

Upfront



Back in the early days of AAC, there were few speech generating devices (SGDs) to choose from and even fewer companies manufacturing and selling them. Today, dozens of AAC companies are in the business, and hundreds of devices are available. Deciding which SGD to recommend and purchase is, to say the least, a challenge for clinicians, individuals with complex communication needs (CCN) and their family members.

The speech generated by SGDs is of two very different types. Synthesized speech uses a 'computer voice' and linguistic rules that can turn text or symbols into speech as utterances are created on the fly. Digitized speech records natural voices or sounds to be replayed as needed. While digitized speech can be easier to understand, the pre-recorded message may not exactly reflect the intent of the speaker. Synthesized speech sounds less natural in tone, but only synthesized speech devices can pronounce a series of typed letters or symbols as spoken words or sentences. Both kinds of SGDs can store pre-programmed messages.

This issue of *Augmentative Communication News* focuses on digitized speech devices, which range in size, shape, cost and complexity. These SGDs are well-suited for a variety of communication tasks and are widely used. The amount of recording time available

on digitized SGDs currently ranges from seconds to many hours. The quality and intelligibility of digitized recordings depend upon a number of factors, including the sampling rate of the digitizer (the higher the sampling rate, the better the speech quality and the more memory that is required).¹

[Note: High quality digitizers, such as those used for a book on a CD-ROM, sample speech at 44.1kHz. However, the digitizers in many SGDs sample speech at rates between 5 and 11kHz.²]

At this time, no research exists comparing the speech intelligibility of commercially available SGDs with digitized speech—there are hundreds! One reason is that several

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For Consumers



Using digitized SGDs

For many people with complex communication needs (CCN), having intelligible speech means using a speech generating device (SGD). When someone is literate and able to spell, an SGD with synthesized speech is typically recommended; however, not everyone with CCN is literate or able to generate language independently. Examples are young children who are just developing language and literacy skills, older children/adults with severe cognitive/linguistic challenges whose language skills are limited, and adults with acquired disabilities, e.g., people with aphasia and dementia, who

have lost language and communication skills. Some professionals feel that devices with synthesized speech are

too complex for individuals in these populations. Others disagree. In any case, not everyone has access to synthesized speech devices in his/her native language.

There are many reasons why digitized SGDs are widely used today and highly valued in the field of AAC. Some are listed in Table I and discussed below.

1. *Digitized SGDs are the only option in many countries/regions.* A majority of individuals with CCN around the world can not access synthesized SGDs in their native languages or dialects because they do not exist. Currently, AAC devices are available with synthesized

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speech in a few languages/dialects, including US English, UK English, AU English, Latin-American Spanish, Castilian Spanish, French, German and Swedish. As Sarah Yong, a speech-language pathologist from Singapore said, "...the lack of synthesized speech devices is an issue in non-English speaking countries. Non-English speakers are limited when it comes to options for voice output."⁴ A digitized SGD may be the only way a vast majority of people with CCN can have a voice.

2. *People who are bilingual need to speak two languages.* The world is increasingly mobile. People emigrate and then gradually learn the languages/cultures of their new communities while they continue to converse with family and friends in their primary language. Individuals who are bilingual require SGDs that enable them to 'speak' both languages. For example, a ten-year-old girl from Mexico lives in California

Table I. Reasons for using SGDs with digitized speech	
1	Digitized SGDs are the only option in many countries/regions.
2	People who are bilingual need to speak two languages.
3	Digitized SGDs are affordable.
4	People with CCN and/or their family members may reject synthesized speech.
5	Digitized SGDs are relatively easy to program and maintain.
6	Sometimes an SGD is needed to accomplish only a few discrete tasks.
7	Sometimes an SGD is needed only in specific environments.
8	Sometimes digitized SGDs are used by more than one person in a group setting to support participation.
9	Sometimes digitized SGDs are selected because professional staff and/or caregivers are unfamiliar with technology and/or are not willing/able to learn how to support the use of more complex AAC devices.
10	Digitized SGDs are widely considered good "starter devices."
11	When someone is struggling with access issues, a digitized SGD may serve as a temporary solution.
12	Digitized SGDs can increase an individual's participation in daily activities, as well as help individuals take on valued social roles.
13	Sometimes more than one SGD is needed.

with her family. They speak only Spanish at home. While her siblings and father understand and speak English, her mother and grandparents do not. At school, only English is used. She needs an SGD that allows her to participate actively in her classroom and that will support her development of language and literacy skills. She also needs a device that enables her to converse with family members and peers in both Spanish and English. What are her options? One solution is to recommend two AAC devices, a digitized SGD for use at home and a synthesized SGD for use in school and out in her community. A second option is to recommend an SGD that offers both Spanish and English, with the flip of a switch.⁵ A third is to recommend an SGD that has both synthesized and digitized speech available. In making this important decision, a child's current as well as future needs are considered.

In another situation, a man with global aphasia is living alone and has paid caregivers who visit him daily to help with a variety of tasks. His caregivers are recent immigrants to the United States and do not understand much English. The man is frustrated because he feels unable to communicate his needs and preferences. To address these issues, his speech-language pathologist recommended that he purchase a digitized SGD and have some messages programmed in Cantonese, his caregivers' first language. This solution addressed two problems: his limited ability to talk to his caregivers and their limited knowledge of English. As a result of the intervention, he can communicate more easily, his frustration has decreased and his relationships with caregivers have improved.

3. *Digitized SGDs are afford-*

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intrinsic and extrinsic factors affect speech quality and intelligibility:

- Sampling rate of the SGD's digitizer
- Quality of onboard (internal) microphone
- Quality and strength of SGD speaker output
- Background noise during recording
- Background noise during playback
- Skills of person doing the recording.

For example, while it may seem preferable to use same-aged peers as the 'voice' for a young child, Kathryn Drager's research suggests that their recordings may be difficult for same-aged peers to understand.³

My thanks to those interviewed for sharing their opinions, experiences and perspectives. *For Consumers* considers reasons why digitized SGDs are so widely used. *Equipment* discusses types of SGDs with digitized speech and lists

examples of available products, as well as AAC manufacturer websites. *On the Web* describes the *AAC Device Assistant*, an Internet-based tool for clinicians. *Clinical News* raises a cautionary flag and suggests there may be downsides to using SGDs that only offer digitized speech to young children. *AAC-RERC* reviews webcasts directly related to the *Clinical News* section.

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able. In many areas of the United States, Canada and countries within the European Union, SGDs are covered by a third-party funder, and the family pays nothing or very little for the equipment. However, this is not the case everywhere. Even in countries where robust funding streams exist, many individuals still have difficulty accessing them. Thus, families often must pay “out of pocket” for the technologies their loved ones need to communicate. Many families in this situation will buy a simple digitized SGD, even if it is not the most appropriate option, because it is all they can afford.

