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Upfront

This issue focuses on recent improvements in the features of AAC technologies that the AAC community considers most exciting. I spoke with over 25 individuals from AAC companies, as well as researchers, clinicians, engineers and people who use AAC technologies. Many marveled at how new features in speech generating devices (SGDs) are making them ever more accessible to people with a broad range of complex communication needs (CCN). As the border between AAC and mainstream technologies becomes less pronounced, innovations from mainstream consumer technology companies are incorporated into SGDs and (to a lesser extent) mainstream devices serve as platforms for AAC applications.

Several people mentioned Moore's Law, which continues to affect everyone, including the AAC community. Gordon Moore, an Intel engineer, predicted decades ago that exponential changes in computer circuitry would occur (and continue to occur) every two years. One impact has been the ever-shifting landscape of increasingly sophisticated technology. Another shift involves global changes in how, when, why, where and with whom we communicate. Individuals with CCN today need to communicate face-to-face, as well as across distances, using SGDs. They also need to access mainstream technologies so they can pursue an education, maintain employment, engage in recreational activities, access media, develop relationships, explore personal interests and participate in social networks.

The **Equipment** section considers the relationship between mainstream technology companies and the AAC industry. Other articles highlight exciting features of today's AAC technologies. For example, **Eye gaze/eye tracking** covers interfaces that offer people with severe physical disabilities access to communication and mainstream technology applications. **Portable devices** highlights technologies for individuals with minimal or mild

Continued on page 2

inside this issue

Equipment

Communication and technology

Input, output, language representation, language organization, processing power, memory, color displays, cameras, videos, lithium batteries, speech that is natural sounding, intelligible and clear, volume controls, gender and age-specific voices, multiple languages, training supports, funding options, cool looking devices and more. Whew!

AAC technologies are now offering many exciting features. As a result, individuals with complex communication needs (CCN) and the clinicians and family members who support them feel not only excited but sometimes overwhelmed. AAC professionals are scrambling to keep up with what's current so they can help people with CCN match their unique skills, abilities and preferences to features of available AAC technologies.

To communicate in 2009

While expressing one's basic needs, exchanging greetings, and engaging in small talk may indeed be steps along the way to functional use of a speech generating device (SGD), true communication requires that an individual has ways to generate and use language with anyone, anywhere and at any time. It's a basic human right.[1] Communication is NOT just an end in itself, but rather a means to many ends: to participate actively in one's family and community and to pursue personal goals and interests (*e.g.*, friendships, lei-

Continued on page 2

Equipment, Cont. from page 1

sure, education, employment, clubs, literacy, music, art, sports) in ways that lead to a high quality of life and to self actualization.

Communication today is not just about talking, listening, reading and writing, but also emailing, texting, twittering, blogging, instant messaging and more. Individuals with CCN must have access to a full range of communication options so, if they choose, they can play Internet games with strangers a continent away, exchange photos and videos, engage with others on social networking sites, shop, work, apply for jobs and college, organize their lives, gather information, recreate and socialize. Communicating effectively with others in 2009 increasingly involves a range of technologies, some of which didn't exist even a decade ago.

AAC and mainstream technology companies

Mainstream consumer technology companies have the resources required to design, develop and distribute technological innovations to the global market. AAC manufacturers do not. They often incorporate mainstream consumer technology features into AAC products, either by adding the new feature to existing AAC hardware and software or creating a "new" product. In either case, they need to negotiate with mainstream companies to purchase or license products or product features. Finally, they have to make everything work together as part of a functional AAC system. Some examples follow:

* DECTalk was developed by a group of engineers at MIT in the 1970s. Digital Equipment Company subsequently introduced DECTalk as a consumer product in the early 1980s.[2] Almost a decade later, AAC companies began to license DECTalk for use in their SGDs. [Note: Today all voices in SGDs come from companies outside the field.]

* Enhanced display technologies with color and touch screens were mass market products long before the AAC industry offered dedicated SGDs with dynamic displays in the early 1990s.[3]

* Eye gaze/eye tracking technologies; longer lasting, smaller batteries; clearer and more powerful speakers; more natural sounding speech synthesis; wireless add-ons; more memory and smaller platforms—all are examples of innovations developed outside the AAC industry and incorporated over time in SGDs.

