



British Columbia

Supporting People who use AAC Strategies: in the Home, School & Community.

Fourth Edition - February 2008

www.setbc.org

Creating Student
Opportunities

Supporting People who use AAC Strategies: in the Home, School and Community
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This document is published by Special Education Technology - British Columbia, a provincial resource program of the BC Ministry of Education. It is based on the previous work by this group, a document called “AAC: A Way of Thinking”.

Acknowledgements

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Most of the examples of communication overlays in this guide were created using Boardmaker™ software, from Mayer-Johnson, Inc.

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Introduction

This document describes the SET-BC CAYA process and considerations for students and clients moving through this continuum. The professionals who contributed to the writing of this document are employed in three provincial technology programs in British Columbia: SET-BC, CAYA and the ATSS at GF Strong. These programs operate in slightly different ways to provide AAC services. For information on other AAC services in BC, refer to the “AAC Services in BC” handout in appendix C.

SET-BC:

Special Education Technology - British Columbia (SET-BC) is a provincial government initiative established to assist school districts and Group 1 and 2 independent schools in educating students with physical disabilities, visual impairments or autism through the use of technology.

SET-BC's mandate is:

- to lend assistive technologies where required to facilitate students' access to educational programs, and
- to assist school districts in providing the necessary consultation and training for students and educators in the use of these technologies.

SET-BC services to school districts include:

- consultation, planning and follow-up for school based teams
- loan and maintenance of assistive technology
- training
- provision of resources and information

SET-BC consultants are based in seven Regional Centres around the province, providing community based services to all BC school districts. Each district has a SET-BC District Partner who can provide information on how services are provided for eligible students. For more information and resources on assistive technology, check SET-BC's web site at www.setbc.org.

CAYA:

Communication Assistance for Young Adults (CAYA) is a provincial initiative funded through the Ministry of Employment and Income Assistance to support adults from 19-27 years of age who require AAC (Augmentative & Alternative Communication) assistance.

CAYA offers services in five areas:

- Individuals in transition - CAYA provides communication assistance to students leaving the K-12 education system.
- Assessment – young adults who are within the age mandate are eligible for CAYA assessment services to have their communication systems updated (both electronic and lite-tech systems).
- Equipment - CAYA maintains a loan bank of AAC devices and provides technical support services for those devices.
- Training and Resources – individualized training, small group sessions and large group workshops will be provided as necessary. Online modules and resource packages are also offered through the SET-BC Learning Centre.

- Follow-up - CAYA staff will help update communication systems for young adults who are within the age mandate.

CAYA employs staff in the following areas of the province: Lower Mainland, Fraser Valley, Okanagan, Vancouver Island and the North. A travelling Speech Language Pathologist will consult and support people who use AAC and live in smaller communities as necessary. For more information and resources, please go to the CAYA website at www.cayabc.org

ATSS:

The Assistive Technology Seating Service is part of the services offered by the GF Strong Rehabilitation Centre and provides technology related services to adults with disabilities. Assistive Technology Consultants and AAC Clinical Specialists are available for phone or email consultation to Clinicians in BC and the Yukon. ATSS offers assessment, consultation and training in the following areas:

- Computer access
- Environmental control
- Specialized seating
- AAC, device access and mounting

ATSS maintains a loan bank for short term trial of AAC, environmental control and computer access technologies. For more information on access solutions and AAC, go to www.assistive-technology.ca

Preamble

The purpose of this guide is to introduce augmentative and alternative communication (AAC) as a way of thinking about the total process of communication. This guide will present considerations for people who are supporting non-verbal individuals, including long-term planning, intervention models and strategies for utilizing technical and non-technical augmentative communication systems within their school, home and community.

Communication is a basic need and individual right of all human beings. These interactions are an essential part of our society and culture. The general purposes of communication are:

- to socialize and to interact with others.
- to exchange information
- to make requests

Expressive communication includes a variety of modes, such as speech, pointing, gestures and writing. The term augmentative and alternative communication is used to describe expressive communication methods other than verbal speech, for example; sign language, gestures, and alphabet or picture systems.

The person who has difficulty communicating verbally may need to use other communication methods, including electronic AAC systems. These systems can generically be called: voice output communication aids (VOCAs), speech generating devices (SGDs) and dedicated communication devices. Electronic methods of communication require supplementary and/or back-up non-electronic systems.