4. *People with CCN and/or their family members may reject synthesized speech.* It is not uncommon to hear an adolescent or adult with CCN complain about the robotic sound of synthesized speech. Ultimately, some reject using any SGD, while others gradually become accustomed to their new ‘voice.’

Family members, who also influence the decision-making process, may initially object to synthesized speech, as well. For example, one woman told her husband (who has amyotrophic lateral sclerosis), “I just can’t stand that robotic voice...I want you to use your own voice.” Because he still had some intelligible speech, they selected an SGD that offered both digitized and synthesized speech output. He was able to record and play back some messages in his own voice after he lost his speech. Using text-to-speech, he was able to say anything he wanted during face-to-face interactions, as well as use email and talk on the phone.

5. *Digitized SGDs are relatively easy to program and maintain.* One factor to consider in making decisions about an SGD is the need for ongoing facilitator support. Many

digitized SGDs are easy to program and update because someone only has to press a button and record the desired message.* In one example, a high school student with severe disabilities worked at the YMCA shredding paper two times each week. His job coach had learned to program his SGD after only minimal training and was able to add and change messages quickly. One day, as they were entering the YMCA where the boy routinely greeted a receptionist with his preprogrammed message [*Hi Pat, how’s it going today?*], his job coach noted there was a new receptionist. After checking with the boy, he quickly reprogrammed the greeting. [*Hi. My name is John. Are you new here?*]. The receptionist was impressed and pleased.

*As pointed out earlier, many variables affect the quality of the recording, so it’s not quite as easy or straightforward as it might sound.

6. *Sometimes an SGD is needed to accomplish only a few discrete tasks (e.g., giving specific or detailed information quickly to unfamiliar communication partners, giving directions, answering the phone, making an emergency phone call).* In one example, a man with global aphasia who is living at home with his wife purchased a simple digitized device, primarily so he could make an emergency phone call and occasionally answer the phone. Both he and his wife indicated they were more comfortable knowing he could deal with an emergency situation when she was at work, shopping or visiting with friends.

7. *Sometimes an SGD is needed only in specific environments (e.g., doctor’s office, restaurant or hospital).* John Costello describes the use of SGDs with digitized speech in an intensive care unit at Children’s

Hospital-Boston.⁶ When surgery will result in a temporary loss of speech, Costello works with children beforehand to program messages in their own voice so they can communicate during the recovery process. Parents and nurses indicate that hospitalizations are less stressful when patients are able to communicate about their pain and/or basic needs (e.g., I’m thirsty) or ask questions about pets and friends, etc. One chapter of a recent book was devoted to a discussion of the benefits of using digitized (and synthesized) SGDs in acute care hospital settings.⁷

8. *Sometimes digitized SGDs are used by more than one person in a group setting to support participation.* Staff in schools, group homes, camps, etc. may set up digitized SGDs so individuals can share them during specific activities. For example, a teacher may pass around a SGD with digitized speech during storybook reading so students can read different parts of the story or participate in choral reading. Also, a teacher might place SGDs in different activity centers for all students to use to engage a peer, ask questions, request a toy, make comments, request assistance, etc.**

**It is also important that each individual have his/her own personal communication system, as well.

9. *Sometimes digitized SGDs are selected because professional staff and/or caregivers are unfamiliar with technology and/or are not willing/able to learn how to support the use of more complex AAC devices.* Family members and non-AAC specialists (teachers, instructional assistants, personal care assistants) often end up assuming major responsibilities for the daily care, ongoing programming and

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maintenance of AAC technologies.⁸ Few are prepared in advance, and most facilitators need to commit a great deal of time learning how to use and maintain AAC devices that offer multiple features. As a result, some do not feel they can support these technologies so a simpler, digitized SGD is selected.***

*** When this occurs, the client's needs are often not met. That is unacceptable. AAC professionals often work hard to support individuals, their family members and other facilitators. They know everyone requires early-on training and ongoing coaching. Tragically, our service delivery system does not often allow this. Thankfully, the AAC industry provides on-line supports, as well as training through their distributor networks. In addition, however, devices need to be designed in ways that make them easier to program, maintain and use.

10. *Digitized SGDs are widely considered good "starter devices."* A "starter" means a place to begin. For example, AAC researchers report that speech-language pathologists are more likely to recommend digitized SGDs for young children.^{9,10} To date, however, there is no research that demonstrates that SGDs with digitized speech and limited storage capacity are, in fact, good "starter devices," or that they should be considered a precursor to the use of a more complex SGD.

[See *Clinical News* for more discussion of issues involving young children.]

11. *When someone is struggling with access issues, a digitized SGD may serve as a temporary solution.* For people with severe physical and speech disabilities, accessing AAC technologies can be very difficult. It often takes time, and considerable expertise, to figure out what access technique(s) will work reliably (e.g., control site, switch placement, seating considerations). While rehabilitation professionals are solving these problems,

they may loan the individual with CCN a digitized SGD (with one or more switches) to serve as a temporary solution.

12. *Digitized SGDs can increase an individual's participation in daily activities, as well as help individuals take on valued social roles.* A device with digitized speech may be useful out in the community and during interactions with unfamiliar (or less familiar) communication partners. For example, many people find digitized SGDs easy to understand and natural sounding.¹¹ One man with autism uses a digitized SGD at his favorite restaurants to order and interact briefly with waiters. Having a voice increases his opportunities to interact with others in his local community, and helps him function more independently in familiar environments.

13. *Sometimes more than one SGD is required.* Most people today use multiple communication technologies (telephone, cellphone, email, BlackBerry, instant messaging). Obviously, no single mode of communication can meet anyone's everyday needs. As noted by Michael B. Williams, who relies on AAC,


No one communication mode, no AAC device, no low-tech board, no gestures, signs, or speech could possibly meet all my communication needs all of the time. I use multiple communication modes. I communicate in many ways. I select the best mode depending on the location, with whom I am communicating, and the purpose and content of the communication. . . I suggest that everyone needs more than one way to communicate. We all need access to multiple communication modes to be able to say everything we need and want to say, whenever and where we happen to be, and to whomever we choose.¹²

No SGD should be expected to do everything. Communication is always multi-modal. Some situations do not require technology, and people often prefer to use low-tech displays along with their impaired speech and

gestures to converse informally with friends and family. However, many situations do require the use of a more sophisticated SGD for meaningful communication to occur. The type(s) of SGDs selected will always depend upon multiple variables. SGDs should be chosen carefully so they will support the individual's best efforts to communicate whenever, wherever and however he or she wants.