Even though some features of AAC technologies originate with mainstream manufacturers, only the AAC community understands, and can advocate for, the unique needs of people with CCN. The AAC industry has been innovative in its design and development of communication software—ways of representing, storing, organizing and accessing language and enhancing communication rates. AAC manufacturers also have developed access methods to address the physical, cognitive and linguistic requirements of individuals with CCN. Finally, the AAC industry provides important infrastructure so individuals with CCN can learn to use their systems and maintain them over time.

Staying current

Keeping track of available AAC technologies is a huge challenge. Two useful resources are:

GATE [http:abilitynet.wetpaint.com] by Ability Net. The Global Assistive Technology Encyclopedia (GATE) is an online encyclopedia that focuses on assistive technologies and their applications. Like Wikipedia, users can freely create and edit content. This site has hundreds of videos and pictures of people using technologies that support vision, hearing, communication and physical access. Available in ten languages.

AACTechConnect [http://www.aactechconnect.com] has information about hundreds of SGDs and their features. It is designed to support individuals with CCN and help professionals, so that together they can make good decisions by matching available device features with user skills, abilities and preferences.

Upfront, Continued from page 1

physical disabilities (*e.g.*, people with autism, Down syndrome, aphasia, *etc*.) who want devices that rate high on portability, functionality and the "cool" factor. Folks are also excited about today's **Speech and sound** technologies because they offer natural sounding, gender- and age-specific synthetic voices in multiple languages and amplification that makes it possible to hear SGDs outside, in classrooms, at parties, conferences and meetings. Finally, individuals with CCN don't want to be tethered to a wall or encumbered by wires. **Connectivity** is exciting because wireless options enable access not only to communication devices**,** but also to computers, cameras, video and MP3 players, the Internet, email, instant messaging, cell phones, texting, *etc*.

In short, it's an invigorating time. New ways of communicating have emerged and with them new opportunities and unique challenges. Thanks to those interviewed for their insights, expertise and willingness to take time out of very busy schedules to share information and reflect. [See list on page 8.]

Sarah Blackstone, Ph.D. CCC-SP

Eye Gaze/ Eye Tracking

The eyes have it

Eyes are the fastest moving parts of the body and are often not impacted by paralysis or extraneous movements. As a result, eye gaze has long offered people with severe motoric limitations important non-electronic (low-tech and no-tech) face-to-face communication options. These systems enable individuals to use eye gaze to indicate "yes/no" (*e.g.*, eyes up for "yes"), as well as to select or construct messages from displays using letters, symbols, words or phrases.* Of course, these systems do not provide access to technology or speech output devices.

Developing eye gaze technologies for AAC

For decades, we have longed for eye gaze/eye tracking systems that control computers and speech-generating devices (SGDs) so that individuals with severe physical and speech challenges can communicate independently. Effective eye gaze/eye tracking interfaces offer options when communication access is restricted, slow and/or labor-intensive.

> Anecdote: I remember in the late 1970s working with Mark Friedman from Carnegie Mellon University and colleagues at the Home for Crippled Children in Pittsburgh, PA (now known as the Children's Institute of Pittsburgh). Our goal was to support the communication efforts of Ana, a young girl with severe cerebral palsy. Friedman set up a computer and cameras in a darkened room. The idea was Ana would look at a desired message (represented by a picture), and the computer would recognize her gaze and say what the picture represented (*e.g.*, *I want to play; I have a question; I want to read a story.*).
>
> Quite truthfully, we were not successful. However, Friedman went on to become one of the original partners in Sentient Systems Technologies, Inc., which was founded in 1983 with Tilden Bennett and Gary Kiliany. The company subsequently developed and marketed the *EyeTyper*, a device that spoke messages composed by users with their eyes. They ultimately sold their patent to the US Navy. [In 1998 Sentient Systems became DynaVox Technologies.]

