and that change is exponential (Kurzweil, 1999; Moore, 1998). This has created a dramatic shift in the field of AAC. Many think that shift is about technology tools, such as the new iPad or new mobile devices running Google's Android operating system. While these tools play a role in the change, they are largely similar to the tools before them. The user interfaces of these AAC tools largely are iterations of the previous software, and the hardware features may have added some unique features in multitouch capabilities, but for the most part, they are relatively similar to what has been offered previously.

What has changed dramatically is the pricing, availability, and exposure of these AAC tools. The price of new consumer-based mobile AAC technologies is much lower than traditional speech generating devices (SGDs). Currently, CMS funds traditional SGDs at roughly \$7,000 and the funding process can take, in worst-case scenarios, months and even years. The most popular of the new mobile technologies for AAC, the iPad, can be purchased for \$499, outfitted with a case and speakers for an additional \$150, and an AAC app can be purchased for under \$200. These can be ordered online or purchased at local retailers like Walmart, Best Buy, and Apple Retail Stores, of which there are thousands in the United States alone.

At the moment, there are potentially over a million people who could benefit from AAC who are not having their needs met. If we use Beukelman and Mirenda's (2005) numbers, citing 1.3% of the population who could benefit from AAC, and the recent U.S. Census Bureau (2010) population numbers citing over 308 million Americans, we are left with a staggering estimate of over 4 million potential AAC users. If we use the AACfundinghelp.com's (2011) estimate that each year 12,000 SGDs are funded, we can conservatively increase the estimate to 25,000 devices funded annually. If we extrapolate that number over 5 years, 125,000 out of nearly 4 million, or 1 in 32 people, are having their needs met. Even if we cut the total by 75%, we can estimate serving only 1 in 8.

The good news is more people have heard about AAC through these new mobile technologies, and the exposure is reaching to new heights. Recently, in *The Wall Street Journal*, Steve Jobs, CEO of Apple, spoke about the impact that new mobile AAC technologies are having. Just last month, in a series of interviews I am doing with leaders in language and cognition, I spoke with a famous language specialist and was able to share with him the latest AAC options; he was unaware they existed. I wonder if President Obama is aware of the needs of users of AAC.

With these great amounts of need in mind and a rapidly growing broad-scale interest in AAC, there is much to discuss, many questions to ask and seek answers to, and quite a few passionate views to take into mind.

This special issue of *Perspectives* is devoted to discussing the issues surrounding new mobile AAC technologies. Various topics and perspectives are presented including user, parent, clinician, assessment, aphasia, android, research consortium, and developer. I hope it brings about much thought and discussion around this important topic.

Jessica Gosnell, John Costello, and Howard Shane share the clinical perspective with a provoking title, "There Isn't Always an App for That!" The Augmentative Communication Program at Children's Hospital in Boston has been around throughout so many changes in the world of AAC. I fondly recall my first years in the field, accompanying my students to meet with John Costello and being so impressed with the body of knowledge the team there displayed. Their article is meant to be an introduction to a full length article to be published later this year in *Perspectives*. Their program as a whole is a terrific model of experienced, thoughtful,

and innovative AAC assessment and intervention. We can look forward to learning more from them in the near future.

At The Pennsylvania State University, a weekly AAC colloquium is held. Recently, the topic was new mobile AAC technologies. A lively discussion ensued, and the conversation always seemed to land back onto the point that assessment, individualization, and ongoing services are often lacking when those in need of AAC are obtaining new mobile technologies. Debby McBride tackles this head on, reminding us all of the value of AAC assessment. Using a modification of the participation model (Beukelman & Mirenda, 2005), she introduces a framework of questions for obtaining assessment data. We are reminded that an AAC tool serves no good if it does not meet the individualized needs of the person being served.

User and parent perspectives impress the importance and urgency of this field. Lateef McLeod, poet, blogger, and experienced user of AAC, shares his in-depth perspective, calling new mobile AAC technologies a “game changer.” His message of personal empowerment using a range of technology tools describes the importance of pushing forward in the field. Robert Rummel-Hudson is the author of *Schuyler’s Monster*, the moving narrative chronicling the discovery of his daughter’s communication disabilities and the journey towards developing her AAC system. His article brings a contagious enthusiasm speaking of the challenges his family faced in obtaining AAC tools, the current democratization of AAC, and the hope that the “Revolution at Their Fingertips” brings.

Glenda Watson Hyatt’s article bolsters the argument that the inclusive factors present in the new mobile AAC technologies are not something to take for granted. She thinks the iPad is a cool communicator. Her description of the social effects of her self-proclaimed “impulse buy” are memorable and representative of a larger issue at hand.

All of the perspectives shared in this issue highlight the enthusiasm being experienced in the rapidly expanding field of AAC; yet, David Chapple’s article serves as a harbinger of the great danger inherent in the mass popularity of new mobile technologies, namely, inaccessibility. Chapple describes the evolution that has occurred in AAC by moving through descriptions of early devices and features leading up to the introduction of powerful computer-based tools for communication. The wonderful new touch technology found in the latest computing platforms is not so wonderful if you cannot touch it. He describes the importance of advocating for alternate access to be a major topic in the conversation everyone seems to be having. Chapple’s article is a call to rise up and insist on accessibility in the new mobile computing platforms.

Simply, there is a lot of junk being sold as “AAC” in Apple’s App Store. It is our responsibility as ASHA members and overall AAC community members to recognize it as such. It seems funny to say “I remember when,” but I recall the first trickle of apps that came out after Proloquo2Go. Now the floodgates have been opened. The key upside that I have stressed is that all of this activity has the potential to give AAC, as a field, small tips regarding user interface ideas and the like. The downside is tragic. There are many apps that are horrible.

Dave Hershberger, an experienced AAC developer who leads Saltillo Corporation, also shares from the developer perspective. Because he has crossed the line from being a traditional AAC manufacturer to offering new mobile options, I thought he would provide a more balanced perspective. The questions and issues he raises should be read carefully by members of the AAC developer community in particular. I am sure his insights will foster lively discussion.

As this is a very large issue, the following articles have been shifted to the June publication. I believe this will complement some of the articles to be published out of the proceedings from the ASHA AAC SIG conference from this past January.

To begin to address the overall issue of design, specifically regarding aphasia, I invited Richard Steele, an experienced scientist who has focused his work on assisting individuals with Aphasia. Richard and a colleague at Lingraphica, Pamela Woronoff, have done a nice job

focusing the field's attention on the importance of design. Individuals with acquired communication disabilities sometimes can be overlooked, and their insights into how to harness new technologies like Skype are valuable. Hopefully, their message about the value of thoughtful design comes through to those creating subpar tools, as well as those pushing the limits of innovation.

In case you were beginning to feel like the issue was going to leave out the elephant in the room, Jeff Higginbotham and Steve Jacobs share their insights from their development work using Google's Android operating system, which promises to change the field just as Apple's iOS has. They provide a basic primer informing about Android and the unique opportunity it holds as an AAC platform. This valuable perspective is much appreciated.

As this issue was being prepared, the AAC-RERC began to mobilize in order to present a position statement regarding the mobile AAC technology explosion that has been occurring. I invited them to publish the paper in this issue, but due to time restrictions, they opted to publish the work as a white paper on their website. They provide a much welcomed introduction to that paper here, in what I believe is a terrific way to close this special issue. As Sarah Blackstone said in a phone conversation about the issue, as soon as we publish it, things will have changed. With that being said, I hope this issue brings up good discussion and leads us to look at both the responsibilities and the opportunities presented by the change created by the advent of new mobile AAC technologies.

References

- Aacfundinghelp.com. (2011). *SGD funding fast facts*. Retrieved from http://www.aacfundinghelp.com/fast_facts.html#2
- Beukelman, D., & Mirenda, P. (2005). *Augmentative and alternative communication* (3rd ed.). Baltimore, MD: Paul H. Brookes.
- Fuller, B. (n. d.). The Buckminster Fuller challenge movie. Retrieved from <http://challenge.bfi.org/movie>
- Kurzweil, R. (1999). *The age of spiritual machines: When computers exceed human intelligence*. New York, NY: Penguin Books.
- Moore, G. (1998). Cramming more components onto integrated circuits. *Proceedings of the IEEE*, 86, 82-85.
- Sennott, S., & Bowker, A. (2009). Autism, AAC, and Proloquo2Go. *Perspectives on Augmentative and Alternative Communication*. 18, 137-145.
- U.S. Census Bureau. (2010). *2010 census data*. Retrieved from <http://2010.census.gov/2010census/data/index.php>

There Isn't Always an App for That!

Jessica Gosnell

John Costello

Howard Shane

Augmentative Communication Program, Children's Hospital Boston
Boston, MA

Abstract

The speed with which apps for the iOS platform have become available has caused many clinicians, educators, and potential consumers of AAC to search for a “quick fix.” While this platform may indeed be a good match to the strengths and needs of some individuals, it is not a match to the communication needs of many with complex communication needs. This paper highlights the need to use the clinical feature matching process when considering all options for AAC.

Apps are poised to have a dramatic impact in a wide range of fields, from education to health care to retail and financial services...[Apps] represent something large and important: the advent of a mobile technology paradigm that may just be as significant as the birth of the web...[Apps] are just the beginning of a social and technological transformation that will have major implications for years to come. (Gravitytank, 2009).

Although Gravitytank Researchers (2009) were speaking broadly on the impact of mobile technology, the statements of “technology paradigm” and “technological transformations with major implications for years to come” strike a chord within the AAC/AT communities. The App hype is infused in mainstream media outlets (*The Boston Globe*, ABC, CNET, *The Wall Street Journal*), with statements like “app gives special needs users a voice” (Perets, 2010), “iDevices are life changers” (Bascaramurty, 2010), and “iPhone app opens world” (Nojiri, 2010) grabbing headlines. Parents and clinicians are, amidst the hype, making purchases of mobile technology and apps without clinical evaluations or trials. Many speech-language pathologists are now faced with iDevices suddenly showing up in the office of their assessment center school with the question: “What apps do we use?” followed by a demand to “make this work.” In some instances, the speech-language pathologist who is enamored with the possibilities of this new platform is the one who is focused on recommending an app that will support her patient to communicate on an iOS platform.

While we are not criticizing the contributions of these new developments or the significance of having mainstream options, the extreme popularity of the platform coupled with the impressive speed with which apps are being produced has led many to forget, or at least temporarily suspend, well established strategies for assessment. Our goal is to remind clinicians that our first obligation is to identify a person's strengths and needs (current and future) and match those to the most appropriate tools and strategies. This process, known as feature matching (Shane & Costello, 1994), provides a framework for clinical decision making rather than choosing tools and strategies based upon media coverage, public testimonials, or recommendations from well meaning friends and family. If the feature matching process supports consideration of the iOS platform, then the process must continue to be applied to match the individual's strengths and needs to the features of available apps. We always must

ask ourselves: “Did we get to the iDevice platform and apps through feature matching?” or “Are we trying to fit the student/patient into an iDevice platform and app?”