Summary

SGDs with digitized speech offer relatively easy-to-use, intelligible and affordable speech output. For some, these devices may represent the only way to access intelligible speech. For others, a digitized SGD may be the best way to meet a specific need at a specific time. For most, these devices represent just one component of a total expressive communication system.

We are constantly learning more about the type(s) of AAC technologies that best fit the needs of specific individuals, as well as what features are most desirable and preferred by individuals or certain groups of individuals (e.g., young adults with cerebral palsy, young children in preschool settings, adults living in group homes, etc.). We know that sometimes digitized SGDs are the best option, and sometimes they may be only option. As speech technologies improve, the AAC industry will respond by incorporating new and better technologies in their products, as well as embedding innovative strategies designed to meet the ever-changing needs and preferences of individuals with CCN. 

Equipment



Types of digitized SGDs with Debby McBride and Libby Rush

Given the small-scale of the AAC industry, advances in speech technology (both synthesized and digitized) typically come from outside the field and then are adapted for use by AAC manufacturers. Over the years, governments and corporations have invested heavily in the development of speech technologies, and their investments have paid off, both for them and for us. As speech technologies become integrated into mainstream applications, better options are also available to the AAC industry. Thus, the storage capacity and quality of digitized speech in SGDs has continued to improve.

For funding purposes, digitized SGDs are often characterized according to the number of minutes of recorded speech available. For example, currently in the United States, the Medicare HCPCS codes categorize digitized SGDs as follows:

less than or equal to 8 minutes recording time (E2500)

greater than 8 minutes and less than or equal to 20 minutes recording time (E2502)

greater than 20 minutes and less than or equal to 40 minutes recording time (E2504)

greater than 40 minutes recording time (E2506)

There are, of course, other ways to categorize SGDs with digitized speech. For example, Tables II and III on pages 6 and 7 list examples of digitized SGDs from more than twenty AAC manufacturers located

in North America. As Luis Azevedo from Portugal said,

To the best of my knowledge, most companies in this field are importing SGDs from North America, which may, in turn, be made in China. The reason for this is simple. Although the technology to produce these devices is not sophisticated, production costs are high because it is expensive to make the plastic boxes with the boards in small quantities. You need a large market to make it work.¹³

The SGDs presented in Table II are devices with digitized speech and static displays. The SGDs in Table III are devices with dynamic displays. Some offer digitized speech only; most offer both digitized and synthesized speech.

[Note: Table II and III are not comprehensive and they are, admittedly, North American-centric. New devices are constantly being introduced and others removed from catalogues. Please check manufacturer websites for updates and for distributors in other countries.]

Digitized SGDs with static displays

These SGDs have digitized speech/sound output. All have static displays, *i.e.*, pictures/objects/symbols/overlays are placed on the device so that each item corresponds to a location that, when selected, produces pre-recorded speech. [See Table II.] Resources exist that detail a plethora of ideas about using both single and multiple level digitized speech devices creatively.¹⁴

Single level. These devices typically have less than 8 minutes of recorded speech and cost less than \$500 US. Most require that the person with CCN use direct selection with a body part to access messages. Many of these produce only one message, *e.g.*, *BIGmack* by AbleNet, while others can store multiple messages on one level, *e.g.*,



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the *WristTalker* by Enabling Devices and *Listen to Me* from the Mayer Johnson Company. A few devices can sequence (*e.g.*, *Little Step-by-step* by AbleNet) or randomize (*e.g.*, *Randomizer* by Adaptation) several messages during playback when repeatedly activated. A number of similar devices are also sold commercially, such as key chains, picture frames, cards that talk. However, the majority of these SGDs are designed for use by people with disabilities, and look like traditional AAC devices (*i.e.*, switches or rectangular boxes). Some let you plug in toys or appliances, *e.g.*, *Partner/One, 2 and 4* by AMDI.

Although these SGDs are very limited in what they do, they are currently used for a variety of purposes, *e.g.*, greetings, joke telling. In addition to providing very limited speech output for communication, clinicians and teachers may use them to provide prompts, foster learning and encourage more independence, *e.g.*, giving someone directions, reminders, *etc.*

Multi-level. Column three in Table II lists digitized SGDs with static displays that offer multiple

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Table II. SGDs with Digitized Speech and Static Displays: Single level and multiple levels
with Debby McBride & Libby Rush (check with companies for other products)

Company	Single level ¹ =environmental control unit (ecu) ; 2=plug-in for toys/appliances	Multi-level ¹ =ecu; 2=plug-in for toys/appliances
AbleNet www.ablenetinc.com	BIG/LITTLE Mack ² ; Talking symbols notepad; iTalk ² ; Big/Little Step-by-Step ² (sequences messages in order)	Step-By-Step with levels ² ; FL4SH ² SuperTalker Progressive Communicator ^{1,2} ; iTalk2
Adaptivation www.adaptivation.com	Chipper ² ; Voi Sec; VoicePal 8K; Randomizer2 (sequences messages in random order)	VoicePal Levels ² ; LEX Sequencer ² (sequences messages in order)
Adamlab www.adamlab.com	Hawk	Hawk II; III; BlackHawk; LightHawk; SuperHawks 6, 12, Plus ²
AMDI www.amdi.net/products.htm	Partner/One ² ; Partner/Two ² ; Partner4; Base Trainer; Talk Track; Tech/Four; Partner/One Stepper ² (sequences messages in order)	Smart/Talk; Smart/Speak; Smart/Scan 8 Plus ² ; Smart Scan 32 Plus; Smart/Talk 128; Tech/Talk2; Tech/Speak; Tech/Scan 8 Plus; Tech Scan 32 Plus; Tech/Talk w/ Environmental Controls ¹
Assistive Technology Inc. www.assistivetech.com		L*E*O* ¹
Attainment www.attainmentcompany.com	GoTalk Button/One; No Touch Talker; Go Talk Card; Clip Talker; Personal Talker; Voice Pod; Picture Frame Talker; One by Four Talker; TalkBook Four; StepPAD (sequences messages in order)	Go Talk 4+; Go Talk 9+; Go Talk 20+; Pocket Go Talk; Talking Photo Album
Dynavox Technologies www.dynvoxtech.com		adVOCate (manufactured by Toby Churchill, Ltd.)
Enabling Devices enablingdevices.com	Single Message: Big Talk; MiniCom; Motion Talker; One message recorder with divider; One Take and Talk; Put-em-arounds; Say It Play It series; Side Swiping Communicator; Single Message Communicator; Small Talk; StoryTeller; Talking Alert; Talking PictureCard Holder Two-four messages: 2/3 Compartment Communicator; Compact 3-Message Communicator; Grooved Platform Communicator; Clip Talk; Talking Rocking Plate; Rocking Say It Play It; Rocking Two Message Communicator with Light; Rocking Two Message Say It Play It; Hip Talk Two Message; Talkable III; Twin Talk; Talkable II; Wrist Talker Five+ messages: Palm Say It Play It, BasicTalk 4, with Communication Builder; 4 Plate communicator; 7 Message Take and Talk Go Board; Bedside communicator; Rocking recorder; Rocking Say it; Roller Texture; Spinning Communicator, Sequences in order: MiniCom Sequencer; Step Talk Sequencer Series; Hip Step Talker Sequencer; Talking Magic Roller; MultiCom; Big Talk Triple Play; Multi-Coms Oval Rectangular Sequences randomly: Big Talk Triple Play ¹	CheapTalk 4, 8, 12 ² ; 32 Message Communicator; Scanning CheapTalk ² ; HipTalk with 12 Levels; 7 Level Communicator; PhraseMaker; 6/7 Level Communication Builder; Talk 4; Talk 8
Great Talking Box www.greattalkingbox.com		EasyTalk; DigiComm
Mayer-Johnson www.mayerjohnson.com	Listen to Me	Boardmaker Activity Pad
Salttillo www.salttillo.com	Chickadee	Cardinal; Hummingbird; Chickadee; BlueBird II ² ; Chat Box 40/1; Chat Box DX; Chat Box 40 XT, VocaFlex
TASH www.tashinc.com		Talking Buddy ²
Words + www.words-plus.com/	MessageMate 8; MiniMessage Mate	MessageMate 20; MessageMate 40
ZYGO www.zygo-usa.com		Talara; Macaw 5; Green Macaw; Dactyl Macaw

