Family Center on Technology and Disability

Issue 127

Technology Voices

Utterance-Based Communication:

Using the Right Tool for the Right Task

Dynamic display devices geared to the needs of children and adults with speech impairments have proliferated for nearly 20 years, evolving from static screens to today's computer screen technology. Yet despite the technological developments that have occurred during the past two decades, stubborn challenges continue to vex contemporary designers of these devices.

For example, dynamic display devices continue to be difficult to learn, especially for younger users, because the design of the devices favors adult users. Fortunately, designers of augmentative and alternative communication (AAC) systems at university-based Rehabilitation Engineering Research Center on Communication Enhancement (AAC-RERC) are now focused on enhancing the "learnability" of AAC systems for children in the K-12 range.

Another traditional design stumbling block is the difficulty in developing displays that produce spoken language fast enough to accommodate typical human communication styles and expectations. This difficulty often puts AAC users at disadvantage during conversations with non-AAC users.

While there are no easy solutions to these and other challenges, an updated approach to the design of AAC display devices, which emphasizes the concept of creating the most appropriate tool for a specific task, shows promise.

"The right tool for the right task," says AAC-RERC (http://aac-rerc.psu.edu/) Partner Jeff Higginbotham, "means that for certain interactive activities we need AAC systems that promote the successful engagement in those activities, with the appropriate vocabulary, the right utterances and the capability to issue them at the appropriate time." To date, admits Dr. Higginbotham, a professor in the Department of Communicative Disorders and Sciences at the University at Buffalo, "this approach has not yet proven to be completely successful, but it appears to be significant steps in the right direction."

Jeff Higginbotham, Ph.D., Speaks

Growing up in the 1950s he gained first-hand exposure to children with disabilities via a friend with cognitive challenges who did not attend school. He was drawn to the friendship because his mother, a pre-school teacher, taught children with psychiatric and developmental disabilities. His introduction to assistive technology came later through his interest in early microchip technology. Dr. Higginbotham recalls: "I was fortunate to be at the right place at the right time, the University of Wisconsin, when microcomputers began to proliferate." He attributes much of his fervor at Wisconsin to his association there with his mentor, David Yoder. Dr. Higginbotham began his doctoral studies in human social interaction at Wisconsin as Apple was producing its first personal computers. Soon he was introduced to and became proficient in the use of the Apple IIe computer. "By the time I graduated I was consulting with equipment companies about integrating augmentative communication into their technology." Since then, he says, "my pursuit has been to combine both of those interests by aiding technology users and designers in conducting competent social interaction."

He has been supported in his pursuit, he adds, by training he has received in conversation analysis, which examines social interaction as it unfolds in real-time. "When I began my research in the 1980s, video was the area of exploration. Today I rely on using digital video and multiple video screens for my research. We investigate human interactions transacted in real-time and focus on critical moments that seem to support or undermine communication.

We invite you to read, and share with others, the research-based perspective of, and lessons learned by Dr. Higginbotham and his colleagues.

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The earlier the better!

We all know the importance of early intervention.

Check out FCTD's newest Powerpoint resource:

Early Childhood and AT
http://www.fctd.info/powerpoints

This free resource can be used for parent education, professional development, client support, university-based programs, and other venues where assistive technology is discussed.

Utterance-Based Communication: One Voice No Longer Fits All

An Interview with Jeff Higginbotham, Ph.D., Partner, AAC-RERC; Professor, Department of Communicative Disorders and Sciences, University at Buffalo


Jeff Higginbotham, Ph.D.

For designers of utterance-based communication devices, conversational interaction is no longer a one-voice activity, declares University at Buffalo professor and AAC-RERC Partner Jeff Higginbotham. "In addition to adopting the right-tool-for-the-right-task concept," he remarks, "we're beginning to design devices that can be utilized by both partners in a communication activity.

Surprisingly, Dr. Higginbotham points out, "many device manufacturers don't promote the reality that the device user's conversation partners may read the display screens as the words appear so that they can respond quickly and keep the conversation going." Among manufacturers, he adds, "this is a major design irony; their devices are developed to accommodate an individual user model and don't provide for the possibility – in fact, the likelihood – that the user's conversation partner will become a user of the device as well.