References

- Bascaramurty, D. (2010, April 11). *For autistic kids, iDevices are life changers*. Retrieved from <http://www.theglobeandmail.com>
- Gravitytank Researches. (2009). *Apps get real: A study by Gravitytank*. Retrieved from <http://www.gravitytank.com/apps/>
- Nojiri, M. (2010, February 9). iPhone app opens world to boy with rare syndrome. Retrieved from <http://www.abcnews.go.com>
- Perets, A. (2010, August 30). Tapping this app gives special-needs users a voice. Retrieved from <http://news.cnet.com>
- Shane, H., & Costello, J. (1994, November). *Augmentative communication assessment and the feature matching process*. Mini-seminar presented at the Annual Convention of the American Speech-Language-Hearing Association, New Orleans, LA.

AAC Evaluations and New Mobile Technologies: Asking and Answering the Right Questions

Debby McBride

AAC TechConnect, Inc.
Boulder Community Hospital
Evergreen, CO

Abstract

The latest mobile technology options have heightened the interest in AAC today. Due to the ease of access and the availability of this technology, there are considerably more device choices available for persons with complex communication needs (CCN). There is an opportunity to build upon the enthusiasm surrounding these new mobile technologies by including all stakeholders in the AAC evaluation process. The clinician needs to ensure the use of sound AAC evaluation principles and procedures and prioritize the individual needs of the communicator. Recommendations about the use of an AAC high-tech device should flow from the evaluation and feature-matching process. The purpose of this paper is to suggest new ways to revisit the basics of a comprehensive AAC evaluation in order to better ensure that individuals who use AAC are being provided with the tools and features they need.

Recently, new mobile technology options have heightened the interest in augmentative and alternative communication (AAC). Due to the ease of access and the availability of these new technologies, such as the iPad from Apple, there are more device choices available for those with a wide range of augmentative communication needs. First and foremost, we need to make sure that sound AAC evaluation principles and procedures are being applied. We need to ensure that recommendations about the use of an AAC high-tech device truly come from the individualized needs of the communicator. The danger is that the appeal of a low cost or easily acquired AAC solution will result in caregivers purchasing a system prematurely before the needs, skills, and abilities of the communicator have been identified.

Key stakeholders, including individuals with CCN, family members, teachers, therapists, and other staff, are now excited about the availability of these popular new options and are no longer intimidated by the idea of an AAC solution. It is an optimum time to capture that enthusiasm by partnering with all stakeholders through a comprehensive evaluation process.

The lack of an AAC evaluation process can have dire consequences for individuals with AAC needs. A survey (Scherz, Dutton, Steiner, & Trost, 2010) was recently sent to members of ASHA Special Interest Group 12 (DAAC) and Quality Indicators in Assistive Technology (QIAT) e-mail lists on the topic of mobile apps. Fifty-five respondents answered questions about a variety of issues. For individuals who already had an iPod/iPad, the survey asked, "Was an evaluation conducted to determine if the iPod/iPad would be the most appropriate communication system?" Of concern, only 54.4% responded "Yes." Schertz and colleagues also found that 68% had acquired their iPod or iPad through parent purchase. These findings, combined with the clinical experiences currently being shared over multiple online communities (e.g., DAAC e-mail list), bring us to some important and troubling questions. Is

the AAC evaluation process being widely abandoned? Are we trying to fit an individual with complex communication needs with technology that may be inappropriate or ineffective? Evidence that more individuals with AAC needs are missing out on a comprehensive AAC evaluation process is serious cause for concern.

The survey results could be due to many factors, including the ease and availability of the mobile technology and apps; access to information offered on the Internet that makes researching available tools simpler; use of social networking such as blogs and Twitter for sharing information; and many other possibilities. Nonetheless, the essential issue remains: Are individuals who need AAC getting the individualized tools and support that they need? If the AAC evaluation process is circumvented, the consequences can be dire, including an inappropriate feature match for the individual, which could lead to abandonment of the device or even AAC altogether.

Principles and Processes of AAC Evaluation

The good news is that the AAC evaluation process is a viable way to ensure that the communicator can be matched with the appropriate AAC tools and strategies to meet their individual needs. Before proceeding to the question framework, we will review the basic principles of AAC evaluations. The principles and processes were well summarized recently at the Eleventh Annual Conference of the ASHA Division on Augmentative and Alternative Communication. In his introduction to the conference, Lyle L. Lloyd (2011) summarized the principles he uses in his basic AAC course as part of the AAC program at Purdue, and Iris Fishman (2011) provided a review of the literature for the important components of an evaluation. Important points from these presentations are described to aid in the review of basic principles and processes of AAC evaluations.

AAC evaluation is based on the premise that everyone can and does communicate (Wasson, Arvidson, & Lloyd, 1997). AAC evaluation services should relate to typical and functional routines in natural settings and environments and should build upon the strengths and abilities of users of AAC, rather than focus on weaknesses and impairments (Lloyd, 2011). An initial goal is to identify the current skill level of the individual as well as his/her participation patterns and communication needs. With that knowledge, the clinician can evaluate the client's potential to use AAC systems and/or devices and identify appropriate features. The clinician needs to be sensitive to both short- and long-term goals, evaluating the effectiveness through ongoing assessment (Beukelman & Mirenda, 2005).

Lloyd (2011) also reminded us that AAC practice is transdisciplinary. Optimally, it involves the collaboration of a team of individuals who have a shared agenda and common goals. The team must assess for an overall AAC system including an integrated network of symbols, techniques, aids, strategies, and skills (Wasson et al., 1997; Vanderheiden & Yoder, 1986). A wide range of communication needs must be considered including speech, vocalizations, facial expressions, gestures, light tech tools (e.g. alphabet board, communication book), AAC devices, computer access, e-mail, and phone access (Blackstone & Hunt Berg, 2003).

The AAC evaluation must involve feature matching with the individual's needs. The determination of the desired features of the AAC system is based on an accurate evaluation of the individual's skills and abilities and communication needs (Quist & Lloyd, 1997). Data from the AAC evaluation defines the needed features and determines the specific device code. The recommendation of a specific device and accessories must include the rationale for why this device and these accessories will enable the individual to meet his/her communication needs (Beukelman & Mirenda, 2005). Lloyd (2011) pointed out that AAC assessment and intervention should be ongoing and co-occurring, so that they are responsive to changes in the user's abilities and needs, communication partners, and environments.

Questions Framework

Asking and Answering the Right Questions is a framework developed by AAC TechConnect (2011). It has been especially helpful when an AAC device has already been provided or requested by an individual, family, or team.

The framework provides information for the AAC evaluation by identifying and asking key questions that support an evidence-based evaluation process; describing how to find and review available assessment tools and resources; considering the types of AAC devices and their features and benefits; and providing examples of how to use the questions framework in a conversational way with all of the stakeholders in the AAC decision-making process.

There are no standardized tests for evaluating AAC and that can make the process more challenging. There are, though, a variety of tools and resources available that can assist in the evaluation process. To further assist with providing a strong evaluation process and collective collaboration, a website (AAC TechConnect, 2011a) was created as a resource for clinicians to share evaluation forms, tools, and resources they find useful.

Clinicians are encouraged to draw upon the proposed questions in the framework by changing, modifying, and formulating their own questions as needed. Though the questions are numbered, it is not necessarily a linear process.

Here are the questions to consider:

1. What does the communicator (individual with CCN) need, want, or desire to communicate? How is that expressed?
2. In order to further evaluate communication needs, where, when, and with whom will the individual communicate?
3. What are the communicator's current skills and abilities?
4. What is the communicator's language/linguistic ability (e.g., vocabulary, symbols, language representation, organization, etc.)?
5. What are the device functions and features required?
6. How does one make the "best choice for the best voice" (i.e., make appropriate decisions for the optimum communication device)?
7. Finally, if the device has already been provided, is the communicator currently using the AAC device?

The Framework of Questions

What does the communicator need, want, and desire to communicate? How is that expressed?

This question immediately focuses on the communicator as an individual. Information can be gathered in a variety of ways: case histories, direct observations, previously reported information, and other related sources. It is important to note current communication modes (including devices they may already have). One assessment tool, The Communication Matrix, (Rowland, 2005) is designed to pinpoint how an individual is communicating within the framework of communication skills. It is especially helpful for individuals at the earliest stages of communication. The Communication Functions chart (AAC TechConnect, 2001a) also can help clarify the skills and modes of communication the individual is currently able to use. The key issue is that there needs to be a roadmap of where the communicator is in order to set up where she needs to go and how that can be best accomplished.

Where, when, and with whom will the individual communicate?

It is certainly important to take an inventory of the individual's current communication contexts, taking into account her current interest and desire to use communication tools in

everyday routines. The SETT Framework (Zabala, Bowser, & Korsten, 2004) can help individuals with disabilities, family members, and professionals make appropriate assistive technology decisions through focusing on the student and the environment, including communication partners, tasks, and tools. By using the SETT Framework, stakeholders can focus on supporting student participation and achievement. Another helpful source, *Assessing Student's Needs for Assistive Technology* (WATI, 2009), has a chapter entitled "Assistive Technology for Communication" that includes many other relevant evaluation suggestions.

It may be equally important to do an inventory of the communication partners' perceptions of the needs of the communicator, along with their beliefs and attitudes about using communication tools. Communication partners should be involved from the beginning to enhance the implementation and use of an AAC device and/or reveal barriers that undermine the successful use of the device. With regard to devices provided by family members, the clinician should consider family issues that affect technology use and training strategies (Scherer, 1997; Scherer & Zapf, 2008).

The communicator's perceptions and preferences also are critical and need to be carefully identified, so that successful strategies and goals can more easily be implemented. It also may be important to note that a variety of communication tools can be appropriate depending on the situation (e.g., versatility vs. complexity of device). For example, from my own clinical experience, I observed a 12-year-old communicator who prefers verbal speech (though limiting) and had rejected use of her current traditional communication device for a variety of reasons. When she was presented with something that looked like a phone, her enthusiasm clearly increased. The new mobile technology was more socially acceptable, and she demonstrated an eagerness to use it. It showed the importance of considering context and social issues when choosing AAC tools.

What are the communicator's current skills and abilities?

There is no standardized assessment or battery of tests that make up an AAC assessment. Instead, "AAC specialists often use criterion-based assessment to determine whether an individual meets the performance thresholds necessary for successful implementation of specific communication techniques or devices" (Beukelman & Mirenda, 2005, p. 160). They go on to state the importance of assessing specific capabilities, including positioning and seating, motor capabilities for direct selection and/or scanning, cognitive/linguistic capabilities, literacy skills, and sensory/perceptual skills.