While AAC manufacturers did not aggressively pursue the development of eye gaze technologies, others did, and, as a result, nearly 40 mainstream companies today sell or license eye gaze/eye tracking technologies. Examples of mainstream applications:

- Research tools to determine what a user has seen and read or where the user's attention is focused. For example, how many people watch a TV commercial or visit an information kiosk or look at an intelligent billboard.
- Computer interfaces in medical settings so staff can access medical records/data in sterile environments or when hands are occupied (*e.g.*, during surgery).
- Inputs for games that bring people or objects into life-like action, zoom, shoot, pan or scan. (Gaming companies also collect information this way.)
- Ways to observe and analyze behaviors that relate to individual preferences and interests.
- Ways to train and monitor security personnel, police, pilots, *etc*.
- Vision and neurological screening/ diagnostic tools to detect strabismus, amblyopia, glaucoma, cerebral impairments, autism, ADHD, schizophrenia, Alzheimer's and Parkinson's disease.
- Ways to alert drivers about fatigue and other safety factors when driving.

The COGAIN website, an excellent resource about eye gaze/eye tracking products, is particularly valuable to the AAC community.

www.cogain.org

COGAIN (Communication by Gaze Interaction) was funded initially by the European Union. Located in Denmark, it has members from 24 companies in 13 countries. COGAIN meets annually, publishes proceedings and maintains a website that focuses on eye gaze technologies and related activities. Their next conference is in Austin, TX in March 2010. For more information, go to http://www.cogain.org/newsitems/News_Item.etra2010

(See box above). It focuses on eye gaze interfaces for people with disabilities and includes important information that affects the clinical decision-making process.

> (1) Lighting conditions; (2) Skill of the person using the eye control equipment; (3) Cognitive, visual and physical abilities of the user; (4) Age, mood, level of fatigue, state of health and level of motivation of the user and (5) Power, features and condition of the computer being used with the eye-control system.[4]

Who benefits?

Eye gaze/eye tracking technologies can offer individuals with motor neuron disease (ALS), traumatic brain injury, muscular dystrophy, locked-in syndrome, aphasia, cerebral palsy (both spastic and athetoid), high spinal cord injuries and other types of severe physical disabilities a reliable way to communicate and control technology applications. For some, eye gaze may serve as a primary access method; for others, it may be one of several input methods.

> People who currently use head pointers or head pointing technologies and those who rely on scanning may find eye gaze less fatiguing and more efficient at certain times during the day.
>
> Eye gaze systems may improve communication rates for some users in some applications or contexts.
>
> Over time, eye gaze may reduce repetitive stress injuries.

Continued on page 4

* Go to www.cogain.org/faq/eye-gaze-communication-board for several examples of low-tech applications. See also *Look2See* at www.ace-centre.org.uk and the *EyeGaze Electronic Hand-Held E-Tran System* at www.amdi.net/megabee

Eye gaze technologies, Cont. from page 3

Eye gaze products for AAC

Eleven companies currently offer eye gaze/eye tracking options for people with CCN. These products are described briefly below and are listed in Table I.

Alea Technologies GmbH. Teltow, Germany. *IntelliGaze IG-30.* A desktop solution for gaze-controlled applications. Allows control of Windows desktops and a range of standard and communication software. *IntelliGaze IG-30* facilitates text entry and is used as an AT tool for people with disabilities and for research. Available in English & German.

DynaVox Mayer-Johnson. Pittsburgh, PA. *EyeMax System*. The *EyeMax* is an accessory enabling those who use the *Vmax,* an SGD, to access its features using eye movements. It is bundled with *InterAACT* software, but users may choose other software options. Allows for multiple input methods.

Eye Response Technologies. Charlottsville, VA. *ERICA and ERICA II* are eye gaze/eye tracking systems that interface with versions of Windows-based computers. *ERICA* offers communication, computer access and environmental controls and has a patented zooming feature. It is bundled with the *LifeMate Software Suite*. Allows for multiple input methods.

EyeTech Digital Systems. Mesa, AZ. *EyeTech TM3* is a portable eye tracker that can be attached to a wheelchair; *EyeTech TM2* is a desktop eye tracker that attaches to versions of Windows-based computers and SGDs. A number of software options are offered. [Note: Licensed to Dynavox Technologies to power the *EyeMax*.]

H.K. EyeCan Ltd. Ottawa, Ontario Canada. *VisionKey* enables users to access computers and communication software. The stand-alone control unit has a display and a voice synthesizer and plugs in through a standard USB port. Compatible with versions of Windows and Mac computers. Available in French and English.