Individuals who can successfully coordinate their use of an appropriate AAC system will:

- exercise control of their lives
- develop independence
- interact with others and express their wishes
- become productive, active members of society

AAC Myths Dispelled

We all approach a challenge with certain assumptions. Often, these assumptions can get us going, but will trip us up at a later date. In order for readers to start their journey towards 'a way of thinking', here are some common myths that people have about AAC, and a brief description of what is currently known about AAC.

Myth #1: AAC is only used by people who cannot communicate verbally.

Truth: AAC can be used by a wide variety of communicators. We all augment our verbal communication with gestures, facial expressions and so forth.

Myth #2: The primary goal of communication is to express wants and needs.

Truth: For most people, in most situations, expressing wants and needs is secondary to social expression. One way to think of this is to put yourself into the position of a person who uses AAC. If you could only say three things, would they be "I need to go to the toilet", "I'm hungry", and "I'm thirsty", or would they be "Hi, how are you", "Can we talk?", and "I love you"? This is not to say that being able to control your environment is not important, but it may not be the most important (or motivating) thing.

Myth #3: Using AAC will delay speech development.

Truth: Studies show that the use of AAC actually improves speech development where possible (Silverman 1995), and it can be argued that it improves language development in all cases. But it should be noted that even the most sophisticated voice output communication aid cannot be as efficient or smooth as good speech.

Myth #4: We should wait to use AAC until a person is ready for it.

Truth: Anybody can use AAC. We do not wait to communicate verbally with a typical child until they are ready to talk; rather, we surround them with a wealth of language. The same can be said for someone who uses AAC. We should not wait to introduce other methods of communication until they are ready to use them; rather we should surround them with a wealth of language (verbal, gestural or symbolically based).

Myth #5: We should not overwhelm somebody with access to too many symbols.

Truth: We should provide more symbols than a person can use at one time. Again, if we look at typically developing children, they have access to all the sounds of their language by 6 months of age. They use them appropriately when they are able to. The same can be said for people communicating with symbols. If they are not provided with any more symbols than they have 'mastery' of, then they have no opportunity to practice new symbols when they are ready.

Myth #6: Somebody who has a VOCA should use it all the time.

Truth: Voice output communication aids (VOCAs) are often vital components of a individual's AAC system. It is true that they should have access to the device all the time (or almost all the time). But, there are times when it is not practical or necessary. For example, using a VOCA in the bath is not usually a good idea. Communication is, in its nature, multi-modal; for example, there are people who use VOCAs in many situations, but not at home with their family.

Myth #7: An AAC system should be a goal for all people who are non-verbal.

Truth: The 'goal' is to have functional communication. An AAC system may be a useful tool towards that end. This distinction, while subtle, can help tremendously towards setting appropriate goals for a person.

Section 1: Planning for the Use of AAC Technologies

Team Roles

Making decisions around the use of augmentative and alternative communication systems needs to have the full involvement of team members. Gathering and sharing information from all members of the team, and combining knowledge and expertise through the process of planning, will lead to well informed and thoughtful decisions. These carefully made decisions will go a long way toward making implementation of any AAC system successful.

It is important that this group of individuals create a collaborative working environment where all the facets of a person's communication needs can be considered. Key members of the team, for the process of designing and implementing an AAC system, may include:

- individual user, family and group home staff
- speech language pathologist
- teachers or community day staff
- occupational therapist
- educational assistants or human service workers

As with any group striving to make changes or implement programs, it is important to identify a team leader. This person can be anyone who will take the responsibility for planning meetings, keeping records, setting goals, and ensuring action is taken. Without a team leader, the program for the person using AAC may not have a clear direction and the effort spent in planning may be wasted. A strong commitment for the long-term, ongoing development of an appropriate AAC system is important for all team members, but it is especially important from the team leader.

The plan will include:

- assessment and selection of a symbol system
- how it will be used
- general and situation specific vocabulary
- flexibility of the system
- use in a variety of situations
- who is responsible for the system maintenance and revisions
- how the team shares information

SET-BC Support for Selecting and Using AAC Systems

Stage 1: School team identifies need for voice output communication aid.

1. Team identifies situations in which a non-technical system does not address student's communication needs.
2. Team agrees on student's representational level (e.g. object, picture, whole word, letter).
3. Team agrees on access method.
4. Seating and positioning concerns for classroom activities are addressed.
5. Time for programming of communication aid is recognized.
6. Necessary support staff members are in place.

For assistance with any of the above steps: SET-BC regional consultants collaborate with school based teams to support students who are using AAC technologies. The following stages describe some of the key steps in the process of matching student need to technology, planning, implementing and following-up on student use of AAC technology. For more information, contact a SET-BC Regional Centre, or visit the SET-BC website at www.setbc.org.