One helpful available resource to aid in the evaluation of required skills is the *Medicare Funding of AAC Technology-Assessment/Application Protocol* (AAC-RERC, 2004). This tool can help the clinician outline the information needed for the AAC evaluation process, both for the skills and abilities of the communicator and the AAC device features. In addition, two resource lists help the clinician identify AAC assessment tools and resources: AAC TechConnect (2011a) lists tools and resources that have become available since 2005, and Beukelman and Mirenda (2005) can be referenced for a comprehensive list of AT/AAC assessment tools prior to 2005.

Limited availability of communication tools and equipment can be a barrier and affects the quality of the AAC evaluations. One solution is to have a toolkit consisting of low-cost and commonly found communication tools that can evaluate the simplest to the most complex communication needs. For example, a low-tech solution, such as a laser light on a baseball cap, can be used to evaluate head movement for head pointing access. See AAC TechConnect, 2011a for a list of items for a low-cost toolkit.

Informal observations, such as watching a child playing with his mother's iPod to find music, can provide information about physical and cognitive abilities, navigation skills, and interests. The evaluation team might consider the advantages and disadvantages of using the same device for leisure/educational activities as well as his communication.

At this point, it also is important for the clinician to clearly communicate the skills and abilities of the communicator to all stakeholders, including parents, while minimizing the use of AAC jargon. The evaluation team needs to accurately describe the individual's vision, hearing, and physical abilities as well as access methods to use the considered devices. The clinician can use a diagram entitled "The Person Skills" (AAC TechConnect, 2011a) to simplify this discussion with parents or other stakeholders.

What is the communicator's language/linguistic ability?

A comprehensive AAC evaluation includes a thorough understanding of the individual's language/linguistic abilities. It is important for the clinician to remember that the AAC system comprises a number of linguistic features, including

- Symbolic representations (single-meaning pictures, multi-meaning pictures, words, spelling)
- Amount and type of vocabulary (nouns, verbs, adjective, pronouns, verb tenses)
- System use (number of messages, number of pages, use of message bar)
- Organization of vocabulary (situational, categories, use of core words, phrase-based, visual scenes)
- Message formulation (single-key messages, phrases, semantic compaction, simple sentences, complex sentences, grammatical/morphological use)
- Navigation (ability to remember location of vocabulary, number of pages),
- Access (use of device functions, such as clear, on/off, speak, ability to use programming features)

Once the communicator's language/linguistic abilities have been identified, they can be used to determine the appropriate language and organizational features. Whether the solution is a communication app for mobile technology or communication software developed for a traditional AAC device, the most effective system/systems will depend on meeting the language/linguistic needs of the communicator. It could possibly be both!

What are the device functions and features required?

General features of devices have been clearly defined for many years and include input method (direct contact, eye movement, mouse, keyboard, switch); selection techniques (direct selection, scanning); encoding (vocabulary expansion, rate enhancement); output capabilities (synthesized or digitized speech, visual display, printed); as well as portability, size, weight, transport/mount, case/carrier requirements, battery time required, and preprogrammed vocabulary features (Lloyd, Fuller, & Arvidson, 1997).

At this point, key differences between the types of devices (more traditional devices and mobile technology) need to be considered. The following comments reflect the current status of options at the time of this article. However, changes are occurring so rapidly that specific examples may not be current, even at time of publication. Therefore, the clinician should ask the following questions.

What access options best meet the needs of the communicator? In general, if the communicator needs a variety of access options, the more traditional devices currently include more parameters that can be modified. For example, if using direct selection, additional features like dwell, background color changes, beeps, zoom, and keyguards may be needed to enhance access. In scanning, the communicator may need a wide range of speeds, switch access options, number of switches, and types of scanning (e.g., linear, row/column, column/row, groups). Some features, like the use of head pointing or eye gaze, are available currently only on traditional AAC devices. If there are no challenges or features required for

access, then one of the new mobile systems could be appropriate and will most likely be less expensive.

What do the communication software/apps provide in terms of meeting language/linguistic and functional needs? Does the identified software/app maximize the individual's ability to communicate what he needs in the most efficient and complete way possible, whether the needs are simple or more complex? Is the software age appropriate? How much customizing is required? The evaluation team needs to ensure that all of the language/linguistic components are addressed.

Is the solution long-term or short-term? Long term, an AAC device must have language that can grow with the individual. A more traditional system has representation/organization that stays similar and just adds more vocabulary and language options, making the transition to more complex language easier. Short-term, mobile technology might be provided while the user or family is seeking funding for a more traditional AAC device. Long-term, mobile technology also could be a solution: A simple app may provide an introduction to the use of AAC technology; a linguistically complex app may be customized to meet the needs of the communicator and/or used with a keyboard app to spell out novel messages. Finally, the solution may be situation-specific; for example, mobile technology could be used "on the go" (e.g., playground, hanging out with friends), while a traditional AAC device could be used for situations that require more sophisticated language/linguistic options.

What are the other device features or functions that need to be considered? Optional features include durability, portability, speaker quality, battery time, and communicator accessibility to device functions (e.g., on/off, volume, programming). Additional functions including media/Internet options, educational/leisure uses, and texting, should be discussed, but should not take precedence over the communication needs. See AAC Device Features (AAC TechConnect, 2011a) for a form the clinician can use to discuss features with parents/stakeholders.

How does one make the best choice for the best voice?

Feature matching requires that the evaluator has an understanding of the general features of AAC devices, including knowledge of the most current devices or familiarity with how to find out about the most current technology (Wasson et al., 1997). Now it is time to start looking at options, including the most current apps. The challenge of keeping current is complicated by the variety of communication apps continuously coming on the market.

There are helpful Internet resources that compile lists of apps and/or AAC devices and include pictures, descriptions, and contact information (see AAC TechConnect, 2011a). In addition, Children's Hospital of Boston (2011) has announced that they will post an example of a feature-matching table used to select or rule out apps. Online clinical tools enable the user to search based on feature-matching and provide a side-by-side comparison of AAC devices. A free trial is available for Device Assistant from AAC TechConnect (2011b), a project of AAC-RERC, which includes an "apps assistant."

When choosing between the types of devices, the clinician might also consider as the merits of assembling a software/hardware solution (e.g., iPad plus apps) versus purchasing an "all-inclusive" traditional AAC device. The ATIA-AAC Special Interest Group recently compiled a list of 12 benefits for choosing an "all-inclusive device" (i.e., hardware, software, and supports), such as funding assistance, technical support, training for programming and adapting applications, and hands-on trials of devices. It is important to consider the amount of support available. AAC companies usually provide online training, manuals, trouble-shooting options, and technical support. Mobile technology companies may provide more limited support.

The client should be provided with hands-on opportunities for trials with potential AAC devices so that he/she can experience all hardware and the software features recommended for

optimum communication. This could include new devices not previously trialed, modifications of existing systems, or a combination of both.

Though hands-on trials are appropriate for the actual AAC devices, the technology may not always be readily available during the initial phases of the evaluation. The use of demonstration software provided by some traditional AAC manufacturers or a download of some trial or “lite” (simplified) versions of mobile communication apps will allow the team to see which systems or features are most effective. Though usually limited in terms of time and usability, these trials can provide important information for the evaluation team. It also is important to take advantage of training offered by many traditional AAC companies, either in person, and/or online, to learn more about the language/linguistics options. Several of apps have tutorials or training options online.. It will be important for the team to evaluate the advantages and disadvantages of each of the trials in light of the individual’s communication needs.

If the device already has been provided, is the communicator currently using it?

If not, then return to question #1 to troubleshoot what is happening.

Summary

There is an enormous opportunity for clinicians to build upon the enthusiasm surrounding new mobile technologies by asking the right questions of all the stakeholders participating in the AAC evaluation process. I hope that this discussion contributes to new dialogues in a rapidly changing field and that clinicians now have some new and innovative strategies as well as additional tools and resources to provide the most effective solutions. We need to ensure that the AAC evaluation principles and procedures are being applied whenever AAC solutions are being considered. The individual needs of the communicator should guide all recommendations about the use of any AAC high-tech device. We then can see effective communication when the best choice for the best voice is made, both for today’s and tomorrow’s communication needs.

References

- AAC-RERC. (2004). *Medicare SGD/AAC funding*. Retrieved from <http://aac-lerc.psu.edu/index.php/pages/show/id/27>
- AAC TechConnect. (2011a). *AAC TechConnect tools/resources*. Retrieved from <http://www.aactechconnect.com/tools.cfm>
- AAC TechConnect. (2011b). *Device assistant*. Retrieved from <http://www.aactechconnect.com/da.cfm>
- Beukelman, D., & Mirenda, P. (2005). Principles of assessment. In D. Beukelman & P. Mirenda (Eds.), *Augmentative and alternative communication* (3rd Ed., pp.133-157). Baltimore, MD: Paul H. Brookes.
- Blackstone, S., & Hunt Berg, M. (2003). *Social networks: A communication inventory for individuals with complex communication needs and their communication partners*. Monterey, CA: Augmentative Communication, Inc.
- Children’s Hospital of Boston. (2011). *Feature-matching table*. Retrieved from www.childrenshospital.org/acp
- Fishman, I. (2011, January). *Important principles in teaching SLPs about the AAC assessment process*. Session presented at the Eleventh Annual Conference on Augmentative and Alternative Communication Conference, Orlando, FL.
- Lloyd, L. (2011, January). *Training speech-language pathologists as AAC practitioners: Insuring AAC prerequisites for pre-service and in-service*. Session presented at the Eleventh Annual Conference on Augmentative and Alternative Communication Conference, Orlando, FL.
- Lloyd, L., Fuller, D. R., & Arvidson, H. (1997). Feature checklist. In L. Lloyd, D. R. Fuller, & H. Arvidson (Eds.), *Augmentative and alternative communication* (p. 494). Boston, MA: Allyn & Bacon.

- Quist, R., & Lloyd, L. (1997). Principles and uses of technology. In L. Lloyd, D. Fuller, & H. Arvidson (Eds.), *Augmentative and alternative communication*. Boston, MA: Allyn & Bacon
- Rowland, C. (2005). *The communication matrix*. Retrieved from <http://communicationmatrix.org>
- Scherer, M. J. (1997). *Matching assistive technology & child (MATCH) for early intervention*. Webster, NY: The Institute for Matching Person & Technology.
- Scherer, M. J. & Zapf, S. (2008). Developing a measure to appropriately match students with disabilities and assistive technology devices. *Archives of Physical Medicine and Rehabilitation*, 89(10), 21-22.
- Scherz, J., Dutton, L., Steiner, H., & Trost, J. (2010, November). *Smartphone applications useful in communication disorders*. Miniseminar presented at the 2010 annual meeting of the American Speech-Language-Hearing Association, Philadelphia, PA.
- Vanderheiden, G., & Yoder, D. (1986). Overview. In S. Blackstone (Ed.), *Augmentative communication: An introduction*. Rockville, MD: American Speech-Language-Hearing Association.
- Wasson, C. A., Arvidson, H., & Lloyd, L. (1997). AAC assessment process. In L. Lloyd, D. Fuller, & H. Arvidson (Eds.), *Augmentative and alternative communication*. Boston, MA: Allyn & Bacon.
- WATI. (2009). *Assessing students' needs for assistive technology (ASNAT; 5th ed.)*. Retrieved from <http://dpi.wi.gov/spedat-wati-asnat.html>
- Zabala, J., Bowser, G., & Korsten, J. (2004). *SETT and ReSETT: Concepts for AT implementation. Closing the Gap*, 23(5), 1, 10-11.