Human Elektronik GmbH. Worms, Germany. *SeeTech* products are modular and work with versions of Windows applications and communication software. The company recommends the *Grid2*. Available in German, English, Dutch, Italian, French, Greek, Swedish.

Table I. Available eye gaze/tracking technologies*

Company	Product	Communication software options	Contact information
Alea Technologies GmbH	Intelligaze IG-30	Grid2; Onscreen keys; MindExpress	Potsdamer Str. 18a, 14513 Teltow, Germany. info@alea-technologies.com; www.alea-technologies.com
DynaVox Mayer-Johnson	EyeMax System	InterAACT; Speaking Dynamically Pro; Grid2	2100 Wharton Street, Suite 400, Pittsburgh, PA 15203. joannekaufman@dynavoxtech.com; www.dynavoxtech.com
Eye Response Technologies	ERICA and ERICA II	LifeMate Software Suite	310 E. Main Street, Suite 220, Charlottesville, VA 22902. info@eyeresponse.com; www.eyeresponse.com
EyeTech Digital Systems	EyeTech TM2 TM3	Viking Communicator 4 Pro; Boardmaker with Speaking Dynamically Pro; Grid 2; Click-N-Type; GazeTalk; Dasher onScreen Keyboard	2160 E. Brown Road, Suite 2, Mesa, AZ 85213. info@etmail.net; www.eyetechds.com
H.K. EyeCan Ltd.	VisionKey	Operates any software	2849 Ahearn Avenue, Ottawa, Ont. Canada K2B 6Z8. info@eyecan.ca; www.eyecan.ca
Human Elektronik GmbH	SeeTech Only, Pro, Mobile and Compact	Recommend Grid2. Can use others	Bingerstrasse 52, 67549 Worms, Germany. info@humanelektronik.de; www.see-tech.de
LC Technologies	Eyegaze Edge	Eyegaze Edge software; Speaking Dynamically Pro with EyeMouse Program; Grid2	3919 Old Lee Highway, Suite 81B, Fairfax, VA 22030. info0309@eyegaze.com; www.eyegaze.com
Metrovision	VISIOBOARD	Word Pad; Grid2	4 rue des Platanes, 59840 Pérenchies, France. export@metrovision.fr; www.metrovision.fr
Prentke Romich Co.	ECOpoint	Unity Suite; Child and Adult Page sets; Adult Acquired Pages; WordCore	1022 Heyl Road, Wooster, OH 44691. info@prentrom.com; www.prentrom.com
TechnoWorks Co., Ltd.	TE-9100 Nursing System	TS-9111 Communication Program	34-31 Sukenobu-Town, Hamamatsu-City, Shizuoka-Pref. 430-0903, Japan. t-works@t-works.co.jp; www.t-works.co.jp/html/TE-9100_E.html
Tobii Assistive Technology, Inc.	Tobii C12 with CEye, MyTobii P10	Tobii Communicator; My Tobii Desktop Software	333 Elm Street, Dedham, MA 02026. www.tobiiati.com; customercare@tobiiati.com

* See also open source, low cost and freeware eye tracking options at www.cogain.org

LC Technologies. Fairfax, VA. *Eyegaze Edge*™ enables users to control many PC and Mac computers using *Speaking Dynamically Pro* with the *EyeMouse program* or *Grid2.* Available in multiple languages.

Metrovision. Pérenchies, France. *VISIOBOARD*. Operates in XP Windows environment. Mouse clicks are controlled by duration of gaze or eye blinks. Bundled with *Word Pad* or *Grid2* software. Available in English and most European languages.

Prentke Romich Company. Wooster, OH. *ECOpoint,* an eye controlled interface for the *ECO-14,* gives users control of all device features. Software options include *Unity Suite* and other PRC software. The *ECO-14* allows for multiple input methods. Available in English and German. [Note: PRC's *ECOPoint* is produced by Tobii.]

TechnoWorks Co., Ltd. Shizuoka-Pref., Japan. *TE-9100 Nursing system for enhancing patient's self-support* is mainly sold in Japan. Enables patients to communicate with nurses in English or Japanese using eye gaze.

Tobii Assistive Technology, Inc. Dedham, MA. The *Tobii C12* is an SGD with optional Eye Control (the *CEye)*. The *MyTobii P10* is an eye-controlled communication device that also provides other input options. Software options include *Tobii Communicator*. Available in Norwegian, Swedish, Dutch, German, Danish, US English.