"When we zeroed in on the problems that can arise in an interaction involving an utterance-based communication device we learned that those problems were not exclusively associated with the device user. These issues also involve the attentional limitations and expectancies of the partner who is engaged with the user of the device, the quality and appropriateness of the synthetic speech as it's being produced and the availability of other modes of representing information."

Face2Face: Keeping Conversation Participants in Time

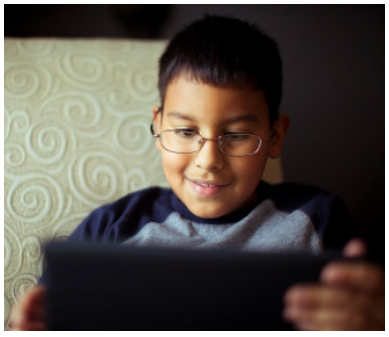
The bulk of Dr. Higginbotham's current AAC-RERC research serves two purposes: keeping conversation participants "in time" and providing information and appropriate vocabulary to conversation participants on a just-in-time basis.

With funding from the National Institute on Disability and Rehabilitation Research, Dr. Higginbotham's AAC-RERC Face2Face project (http://aac-rerc.psu.edu/index.php/projects/show/id/8) helps keep AAC users and their conversation partners "in time" via a focus on designing prototype technologies that have the potential to support face-to-face AAC social interaction. Face2Face experiments with prototype devices designed specifically for composing text or generating message content. Although most microcomputer-based AAC technologies, he says, are designed for composing text or generating message content, Face2Face explores tools that support real-time face-to-face interaction.

Several years ago electronic paper (http://thefutureofthings.com/articles/1000/the-future-of-electronic-paper.html) was incorporated into the design of Amazon's Kindle e-Reader. The Kindle, Dr. Higginbotham explains, was one the first technologies in a new generation of lightweight electronic information appliances that appear to have AAC application potential when utilized in a face2Face format. "The device is light, easy to read, has a long battery life, provides speech output and the content is customizable."

His Face2Face team detected the early promise of the Kindle "and believed we could work with the Kindle in an AAC format. We were wrong. The first generation Kindles did not allow any modification and within about a year of e-paper's incorporation into the Kindle, Apple produced the iPad, a revolutionary technology that swallowed e-paper – and just about every other related technology."

Less Oversight for Proliferating Non-dedicated Technologies



While e-paper may have flopped as an AAC application, Dr. Higginbotham says, the advent of the iPad has provided a slew of small, lightweight and portable technologies, including accessible software. "For our purposes of experimentation and prototype development, these technologies are less expensive and have some potential for being more socially inclusive, [in that] multiple users can become engaged."

However, he continues, "the current software is limited mainly to imitating tasks performed by dedicated devices. We're beginning to see hints of breakthroughs but I'm not really convinced that as of January 2012 there is a single technology that stands out as a template for the socially inclusive technology of the future."

In the meantime, he cautions, manufacturers of dedicated devices will continue to be pressed by the utility of more versatile and affordable devices. "There's no doubt that more people are acquiring non-dedicated devices. Unfortunately, there is probably less oversight and support for the individuals and families using them."

Dr. Higginbotham fears that standard non-dedicated software "may be assigned to all students in a classroom whether or not some of the users can physically access the technology or understand the information displayed. Recommendations urging the use of non-dedicated [devices] may be emanating from individuals who may or may not be qualified to provide assistance to students who are unable to access the technology. For this reason many users are seeking help."

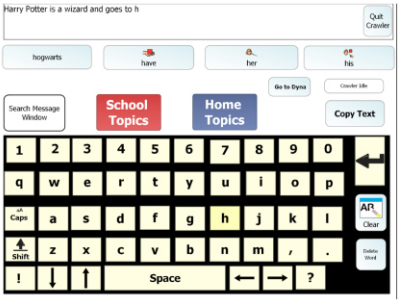
He cites the iPad as an example. "Schools are urging adoption of the iPad as a classroom tool, but Apple did not design the first generations of iPad to be accessible for individuals with severe physical disabilities. The most recent version is improved but is not on a par with the capabilities of current dedicated technologies, or even with the softwares that work with microcomputers. We may see a change in that situation because it is primarily a software development issue. And there also may be challenges emerging from other mobile computing markets. However, it is very early still in the tablet design and application process and there is more research that needs to be conducted."