Game Changer

Lateef McLeod

Oakland, CA

Abstract

Individuals with significant communication challenges need to communicate across many different venues. The author, from the perspective of an individual who uses AAC, discusses the strengths and weaknesses of both traditional AAC technologies and new mobile AAC technologies. He describes how access to AAC has allowed him to fulfill his dreams as a presenter and writer. He successfully manages a blog in San Francisco, writes grants, and has published his first book of poetry. Not one AAC device fits all of his communication needs; however, access to mobile technology tools has increased his flexibility across environments and given him another successful tool for communication.

As a person who has been using AAC for two and half decades, I have witnessed many changes in the AAC industry. Since my cerebral palsy has made oral communication difficult, I have been using AAC since I was 6. When I started using AAC devices, they were big and bulky. Plus, they had a very automated, robotic voice. Although the voice did not resemble anything human, I was glad that I could use it to talk to my friends and loved ones. However, as time progressed, AAC devices developed into more effective high-tech devices that better suit the needs of people who communicate with AAC. Now, AAC software can be installed in a mass produced mobile device like a mobile phone or an mp3 player, which makes AAC more affordable. AAC software on widely available mobile devices is the future of the AAC industry. This will benefit both the developers of the software and the consumers who will be able to purchase the software at reasonable prices.

I was first introduced to the software, Proloquo2Go (Assistiveware, 2009), when I was asked by one of the creators to be a beta tester for the program. I was one of the first people to experience how well Proloquo2Go works with my iPhone and, later, iPad. Finally, I had AAC devices on durable, portable mobile devices with lengthy battery lives. It was cool to have Proloquo2go as a backup when other communication devices malfunctioned. I also liked how simple it was to store instant phrases in the program and the relative ease with which I could transfer text files to the app to speak.

Proloquo2Go is revolutionizing how people think about AAC. Developing AAC software as apps for handheld devices makes the technology more available and less expensive. This means people like me who need these devices to communicate can purchase them without any financial assistance from such agencies as the Department of Rehabilitation or Regional Center. Although I love the convenience of the Proloquo2Go app, there are a few improvements I want to suggest. First, there is no way for the app to speak one word at a time as it is being typed in the typing message mode. As a result, I have to type out my complete message before I speak it, which makes it harder for me to keep someone's attention during a conversation. I contacted the manufactures of the app and they said that they would add the speaking word feature at a later date. The other improvement I would advise app manufacturers to consider is to develop word prediction capabilities. Word prediction will make typing on the program much easier and enable the user to communicate much faster. With those additions, I would use Proloquo2Go as my main form of communication.

The main AAC device I use at this time is the DynaWrite (DynaVox Systems LLC, 2002). DynaVox produces the DynaWrite, and I have been using this device for 7 years. The device has a regular size QWERTY keyboard with a rectangular LCD screen on top of it. I like it because my typing speed is pretty fast on it, partly due to my keyguard. Also, the device has multiple word prediction choices and abbreviated expansion phrases that speed up my communication. The device also can store text files. I use this feature when I want to speak long passages, usually in presentations. The main problem with this device is it freezes, or the speaker goes out, and I have to ask someone to put in a pin in the bottom of it to restart it. What makes it more annoying is it takes extremely long for it to restart. Other than that drawback, the DynaWrite has been my main reliable device for years.

For presentations, I usually use Vmax, also manufactured by DynaVox. The Vmax is a large rectangular device with a wide touch screen display. I can easily store my presentations for work, and I can generate a clear distinct voice, enabling the audience to hear every word. This is especially important when I recite a poem, given that every word must be heard for the audience to grasp the full meaning. It's pretty straightforward to write a presentation with a Vmax. I write and edit the piece on the computer and then save it to a flash drive. Then, I load the file onto my Vmax, saving the file onto a button that speaks the file when I push it. Recently, I used the Vmax to participate in a play, entitled "Resident Aliens," put on by the Sins Invalid theater company. My Vmax was the voiceover for a couple segments of the play, and I felt that the audience really heard me.

My occupation and career activities are diverse. I am fortunate now to have three part-time jobs. I am a blogger and grant writer with United Cerebral Palsy of the Golden Gate. My blog is called "Lateef's View of the Bay" and can be found at <http://ucpgg.org/lateefs-view-of-the-bay>. I also am an intern with the World Institute on Disability and a consumer consultant with DynaVox Mayer-Johnson, a manufacturer of communication devices. I also volunteer as a commissioner on the Oakland's Mayor's Commission on People with Disability, where I help influence city policy for people with disabilities. I published my first book of poetry last year, *A Declaration of a Body of Love*. I am also in the process of writing a novel. I was able to accomplish all this with the assistance of AAC, so I owe a lot to this field of communication technology.

With new advancements in this field of devices, soon the barrier that my communication has on my success will be completely obliterated. Soon AAC devices will be available to everyone that needs them around the world. I have seen this field grow and change, as innovative and more effective devices are replace old ones. What these new mobile AAC technologies offer are a more affordable option for people with speech disabilities to purchase a state-of-the-art AAC device. A quality, affordable option is what people need so we all can have access to effective communication.

References

- DynaVox DynaWrite. (2002). Pittsburgh, PA: DynaVox Systems LLC.
- McLeod, L. H. (2009). *A declaration of a body of love*. Houston, TX: Atahualpa Press.
- Proloquo2Go. (2009). AssistiveWare [Software]. Available from <http://www.apple.com/iphone/apps-for-iphone/>

A Revolution at Their Fingertips

Robert Rummel-Hudson

Plano, TX

Abstract

This article shares how parents approach the issues of their children with disabilities from a different perspective than that of educators and service providers. It examines the history of one family's experience with AAC technology with their child and what they have learned about advances in consumer touchscreen electronics such as the iPhone, iPod Touch, and iPad, and what it might mean for parents of children using AAC technology.

We'd learned to be on our own, navigating a new world of Schuyler's disability with little information and no road map. We learned that in our situation, sometimes all you can do is trust in your fool's hope and keep going. You never give up, and you persevere, not because you're plucky or heroic or even smart, but because you hate the thought that if you give up too early you could miss some answer or solution waiting right around the next corner. It's hope, and it's stubbornness and, sometimes even stupidity, but it's the thing you've got so you run with it. You go into battle against the monster with a rubber sword, because, really, what else are you going to do? (Rummel-Hudson, 2008, p. 170)

Children with disabilities travel through life with a kind of entourage. Like any good entourage, the members strive to provide support and encouragement in accordance with their unique gifts and talents. Most of them—the teachers and the therapists, the doctors and the researchers— come to the party prepared. The best of them learn constantly as they go forward, but start from a place of knowing, of sizing up the challenges facing them before stepping into the fray. This is probably the most striking difference between their experience and that of parents and families. As professionals, they have sought out the monsters. They've armed themselves with the knowledge and the tools to wage that war, and they've gone into battle with their armor in place. For parents, the monsters have found us, in most cases sitting by the campfire in ignorant bliss, totally unprepared.

Before I go any further, allow me to share some of my qualifications. I'm an author. I'm also the communications director for the School of Architecture at a University in Texas, where I interact with the media, write press releases and Web content, and try to sound as if I know the first thing about architecture. I majored in English in college, with a minor in music performance, so the fact that I'm not employed in the food service industry is a kind of success story of its own. I'm a former professional trombonist. And my daughter thinks I am the finest racecar driver in all the world, but her experience is limited to Mariokart on the Wii system, so I don't know if her endorsement carries much weight.

I'm not a speech-language professional. If I use any fancy jargon at all, I will no doubt butcher it. I might even make some up, if I feel ambitious. I'm not writing as an expert, but rather as a parent. For some professionals, their first impression of me might be as an ally, like the many concerned and involved parents they've come to know and partner with. I suspect at least some of you may wonder if I'm as big of a pain in the butt, like some of the parents you

may have worked with, and possibly endured, over the years. If you've read my book, you know that the answer to that last question is probably "yes." Sorry about that.

My interest in assistive technology, or in disability issues in general, began with my daughter, Schuyler. Before she was born, I was a writer and a music teacher; neither of which was a particularly good place to start when,, a year and a half later, her pediatrician at the Yale School of Medicine expressed concern for Schuyler's lack of speech.

The doctor's primary concern wasn't the lack of language. Kids develop speech at wildly different rates, after all, and, most of the time, the types of delays you see before the age of 2 tend to work themselves out before long. For most kids, the words come eventually, and when they do, it is often with a vengeance. But not in Schuyler's case.

When she was 3 and a half years old, we had our answer, thanks to an MRI performed by Yale's Department of Neurology. It was a stab in the dark, one of those "let's just take a look in that little head and see what we find" procedures; it revealed a brain malformation affecting somewhere between 60 and 75% of Schuyler's brain. She was diagnosed, with the help of the University of Chicago's Dr. William Dobyns, with a rare condition called Bilateral Perisylvian Polymicrogyria.

The issue that affects Schuyler's life on a moment-to-moment basis is her lack of speech. This is the reality of Schuyler's monster. It has been the most concrete manifestation of her Polymicrogyria, and it is one dire prediction that she received from her diagnosis that has come true and has, if anything, been more tenacious than we expected.

In retrospect, I think one of the best decisions we made to help Schuyler was to give her a variety of communication tools. Sign language is difficult for her at times, with her clumsy hands and fine motor problems, but just like her handwriting, Schuyler's signs don't need to be elegant. For more detailed and nuanced communication, Schuyler has another voice, the one that we find the most remarkable.

It's hard to believe that it's only been 6 years since Schuyler saw her very first AAC device, one that in retrospect seems so primitive now. My introduction to the technology that would ultimately change the game for Schuyler came the day I arrived to pick her up from school and found her wearing a strange device around her waist. While the HipTalk was far too remedial to meet Schuyler's communication needs, it did present the very beginning of an answer. She could hear the words that she wanted to express, at least at a fundamental level. If I have one regret about Schuyler's experience with AAC technology, it might be that her introduction to the concept came as late as it did. I almost can't imagine how she might be doing now if she'd been exposed to something like the HipTalk or the Springboard as soon as her speech delay was identified.