What we know/don't know

Currently, we have positive testimonials from manufacturers, clinicians and users about eye gaze technologies for individuals as young as three years of age. In addition, one study by Ball, Fager, Nordness, Kersch, Mohr, Pattee and Beukelman reports on 15 consecutive patients with ALS who selected the *ERICA* system with *Type n Talk* or *LifeMate* software.[5] Interviews with these patients document positive outcomes.

> All but one person was successful in using *ERICA* to communicate. The person who discontinued using *ERICA* did so because he was unable to control his eyelids due to deterioration in his physical condition. All (N=14) used their system for face-to-face communication. Most also used *ERICA* to access the Internet, send email and talk on the phone. Nearly half used *ERICA* to communicate in groups and for other computer applications.
>
> The participants reported three reasons for selecting eye gaze: (1) eye gaze was their "only access option," (2) they wanted "multiple access options" and (3) "scanning was too difficult." A speech-language pathologist provided training for an average of 5.67 hours, although more than half of the patients required three hours or less of training. Individuals reported using *ERICA* in their chairs and in bed, as well as other locations, depending on their physical condition and living arrangement. The study suggested that, while problems with glasses, lighting and positioning occurred, they were easily resolved.

Comparative studies of specific eye gaze products conducted with people who have CCN are <u>not</u> likely given the severity of these individuals' disabilities. However, research is still needed to answer key questions:

1. How does the use of an eye gaze interface affect face-to-face communication? Are there ways to minimize any negative effects?
2. How can communication software be designed to optimize access to language for people who use eye gaze/eye tracking as an input method?
3. How can communication software be designed for users at various ages and linguistic and cognitive levels using text, symbols, pictures and/or scenes?
4. What do usability studies tell us about various eye gaze products by diagnoses? age? function?
5. Can eye gaze/eye tracking technologies contribute to multi-modal access systems and their effective use? How?
6. Do eye gaze/eye tracking methods reduce user fatigue and/or repetitive stress injuries over time?

Summary

The AAC community is excited about, and appreciative of, eye gaze/eye tracking technologies. However, at this time, no clinician, engineer or researcher I interviewed knew how to predict which eye gaze product would work for which individual. For now, therefore, individuals with CCN who are interested in using their eyes as input may need to try several products before deciding which one to purchase.

Portable Devices

There when I need it

Moore's Law is a funny thing. Computing gear ticks along, getting faster and often cheaper at a steady rate, But, every now and then, we hit an inflection point where things change in a drastic fashion. (Ashlee Vance, The New York Times, September 17, 2009)

There is a buzz in the air. Many feel we are approaching a juncture that portends change in how we think about AAC technologies. Small, handheld, wireless, multi-media speech generating devices (SGDs), such as those listed in Table II, hint at that future. Individuals with complex communication needs (CCN) (and relatively good dexterity) can use these devices to communicate with friends, family and strangers. In addition, these multi-functional devices offer a range of media options, computer applications and Internet access that address a broader spectrum of communication needs for more people with CCN than ever before.

Three device features seem particularly appealing: (1) "cosmesis" (*i.e.*, they look really cool and do cool things), (2) portability (being able to stand, walk and gesture while using a device and (3) affordablity/accessibility (*e.g.*, some are sold in local stores for a few hundred dollars.). While we've had portable SGDs for years (*e.g.*, the *LightWriter*, *Chat PC*, *Message Mate*), only recently have products become available that enable individuals to couple AAC software with so many other functions.

Who benefits

Individuals with autism, Down syndrome, aphasia, bulbar-onset ALS, cerebral palsy, severe cognitive challenges and others who have the finger dexterity to operate a handheld device seem particularly interested in these products. This seems to include many individuals who, in the past, have not found more traditional AAC devices very desirable or functional. Thus, handheld, wireless SGDs seem to be tapping a new group of users.

Handheld, wireless multi-media devices

These products (with 3 to 8 inch displays) use hardware platforms that include (1) PDAs with wireless capabilities; (2) smartphones and (3) specialty devices created by AAC manufacturers.[6,7] Companies are of-

Continued on page 6

Portable devices, Continued from page 5

fering communication software and speech, as well as other desirable functions (*e.g.*, Internet access, texting, music, phone, camera, games, GPS). Importantly, AAC companies provide customer support for these products, which many need. Table II lists some examples.