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levels on which to store messages. These devices have greater storage capacity (some have several hours) and are more expensive. To access vocabulary/messages requires that someone (either the individual who uses the SGD or a facilitator) change the overlay and, most often, the corresponding level. A few devices now are able to “sense” when a different overlay is placed on the device and the level changes automatically, e.g., L*E*O* from

Assistive Technology Inc. and the SMART Series by AMDI. Also, the *BlueBird* from Salttillo has a flip option so overlays are more readily available.

Some devices with multiple levels enable clinicians to use a variety of overlay formats to accommodate cognitive and motoric factors. For example, they offer more flexibility with regard to how language is represented and organized, e.g., the *Progressive Communicator* by AbleNet, *EasyTalk* by Great Talking Box, *adVOCate* from Dynavox

Technologies, and the *Talara* by Zygo.

Some devices enable individuals to access SGDs using scanning, e.g., *Smart/Scan*, *Tech Scan* by AMDI, *Message Mate 40* by Words+ and the *Macaw 5* by Zygo. Some also include environmental controls (e.g., *Tech/Talk* by AMDI, *adVOCate* from Dynavox) or enable individuals to plug in toys and appliances (e.g., *CheapTalks* by Enabling Devices and *SuperHawks* by Adamlab.)

While these devices are popular

and used effectively for a multitude of purposes today by people around the world, it must be noted that they make it difficult to access large vocabularies, construct novel messages and engage in interactions that are not scripted.

Digitized SGDs with dynamic displays

A growing number of SGDs now use dynamic displays. These SGDs do not require clinicians to develop paper overlays, or individuals to change overlays and levels manually or find someone to do it for them. As shown in Table III, most SGDs with dynamic displays have both synthesized and digitized speech.

These SGDs are computer-based, which means they are more complex and expensive, as well as more flexible and powerful. One advantage of devices with hours of storage capacity and more flexibility is that clinicians can represent and organize language in ways that more specifically address an individual's needs and abilities over time. For example, these devices enable you to import symbols and photos, as well as use vocabulary sets prestored on the device. You can organize messages in various ways and access them using symbols, words or personalized scenes/pictures. Of course, the user has to learn to navigate among the available pages, which can be difficult.

Digitized speech only. Column two in Table III lists examples of the devices currently available with dynamic displays and digitized speech (only). Most also offer professionally recorded speech in several voices and premade language sets, e.g., *MiniMo* and *MightyMo* from DynaVox Technologies. The *Springboard Plus* from the Prentke Romich Company supports the use of Spanish and

Table III. SGDs with Digitized Speech and Dynamic Displays
with Debby McBride (check with companies for other products)


Company	Digitized only [1=ecu; 2=plug in for toys/ appliances]	Digitized & Synthesized [1=ecu; 2=plug in for toys/appliances]
Advanced Multimedia Devices (AMDI) www.amdi.net		TechTouch ¹
Assistive Technology Inc. (ATI) www.assistivetech.com		MiniMerc ¹ ; Mercury ¹
BlinkTwice www.blink-twice.com		Tango! (with digital camera)
Cyrano Communicator www.cyanocommunicator.com		Cyrano ¹
Dynavox Technologies www.dynvvoxtech.com	MiniMo ¹ ; MightyMo ¹ ; Dynamo ¹	MT4 ¹ ; DV4 ¹ ; DynaVox V ¹ ; DynaVox Vmax ¹ ; iChat3; Palmtop 3; DynaWrite (text-to-speech only) ¹
Great Talking Box www.greataalkingbox.com		ETalk 8400; ETalk Tablet
Gus Communications www.gusinc.com		Pocket Communicator
Lingraphica www.aphasia.com		Lingraphica Express2
Prentke Romich Company www.prentrom.com	SpringBoard Plus ¹	Vantage Plus ¹ ; Vanguard Plus ¹ ; ECO-14 ¹ ; Pathfinder Plus ¹
Saltillo www.salttillo.com		ChatPC/M3
Words+ www.words-plus.com/		SayIt!Sam Communicator ¹ ; SayIt!Sam Tablet
Zygo Industries www.zygo-usa.com		Optimist 3HD ¹ ; TalkAid Wireless (text-to-speech only)

English, which is invaluable in countries where both languages are spoken. These devices have large storage capacities, multiple access options and environmental controls. Most have colored displays. [The Dynamo from Dynavox records about 30 minutes of speech and has a black and white screen.]

While more expensive than devices with static displays, these devices are less expensive than devices with text-to-speech synthesis.

Digitized and synthesized speech. Devices in the last column of Table III offer a wide variety of features and are designed to meet a range of communication needs across the age span. They are typically recommended for individuals who can generate language and are, to some extent, literate. Most individuals who use them rely on features associated with synthesized speech and use digitized speech and sounds in a supplementary capacity.