The story of how Schuyler graduated from this early, remedial device to the advanced speech output device she uses now has lessons for us all, including for my wife Julie and me. Despite the fact that they had initiated this experiment, Schuyler's team at her school simply did not seem to fully believe in the technology they were introducing. Part of this, I'm sure, was budgetary, and believe me when I say that I understand the constraints that they operated under. The HipTalk cost a few hundred dollars, I believe. The speech output device that Schuyler uses now is the Vantage Lite, made by the Prentke Romich Company (PRC). It's an amazing device that has changed her life, but it sells for about \$7,500 before service agreements. It's a significant investment for a school district or a family, and, as in all things related to the education of special needs children, there are no guarantees that it will work.

My wife Julie and I understood, in a way that perhaps only a parent can instinctually grasp, that Schuyler was capable of more than anyone had ever given her credit for. We researched devices available from a number of companies and met with their representatives before finally choosing Vantage. The technology advisor for Schuyler's support team recommended that the school district purchase a different, cheaper device, one with a

vocabulary level roughly appropriate for a 3-year-old. At the time, Schuyler was 5. The advisor's reasoning, and the position of the school district, was that there was no indication Schuyler would ever be capable of using a higher end device.

We took matters into our own hands. We informed the school district that we were rejecting their recommendation and pursued third-party funding in order to purchase the Vantage. After 5 weeks of fundraising on the Internet, we had raised all the money we needed, thanks to the generosity of strangers who'd been reading about Schuyler on my blog over the years. And while I acknowledge the generosity of spirit that made this happen, I also recognize all too well that we were fortunate to have the mechanism and the public exposure that allowed for such a miracle. Most families don't have those resources. They depend on very limited state funding or the nightmare of negotiating with their insurance carrier, or they hope and pray that their local school district can provide for them. For most families, the reality is less than "happily ever after."

There's one thing about Schuyler's experience, and in particular her new life with AAC, that I want to emphasize. AAC technology alone did not help Schuyler. In fact, the months following her acquisition of her Vantage were some of the most discouraging we experienced. The device alone couldn't help her, we couldn't help her, and her own tenacity wasn't enough. Without the support of her school system and her support team, none of it was enough.

Two weeks after Schuyler began using a loaner device while we waited for the delivery of her Vantage, we had a pivotal IEP meeting. A couple of nights before the meeting, I videotaped Schuyler answering questions on her speech device, including many that required her to move through subdirectories on the device. She'd had the Vantage for only a few days and had been using a loaner device for only 2 weeks before that, yet, she was able to answer questions using preprogrammed answers. She was able to find and identify colors of specific objects (in this case, rubber ducks). She navigated multiple levels and subdirectories in order to find food menu selections, and she was able to put her choices into very simple sentences. Most of all, she was enthusiastic about using the device. She consistently answered questions with the Vantage that she was perfectly capable of addressing using sign language, and she was just barely getting started. Two weeks had given her this much.

The video was convincing; indeed, it changed attitudes among her support team, attitudes that I suspect were built on our reputations as annoying know-it-all parents. It contradicted people like the technology advisor, professionals who were supposed to know better, who were supposed to do better than they did. It would have been easy to feel smug in the face of this evidence, but the more I thought about it, the more it bothered me. Should it really be the job of a parent to resort to videotaping their own child at home in order to be taken seriously? More important to us, should teachers be in the position of limiting a child's options, basing that decision on budgetary issues?

You might be surprised at my answer, at least to that second question. I recognize the very real fact that for most teachers and administrators, the question quite often boils down to exactly that. What can we afford to do? How much can we afford to help an individual student when each resource that goes to one child reduces the total available for the rest? It's a real question, and I recognize that for a small school like the one Schuyler attended, that one child's needs could very directly affect the services that the rest of his or her class receives. It's an ugly way to look at it, but it's a fact and we all know it.

In the end, parents simply must face a hard fact. It's one that we all confront eventually. If we want our child to be taken care of, it falls upon us to make it happen. Of all the members of our child's entourage, we are the ones who bear the ultimate responsibility. For us, there is no moving on to the next case, no graduation, no "job well done" or "yikes, I hope I get it right the next time." And one of the most formidable obstacles facing parents is the struggle for autonomy, the seemingly endless fight to have our input recognized and our hard-won expertise respected.

We learn quickly to conceal our fear, which is great, and our self-doubts, which are many. Once we get past our denial and our mourning for the child we always thought we'd have, we devote ourselves to the complicated, broken but equally wonderful, child in its place. No one in the world is a quicker study than the parent of a child with special needs. We often find ourselves holding the vital perspective in determining what our kids need, and yet our place at the table is often very limited, particularly where decisions of funding and acquiring the appropriate technology are concerned.

That struggle has changed dramatically in the past few years, and particularly in the past 12 months, with the introduction of affordable consumer electronics options, including Apple's iPhone and iPod Touch and particularly the iPad, introduced early last year. Like any technological game-changer, the appearance of affordable touchscreen technology paired with robust system architecture and socially appealing design has met with a wide range of reaction. For parents, however, it has opened the door to a level of real decisive autonomy, the likes of which we dared not dream of even a few short years ago. It remains to be seen if this potential will be met.

A few months ago, I solicited other parents to submit their most pressing AAC concerns and hopes, and the responses I received weren't surprising. Much of what they had to say echoed what I've been hearing since we first became involved in the AAC world. Many parents felt that they were the only ones who truly understood and believed in their child's capabilities. Parents ahred how hard they had to fight just to be heard in IEP meetings and funding discussions. That lack of autonomy is particularly hard to bear when the expense of AAC technology is beyond the reach of most families' budgets. The final decision is almost never in the hands of the parents.

I believe that one of the most promising developments in AAC is the emergence of the iPad on the market, as well as whatever competing products inevitably appear. For parents of AAC users who are largely ambulatory, including that huge population of kids with autism, issues surrounding funding and decision-making and parental autonomy may change dramatically with the possibility of purchasing a \$500 device at the mall. And it's not just about funding, either. It also addresses the resistance of our kids to use a speech device even under the most ideal circumstances. And it provides a rather elegant solution to the social integration problem. Kids with even the most advanced dedicated speech device are still carrying around something that tells the world "I have a disability." Kids using an iPad have a device that says, "I'm cool." And being cool, being like anyone else, means more to them than it does to any of us.

There are benefits far beyond carrying a device that doesn't label the user as possessing a disability. After using an iPad for the better part of a year, Schuyler still uses her PRC Vantage Lite for a variety of reasons. It uses Unity, the language system that she has grown the most comfortable with, and it is a powerful tool for her communication. It is also the product line that her classmates use in her AAC special education class, so there is a level of consistency is attained when all employ the same language system.

Outside of school, however, Schuyler has embraced the iPad with enthusiasm, both at home and out in the world. She still uses her Vantage when pressed, and her comfort level with Unity far exceeds any other AAC options she might have, but the iPad has become her preferred device. When she's on the iPad, she uses Proloquo2Go, which has proven to be the most robust and flexible AAC app that we've seen. Schuyler also uses some sign language for faster communication, and when she doesn't know a word, she quickly looks it up on her iPad using an app called Sign 4 Me. The app shows an animated figure who will sign the words she types, at any speed and from any angle she chooses. And when she simply wants to type sentences for us to read, as she often does, she can open the simple text editor that comes with the iPad. The virtual keyboard is the same size as the one she uses on her Mac, and she adjusted to it almost immediately.

Beyond her communication needs, Schuyler engages other apps in her day-to-day use. She uses the iPad to read books, both in big boring blocks of text and with interactive graphic and sound elements that hold her interest. We frequently take the iPad outside at night and use an app called Star Walk to find and identify the planets and stars that she learns about in school. She has apps for math drills, and a brilliant app called Sentence Builder that helps her learn how to build grammatically correct sentences. She easily navigates freely among all those apps, in addition to games and streaming video that can keep her entertained when I drag her to boring speech/language conferences.

The piece that I believe is currently missing, however, is development for the iPad by companies like PRC and DynaVox. I could be wrong; there could be plans in the works to bring their language systems to the iPad that I'm unaware of. Until then, the gap will continue to be filled by smart, independent developers like the co-creator of the original Proloquo2Go's Sam Sennott. Right now, it's the Wild West in AAC development for the iPad.

Make no mistake; the iPad will bring a level of democratization to the AAC implementation process that parents and educators will take advantage of. Families using systems like PRC's Unity language may have to choose between the system they know works best for their kids and the system that they can afford. I don't think I'd be exaggerating to say that most of Schuyler's success over the past few years has come about as a direct result of PRC's Unity language system, based on Minspeak. It has saved my daughter's future, probably literally. As a true believer in PRC's language system, therefore, I have to say, the possibility of PRC users walking away from Unity breaks my heart. I'm not sure what that business model would look like, the one where companies like DynaVox and PRC are developing for both their own devices and those available to the average consumer. But look at the trends in both educational funding and technological advances in the consumer electronic market, and I think you'll see that someone needs to figure out that business model, and they need to do it soon.

The iPhone and the iPod Touch gave users a peek at some of the possibilities for affordable and vibrant AAC. In the year since the iPad was released, interest in its potential as an AAC solution for families has exploded. The autism community has been especially quick to explore the possibilities; I suspect that parents of kids with autism are perhaps more accustomed to stepping outside the lines where advocating for their children is concerned. Parents who are unsure if AAC is the right step now have an affordable option for trying it with their kids; families who struggle to get access to AAC technology or who have difficulty affording the extended warranties or coordinating support and training now have possibilities as close as their nearest Apple Store. And users who have shied away from publicly identifying their disability with their AAC technology are now able to order their dinner and chat with friends with ease and without stigma, communicating clearly and effectively in between updating their Facebook status and unleashing Angry Birds.

As a parent, I watch these developments with excitement and with the one commodity that we cherish the most. I feel hope, for Schuyler's future and for her friends and her fellow travelers. I see possibilities for her that I never considered before, and I can imagine with ease a day when she takes control over the decisions that are currently being made for her by therapists and teachers and school administrators with one careful eye cast towards their budgets, and by us, her parents. Given the right approach by developers trained in the science of AAC language and at the same time visionary enough to see beyond what has come before, changes in consumer tablet technology may empower Schuyler and her friends in ways I can't even imagine.

I don't even know how to describe how happy that makes me.

References

Rummel-Hudson, R. (2008). *Schuyler's monster: A father's journey with his wordless daughter*. New York, NY: St. Martin's Press.

The iPad: A Cool Communicator on the Go

Glenda Watson Hyatt

Do it Myself Blog

Surrey, British Columbia, Canada

Abstract

Glenda Watson Hyatt, Web accessibility consultant, blogger, and user of AAC, shares her perspective on new mobile AAC technologies. A history of Glenda's use of AAC is chronicled from her early low-tech strategies to her recent embracing of new mobile AAC technologies. She recounts purchasing an iPad and her early experiences attempting to use it as an AAC system in a variety of contexts. Strengths, weaknesses, and projections for the future are highlighted in this personal sharing of a user perspective.