- Steps 1 or 2 - Request AAC consult from district, or services from an agency.
- Steps 3 or 4 - Request OT consult from district, or services from an agency.
- Steps 5 or 6 - Contact school or district administration.

Stage 2: Team plans for the use of technology.

- Team contacts SET-BC District Partner to initiate request for SET-BC service and to discuss possible equipment loan from SET-BC.
- District screening team for assistive technology determines which students will be put forward for SET-BC services and which students will be served at a district level.
- Team may field test the voice output communication aid that they think will match the student's strengths and needs.
- School team and SET-BC consultant develop Collaborative Action Plan (CAP), including strategies for message selection and system implementation.
- SET-BC consultant provides equipment, training and support to school team.

Stage 3: Team implements the AAC technology.

- School team maintains system, including ongoing programming of messages required for current student need and classroom activities.
- Equipment use is reviewed as part of regular IEP process.

If the AAC technical system doesn't appear to meet student need

- Team reviews relevant items from Stage 1.
- Team contacts SET-BC consultant to request support.

Stage 4: Student moves to new setting.

Prior to any student or staff transition:

- Team shares information on technology use in the classroom.
- Team describes roles of technical and non-technical systems for the student.
- Team provides overlays, technical tips, and training ideas.
- It is also useful to provide photos or a video of the student using the VOCA, and a student information binder.

CAYA Support for Selecting and Using AAC Systems

A person whose speech does not meet their daily needs, and his/her age is within the mandated age range, can request services from CAYA. The process begins by completing a Request for Service form (or a Transition form if a recent SET-BC graduate) and submitting this to the CAYA office in Vancouver. These forms can be downloaded from our website at www.cayabc.org

CAYA provides service in cycles during the year. A letter acknowledging receipt of the request will be sent out immediately, but service may not be initiated for a few months, as determined by caseload issues. Client visits and meetings will be initiated by the Speech Language Pathologist (SLP).

The individualized service delivery process from this point on will be determined by the team supporting the person who uses AAC. It will vary from person to person, but the components of assessment, environmental considerations, equipment trial, lite-tech system development, implementation and follow up will be part of the process.

Clients will be supported in a fairly direct fashion at the beginning of the process and then, as system expertise increases and the team supporting the individual becomes more independent, the Client will be placed on “monitor” status and it is expected that he/she will use the system in as functional a manner as possible. Should major revisions or updates be identified, the team can contact the SLP for a follow up consultation.

Including People Who Use AAC

Communication goals should be discussed and documented at the person's planning meeting. After goals are established, the team needs to review a range of strategies that can be used to support the person using AAC and identify the approaches that are most meaningful. The following general guidelines may provide some direction for teams when planning strategies for a person who uses an AAC system.

- Structure the physical environment to support communication. Make sure that the person has consistent access to an appropriate technical or non-technical AAC system. Ensure proper seating and positioning so the person can access the AAC system independently.
- Provide frequent opportunities for communication. All people need opportunities to communicate their thoughts and ideas in order to learn and develop. Unlike people who speak, those who use AAC systems may not be able to initiate, get attention, or interrupt others, even if they are motivated to say something. We need to structure communication situations with a shared focus of attention, so people have many chances to communicate and interact. By incorporating communication opportunities in daily routines, the person who uses AAC will have regular chances to interact.
- People with physical disabilities may need extra support in order to get access to communication partners and to get involved in motivating activities. It is helpful to teach communication partners how to talk to, understand, and respond to the person using an AAC system. They can often find creative ways for the person using AAC to participate in activities.
- Expect successful communication from the person who uses AAC. When we have a conversation with a speaking partner, we expect interaction and responses. We must have the same expectations for the people who use AAC systems. Expectation is a critical component of a successful communication partnership. If we expect participation, we increase the chance that it will happen.
- Wait expectantly and provide the person with enough time to communicate. Those who speak can often carry on conversations, interrupt and interject with great speed. People who use AAC systems communicate at a much slower rate. We must allow time for communication messages to be sent and received.
- Respond to the person's communicative attempts, confirming the intended message or clarifying meaning if necessary. You may want to use the person's AAC system to participate in conversations, demonstrating how to say specific messages and modeling appropriate interaction strategies, such as turn taking or asking questions.
- Try different problem solving strategies if you do not understand what the person is trying to communicate. Ask the person to repeat the message, ask if they have another way to say the same thing, or ask if they can give you a clue or hint. Look for gestures, eye pointing, or other body movements that might indicate a person or object related to the message. Try to narrow down the message topic using the "20 questions" approach, starting with broad topics and gradually working towards more specific topics.