These devices enable people to import pictures, set up visual scene

displays, connect to the Internet, use environmental controls and so on. One device, the *Tango!* by BlinkTwice, enables children to take pictures and is known for its voice-morphing feature. Devices with digitized and synthesized speech are the most complex category of SGDs on the market today, the most expensive and the most flexible. Unfortunately, individuals with CCN, family members and facilitators often find them difficult to learn and to use. 

Note: Compiling information about AAC technologies is not easy. It's painstaking, confusing and frustrating. Many thanks to Debby McBride and Libby Rush for their help. These talented, hard-working clinicians have spent years compiling and comparing features of AAC devices. See *On the Web* to learn more. Also, check out the June/July 2007 issue of the *Closing The Gap Newspaper* entitled "Lite tech should always be an option in AAC selection," written by Libby Rush and Mary Joan McClure.¹⁵

Go to www.closingthegap.com/ctg2/solutions/detail.lasso? That will take you to the archives and you can subscribe or join for 14 days to get the article without charge.

On the Web



AAC TECHCONNECT

www.aacTechConnect.com

Developed by Debra McBride, a speech-language pathologist and formerly an AAC device distributor, www.aacTechConnect.com provides unique resources to assist clinicians in AAC evaluations and AAC device searches. The *AAC TechConnect* website gives general information about speech generating devices (SGDs) and AAC manufacturers. It features *Device Assistant*, a tool which can help clinicians (and other AAC stakeholders) sort through the numerous device options now available.

Device Assistant

The *Device Assistant* is a database that includes nearly 100 speech generating devices (SGDs) organized according to device categories and features. Developed by a clinician for clinicians, it enables you to search for appropriate devices to meet the needs of specific individuals with complex communication needs (CCN). Ultimately, clinicians get side-by-side comparisons by searching in one of three ways: (1) By selecting specific devices to compare and (2) by searching within major device categories: Dynamic display; integrated system; text-to-speech; digitized with more options; simple digitized (4 or more pictures).

Note: Devices with fewer than 4 pictures are not included in the database at this time. For information on these types of devices, please refer to **The 2007-2008 Lite Tech Low Cost AAC Chart** prepared by Libby Rush and Mary Joan McClure. See section on **Products** in this article.

3) By selecting major features. At first the clinician selects according to type of symbol/representation, device style and message formulation options. Then, the clinician selects additional features (e.g., physical characteristics of the device, type of input required to access the device, output options, power, cost, technical support, software features, *etc.*). Results of the database search provide a side-by-side comparison for selected products. [See Figure 1.]

Using the Device Assistant

Hal is a 12-year-old boy with mild-to-moderate cerebral palsy, CNN and moderate cognitive and language delays. He is ambulatory and can generate three- to four-word utterances, but his speech is very difficult to understand. He is not literate, but he is interested in books, loves to use the Internet and has a teacher who is helping him learn to read. He needs a way to communicate with peers at school and friends out in the community, that supports his development of language and literacy skills and that looks 'cool.'

How could one use the *Device Assistant* to help identify an SGD that could help Hal meet some of his daily communication needs? The description that follows demonstrates how easy it was to come up with several good options.

Step 1. Select the type of search. I opted to conduct a search based on device features. I answered the questions indicating that Hal needs a device that allows him to use both pictures and alphabet/spelling input and enables him to construct novel messages.

Step 2. Indicate desired features. I was then required to

make some additional choices. For example, we thought Hal would prefer to have access to both digitized and synthesized speech, lots of pre-stored messages, as well as want to use single meaning pictures so he could combine symbols and play around with/use the alphabet. Hal is able to use direct selection and does not require a keyguard. Because he is ambulatory and in high school, a small device that resembled technologies his peers use would be best.

The search yielded five SGDs: the *Chat PC-M3*, *Cyrano Communicator*, *iChat 3*, *Palmtop 3* and *Say-it! SAM Communicator*.

Step 3. Select devices you wish to get more information about. I was interested in learning more about all of these devices and how they compared to one another, so I checked each one.

Step 4. Rate the devices in order of preference, if desired, I chose not to do so, and they appeared alphabetically.

Step 5. View results. As shown in Figure 1, the results of my search yielded a comparison of the five devices. [Note: only one page is shown.] In addition to the features I had selected, many other features were compared. For example, I learned more about the type(s) of voices available in each device, the amount of speech that could be recorded, warranty and accessory options, rate enhancement features and more. I also learned that some are WiFi compatible.

I was able to print out the comparison sheet and the PDF flyer from each manufacturer. This made it easier for me to follow up with local sales consultants.

Step 6. Give us feedback. The last step is to complete a brief survey about using the *Device*

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Basic Information			
Cost	\$2, 195 - \$3, 895	\$1199	\$2, 995 - \$3, 495
Medicare sion/code	ChatPC-D3+ \$3, 895; E2508	yes, \$1199; E2510	Say-it! SAM Dedicated; \$3, 495; E2508
Input/Selection thod			
Selection method	Direct select	Direct select (onscreen or wireless keyboard, writing transcribing)	Direct select
Types of scanning		Not applicable	Not applicable
Symbols/Language resentation			
Symbols/Language resentation	Pictures, alphabet, PCS, Imagine, import digital photos	Photos (import other symbols) , alphabet / words	Single meaning pics / alphabet / words; PCS symbols, import digital pictures
Rate enhancement			
Rate enhancement	Prestored messages, M3+ / D3+ includes prediction (word, letter) , abbreviation expansion	Prestored messages; abbreviation expansion, prediction	Pre-stored messages; Prediction (letter / word / phrase / grammatical) , abbreviation expansion

Figure 1. Example of *Device Assistant* results

Assistant. It invites you to make contact through email or by phone if you have any questions.

There are many reasons to check out this high-value, fee-for-service tool. For example:

It is a lot easier to spend some time on the site than searching through your old files or catalogues. Therefore, ***it saves you time.***

In addition, because information will be updated quarterly, ***it will help you stay up-to-date.***

The AAC TechConnect staff has thoroughly researched the information and then confirmed it with the manufacturers so you are sure ***the information you are getting is accurate.***

Because of the way the results are displayed, it allows you to compare several devices so you can avoid overlooking something, thus ***it helps you make appropriate clinical recommendations.***

The results can be printed out and shared with clients and colleagues. Finally, the database is really easy to use and you can learn a lot by using it. ***It expands your horizons.***

What it's not! The developers of this site stress that the *Device*

always required when making decisions and recommendations for an SGD.

What does it cost? The *Device Assistant* is reasonably priced.

For single users, costs range from \$14.95 (one-time use) to \$149.95 (year-long subscription for teams). In addition, site licenses will be available.

What else is on the site?

In addition to the *Device Assistant*, other information sources and clinical tools are offered.