A lack of oxygen for 6 minutes at birth resulted in the diagnosis “cerebral palsy athetoid quadriplegic.” My physical movements are jerky and involuntary; one body part or another is in constant motion. My left hand has some function, while my right is generally in a tightly clenched fist. I am not able to walk without support. My head control is tenuous, and swallowing takes a conscious effort.

“Functionally non-verbal” was also included in my diagnosis. It wasn't that I couldn't or didn't communicate verbally, I did and do. My husband will attest to that fact, particularly when I'm fired up about something. It was the individuals beyond my family who didn't understand what I was saying, as was evident early in my life, when in preschool a psychologist administered the Peabody Vocabulary Picture Test. I uttered one response that he could not understand. Finally, in complete desperation, he called in Mom, who was observing from the next room, to decipher what I was saying. “Roo roo.” The two of them gazed at the picture of a chicken. “Roo roo.” Suddenly it dawned on Mom. She asked, “Glenda, do you mean rooster?” Yes! The picture was obviously a rooster; the bird had a big, red comb. The experts expected me to offer the accepted response, chicken.

I learned to be quiet, except around my family and close friends. One day I came home from kindergarten nearly in tears. “Mommy, my knees hurt.” She sat me down and looked at my long-legged braces. The occupational therapist had put them on the wrong legs! Wearing shoes on the wrong feet causes some discomfort, but wearing heavy, metal braces on the wrong legs hurts. I knew he was putting the wrong brace on the wrong leg. However, I kept quiet because I thought he wouldn't understand what I was saying. I didn't want to create a hassle as he tried to decipher what I was telling him. After all, only people close to me understood Glenda-ish.

During my school years, there was an occasional attempt to introduce me to communication devices, which were quite primitive back then. I wasn't interested. I felt those clumsy-looking “voice boxes” were more difficult to understand than I was. I was scared people would stop trying to understand me when I did talk. I didn't want to be stopped from having my own voice being heard.

During my 7 years at university, my low-tech, no-batteries-required alphabet card became my security blanket. I didn't leave my apartment without it. The alphabet card was handy for spelling out a word or two in a pinch and during lopsided conversations. My main

form of communication was by notes I had typed beforehand, trying to anticipate all the information that would be needed in that particular conversation, which took some planning and forethought. I went through several dozen pads of Post-It notes during my university years. I dubbed them my talking papers.

Fast forward to 2005. I was active on the Social Planning and Research Council of British Columbia's Board of Directors, and I was beginning to give presentations. The need for effective face-to-face communication was becoming more of an issue. I began wondering whether, with the advances in technologies, there was now a communication device that suited my needs. My husband Darrell called an old friend's father who was the sales representative for a few communication devices, which he brought by our home for me to see. Despite the lure of the "shiny new objects," I wasn't overly sold on the fact that they were single-purpose devices, which would mean something else to lug around with me. And the price tags, ranging between \$4,500 and \$8,500, were definitely prohibitive.

I decided to go with a small Libretto laptop for roughly half (or less) of the price and with much more functionality than a communication device. I used it to take notes at conferences, to give several presentations, and to participate in some group discussions using the free text-to-speech software, E-triloquist.

I had some communication success with the Libretto and adding a \$15 roll-up keyboard made typing easier. However, despite its small size, using it for spontaneous communication was clumsy. I had to unzip the laptop case, undo the Velcro straps, pull out the laptop, place it on a horizontal surface, boot it, and run the desired software before I could type out what I wanted to say. By then, the conversation had progressed and my contribution was old and disjointed. The laptop, although useful for some purposes, wasn't really convenient for communication in the way I needed it to be. The Libretto did enable me to communicate a bit more, but it still wasn't the ideal solution for me.

Fast forward again to April 2010. While in Chicago for a conference, I found my way to the Apple store and, after playing with an iPad for an hour, I pulled out my Visa to buy one, a month before the device was available in Canada. I also bought the Proloquo2Go (Assistiveware, 2009) app. Leaving the store, I had an intense feeling of buyer's remorse. Would I be able to use the touch screen reliably with my shaky and jerky movements? Would the iPad really work for communication? Would it be another fad "shiny object" to gather dust? Had I just put \$1,217.40 USD on my Visa for nothing? My stomach was in knots as I headed back to the hotel.

My buyer's remorse was short-lived. After an hour of quality time with my iPad in my hotel room—enough time to unpack the thing, turn it on, and play around in Proloquo2Go and discover the onscreen keyboard and "speak" button—I met my two Deaf and hard-of-hearing friends for lunch. Typing in Proloquo2Go came in handy. A combination of lip reading, American Sign Language, and typing on the iPad, now there's AAC on the fly!

Later that night, hanging out with other friends at the bar, the iPad's back light and clear display made for easy reading in the dimly lit bar. The font size in the Proloquo2Go app was large enough to read from a comfortable distance.

The cool thing was, because the Holiday Inn and bar had WiFi, I had Internet access. When asked what I had been up to, I responded "problogging and ghost writing," and I was able to show what I had written. I also shared the video of me ziplining across Robson Square in downtown Vancouver during the Winter Olympics. The iPad allowed for a deeper level of communication that would not have been possible with a single-function AAC device.

At another point during the conference, someone was having trouble figuring out what I was saying, and she asked, "Where's your iPad?" In that moment, I felt a sense of normalcy and acceptance. Using my iPad, a Blackberry, or iPhone in a size I can actually use is not another thing that makes me different. It wasn't using a strange, unfamiliar device to

communicate with this group. People were drawn to it, because it was a “recognized” or “known” piece of technology, rather than being standoff-ish with an unknown communication device.

Even though the Proloquo2Go app has two options for communicating, the grid view and the onscreen keyboard, I see myself using the keyboard more where I have the freedom to use the words I use without needing to go hunting for them mid-conversation. For in-depth conversations, the grid option is too limiting and too much customization is needed to add the vocabulary that I use. Learning the organizational structure and memorizing where individual words are located to effectively communicate with this tool would require either training or several rainy Saturday afternoons curled up with my iPad.

What would be great is if the TextExpander (SmileOnMyMac LLC, 2010) app was compatible with the Proloquo2Go app. This could enable me to type something like “GH,” and it would automatically expand to “Glenda Watson Hyatt,” saving me time and not slowing down the conversation flow as much. A separate app would be better than an expansion feature within Proloquo2Go, because then I could use the same shortcuts across apps on my iPad.

In addition to using the Proloquo2Go app, I have found other ways to use my iPad for communicating. Nominated for the local Entrepreneur of the Year’s High Tech Award, I needed to prepare a one-minute acceptance speech in the event of being announced as the finalist. Not eager to need to pull out my laptop, I wanted to be able to whip out my iPad for the quick task. I used my text-to-speech software TextAloud (NextUp Technologies, LLC, 2005) on my computer to create the audio file in the NeoSpeech voice of Kate, which I use in all of my presentations and which people have come to recognize as “my voice.” I then e-mailed it as an attachment to myself on my iPad. When I was announced as the winner, the Master of Ceremonies knelt beside me and held a microphone next to my iPad. I tapped play and Kate spoke my acceptance speech perfectly!

Being able to whip out my iPad from my handbag and having a choice of communication methods for when I’m on the go is life changing. Technology is finally catching up to my needs.



Figure 1. Glenda Watson Hyatt, Glenda blogs at Do It Myself Blog (www.doitmyselfblog.com) and Blog Accessibility (www.blogaccessibility.com)

About the Author

I work as a Web accessibility consultant with three levels of government, transit authorities, and non-profit organizations to improve accessibility of their websites for people with disabilities. I also combine Web accessibility expertise with a passion for blogging and first-hand experience living with a disability to work with bloggers to create an accessible

blogosphere. Personally, I blog at Do It Myself Blog (www.doitmyselfblog.com) and Blog Accessibility (www.blogaccessibility.com) I have shared my life story in an autobiography titled *I'll Do It Myself* (available from my blog and on the Amazon Kindle) to show others cerebral palsy is not a death sentence, but rather a life sentence.

References

Proloquo2Go. (2009). AssistiveWare [Software]. Available from <http://www.apple.com/iphone/apps-for-iphone/>

TextExpander. (2010). SmileOnMyMac LLC [Software]. Available from <http://smilesoftware.com/TextExpander/touch/>

TextAloud. (2005). NextUp Technologies LLC [Software]. Available from <http://www.nextup.com/index.html>

Disclosure: The author is the owner of Saltillo Corporation, maker of the application described in this article.

Mobile Technology and AAC Apps From an AAC Developer's Perspective

Dave Hershberger
Saltillo Corporation
Millersburg, OH

Abstract

Mobile computer technology has undergone profound changes over the past few years. It is important to appreciate the benefits and challenges of using mobile technology for AAC applications and to understand how various AAC stakeholders are affected by mobile devices and the corresponding changes in service delivery. This article will help us appreciate how our concept of an 'AAC Solution' may need to evolve to accommodate these new technologies.

The past few years have brought profound changes to the world of mobile computer technology. While the advances have been significant in their own right, the more profound changes have come in the way that we interact with the technology. "There's an app for that" is more than a clever marketing phrase; it's the way we view our portable technology. No longer is technology limited by to an initial feature set or clunky software installations. If we want additional functionality, we simply download an app. The process is fast, convenient, and relatively inexpensive.



Figure 1. iPod touch from Apple Computer

It is only natural that this new technology has become a platform of interest for augmentative/alternative communication (AAC) functionality. Like traditional AAC devices,

these mobile devices often have touch screens, plenty of processing power, and speech output capabilities. While currently there may be sacrifices such as durability and accessibility, price and convenience often make these products an attractive alternative to traditional AAC devices. Plus, rather than using a specialized device that may accentuate a disability, one can use the hottest technology on the market.

Loading AAC apps onto commercial devices makes AAC solutions more accessible to parents of individuals with speech disorders. Rather than going through a lengthy evaluation and funding process, a parent can now download an app ranging from \$5 to \$200 onto a device they may already own. This often provides the family with a greater sense of control and participation in the process of providing a voice for their child.

On many levels, these new opportunities are refreshing and exciting. The mere fact that more people have access to AAC solutions is exciting in itself. But just as this new technology has changed how we think of consumer technology, it is also changing our concept of AAC technology. Not only is our concept of hardware platform changing, but also the methods in which these devices are used, funded, and supported.

The Role of AAC Manufacturers

I have had the privilege of developing and manufacturing AAC devices for over 30 years. During this period, I have been both a participant and observer in the dynamic interaction between developers, clinicians, teachers, researchers, parents, and the individuals who use AAC products. As the field of AAC grew and matured, developers did not have the luxury of following a predetermined blueprint when designing new products. Rather, they collaborated with clinicians to discover better access methods, more robust vocabulary organization strategies, and more powerful customization options. Numerous innovations in the field of AAC have come as a result of this dynamic interplay. Developers and manufacturers saw their role not only as building a product that met a particular need, but as partnering with clinicians and consumers to nudge the field to greater heights.