- Provide regular ongoing instruction in the use of the communication system. People need to be formally taught to use the AAC system and need frequent opportunities to practice using it in meaningful situations. Set aside time to teach vocabulary, strategies for communication and interaction, as well as operational skills for any technical AAC systems. Communication lessons should have clear objectives that build upon previously learned skills. Monitor the person's progress and skill development and make long-term plans for further learning and growth.
- Update the messages in the AAC system regularly to ensure that they meet the person's communication needs and are appropriate for the current environment. Review the AAC system regularly to ensure that it continues to be the most effective communication tool for the person.
- Ensure ongoing training and support for the person's communication partners. Search out opportunities for professional development in augmentative communication for team members. Share ideas, discuss communication issues and problem solve with others with an interest in AAC.
- Supporting a person who uses an AAC system requires a long-term commitment from his or her team. This may be challenging at times and progress may seem very slow. It is therefore very important for the team to focus on positive developments and recognize successes on the part of the person and the team. The examples of positive statements in the following table (Prentke Romich, 2000) may help to refocus teams when the use of a technical (or non-technical) communication system seems to be a problem.

<i>We are leaving the device behind because...</i>	<i>We are definitely taking the device along with us because...</i>
There's a vague chance it might get rained on.	You are a grown-up and grown-ups talk for themselves.
We are going to eat and you might spill on it.	I am not your mother and I won't talk for you.
We are going to get a drink and you might spill or drool on it.	You need to order for yourself at the restaurant.
It might get lost or stolen.	People treat you with more respect when you talk for yourself.
It might get broken on the van.	It was made to be carried around and can be fixed if something goes wrong.
It's too much trouble to carry around.	You are going to meet new people who you can talk to by yourself.
The battery might run down if we take it.	You will need it to get what you want. Without it, you are going to do without.
We don't want you talking to strangers.	We don't know what you might need to say, but we know you will have chances to talk.
Someone might steal it.	People treat you the way you expect to be treated. And you expect to be treated as well as a person who can communicate.
We might leave it behind.	It's too important to be left behind.
I know what you need to say and I can talk for you.	I can't read your mind.

In the school system, if a student is using an AAC system, he or she will most likely also have an Individualized Education Plan (IEP). It is important that the AAC system be acknowledged in the IEP, but it should not be a goal in the IEP. Rather, it should be listed as a strategy or technique that a student will use to complete educational goals.

Once a person leaves the school system, a Community Care Plan will be developed. Major revisions to the AAC system may need to take place as the person who uses AAC participates in this major life transition. The AAC system should be acknowledged in the Care Plan in a similar fashion as it is in the IEP. It is a strategy or technique that a person will use to achieve their life goals.

Assessment

In situations where a person is unable to communicate effectively with family and friends, alternate ways of interacting and participating need to be investigated. The process of investigation or assessment may include formal and informal components.

In order to make effective decisions about AAC systems and devices, we need to gather relevant information. The following general questions may help address this process:

- What do we want to know and learn from this assessment?
- What information do we need to gather?
- What is the best method of gathering this information?
- How are we going to document the relevant information and where will it be retained?

Identify needs

The team should keep the person's needs at the forefront of all discussion and assessments, by focusing on the following three questions (Beukelman et al, 1985):

- What are the person's communication needs?
- What needs are met through current communication techniques?
- What are the systematic AAC interventions that will reduce unmet communication needs?

Describe current system

A good starting place is with a description of the person's current means of communication, including successful strategies, tools and communication methods. Consider the following points in your assessment:

- Determine the effectiveness of the current communication in terms of the person's interaction and participation.
- Collect information about the person's communication environments, routines and communication opportunities.
- Identify partners with whom he or she communicates most effectively.
- Assess the person's language and literacy abilities as these will have an impact on the type of symbol set to be selected.
- Find out about the person's interests, likes and dislikes, and preferences as these may determine the success or failure of implementation.
- Assess the person's physical capabilities related to movement, seating and positioning, fatigue, vision, and auditory abilities. This is critical when determining the person's method of access for the selected AAC system.

Evaluation tools

Currently, there are no standardized assessment tools on the market that have been determined to be valid and reliable when assessing the communication skills of people who use AAC. There are, however, several products that have been created to help teams make decisions about AAC systems.