What's new? This page announces new AAC devices from major AAC manufacturers and enables you to download their product flyers.

AAC manufacturers and AAC devices. This section lists more than 20 AAC manufacturers and includes product information for nearly 100 AAC devices, categorized in five device categories. McBride notes that criteria for inclusion in the database is: (a) the manufacturer distributes in the U.S. and has been in business for five or more years,

(b) the manufacturer provides support to consumers who use their products, (c) the manufacturer has a distributor network/or loaners available and (d) the manufacturer provides funding assistance for Medicare, Medicaid and other insurance.

Used equipment. This section lists used devices available for purchase. Currently ten devices are listed. In addition, several books from AAC companies are offered at a reduced cost. You can submit a request to sell an AAC device and/or a request to find a specific device.

Paperwork Assistant: This tool is designed to help clinicians during the AAC evaluation process and is HIPAA compliant. The *Paperwork Assistant* guides you through the process of gathering information and recording evaluation results. It also helps you develop equipment lists, do device searches, and finally, guides you through the report writing process. Ultimately, it will be a fee-for-service product. Check out the demo on the website. Available in Fall 2007.

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Products: The 2007-2008 Lite Tech Low Cost AAC Chart. Developed by Libby Rush and Mary Joan McClure, this “features chart” of AAC equipment includes both non-voice and voice output technologies (under \$1500). It’s comprehensive and easy to use. There is information about 250 products on 42 downloadable pages. Each item listed on the chart has: (1) a photo, (2) the current cost of the item, (3) manufacturer/distributor information, (4) features of the item and (5) client characteristics.

The chart is available for purchase for \$19.95 and is downloadable from the website.



Clinical News



SGDs and young children: Rethinking basic assumptions

with Janice Light

Clinicians often recommend simple digitized speech generating devices (SGDs) for young children with complex communication needs (CCN).^{9,10} Digitized SGDs enable children to access pre-recorded messages, are relatively easy to learn and are low cost. However, there may be a downside to using them with young children, because of their limited storage capacity and because the language they make available is typically whole phrases/sentences rather than single words. In addition, most digitized SGDs are designed as speech output devices only and, as such, are not configured to support interaction and language learning. They lack flexibility and make it difficult to store large vocabularies, to modify how language is represented and laid out and to employ easy-to-use navigational strategies. Also, Drager and colleagues report that the intelligibility of digitized *sentences* is excellent for high quality SGDs (approximately 98% for 3-5 year old children), but the intelligibility of digitized *words* is less robust (approximately 72% intelligible for the higher quality systems). They have called for manufacturers to improve intelligibility at the single word and phoneme level to better support language and literacy development.²

As discussed in the **Equipment** section, SGDs with digitized speech include devices that provide just a few messages, such as the *Step-by-*

step, GoTalk, etc., as well as devices that can store a lot of speech and offer multiple levels, such as the *Macaw, Message Mate, etc.* In addition, there are SGDs with dynamic displays that have digitized speech only, such as the *SpringBoard Plus and MiniMo*, as well as many devices that offer digitized and synthesized speech, such as the *Dynavox V, Eco-14, Impact, Mercury II, Optimist 3HD, Tango!, Vanguard Plus, etc.* The devices with dynamic displays have considerable storage capacity, as well as other desirable features. They are, as a result, often considered too complex for young children to use. However, as discussed below, they may be better suited to meet young children’s communication needs than simpler devices.

What young children need

Rhea Paul (1997) argued that young children with CCN require access to AAC systems

“... that can grow with them. That is, the child needs a language system that has inherent in it the capacity to make the crucial transitions from one level of linguistic complexity to another.... If these transitions are not built into an AAC system, the child is doomed to a limited modality of communication.”¹⁶

SGDs with digitized speech can and do increase children’s access to language and allow them to communicate preprogrammed messages.

However, we need to ask whether these SGDs, particularly ones with limited storage capacity, are the most appropriate solutions for young children with CCN. Are they truly easy for young children to learn? Do they provide sufficient support for the development of key language and communication skills? Are they designed in ways that make young children want to use them?

Since 1998, Light and her colleagues have been investigating which design features of AAC technologies best meet the needs of young children.¹⁷ As shown in Table IV, the research suggests that SGDs for young children should be appealing and easy to learn and to use. In addition, SGDs should be easy for family members and AAC facilitators to learn and use. Ideally, SGDs should employ contexts that are engaging and that support interaction by providing access to fun activities and varied learning opportunities. In short, the design specifications for these SGDs need to extend beyond their use as speech prostheses. Finally, devices best suited for young children should be easy to modify as children transition from “one level of linguistic complexity to another.”¹⁶

Let’s consider how current AAC technologies measure up.

SGDs with digitized speech

Whether an SGD with digitized speech offers seconds or hours of recorded speech, these devices

Table IV. Desirable design features in AAC technologies for young children¹⁷

High appeal to children /captures and sustains their interest.	Incorporates developmentally appropriate, motivating and fun activities that engage children and provide contexts for social interaction (e.g., songs, books, Peek-a-boo games, play activities).
Easy for beginning communicator to learn, i.e., immediately transparent.	Provides access to rich, varied learning opportunities (language, literacy, conceptual development).
Allows for growth in providing flexibility and ability to change features easily, as needed.	Fast to program.
Provides tools for communication across functions.	Easy for communication partners to learn and maintain.
Provides learning supports for the child.	Provides supports for partners during interactions.

The benefits of using digitized speech with young children

Concerns raised about the current designs of digitized SGDs in this article are *not* related to the use of digitized speech *per se*, but rather to how it is used and packaged in SGDs. In fact, there are clear benefits to using digitized speech/sound in AAC technologies with young children because it both appeals to children and may make learning language concepts easier as a result.

Increased appeal. Young children seldom do things simply because they should. Rather, they do things because they want to. Thus, children with CCN and their peers are more apt to use SGDs that capture and sustain their interest. For example, young children enjoy popular toys that incorporate sound effects (*e.g.*, beeping, honking, popping, heartbeat), songs, instruments, music, or the voices of favorite children’s characters.²⁰ It appears, not surprisingly, that digitized speech output also increases the appeal of AAC technologies, especially when they provide:

- A library of sound effects to enhance play and peer interactions (*e.g.*, truck sounds, “raspberries”, burping and other sounds that children produce that might not be easily accessible to young children with disabilities).
- Giggling, laughing and crying to allow children to mark emotions and to incorporate emotions into imaginative play.
- Animal sounds to enhance songs (*e.g.*, *Old McDonald Had a*

Farm), stories and imaginative play.