A 1994 article discussed the role of the AAC manufacturer.

An interesting and perhaps unique aspect of the field of AAC has been the active involvement of manufacturers of communication aids and devices. Individually and as a group, manufacturers have made several important contributions.' In addition to citing numerous technological innovations that AAC manufacturers brought to the industry, it refers to examples where these companies have provided scholarships, consumer advocacy, and information dissemination for consumers of AAC technology. (Zangari, Lloyd, & Vicker, 1994, p. 38)

Another role manufacturers have taken on is the ongoing support of their products. When one speaks of an AAC device purchase, one is often referring to more than simply buying a device. This has evolved, in part, as a side effect of the funding process for AAC technology.

In 2000, major policy changes were made to the Medicare policies for funding AAC devices. Among the changes was the reclassification of AAC devices from "convenience item" to covered durable medical equipment. The new rules also specified that AAC device coverage is limited to dedicated devices, or devices that solely function as communication aids. For a summary of the changes, see Golinker, 2001. Later, Medicaid departments and many insurance companies revised their coverage for AAC devices, based on the new Medicare policy.

Today, a large number of AAC devices are purchased through third-party funding sources, based on the recommendation of a speech-language pathologist. A client who receives such a device may not be eligible for further device funding for as long as 5 years. This puts a lot of pressure on clinicians and equipment providers to offer solutions that will serve an individual's needs for a number of years. Devices often are provided to children during preschool and elementary ages. The language, physical, and social needs of these children will

change significantly over the next few years. The AAC device needs to accommodate these needs until the next funding cycle is reached.

Traditional AAC manufacturers not only provide equipment, but are often a lifeline to the client and his/her support team throughout the life of the product. This may include providing training to the new SLP when the child attends a new school or repairing the device that was dropped on the playground. Manufacturers not only repair the devices, but often provide service loaners while a child's device is being repaired. AAC device manufacturers routinely assist the client through the process of obtaining funding for the communication device. They make personal visits to demonstrate equipment to potential clients. They also provide live phone support.

While these services provide obvious benefits to clients, who pays for them? Typically, manufacturers can only bill the funding source for the device itself and for out-of-warranty repairs. The cost for the additional services is included in the price of the product, making traditional AAC devices significantly more expensive than comparable consumer devices.

Two Models

The traditional approach to providing AAC equipment can be thought of as a clinical model. The process often starts with a clinical assessment. The assessment covers language needs, physical access, and connectivity. The clinical evaluation and physician's prescription are often prerequisites for the funding process. As described above, a manufacturer often becomes involved at this point to assist the individual through the funding process. After purchase, the manufacturer takes on a supportive role for the client, the family, and the clinical team.

The new mobile technologies and apps have given a sharp rise to a consumer model for providing AAC solutions. Dave Moffatt, CEO of Prentke Romich Company, refers to this model as "Over-the-Counter AAC" (personal communication, 2011). Due to the low cost of these solutions, third-party funding sources often are not necessary and, in many cases, are not available for these purchases. Eliminating the funding process cuts time and expense, but also often eliminates the clinical component of selecting a device and creating a plan for clinical intervention. Parents who enthusiastically download an app for a son or daughter may find their enthusiasm wane in the absence of clinical and technical support as their child begins to use the device.

The Future

Will the clinical and consumer models for AAC remain largely separate, or will they converge over the next few years? Can we benefit from the technology and affordability of the new mobile solutions without losing the support aspects of the traditional model? While it may be too early to answer these questions definitively, we have a historical basis from which to make predictions. Over the past 30 years, the AAC field has continuously evolved to adapt to new technology, research data, clinical practices, and social trends. It will continue to evolve. Those of us who participate in this field as practitioners, developers, manufacturers, and educators have an opportunity, as well as a responsibility. We need to find ways to take advantage of new technologies without sacrificing those aspects of implementation that lead to communication success. Here are a few questions that may need particular attention:

In addition to AAC apps, can we also use the new internet based delivery methods, such as the Apple App Store, to provide guidance to family members of individuals needing speech augmentation? There are an increasing number of apps available from online sources such as iTunes. This number is only expected to increase in the future. Soon, a parent will likely find an overwhelming array of apps, each of which may have its own unique features and benefits. Where should a parent start? Which app might be most appropriate for their unique child? How do they get connected with a speech-language pathologist? iTunes has made a huge

impact by making AAC solutions accessible and available to parents who may have only a vague idea of the solution they are seeking. Can we find an equally accessible means for them to determine which app may offer the most benefit for their child? While not in app format, there are already several resources that can be used to help evaluate available options. A number of websites, such as Autism Epicenter (<http://autismepicenter.com>), offer reviews of AAC apps. AAC Tech Connect (<http://www.aactechconnect.com>) plans to release an Apps Assistant this spring to help identify AAC apps meeting particular feature requirements.

How can we get more clinician involvement in selecting appropriate apps for an individual? E-mail lists and blogs increasingly report cases where a clinician is asked to provide service to someone whose family has already obtained an AAC solution. A number of clinicians have shared experiences of being asked to implement devices that may not be an ideal solution for the individual. We need to enable early AAC experience to be a launching pad for a lifetime of communication success, rather than a frustration that makes both the individual and his/her family skeptical about augmentative solutions.

Will the funding process evolve to allow individuals greater flexibility in acquiring products and services? During the past several years, public and private health insurers have become more consistent in paying for AAC devices. As discussed above, when funding agencies pay for a device, they are also paying for certain services and support required for implementing and maintaining the technology. But, since many consumer AAC solutions fall outside of the definition of Speech Generating Devices (SGDs), funding agencies often will not pay for these devices and for the service and support that is typically included with traditional solutions. Will agency policies evolve to become more flexible in funding these support services, whether or not a traditional device is purchased?

How can manufacturers and other solution providers more efficiently and more effectively provide training and support for their products? One of the contributing factors to the higher prices of traditional AAC solutions is the level of training and support that manufacturers provide for their products. Live training and support often is provided for the consumer's family, as well as the consumer's educational and clinical support staff. As a child transitions to new schools, the training may be repeated several times to support a single device. While face-to-face training is personal and effective, it is also expensive and can be hard to schedule. AAC manufacturers are offering more and more online training and support, but still lag behind other industries with similar technology. We need to take a more aggressive approach to providing training and support through webinars, videos, and other online methods.

How can AAC manufacturers be more responsive in adapting to new technology? While traditional AAC devices are typically more rugged and robust than consumer devices, they often lose out in the "coolness" factor. These devices often incorporate technology that is a few years behind their counterparts in the consumer world. AAC companies are a fraction of the size of companies that manufacture consumer devices and do not have the development resources and the production quantities to keep up with large-scale manufacturers. So how can we combine the consumer market's latest technology with the AT developers' focus on accessibility and functionality for individuals with physical and cognitive disabilities? Several factors are moving us in this direction. Consumer devices are becoming more accessible. As the demographics of users of consumer devices have expanded, commercial manufacturers have responded by including accessibility features that previously were available only in specialized assistive technology. AT manufacturers are becoming more creative in their partnerships with commercial companies. Development of assistive technology always has consisted of using as much as possible from the commercial market, but compensating where this technology fell short in providing for the needs of individuals with physical or cognitive disabilities. Whereas a decade ago, AAC manufacturers largely obtained individual components from the commercial world, they now incorporate circuit boards, subassemblies, and other large components from industrial partners. It is even becoming common to integrate entire consumer devices into AAC

products. Finally, the AAC product industry has experienced significant growth during the past decade. While still smaller than most commercial manufacturers, AAC manufacturers have greater access to design and manufacturing capabilities than at any other time in history.

How can we maintain the product innovation that has resulted from the dynamic interaction between developers and practitioners? In some ways, new mobile technologies highly promote innovation. In others they introduce disincentives; focus groups and interactions with individual users are often time consuming and expensive. The cost structure of providing apps may not support these research activities, encouraging developers to copy features used in existing products rather than breaking new ground. Developers may be encouraged to provide capabilities for the “average” user, rather than investigating ways to give better access to individuals who may need additional features, access capabilities, or vocabulary. On the other hand, these devices have many aspects that encourage innovation. Apps easily can be updated wirelessly, allowing additional features to be added with little effort on the part of the user. Likewise, the online community that uses devices is often proactive in evaluating the strengths and weaknesses of apps and communicating them among each other. This feedback is an excellent source of information for the developer who is looking for ways to improve the app.

Can we make it easier to transition between technology platforms? Most of us use multiple technologies for electronic communication in our professional lives. For example, you may use a desktop computer at work, a laptop at home, and a smart phone on the road. While one may be more comfortable for you than the other, you easily transition back and forth between the devices. It may take you a bit longer to type out a message on your smart phone than on your computer, but it sure beats trying to use your desktop computer while riding the subway. The reason we can easily transition back and forth between these devices is that we have access to all of our language generating capabilities in each of our devices. AAC devices are often highly customized for an individual. To transition between multiple AAC devices, one would either need to customize each of the devices individually or use different vocabulary on each device. Current wireless technology would allow developers to synchronize vocabulary and other settings between multiple devices. This would allow a person using an iPad, while riding the bus to communicate with the same language interface and vocabulary that they use on their full AAC system at school.

To Participate or Not...

AAC manufacturers have carefully watched the rise of popularity of mobile devices and AAC apps and evaluated where this new technology and mindset fits within their own organizations. We are already seeing product innovations that have been inspired by these devices. But many manufacturers have been reluctant to offer apps for commercial products, because it would mean offering a different solution to their customers.

Saltillo was the first AAC manufacturer to offer an iPod/iPad AAC application in addition to its full-featured traditional devices. To some extent, this was an easier transition for Saltillo because of experience with its ChatPC devices, which are built on Windows Mobile PDAs. Even so, this step was not taken lightly. While the affordability and convenience of offering an AAC solution through iTunes is obviously appealing, we also acknowledge that the price structure does not allow us to provide the level of support to which our customers are accustomed. In the end, we felt we could provide a greater benefit by offering an app, being very clear in what we can and cannot provide, and then letting the customer choose the solution that best meets his/her own needs.

Like all new technologies, iPads and other mobile devices come with a mixed bag of opportunities and pitfalls. I believe the greatest pitfall is for us to focus too much on the technology. Providing an AAC solution is a complex process. An AAC device is only a tool, one of many components of a solution. The embedded vocabulary and language system are as

important as the hardware platform. Without appropriate clinical intervention, even the best device may have limited value. Rather than focusing only on the particular technology, we should focus on finding the best total solution for the individual who needs speech augmentation. This will help ensure that not only do we take advantage of new technology, but we also address the other components that contribute to success.

Dave Moffatt, president of the Prentke Romich Company, expresses a similar sentiment.