Some commercially available assessment protocols are: Functional Communication Profile-Revised (Kleinman), Communication Matrix (Rowland) and TASP (Bruno). Others are commercially available and have been adapted for alternative access (contact your SET-BC or CAYA Consultant): PPVT, TACL and CELF. And other informal evaluations are available by contacting the authors: CAAP-Communication Assessment & Action Plan (CAYA), Minspeak Assessment Protocol (VanTatenhove) and AAC Language Sampling Procedure (Burkhart).

Ongoing team process

Assessment is not the job of any single individual. It requires team collaboration and input from the person who uses AAC and their family. There are many resources available to assist in the assessment process. For a student, look to resources available within your school, district, provincial resource programs and external agencies. For adults, look to CAYA and ATSS. There are many AAC texts and web sites which can also provide you with background information. (For suggestions, see appendices A and C at the end of this guide.)

A major component of AAC assessment may include extended assessment of several strategies or technical devices. Extended trial with specific devices can allow an opportunity, within a specified time frame, for the team to acquire key information for decision making. As with the other aspects of assessment, clear documentation of extended assessment information is essential. This provides the team with baseline information for ongoing evaluation purposes.

Assessment is not over once the team has identified an appropriate AAC system for a person. Keep in mind that an AAC system or device will need to be updated and reassessed as the person or their environment changes. Vocabulary within a system will also need to be revised on an ongoing basis. Working with the person who uses the AAC system to implement these changes is essential.

System Components

An AAC system is comprised of the following parts:

- the means to represent (symbols)
- the means to select (access)
- the means to transmit (lite-tech system/electronic device)

Symbol sets

Determining a symbol set that will be most appropriate for a person at any given time is a critical component of the assessment. It is most easily done in a team format, where all parties concerned can contribute their observations and knowledge. The symbol set that is most appropriate for a person might change as the person, the environment, the communication partners, and the field of AAC changes and progresses.

The means to represent requires the selection of a symbol set for use with the AAC system. There are many types of symbol sets available for people who require them. Symbols sets are usually categorized as "unaided", which use movement or sounds to represent meaning (e.g. gestures or sign language) and "aided" (meaning that there is a board, or book, or device associated with them).

People using AAC may incorporate a variety of aided and unaided symbols in their personal communication system. However, the selection of an aided symbol set is of major significance. Aided symbol sets are described in more detail on page 33. Symbol sets may be combined using particular system rules or logic to allow the generation of novel utterances. Minspeak is an example of a symbol set which is intentionally abstract so that the symbols can be used to represent a wide variety of concepts.

Some issues which need to be considered in the selection of particular symbol sets are as follows:

- How transparent is the symbol?
- How complex?
- Does it allow for concrete as well as abstract concepts?
- What is the degree of ambiguity?
- How many messages does the symbol set allow?
- What is the efficiency of communication allowed by the symbol set?

Alternate Access

The term "access method" describes how the person will select the messages he or she wishes to communicate. Determining the access method is a major component of the assessment and information gathering process. The person's motor abilities and physical limitations, together with information on fatigue levels, vision and hearing, will help determine the preferred method of access. It is essential that an occupational therapist be consulted when considering access.

The following access options may be considered:

Direct selection

The person points to, or directly touches, the message or symbol representing the message. Direct selection is a preferred access method, because it is relatively simple and quick.

Eye pointing

This is also a form of direct selection. An eye-gaze board, or “e-tran”, can assist with eye pointing. The person gazes at symbols that are attached to a transparent frame in order to make a selection. The communication partner “reads” the eye-gaze from the other side of the frame.



An e-tran provides a low-tech method of communication for some people.

Assisted direct selection

The person may use a tool such as a joystick, trackball or light pointer for assisted direct selection. A splint created to support a finger is another example of assisted direct selection, as is Morse code when considering software.

Scanning

- **Partner assisted scanning**

This access method is useful for people with both motor and visual challenges. Using a non-technical system, the communication partner reads out and points to each choice in a predetermined, consistent pattern. The person indicates when the desired selection has been identified. Linda Burkhart and Gayle Poole have created resources to support learning this access method.

- **Visual scanning (for electronic communication aids)**

Message choices are illuminated electronically, one at a time, by a moving cursor. The person selects the desired item by activating a switch when the choice is illuminated. This access method may be appropriate for the person with motor control problems, giving him/her the ability to accurately select a message from many choices. Scanning can be slow, however, as the person must wait for the cursor to move to his/her selection.

- **Auditory scanning**

When using auditory scanning with electronic communication aids, messages are quietly read out upon activation of a switch. The person presses the switch again when the desired message is heard, and the message is repeated at a higher volume (Locke and Levin, 1999).