- Songs, music and the sounds of musical instruments to facilitate inclusion in music activities at school as well as for pleasure and play.
- The voices of popular children’s characters to add interest to early literacy activities, facilitate dramatic play, and enhance peer interactions.

Motherese. In addition, digitized speech may be especially important when implementing AAC systems with infants and toddlers who are at risk for developing speech. When talking to young children, for example, adults often modify their patterns of stress and intonation in ways that are described as ‘motherese.’ These highly inflected speech patterns are effective in engaging very young children during interaction. With digitized speech output, patterns of exaggerated stress and intonation can be replicated. Thus, they may be more appealing than synthesized voices that typically have very limited inflection.

Language learning. Drager and colleagues found that young children performed more accurately with digitized speech output than with synthesized speech output on a symbol learning task. They suggest that digitized speech may have provided more intelligible feedback, thus making it easier for young children to learn language concepts and representations.³

More research is needed to sort out how to employ digitized speech in SGDs to engage young children, help them communicate and foster their early language learning and literacy development.

typically have architectures that offer limited options regarding the types of representations (*e.g.*, symbols), layouts (*e.g.*, grids) and organizations (*e.g.*, pages) they can support. For example, most do not allow for the use of visual scene layouts with digital photos or scanned images, which may be easier for very young children to understand and learn.^{18,19} Also, they do not provide access to enough vocabulary to support rapid growth periods and are not designed to store a large number of single words. Thus, they make it very difficult for children to construct multi-word utterances, a critical stage in language development. In addition, even though some can run battery operated toys or appliances, most do not make it easy to communicate while participating in other activities.

Many SGDs with dynamic displays offer both digitized and synthesized speech. Because these

are computer-based systems, they are better able to support the use of a variety of representation types, layouts and organizations. Current research suggests that even though these devices are powerful and complex, very young children with developmental disabilities, age 13 months and younger *are* able to learn to use them when:

1. The systems incorporate developmentally appropriate, motivating and fun activities that engage the children and provide a context for social interaction (*e.g.*, songs, books, Peek-a-boo games)
2. The systems are set up to incorporate developmentally appropriate vocabulary, representations, layouts and organizations.
3. Partners initially provide the support children need to learn to navigate through pages.
4. Partners model the use of SGDs (and low-tech boards) during their interactions with these children.¹⁷

Because of their inherent flexibility,

SGDs with dynamic displays ultimately may be better suited to support the developmental needs of young children than simpler AAC technologies. However, setting them up and programming them is still very difficult and time consuming. Current technologies do not support *just in time* programming that would enable young children to communicate in the moment, thus capitalizing on motivating opportunities for learning.¹⁸

Supporting language and communication development

It is entirely possible that our expectations for communication development and language learning in some young children who require AAC are too low and that we are seriously underestimating their potential. For example, by recommending devices with limited storage capacity and flexibility, we may be artificially capping language develop-

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ment during the early years when young children are neurologically primed for learning language. The following section considers ways in which AAC intervention with SGDs can support the early language and communication development of children with CCN.²¹

Pragmatic development

Supporting growth in communicative functions and language use. Light, Page, Curran and Pitkin argue that we need to think about AAC technologies for young children as interactive communication tools, rather than simply as devices with speech output.²⁰ Children begin to engage in turn taking and meaningful interactions from birth, using gestures and vocalizations. As language develops, they learn to label, repeat, answer, request (action, answers, information), call, greet, protest, practice, persuade, scare, tease, and so on. They also learn to communicate effectively across contexts and partners, so they can share information, establish social closeness, use social etiquette and meet their basic needs (*i.e.*, use a variety of communicative functions). In developing these important pragmatic skills, young children rely heavily on their communication partners. Learning occurs within familiar routines and play activities. Thus, it is highly desirable for SGDs to provide interesting and engaging contexts that encourage interaction and support play, familiar routines, *etc.*

Currently, most AAC technologies are designed neither to foster these types of interactions between young children and their communication partners, nor to encourage the development of a variety of communicative functions and speech acts.

All of the children participating in an ongoing study at Penn State

University (PSU) have demonstrated significant increases in their participation in communicative interactions after the introduction of an AAC intervention that included the use of SGDs with both digitized and synthesized speech, configured to provide developmentally appropriate, motivating and fun activities. [See Figure 2.] For example, prior to intervention, a little boy with Down syndrome (age 15 months) took fewer than 3 turns during 20 minutes of interaction (less than one turn per minute). After nine months of AAC intervention, he increased his participation substantially, taking 120 turns in 20 minutes of interaction (six turns per minute).

In another example, at 25 months of age, a boy with severe cerebral palsy and a tracheotomy took one turn or less in 20 minutes of interaction. After nine months of intervention, at the age of 34 months, his number of turns had increased to an average of 44 turns in 20 minutes, a rate of just over 2 turns per minute. Because of his severe motor impairment and restricted speed of access, his gains were more limited. However, he demonstrated substantial progress in his participation in communicative interactions and a dramatic increase in communicative turns.

Because these children had increased their turn taking, it meant they had substantially more opportunities each day to learn language and social interaction skills. In addition, the data showed that both children communicated not just to express their needs and wants, but also to engage others socially, ask questions and share information in joint play activities.

Semantic development

Supporting vocabulary growth. In typical development, children pass

Figure 2. Key intervention strategies for young children with CCN²¹

1. Provide access to SGDs, with both digitized and synthesized speech, that are configured to provide developmentally appropriate, motivating and fun activities.
2. Provide AAC technologies with vocabulary, symbols, layouts, and organizations designed to meet their developmental needs of young children with CCN.
3. Add vocabulary on a daily basis.
4. Provide models of functional use of this vocabulary in meaningful contexts.
5. Model more complex communication using AAC technologies (low and high tech) and speech.
6. Expand the child's utterances using AAC and speech.

through the “first words” stage and then experience a period of rapid vocabulary growth. However, most SGDs selected for young children provide a limited range of linguistic concepts. This means that the language development of very young children who use these devices may be artificially constrained by factors external to the child, *i.e.*, the technology may limit their growth of vocabulary.^{17,21}

Current research suggests that young children with developmental disabilities (ages one to three years) can and do demonstrate substantial increases in their acquisition of vocabulary when AAC interventions are designed so that trained professionals and family members (1) provide access to dynamic display AAC technologies (with vocabulary, symbols, layouts, and organizations designed to meet the developmental needs of the children), (2) add vocabulary on a daily basis and (3) provide models of functional use of this vocabulary in meaningful contexts. [See Figure 2.]