The *Xpress,* developed by Dynavox Mayer-Johnson, and *Tobii C8,* developed by Tobii, are designed for the AAC market. When unlocked, they offer a range of wireless, multi-media options.

The *Cyrano Communicator 2*, *Chat PC Silk, Chat PC4* and *Say-It! Sam Communicator* and *Persona Mobile* use PDA platforms. They're adapted by AAC manufacturers with communication software and other features added.

Smartphones (i*Phone,* i*Touch, BlackBerry*, *Android*) support AAC software applications. The best known example is the Proloque2Go for the i*Phone*/i*Pod Touch*. Smartphones can be purchased in stores and AAC applications downloaded or they can be purchased as a package from an AAC distributor.

What we know/don't know

Many of these products are new, and we have limited documentation regarding who is using them—why, when, where and how. Because of huge cost differentials and the "buzz" some have created, there are implications for funding, future development of AAC software and service delivery that we probably do not yet understand well. In any case, we need to move beyond today's testimonials and media hype to document how these devices are being used and by whom, as well as what the problems are. We also need to know about their social validity and how they will be supported. Examples of research questions are:

1. What populations (diagnostic categories, ages) are using handheld, wireless multi-media devices to communicate?

2. What device features do individuals use the most? the least? Why?

Table II. Hand held, wireless multi-media devices for AAC

Company	Device	Software Options	Contact information
Dynavox	Xpress	InterAACT Framework	www.dynavoxtech.com/products/xpress/
Tobii Assistive Technology, Inc	Tobii C8	Tobii Communicator	www.tobiiati.com
OneWrite Company	Cyrano Communicator 2	Picture Block Editor Cyrano Shorthand	www.cyranocommunicator.com
Origin Instuments	iPhone/iPod Touch	Proloque2Go	www.proloquo2go.com
Look2Learn	iPhone/iPod Touch	Look2Learn	www.look2learn.com
Lingraphica	iPod Touch	SmallTalk	www.aphasia.com/patients/product_smalltalk.aspx
IDEAL Group	Android	iAugComm/Speaking Pad	http://apps4android.org/iaugcomm.htm
Gus, Inc.	BlackBerry Curve/ Bold/Storm; Pocket communicator; U1/U8 Communicators	Mobile TTS SpeechPro SpeechPro	www.gusinc.com www.gusinc.com www.gusinc.com
Saltillo	Chat PC Silk Chat PC4	PalmChat; VocabPC; 16 Basic/16 Primary; Saltillo Sampler	www.saltillo.com/products/index.php?product=32
Words+, Inc.	Say-It! Sam Communicator	Say-It! Sam PC	www.words-plus.com/website/products/syst/say_it_sam.htm
Zygo Industries	Persona Mobile	Persona Communication System	www.zygo-usa.com/persona_mobile.html

3. Where do individuals use these devices to communicate? With whom?

4. Given the small "real estate" on device displays, how can language be organized most efficiently for those who are using text, pictures, scenes. symbols?

5. How do professionals, individuals with CCN and family members rate features of these devices as compared to other AAC technologies?

6. What percentage are being used as someone's primary AAC device? secondary device?

7. Are users, clinicians, family members satisfied with the support they receive (*i.e.*, training, maintenance, upgrades)?

Speech and Sound

Can you hear me now?

No longer does everyone have to sound like "Perfect Paul."

Today there is a clarity and naturalness to the sound of synthesized speech voices offered in AAC technologies. Among the current products are:

AT&T Natural Voices. 15 voices in multiple languages/dialects. To listen, go to www.research.att.com/~ttsweb/tts/demo.php.

Acapela® HQ Voices. 25 languages with 50 different voices. Go to www.acapela-group.com/speech-synthesis-voices.html.

NeoSpeech. 5 languages and 11 voices. Go to www.neospeech.com/default.aspx.

Loquendo Voices. 17 languages and 70+ voices. Voices have some emotion tags. Go to www.loquendo.com/en/demos/demo_tts.htm.