Systems and devices

Individual AAC systems are often comprised of both non-technical and technical components. Each person who has an electronic system must have a non-technical system for use when the electronic system is neither available nor appropriate. As an example, it can be dangerous to use battery operated or electronic technology in the rain or near a swimming pool! A non-technical eye gaze system can often be quicker and more efficient to use with familiar communication partners than would a technical device.

Electronic devices are also divided into two categories; dedicated and integrated systems. Dedicated devices are used for communication purposes only while integrated systems are computers that run communication software and also function as regular computers. There are pros and cons to both types of devices and these must be acknowledged and considered before a decision is made.

Transitions

Growing up is a continuum of new experiences and new learning. Children move naturally from one set of expectations to another as they grow from infancy through the stages of childhood. There are transitions from home to school, from grade to grade, between and within extra-curricular pursuits, and with friends. A milestone transition takes place when young people graduate from high school.

School to Adulthood

High school graduation is only one element of the transition from childhood to adulthood. In the years between ages 17 to 25, most young people will move from pediatric medical care to an adult medical plan, from educational to vocational activities, from their parents' homes to more independent living arrangements, and from family-based financial provision to personal income planning. In terms of medical services, there is a qualitative as well as quantitative change in the care provided to adults, with fewer services available to adults and much more personal responsibility for arranging and managing care and equipment needs.

For those young people who will not transition from high school to post-secondary education or to competitive employment, a daily familiar schedule of activities must be replaced. Colleges offer some programming for young people with developmental disabilities, and the Employment Program for Persons with Disabilities (EPPD) provides vocational training. These students should apply for this program or for appropriate assessment by the second term of grade twelve. If the young person is a candidate for Community Living BC, that organization offers some day programs and also some residential options.

Young people who do not qualify for CLBC but who require assistance with personal care will look to their local health units for long-term care hours or for residential care. Those young people who do not require assistance with personal care but who have disabilities that interfere with the ability to compete for paid employment will look for housing by applying at co-ops organized by the Vancouver Resource Society or the BC Independent Living Society. Finally, young people will move towards financial independence when, at age seventeen-and-a-half, they start the application process for income assistance through Persons With Disabilities (PWD): a financial program available to children who have been on the At Home program.

Discovering Adult Communication

Students in grade twelve who use AAC or who are candidates for the use of AAC should be referred to CAYA. All of the aforementioned transitions will affect the young person's communication needs upon graduation from high school. When communication environments change, the vocabulary on the VOCA will also need to change. Furthermore, these young people will have a greater need to be independent in the use of the equipment so that they can direct their own care as well as instruct others how to communicate with them and how to care for the equipment. They will need to cope with unfamiliar communication partners. They also need to learn to deal with frequently changing communication partners, for example, with casual staff at care facilities. The new environmental factors should be considered when choosing a communication system and when setting goals for both younger and older students.

Self-Advocacy and Empowerment

Having the ability to control one's environment is essential to well-being. Teaching a person to create what he or she needs goes beyond the activities of daily living. It extends to issues such as assertiveness, how to make decisions for one's overall plan for living, and setting career and lifestyle goals.

Safety and Rights

Although we certainly wish that this were not the case, people who have disabilities can be in a vulnerable position. This can be compounded if individuals are not able to talk about what they fear may happen or what in fact has happened in their situation. This vulnerability can be reduced by teaching people who use AAC how to create a safe environment for themselves. We can also teach them about their legal rights and how to communicate when their rights have been violated.

Section 2: AAC Intervention

Intervention Models, Approaches and Techniques

Teaching people how to use AAC as a method for communication is a long process. There are several models, approaches and techniques that can help teams teach, set long term goals and measure outcomes. It is important to note that these are not mutually exclusive, nor are they either-or approaches. Rather, they can be used to set goals for people that are both relevant and possible within the environment.

1. Continuum of Communicative Independence

This model was created by Pat Dowden at the University of Washington. Becoming an independent communicator who can “communicate anything on any topic to anyone” is the goal. On the way to achieving this goal there are two major milestones, combining to form three stages in total.

An “Emerging” communicator is an individual who does not yet have any reliable means of symbolic communication, although he/she typically has non-symbolic communication (Dowden, 1999). This communication, for example using gestures and facial expressions, can be very useful with highly familiar partners, but it tends to be limited to the “here and now” or rely heavily on the partner’s shared knowledge.

A “Context-Dependent” communicator has symbolic communication that is reliable, but it is limited to particular contexts or partners. Context-dependent communication is more effective than emerging communication because it is not limited to the “here and now” or shared knowledge by the partner.