Enter inTra

Consistent with Dr. Higginbotham's conviction that socially inclusive interaction requires the participation of at least two individuals and the coordination of expression between them in time, the Face2Face inTra project has developed a front-facing display and a technology that couples the transcribed utterances of the communications partner with the utterance spoken by the AAC user. The inTra corporate sponsor and partner is Ultratec (http://www.ultratec.com/), a manufacturer of technology for individuals with hearing impairments.

According to Cre Engelke, a UCLA doctoral candidate who is Dr. Higginbotham's inTra co-researcher,

inTra's objective "is to learn how a real-time transcript of partners' talk can help facilitate interactions involving an augmented communicator.



"We've explored several ways of using the real-time captions including as a supplement to conversation partners' speech so that individuals with low hearing or those who prefer text to spoken interaction can have an alternative interactional resource. We have also examined the feasibility of using partner speech to prime a word prediction engine so that fringe vocabulary will be predicted with fewer keystrokes.

"Now we are evaluating the effectiveness of using captions to create a transcript of the conversation so that an AAC user can insert his/her utterance or comment in the relevant position to maintain the intended context. We are trying to determine if by showing conversational partners a short transcript of what was said before the AAC user started typing as well as what the AAC user types, we can reduce conversational breakdowns and improve flow."

InTra as a Classroom

Mr. Engelke views inTra in the context of a classroom. "In school an augmented communicator may be given some of the questions in advance but may not be able to communicate fast enough to interject a novel utterance into the ongoing conversation such as would be required to disagree with another student's answer. By freezing the last few sentences said before the augmented communicator began typing, inTra would allow him/her to produce a complete utterance without fear of other conversation participants losing track of what they were responding to. Our hope is that this will reduce pressure on AAC users and aid their conversation partners in understanding user utterances, even when the AAC utterance is completed several minutes after a preceding utterance, which it was meant to address."

Basically, Dr. Higginbotham adds, "an individual with an identifiable hearing impairment can obtain either a dedicated device or piece of software for his/her PC or for an iPhone in which the user can talk to another person through the phone. When the callee talks back to the caller, the operator listens to one-way communication by the partner who is talking over the phone and revoices what that person says into a speech recognition system, which in turn, produces an accurate transcribed version of that communication. The transcription then appears on the display screen for the hearing impaired person to read."

Adults who have acquired hearing impairments "can benefit greatly from this technology as can many other individuals including children with hearing impairments." Under the terms of federal government contracts, major communication providers fund these services.

The significance of the inTra process, Dr. Higginbotham notes, "is that sometimes, given that a person types out an utterance at 6-10 words per minute, there are other verbal exchanges that occur in the normal course of a conversation during that typing period. Such exchanges may only be a minute or two, but nevertheless the user's partner is at risk of forgetting what was being talked about, or the partner may begin to engage in another conversation if there's another person present, and the conversation shifts, making the previous conversation no longer relevant. At that point it's often too difficult for the conversation partners to go back and integrate the utterance produced by the device."

In preliminary studies, Dr. Higginbotham says," we

have found that conversation problems begin to disappear when this display technology is introduced. We've been arranging situations which encourage topic shifts in multi-party conversation. We're finding that the augmentative communicator is not being asked to rephrase, that the partner has not dropped the conversation thread or acknowledged that the text generated by the augmentative communicator is irrelevant. In fact, the text is very easily integrated into a conversation with the appropriate context.

"This represents a leap forward, but a number of challenges remain. There are policy issues that require resolution, including the tool's cost effectiveness for individuals with augmentative needs. We need to demonstrate the efficacy of the technology before we can move forward. I'm confident that these issues will be resolved."

WebCrawler is Just-In-Time

To meet the need by AAC users for just-in-time information and appropriate vocabulary, Dr. Higginbotham and the AC-RERC initiated WebCrawler (http://aac-rerc.psu.edu/index.php/projects/show/id/11). An Internet and Intranet natural language processor, WebCrawler addresses a salient issue that has bedeviled AAC designers and users: AAC message content has been limited to preprogrammed vocabulary or to spontaneous constructions. WebCrawler, says Dr. Higginbotham, enables individuals to program their systems in real time, providing the right information to users when that information is needed.