The hopeful news is that the enormous popularity of iPads, iPhones, etc. could generate a level of awareness of AAC that our small industry has never been able to accomplish. Some individuals will be well served by these over-the-counter solutions (after all, we serve a very diverse population with a wide range of abilities.) However, many individuals with severe communication disorders, those individuals who will require AAC for most of their communication needs throughout their lives, will need skilled clinical assessment, intervention and support services and specialized communication solutions to achieve their full potential in independent communication. (Personal communication, 2011)

I am convinced that there are many cases in which iPads and other mobile technology fit into one's AAC solution. I am equally convinced that we will continue to improve our methods of integrating these products into AAC intervention strategies. As we move forward, let us who participate in this field as practitioners, developers, manufacturers and educators use our opportunity in the best possible way, as well as take responsibility for guarding the important gains the AAC field has made.

References

- Golinker, L. (2001). *Key questions for medicare coverage & funding for AAC devices*. Retrieved from <http://www.nls.org/conf/medicareforacc.htm>
- Zangari, C., Lloyd, L., & Vicker, B. (1994). Augmentative and alternative communication: An historic perspective. *Augmentative and Alternative Communication*, 10, 27-49.

The Evolution of Augmentative Communication and the Importance of Alternate Access

David Chapple

AAC Institute
Shalersville, OH

Abstract

Over the past 20 years, there have been many advances in the computer industry as well as in augmentative and alternative communication (AAC) devices. Computers are becoming more compact and have multiple purposes, such as the iPhone, which is a cell phone, mp3 player, and an Internet browser. AAC devices also have evolved to become multi-purpose devices; the most sophisticated devices have functionality similar to the iPhone and iPod. Recently, the idea of having the iPhone and iPad as a communication device was initiated with the development of language applications specifically for this format. It might be true that this idea could become the future of AAC devices; however, there are major access issues to overcome before the idea is a reality. This article will chronicle advancements in AAC devices, specifically on access methods, throughout the years, towards the transition to handheld devices. The newest technologies hold much promise with both features and affordability factors being highly attractive. Yet, these technologies must be made to incorporate alternate access if they are to meet their fullest potential as AAC tools.

In the mid-1980s, augmentative and alternative communication (AAC) devices primarily required the user to form their spontaneous communications one letter at a time using a basic keyboard. A popular device of this kind was the Epson Speech Pac (ACS, 1984) that was one of the first laptop computers that had a voice synthesizer attached to the side. In addition to inputting single characters, whole phrases could be stored under two- or three-letter sequences. The biggest advantage of the Speech Pac was that it could be adapted to be accessed with an optical head pointer by attaching a LED overlay. Another key feature was that it could interface with a desktop computer. If an individual could not access the regular computer keyboard, he could type using the LED interface. It should be noted that this device could function as a normal laptop, but the laptops of those days were just glorified calculators.

Later in the same decade, there was a shift to communication devices being language-based, where the devices were preprogrammed with basic words and phrases. The pioneer of this philosophy was the Prentke Romich Company, and as it is known now, Semantic Compactions Systems. This innovation was called Minspeak (Baker, 1986). The Minspeak system uses pictures or icons to represent words. One of the major advantages of this system is that language is stored under a static overlay so the user can learn the physical patterns to access the vocabulary. It is very much like how people learn to be automatic at typing on a regular keyboard. Minspeak has been incorporated in every Prentke Romich Company device since its onset.

In the 1990s, there was an interest in developing communication devices with dynamic displays where the user's vocabulary could be broken into categories. The DynaVox Corporation was the first to produce a communication device using this concept. Unlike the

idea of the static overlay of Minspeak, DynaVox users select a category button on the display and the screen changes with pictures and word that represent the category. In spite of their differences with language representation, both Prentke Romich Company and DynaVox have kept up with the latest alternative access technology.

Alternative access is important, because many of the people using communication devices have limited mobility and cannot direct select with their fingers or toes. Scanning switches have been around for decades and will be for decades to come because they represent an effective means of alternative access for some users with physical impairments (Beukelman & Mirenda, 2005).

A large advancement in alternative access occurred when the Prentke Romich Company (PRC) began building optical head pointer sensors into their devices. The Liberator (PRC, 1996a) and DeltaTalker (PRC, 1996b) were some of the first devices to have this technology. The DynaVox devices do not have a built-in optical head pointer, but instead an external Tracker (Madenta, 2000) that can be attached to the top of the device. The Tracker has a camera that reads light reflected from a little dot stuck to the user's forehead or glasses that moves a pointer on the screen. This works exactly like the optical head pointer. These head pointing technologies enable users to access selection by a cursor, as long as they have sufficient motor control to move their heads or another part of the body.

An important selling point of these language-based devices was their ability to interface with a computer. This allows the user to type e-mail or papers using their language system whether it is a pictorial system, such as Minspeak, or a pictorial set, such as is found on DynaVox devices. In addition to typing text, devices had mouse emulators that enable the user to move the mouse pointer on a computer monitor. This opened up a completely new world for people with severe mobility disabilities who could not use a mouse in the past.

Communication devices can interface with a computer in a number of ways, depending on the needs of the user. The least complicated way is to attach a cable between the device and the computer. On older computers, this was done through the serial port, but most new computers do not have serial ports, but rather the cable goes through a USB port. However, there are interface options that do not require a cable for people who cannot physically plug and unplug cables into their devices. When wireless technology first appeared in the early 1990s, computer commands from the communication device were sent by an external radio transmitter plugged into the device's serial port, and a receiver was plugged into the computer's serial port. By the mid 1990s, this wireless technology was replaced with an infrared transmitter built in the devices and a receiver for the computer. Currently, computer interfacing is commonly accomplished via a BlueTooth adapter that is plugged into the computer's USB port and paired to an individual communication device. The BlueTooth technology is available in most Prentke Romich Company, DynaVox, and Tobii devices.

In 2000, the Prentke Romich Company released a revolutionary communication device called the Pathfinder (PRC, 2000). Several features made this device unique. First and foremost, it was the only device with both a static overlay and a dynamic touch screen display. This made constructing spontaneous sentences faster. The Pathfinder also ran under the Windows CE format, which was the format of PDAs of that time. This enabled the Pathfinder to run applications that were made for PDAs such as a calendar, address book, and some games; this was the first step towards a fully integrated communication device with a computer.

Another important feature of the Pathfinder was its cell phone integration capability. The user was able to make and receive calls directly through the Pathfinder by inserting an Air Card and SIM Card into the device. This opened up a new level of freedom and independence for users who were not physically able to use a regular cell phone. DynaVox and Tobii devices now also have cell phone capabilities. With the most recent AAC devices, the user is able to send and receive text messages. However, it should be noted that DynaVox devices only have text messaging and they are currently working on integrating the phoning technology.

Beginning in 2007, totally integrated communication devices became available when the Prentke Romich Company, DynaVox, and Tobii shifted the market. This meant a single machine could be used as a communication device as well as a laptop running either Windows XP or Windows 7. Although all of these devices can interface with an external computer, all of the user's computer needs can be met with the communication device such as surfing the Internet, writing e-mail, running word processing and spreadsheet programs, and playing games. The computer portion can be accessed via the user's access method including the latest, eye gaze technology. This technology is the most useful for individuals who have limited or no motoric use of their bodies.

Along with the emergence of communication devices that are internally integrated as laptops, there has been with a significant shift to using the iPhone and iPad as a communication device. These devices are all in one, meaning they can run computer applications, have Internet access, and can make cellular calls, exactly like the integrated communication devices mentioned above. In addition, because there is potential for these portable devices to be beneficial for people with speech disabilities, voice output applications have been specifically designed for portable devices. Of these applications, the two popular applications are the more full featured Proloquo2Go (Assistiveware, 2009) and the more entry level SoundingBoard (Ablenet, 2010). These applications are similar to the DynaVox philosophy, because the language representation is broken down into categories.

The concept of using the iPad, iPhone, iPod touch, or other consumer mobile technologies is sound for individuals who are ambulatory and have full function of their hands. However, these devices are challenging for people who need alternative access. At this time, there is no option for an optical head pointer, tracker, or eye gaze. Only recently have some scanning options become available for use with some applications.

If the introduction of new integrated devices is a major step in the evolution of AAC devices, the lack of alternative access for these systems can be likened to stepping back into the Stone Age. Therefore, it is important to set a stake for accessibility in this new territory. Mobile technologies are being embraced throughout the world, and there is seemingly little in the way of slowing this trend. These technologies often are fitted with beneficial features such as touch screens, innovative applications, Internet, and phone/ texting access. Yet, how can alternate access be included in the trend towards mobile technologies?

One answer is to build alternate access on the Apple accessibility framework for the iOS, which includes VoiceOver (Apple, 2008), the built-in screen reader technology. The basic concept is that the application programmer ensures that all items found on the screen have labels, and, when using VoiceOver, those items can be spoken. The user can quickly swipe to move to each item on the screen, hearing that item spoken. They can double tap to select. The user can also drag a finger or pointer across the screen until they hear the item they would like to select, and then double tap to select. Currently, you can see the result of not labeling items when using an app. When VoiceOver is activated and items are not labeled, the user moves around the screen with no access, and there is no opportunity to hear what is on the screen or select items on the screen.

One can imagine that, if all items could be selected and spoken in this fashion, then vocabulary could be selected through using a joystick, optical head pointer, eye gaze, and beyond. Application developers and hardware manufacturers could use this framework to open the iOS to alternate access. If alternate access is not built into the new mobile technologies such as the iOS and Google's Android, people with physical access needs will be prevented from using these technologies.

Therefore, it is important to ensure that all key stakeholders know how important accessibility is in this new era of AAC. The devices have come so far in the recent years, empowering people who use AAC in ways that could be only dreamed of 20 years ago. The newest technologies hold much promise, with both features and affordability being highly

attractive. Yet, these technologies must incorporate alternate access if they are to meet their fullest potential as AAC tools.

References

- Ablenet SoundingBoard. (2010) Roseville, MN: Ablenet.
- ACS Speech Pac/Epson. (1984). Pittsburgh: Adaptive Communication Systems.
- Baker, B.R. (1986). Using images to generate speech. *Byte*, 11, 160-168.
- Beukelman, D. R., & Mirenda, P. (2005). Alternative access. In D. R. Beukelman & P. Mirenda (Eds.), *Augmentative and alternative communication: Supporting children and adults with complex communication needs* (3rd ed.; pp.81-110). Baltimore, MD: Paul H. Brookes.
- Madenta Tracker. (2000). Edmonton, Alberta, Canada: Madenta Communications.
- PRC DeltaTalker. (1996). Wooster, OH: Prentke Romich.
- PRC Liberator. (1996). Wooster, OH: Prentke Romich.
- PRC Pathfinder. (2000). Wooster, OH: Prentke Romich.
- Proloquo2Go. (2009). AssistiveWare [Software]. Available from <http://www.apple.com/iphone/apps-for-iphone/>
- VoiceOver. (2008). Apple [Software]. Available from <http://www.apple.com/accessibility/voiceover/>