An “Independent” communicator has the ability to communicate with both familiar and unfamiliar partners about any topic in any context (Dowden 1999). “Independent communication” does not mean that the individual does not rely on technology or assistance from people in the environment.

Information retrieved from the world wide web, <http://depts.washington.edu/augcomm/>

2. Participation

The Participation Model (Beukelman and Mirenda, 1998) provides an overall framework of considerations associated with enabling people who use AAC to communicate as their peers do. There are access and opportunity issues within society that must be addressed for people to participate fully in their lives.

Within general education settings, there are four areas where participation patterns can be analyzed and measured: integration (physical, academic and social), academic participation (competitive, active, involved, none), social participation (competitive, active, involved, none) and Independence (full, selective or none).

3. Communicative Competence

Communicative competence (Light and Binger, 1998) for people who use AAC goes beyond simple language skills. These competencies can be divided into four main areas (Light 1989):

Operational Competence

The first skill, operational competence, refers to the ability of the person to operate their AAC system. It is analogous to actually being able to speak. It includes access to the device, ability to program vocabulary (either assisted or not), charging the device and so forth.

Linguistic Competence

The second skill, linguistic competence, refers to the ability to use vocabulary and grammar. Ideally, a person who uses AAC would have good linguistic skills. These skills may be more difficult to acquire though, due to access issues, practice, and the age at which they are often learned.

Social Competence

The third skill, social competence, refers to the ability to use social rules such as when it is appropriate to speak, appropriate topics and levels of formality, detail and so forth. A few examples of social competence are turn-taking and asking partner-focused questions.

Strategic Competence

The fourth skill, strategic competence, refers to the ability of a person who uses AAC to approach their interactions in a more planned, strategic way. This area of communication is much more of a focus for individuals who use AAC than for typical communicators. Strategy comes in many areas, such as improving speed while still presenting enough information, and in preventing and repairing breakdowns. Communication breakdowns when using an AAC system are often more disruptive and challenging than in typical conversations. One example of a communication strategy that is unique to people who use AAC is an introduction strategy.

Use/Model/Teach

One adaptation of the Communicative Competence model is the Use/Model/Teach approach referred to in the Dynamic Display Section of the PowerPoint presentation accompanying this guide. To become a competent AAC user, a person would need the opportunity to USE a communication device, having opportunities to develop operational competence, linguistic competence, social competence and strategic competence. It is equally as important for a user, however, to benefit from the experience of another person MODELING how to use a communication device. Sarah Blackstone considers modeling “an essential” instructional strategy because it

- Provides language models for beginning communicators to emulate
- Sensitizes facilitators (clinicians, family members and teachers) to difficulties inherent in using AAC approaches as forms of expression
- Requires that facilitators become competent users of AAC strategies and technologies, and, thus ensures some accountability for those who teach children to use AAC.
- Confirms that adults and peers consider speech generating devices (SGD), manual signs and communication displays, etc. valuable modes of communication.”

(Blackstone, 2006)

In addition to having opportunities to USE a communication device and to experience MODELING, some skills will need to be taught. Users may need to be taught specific

vocabulary, specific features of the device and other supporting skills. Millman recommends TEACHING skills that support communication and active participation such as active listening, maintaining a topic, and repairing a communication breakdown. (Millman, 2006)

4. Social Networks

Blackstone and Berg (2003) use the principles of functional goal setting and person centred planning to create social network inventories of an individual's communication partners and preferred modes of communication. This provides a picture of the individual's communicative competence across a variety of partners and situations. Examination of social network inventories over time may be useful as an additional tool for gathering outcome measurement information.

5. Development

Although not a formally researched approach, many teams find this way of thinking useful for setting goals, especially in schools. The basic concept is that learning to communicate using an AAC method is not fundamentally different from learning to communicate using speech. In essence, all of the developmental stages of language learning still apply. There are obvious differences, in that the modality is different, and developmental stages can happen at any age, and often in varying order, depending on when a person had access to what form of communication. These stages can also be considered independent of cognitive level, in that even a cognitively typical child often has to go through these stages when first presented with voice output.

For example, let's look at the vocal play stage. Often when children are given an AAC device, they are eager to try all of the messages (In fact, this is what adults often do too when they are looking at a device). They often find a favorite message, and play it over and over again. Usually, a clinician's instinct is to allow them to play for an hour or two, and then move quickly to discourage 'unintentional hits'. This can even be translated into taking the device away if the child is disruptive. Imagine covering up an infant's mouth if he disturbs a movie theatre by making raspberry sounds!