Some aspects of what is now WebCrawler originated over a decade ago, Dr. Higginbotham recalls. "We were attending a conference and a friend and I were discussing research issues with a group of augmentative communicators. One of the attendees asked, 'Why can't I talk about politics? Why can't I talk about baseball scores and how my favorite team did yesterday?' That started us thinking about the technology that could make that happen."

With Webcrawler, he remarks, "our goal was to make use of the environment, in this case the Internet, to provide vocabulary to individuals as needed. It's impossible to provide all the vocabulary an individual needs in a single self-contained device. For example, an attorney requires a different vocabulary than a school teacher. A student taking a current events class needs a different vocabulary from that required by a student writing a paper on an author of classical fiction.

"We all have different vocabulary needs. Whether we populate our devices with 400 or 40,000 words, we're not going to have all the words we need nor will those words be made available to us."

A case in point, he points out, occurred several years ago when Harry Potter novels and movies were popular. "Kids wanted to talk about Harry and Dumbledore and the other Harry Potter characters. Did anyone build an augmentative communication device that contained the vocabulary to accommodate that demand? Nobody built such a device. A conversational opportunity was lost."

In a classroom environment, he points out, "it's extremely difficult to supply students with the relevant vocabulary for their studies, because doing so requires a speech-language pathologist or a teacher or teacher's aide to keep the expected vocabulary and connective terminology current. It's not an easy task to perform and devices aren't configured to make that activity any easier. If a teacher's aide, for example, must simultaneously manage a couple of kids the

task becomes impossible."

Timing Remains an Issue, albeit Less of One

A perennial issue with AAC vocabulary retrieval devices, timing is less of an issue with WebCrawler, Dr. Higginbotham says. While retrieval is not yet immediate, he notes, it can now be achieved in about 30 seconds. "Retrieval takes as little time as the user wants, but the more time that's taken the more information can be downloaded into the WebCrawler system."

To keep a just-in-time information flow, he advocates "background downloading wherein the system evaluates the user's typing and makes continuous content-based judgments while retrieval is ongoing."

As a way to help students keep current with their information base, his WebCrawler team is now exploring information retrieval in several scenarios, including the following: "Let's say a student is studying politics, which changes rapidly. The student can program the device to refresh its vocabulary on a periodic basis." In addition, he says, students can visit a teacher's website daily to review which new information items are needed for their systems.

Transferring the Technology

Dr. Higginbotham says, "we've developed a technology in partnership with two DynaVox engineers, director Greg Lesher and Bryan Moulton – to whom we transferred the technology this fall – which was based on a word prediction system that searches for key words on the Internet and transfers the pages to the text on which those words are found. For example, a Google search will pull down those pages and will check for content and formatting, extract the vocabulary and then recompile it with a word predictor. This process provides appropriate fringe vocabulary content to a student or an adult who is speaking or writing on a particular topic."

In addition, he says, "if a teacher puts his/her syllabus or work sheet on the web to be downloaded and used by a student, our technology will read that material and incorporate it into the communication device for use by the student."

"We developed a prototype with DynaVox that's not yet commercially available but which provides users with the opportunity to gain an unlimited configuration of vocabulary." This feature, he says, "enables users to talk about science, for example, and history, social studies, current events and to use the vocabulary appropriate to conduct their social interactions and fulfill their academic obligations regarding their selected topic."

The Future: Internet Connectivity; GPS in the Wings

Dr. Higginbotham predicts that Internet connectivity will become ever more ubiquitous in the near future. As designers, he says, "we're parasitic on the technologies that are generally available. We capture those technologies and then spin them in various ways depending on our objective. We didn't invent dynamic display screens or speech synthesis, for example. We have depended on the marketplace to provide the base technologies which are then reconfigured.

"We'll see the proliferation of more ways to access technology. Our communication technologies may be more integrated into the tasks we perform. The big challenge is to make these innovations available for use by individuals who otherwise would be unable to participate with those technologies."

GPS, he predicts, is a ubiquitous technology with real AAC potential. "We are beginning to see the use of geo positioning – using a GPS system to help tailor a conversation scenario so that, for example, if the user is nearing a Starbucks he/she would have access to coffee-related vocabulary."