For example, the little boy with Down syndrome described earlier acquired more than 1,000 linguistic concepts during nine months of intervention (from ages 16 months to 25 months). His rate of vocabulary development was three or four new concepts a day. This rapid semantic growth was possible because he had access to developmentally appropriate AAC technologies and an intervention strategy that was specifically designed to support his growing understanding and use of language. Also, he regularly observed adults modeling the use of his vocabulary using SGDs and natural speech during meaningful social interactions.^{17,21}

Syntactic development

Supporting the use of semantic relations, morphology and syntax. SGDs with limited storage and flexibility are ill suited to support the development of syntactic and morphological skills because they make it difficult to create novel utterances or combine concepts to communicate more complex meanings. Current research by Light and her colleagues suggests that young children with CCN can develop early syntactic skills given access to appropriate AAC interventions during which (1) facilitators model more complex communication using AAC technologies (low and high tech) and speech and (2) facilitators expand the child's utterances using AAC technologies and speech. [See Figure 2.]^{17,21}

For example, the little boy with severe cerebral palsy and a tracheotomy described earlier acquired a vocabulary of more than 450 concepts after only 12 weeks of intervention at age 28 months. Also, he was communicating using single-word and novel two-word utterances. Six months later, at the age of

34 months, he had acquired more than 1,000 words and was communicating using one- to four-word utterances and expressing a wide range of communicative functions. In addition, he was beginning to use grammatical markers in some of his communication (e.g., plural, past tense).

Supporting a continuity of growth and development


As discussed earlier, supporting the development of cognition and language in young children with CCN requires AAC technologies and intervention strategies that are flexible in ways that allow children to transition easily from one level of complexity to the next. The use of simple SGDs as 'starter' systems may seem reasonable in theory, but in practice poses significant difficulties for children with CCN. For example, simple SGDs with digitized speech employ paper overlays that must be changed manually, whereas dynamic display devices require a very different navigational strategy to access words and messages. Thus, important skills do not easily transfer from one type of technology to the next. Children must not only learn how to use new operational demands, but also must "unlearn" many facets of their simpler systems in order to express language.

By underestimating children in the beginning, valuable opportunities for language learning may be lost during their most important language-learning years. Additionally, by recommending a "starter device," we may delay or preclude some children from gaining access to a more sophisticated SGD because of restrictions imposed by funding agencies.

Summary

What would have happened to the children described in this article if they did not have access to the types of AAC interventions and technologies they received? Would they have developed vocabularies at the same rates? Would they have combined words in novel ways using morphological markers and syntax? Would they have expressed a broad range of communicative functions and speech acts? Would their language skills have developed at the rates reported? We need more definitive answers to such questions.

The early years are critical for language and literacy skills development. Thus, children with CCN need access to AAC interventions that can support language learning and communication, rather than stymie it. Ongoing research suggests we need to rethink some of our basic assumptions about how we support very young children with CCN who require AAC. All children need ways to understand and use large vocabularies, construct multi-word utterances and engage in literacy learning activities. The SGDs they use have to encourage and support their dynamic interactions with family members, siblings and friends during play, daily routines, songs, story book reading, *etc.* It is *not* enough to think of SGDs as therapy tools, curriculum supports or toys to be used on occasion. They need to be more than devices a child uses only to request a cracker at snack, tell a joke or make a few comments.

Using digitized speech and sounds is incredibly valuable and helpful to children with CCN and should be available to them. However, it is essential that the SGDs we recommend do not unnecessarily constrain language learning during these critical early years. 

AAC-RERC



SPREAD THE WORD

Webcasts on AAC technologies and young children

The Rehabilitation Engineering Research Center (RERC) on Communication Enhancement (AAC-RERC) is funded by the National Institute of Disability and Rehabilitation Research and focuses on four areas: research, development, training and dissemination. The mission of the AAC-RERC is to assist people who rely on augmentative and alternative communication (AAC) to achieve their goals by advancing and promoting AAC technologies and supporting the individuals who use, manufacture and recommend them. This article highlights two webcasts presented by Janice Light.²² Each relates to the previous article on the use of AAC technologies with very young children who have complex communication needs (CCN). Both webcasts will probably be offered for ASHA continuing education credits (1.0 CEUs) in the near future.

These webcasts describe the results of ongoing research and development work at Penn State University. Already emerging from this research are multiple peer-reviewed publications, as well as design specifications that are having an impact on the AAC industry. For example, several AAC manufacturers are advertising visual scene displays. In addition, there are many more colorful and engaging SGDs designed for very young children on the market today.

Not only does Dr. Light give a lecture with clarifying slides, but she



also shows videotapes of young children who are participants in the

Penn State projects.

The webcasts are developed in Macromedia Breeze and work across computer platforms. You can easily download the accompanying PowerPoint slides, as well as read a transcript of the talks. In addition, it is easy to skip around, *i.e.*, go back to review a slide or skip forward to see a video. These webcasts are already being used by teachers in graduate schools to support university courses in AAC. They are also extensively used by parents and clinicians who are working with very young children. To access these webcasts (and others from the AAC-RERC), go to www.aac-lerc.com.

AAC Interventions to Maximize Language Development for Young Children (81 minutes, 84 slides. May 2005.)

This webcast highlights the use of SGDs with very young children who have CCN and are at risk in all aspects of their development. Dr. Light reports on the results of ongoing research at Penn State and discusses: (1) effective design specifications for AAC systems to better meet the needs and skills of young children and (2) effective techniques to implement AAC with young children (ages 0-3) who have significant communication disabilities and their families. She also discusses the implications for evidence-based practice, using case studies to illustrate the effects of the interventions under investigation on language and communication development. She makes a strong case for early

Visual Scene Displays for adults with aquired conditions

In May 2007 Dynavox Technologies released the *Visual Scene Display Communication Framework* for adults who have CCN secondary to severe aphasia and traumatic brain injury. This communication strategy results from the research and development work undertaken by David Beukelman, an AAC-RERC partner, and his colleagues at the University of Nebraska. It is now available on the Dynavox V and Vmax. For more information, go to www.dynavoxtech.com.

interventions that provide appropriate AAC technologies and services for young children with CCN.

Maximizing the Literacy Skills of Individuals who Require AAC (106 minutes 151 slides. November 2006.)

Literacy skills are critical for individuals who require AAC. Yet many individuals with CCN experience significant difficulties acquiring literacy skills. This webcast discusses effective evidence-based practices to maximize the literacy skills of individuals who require AAC. Case studies illustrate effective interventions to help children with CNN (a) acquire phonological awareness skills, (b) learn to read words, (c) participate in shared reading activities with personalized books and (d) write their own stories. Researchers Janice Light and David McNaughton have also successfully completed a low-tech curriculum that was field tested on individuals with CCN. AAC-RERC



SPREAD THE WORD

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