These voices are relatively easy to access and some can be downloaded for under $50 US. In fact, many AAC manufacturers now offer a choice of voices (male/female) in

different languages or dialects. In addition, digitized speech is higher quality today and also offered in many AAC products.

Who benefits?

Everyone! Speech generating devices (SGDs) now have voices that are more personalized, more intelligible and more natural sounding. Embedded or external speaker systems profoundly influence the quality of speech output. Today's smaller, more powerful speakers enable effective communication to occur in noisier situations.

Individuals with CCN want the speech and language in their SGDs to reflect the communities within which they live. Australians want to sound like Aussies, the Brits prefer the queen's English and the French want to speak French. Today, speech synthesis is finally available in multiple languages. This opens the door to people with CCN around the world who previously weren't all that interested in AAC technologies because SGDs didn't speak their language.

What we don't know

In a recent chapter, Higginbotham acknowledged the importance of voice to one's personal identity, calling for researchers to further improve the speech in SGDs by addressing three goals:[8]

1. Providing emotional expression so users can yell, sing, talk to animals, *etc*.

2. Providing ways for individuals to select desirable features from several voices and then "morph" these into a single unique synthesized voice.

3. Providing ways for individuals to control prosodic dimensions or intone their utterances in "real time."

What I'm excited about by Michael B. Williams

The rise of social media on the Internet. Use social media sites such as myspace and facebook to project a persona. Say funny things. Be silly. Be angry. Be wise. Be helpful. You don't have to write long things. Just a few sentences. I love it.

Blogs. Feel passionate about something, blog about it. It cost nothing to set up a blog.

Text messaging by cellphone. I keep track of my wife, kids, friends and family. We all text each other. A great communication tool.

Electronic reading devices such as the *Sony Reader* and *Amazon Kindle* brings the idea of paperless books into the realm of possibility. These things are not mere gadgets, but may expand opportunities of people with disabilities to independently access printed material. This technology is in its infancy, but it's boiling hot.

Connectivity

Anyone, anywhere, anytime

Connectivity refers generically to the ability to connect devices or networks so as to transfer data back and forth—for example, connecting to the Internet, connecting a digital camera to a computer or printer and using cell phones. Wireless technology makes such connections not just easier, but possible, for many who use AAC technologies. Wireless connections provide independent access to computers, printers, phones and other media at home, in school, on the road and in offices. Many of today's SGDs have built-in wireless capabilities.

Who benefits?

Children benefit because being connected without wires enables them easier access to educational materials, books, their friends, games and motivating media. Connectivity supports their social, educational and emotional development. Teenagers benefit because they can connect to the world and their peers, which provides access to the information age and global social networks. Adults with acquired and developmental disabilities benefit because they can have independent access to information and wide-ranging opportunities to participate and engage in activities of their choosing. [See Michael B. Williams' thoughts above.]

What we know/don't know

We know that Wi-Fi, Bluetooth and cellular technologies enable individuals to access the Internet, check email, transfer images from digital cameras, print, connect computers, send text messages, download music and video and use global positional systems (GPS). We won't be surprised if someday SGDs connect with ATMs and other devices in the community, as well.

Unfortunately (and this is really important), statistics show that the "digital divide" negatively (and disproportionately) impacts individuals with disabilities. Despite global increases in connectivity, people with disabilities have lower rates of Internet access and Internet use than their geographic counterparts without disabilities (especially in rural communities).[9]

For individuals who use AAC, easy access to a computer is more important than it is for those who are not disabled, and having an SGD with wireless access is often the only way to perform activities that are essential to full participation in school, the workplace and the community at large.[10]

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EVIDAAC

Evidence in Augmentative and Alternative Communication

ASHA Convention: New Orleans

The EVIDAAC team* (see below) is presenting a two-hour session at the American Speech-Language-Hearing Association in New Orleans, *EVIDAAC: A Database of Appraised Evidence in AAC*, on 11/20/09 from 3:30PM-5:30PM in Room 262 (Ernest N. Morial Convention Center). The team will introduce and discuss the project. They will also demonstrate the use of the EVIDAAC website for speech-language pathologists and other interested professionals.

* Ralf Schlosser (PI), Patricia Dowden, Gunther Eysenbach, Parimala Raghavendra, Jeff Sigafoos and Sarah Blackstone

ACN

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