When GPS-enhanced devices will become widely available, however, is uncertain. Most of the AAC-RERC prototypes, he explains, are eventually turned over to manufacturers who initiate the next phase in a device's evolution. "What happens next in terms of the final form a prototype will assume and how it is used is up to the company."

Sometimes, he continues, "a manufacturer will use pieces of a product innovation acquired from the designer and scatter those pieces throughout the company's system." For instance, he continues, "earlier work I've performed on utterance-based communication devices can be found in DynaVox products. Often we encourage the manufacturer to pull a prototype apart and use the individual parts. Whether that occurs is the prerogative of the company because the company has its own agenda regarding the usefulness of an innovation that sometimes diverges from our designer perspective." How the device is utilized by a manufacturer and how the innovator's recommendations are regarded depends on the existing relationship between the developer and the manufacturer, Dr. Higginbotham emphasizes.

WebCrawler's future, however, hinges on the ability of the U.S. to resolve infrastructure issues surrounding wireless access. "WebCrawler is dependent on stable wireless access. If there's no connectivity – 3G or otherwise – then the WebCrawler concept won't work. I'm confident, however, that those issues will be resolved sooner rather than later. And when they are resolved there will be a burst of new AAC technologies that many of us have barely imagined."

Nevertheless, his vision is tempered by the reality of recent history. "Two years ago Kindle had debuted and I ordered two brand new e-paper display devices that were just about to make their appearance in the marketplace. One entered the marketplace months late and the other didn't make it at all. The iPad had already disrupted the new paradigm and knocked the marketplace askew. Many technologies then in development were made irrelevant almost overnight."

As a result, he concedes, "I am very cautious about suggesting what is likely or unlikely to appear. It's fun to speculate but I'm of the opinion that to be ahead of the curve, designers first need to be very attuned to what is happening right now. In this era, that's enough of a challenge for us all."

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Excerpts from FCTD's Assistive Technology Solutions. Read more – and see visual examples of AT organized by category – at: http://www.fctd.info/assets/assets/19/AT_solutions-2011-FCTD.pdf?1322842743

A child's difficulty in completing a task may involve a combination of factors – physical, intellectual, and emotional. Sometimes multiple AT devices will be useful. A computer program that helps a child understand the rules of a group sport may be an effective first step before involving the child in the activity with others. Likewise, virtual games can introduce a child to the movements needed in real-world games.

Computer-based programs can provide the motivation to increase a child's time-on-task. However, some children are very sensitive to the sounds and quick motions in such programs; their exposure to visual and auditory stimuli should be monitored and controlled.

RESOURCES

ARTICLES

Synthetic Speech Systems

American Foundation for the Blind (2010)

This AFB fact sheet provides an introduction to synthetic speech systems, active accessibility and how to evaluate and purchase a screen reader. Product and vendor information is included, along with links to a number of online videos. http://www.fctd.info/resources/828

WEBSITES

Early Intervention for Young Children with Autism, Cerebral Palsy, Down Syndrome and other Disabilities

This website demonstrates early intervention techniques that were successfully used to improve communication skills in young children with developmental disabilities. The videos and related information are derived from a study conducted by Penn State University researchers Dr. Janice Light and Dr. Kathy Drager. The website lists the following five steps for successful intervention: 1. Identify contexts; 2. Provide effective means; 3. Select appropriate vocabulary; 4. Set up the environment; and 5. Use interaction strategies. To aid parents the researchers provide descriptions for each step and discuss key points. Video examples are included as well. http://www.fctd.info/resources/5137

Using Google Products: How to Use Accessibility Features

This website offers information about Google accessibility features for users with low vision and/or deafness/ hearing impairments. Site information is divided into the two areas of disability. Technology platforms include Android phones and Chrome Browser with specific information about accessible apps or programs such as Gmail, Google Maps, Google eBooks and SMS. Step-by-step instructions are provided for each accessibility feature or Android app. YouTube videos explain options for use. For example, both Gmail and Google Calendar can be used with a screen reader. Google Calendar can also be synchronized with Outlook. For individuals with hearing impairments, free SMS apps translate English into text. Gmail has a voice and video chat option. Sign language users can video chat online, or use Google Voice which converts voicemail to text. http://www.fctd.info/resources/5198

VIDEOS

K-12 Using Assistive Technology for Math and Science

YouTube (2011)

This brief YouTube video highlights AT devices and/or software useful for students who have difficulty with math and science, including computer-based talking calculators, screen readers, electronic dictionaries and text-to-speech options that recognize mathematical language and science terms. Mind-mapping software is presented as well. http://www.fctd.info/resources/5278

HARDWARE & SOFTWARE

Symbly

Symbly is a web-based visual support creator and editor for professionals and family members assisting individuals who are non-verbal and/or need visual communication support. The symbols are SymbolStix, Mulberry and Noun Project Symbols. Symbly's web-based platform, which eliminates the need to load software, is mobile and is downloadable to a computer, iPhone or iPad. Users create communication pages for multiple communication devices and then print. Page creation is facilitated by ready-made templates; help support is built in. http://www.fctd.info/resources/5286

Pictello: Visual Stories for Everyone

Pictello is a visual story builder designed by As-

sistiveWare (http://www.assistiveware.com/about.php), creator of Proloquo and Proloquo2Go. Pictello is a universal application that runs on iPod Touch, iPad, and iPhone. Pictello visual stories do not require reading skills, can be designed or played offline; stories are played back on external displays when a larger screen is needed. The picture library can be backed up in iTunes; stories are shared through iTunes or with other Pictello users via WiFi. http://www.fctd.info/resources/5205

UbiDuo

UbiDuo is a portable communication device utilized by deaf, hard-of-hearing and hearing people for written communication. UbiDuo consists of two interlocking units with keyboards and displays that flip open and are separated for use. This device can be employed as a social tool between friends and family and in work situations or medical environments when a sign language interpreter is unavailable. In college settings the device has been used as a tutoring tool, in study groups and in peer interaction. Four UbiDuo devices can be linked in the same conversation. The device meets ADA legal requirements for auxiliary aids and services. Cost: $2095. http://www.fctd.info/resources/5143

WordQ + SpeakQ

Version 3 of Word Q and Speak Q features are simplified reading and writing support tools. The software installs on Windows XP and Macintosh OS 10.4. Word Q offers starter to advanced vocabularies and in-context word prediction. Prediction vocabularies are expandable or focused, depending on user needs. Font, size, number of words in the box, sort order and positioning of the prediction box are customizable. WordQ adapts to user word choice, becoming more efficient over time. Specific topic lists can be created to improve prediction rate. Separate user vocabularies are customizable. Commonly confused words, such as "there" and "their," are displayed with an arrow in the prediction panel and a sample sentence offered to help selection. Non-standard spelling is recognized as the user types, predicting words with spellchecked suggestions. The spell check within MS Word can be utilized and words from the drop down list read aloud. Word Q also provides text to speech in reading new text as well as original writing. A text-reading mode helps with proofreading as documents can be highlighted and read aloud. Speak Q adds basic voice recognition. Speak Q "guesses" one word at a time, placing it and other options in the word prediction window, easing the requirement for rigorous correction required by more sophisticated programs. Cost: Word Q3 $200, Speak Q3, Word Q3+SpeakQ3 $280; free 30-day trial.
http://www.fctd.info/resources/5228

Write Online

This web-based Crick Software (http://www.cricksoft.com/us/home.aspx) writing tool features auditory support, word banks, word prediction and writing frames. Version1.3 offers phonetic word prediction, picture captioning capability and expanded accessibility features including additional speech options and updated vision enhancements for toolbars and menus. This online program is compatible with Mac, Windows and Linux. Cost: $1000-$1950 for an entire school subscription for the first year to $500-$950 for subsequent years. Purchase entitles teachers access to learninggrids.com (https://www.learninggrids.com/us/WelcomePage.aspx), the designer's free resource-sharing site which includes ready-made toolbars.
http://www.fctd.info/resources/4891

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KNOWLEDGE NETWORK MEMBERS

AAC TechConnect

AAC TechConnect markets toolkits and workshops designed to simplify augmentative communication evaluations. In addition to product information, their website provides a "device assistant" to help users search for AAC devices and links to a number of free resources. For more information, contact:

AAC TechConnect
PO Box 1944, CO 80437
Phone: (866) 482-2279 or (303) 674-8553
Fax: (303) 670-3564
Contact: Debby McBride, MS., CCC-SLP
Email: info@aactechconnect.com
http://www.fctd.info/organizations/12432

DynaVox Technologies

In addition to DynaWrite 2.0 and other state-of-the-art AAC devices, Dynavox provides funding advice and device training, plus InterACCT, a language framework that is incorporated into all DynaVox AAC equipment. The company also provides a free implementation toolkit for AAC users. Toolkit resources include print materials and instructional videos featuring information about AAC lesson and therapy plans, techniques for communication partners and an introduction to InterAACT software. For additional information, contact:

DynaVox Mayer-Johnson
2100 Wharton Street; Suite 400
Pittsburgh, PA 15203
Phone: 1(866) 396.2869 (toll free); (412) 381-4883
Fax: (412) 381-5241
http://www.fctd.info/organizations/7884

Tyler Institute at Nova Southeastern University (NSU)

Housed at NSU's Fischler School of Education and Human Services, Tyler Institute offers several AAC-related programs and services, including:

- ACE Lab, which provides AAC print resources and is the repository of more than 50 pieces of assistive technology;
- AAC Clinic, which provides evaluation and treatment services to children and adults with little or no functional speech;
- IntelliShare Center, which serves as a venue for training workshops on IntelliTools products such as Balanced Literacy, IntelliPics Studio, IntelliTalk 2 and IntelliMathics.
- Education, which offers AAC courses for graduate students; and
- Ongoing Research and scholarly writing on aspects of AAC practices.

For more information, contact:
Tyler Institute
FSE-GR NOVA Southeastern University
3301 College Ave.
Fort Lauderdale, FL 33314
Phone: (954) 262-7706 Fax: (954) 262-3940
Contact Carole Zangari, zangaric@nova.edu
http://www.fctd.info/organizations/3663

Angelman Syndrome Foundation (ASF)

The foundation sponsors AS research via grants to researchers pursuing promising avenues of discovery. AS is a genetic disorder with characteristic features that include severe speech impairment, developmental delay, intellectual dis-

ability and ataxia (problems with movement and balance). Individuals with AS may benefit from the use of AAC devices. ASF sponsors a biennial national conference at which current research results, therapeutic techniques, educational strategies, long-term planning and networking opportunities are discussed. The foundation also publishes a monthly newsletter. For more information, contact:

Angelman Syndrome Foundation
3015 E. New York Street, Suite A2265
Aurora, IL 60504
Phone: (800) 432-6435 (toll free); (630) 978-4245
Fax: (630) 978-7408
Contact Eileen Braun, Executive Director
Email: info@angelman.org
http://www.fctd.info/organizations/8565

Association for Science in Autism Treatment (ASAT)

ASAT urges the adoption of higher standards of accountability for the care, education and treatment of individuals with autism via the dissemination of accurate and scientifically sound information about autism and treatments for autism. The ASAT website features peer-reviewed research regarding AAC and autism. For further information, contact:

Association for Science in Autism Treatment
P.O. Box 188
Crosswicks, NJ 08515-0188
http://www.fctd.info/organizations/11098

Auburn University Center for Disability Research and Service

The center, which emphasizes the use of assistive technology, is a demonstration site for best practice. It provides diagnostic services for children with autism spectrum disorder; training for families, teachers, and related professionals; outreach consultation; and research opportunities related to effective intervention strategies. The center's AT-related activities include:

- Partnering with the university's Department of Industrial Design to produce innovative AT devices
- Exploring technology transfer opportunities
- Providing AT demonstrations, consultations and assessments for school systems, parent groups and service providers
- Hosting the annual Alabama Assistive Technology Expo and Conference (ALATEC http://www.auburn.edu/outreach/alatec/)
- Creating Apple iPad applications as AT
- Offering a graduate certification program (AT Practitioner) for teachers, rehabilitation and other social service professionals

For additional information, contact:
Center for Disability Research and Service
215 S. Donahue Dr.
Auburn University
Auburn, AL 36849
Phone: (334) 844-2487 Fax: (334) 844-2008
Email: autism@auburn.edu
http://www.fctd.info/organizations/8820

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Family Center on Technology and Disability
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Washington, DC 20009
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