Let's imagine what we would typically do with a child at that stage. We would take him out of the movie theatre, and then have a fabulous afternoon burbling at one another (and thus teaching turn-taking). This also applies to the person who is using a voice output device. We could work with them in an appropriate environment, taking turns selecting messages, and giggling when we got a great turn taking rhythm going.

In summary, although language development in children who are using AAC is not exactly the same as typical children, it can be very helpful to create analogies to typical language development. Those analogies can help guide us in our intervention.

6. Routines/Choice Making/Matrices

The typical child first learns language based on what is familiar and routine in his or her environment. Routines, by definition, are predictable and have a high frequency of occurrence. They create the structure onto which we can hang language labels and thereby map out our world. Adults rely on routines every day; they provide structure, consistency and reliability in our lives.

Creating opportunities to make choices must also be one of the strategies of teaching communication. Choice making can easily be built into many activities throughout a day, in the classroom or the community. Choices can be offered around how things are done, when they are done, with whom, or with what materials. Through choices, the person then has some degree of control over his or her life with all its inherent rewards, risks and consequences.

Here is an example of how AAC activities can be schedules into a weekly routine. “Debbie” is a composite person and this is her weekly schedule:

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Library		binder					
Swimming				Laminated page on a flutter board			
Mall	device						
Walks			device		device		device
TV/movies	device	device	device	device	device	device	device
Meals	Placemat with symbols around border	Placemat with symbols around border	Placemat with symbols around border	Placemat with symbols around border	Placemat with symbols around border	Placemat with symbols around border	Placemat with symbols around border
Washroom	Activity overlays on wall	Activity overlays on wall	Activity overlays on wall	Activity overlays on wall	Activity overlays on wall	Activity overlays on wall	Activity overlays on wall
Groceries					device		
Laundry						device	
Dishes	device	device	device	device	device	device	device
Dances						device	
Social Chat	device	device	device	device	device	device	device

7. Second Language Learning

Introducing a new AAC system can present quite a challenge. One paradigm that has been useful for many people is that of teaching a second language. For example, a great deal of exposure to a language is essential before a person can begin to speak a second language. Just as it is difficult to learn a second language with two hours of instruction a week, it is difficult to learn a new AAC system in that amount of time. This is especially true for complicated systems such as dynamic display or semantic compaction systems (see section on VOCAs).

Creating that kind of extended exposure can be much more challenging for people using AAC, as often they are the only one learning that 'language'. There are things that can be done though, such as: creating multi-modal language environments, providing books with symbol translation, providing curriculum and learning materials translated into those symbols, and using the system itself to model. Just as with a second language, once a certain level of proficiency is achieved, practice (and a great deal of it) is required. This can occur naturally with people who are using AAC, as they will presumably be using this system in many of their daily communication interactions.

Another example is to look at the level of difference between one system and another. For example, consider moving from a four message device to an eight message device, versus moving from a communication book to a Minspeak device. Two languages may be as close as Italian and Spanish (which use the same sound system and alphabet, and share much vocabulary), or as different as Finnish and Mandarin (which have different sound systems, grammar, alphabets and share almost no vocabulary). Acknowledging the level of difference between the systems can help us set timelines and create reasonable goals.

8. Prompting/Fading

Many teaching models suggest that the learner should initially be provided with verbal and or gestural cues to elicit a desired response or behavior. These cues or prompts are faded over time until the learner can produce the behavior independently. Unfortunately, for many communicators, this teaching strategy can lead them to become "prompt dependent". That is, the learner does not become an initiator of communication and he does not produce communicative behaviors until a cue is presented (e.g., What do you want?, Push the switch, etc.).

One solution to this problem is to use a least-to-most prompting strategy to elicit communicative behaviors. This training strategy suggests that initially, no cues are provided to the communicator. Cues are then added as needed, beginning with the least intrusive cues.






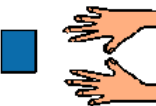










Information retrieved from the internet,
[http://aac.unl.edu/intervention/Least to Most Prompting.html](http://aac.unl.edu/intervention/Least_to_Most_Prompting.html)

9. System for Augmenting Language (SAL)/Aided Language Stimulation/ Augmented Input

A key component of the System for Augmenting Language (Romski and Sevcik, 1996) is the provision of human models to show how to use augmentative communication. The facilitator should demonstrate how to communicate using the technical or non-technical system. It is this human modeling that has a direct impact on how successful a person becomes. It is sometimes known as Aided Language Stimulation and Augmented Input.

The partner's role in interactions includes using the AAC system:

Communicative partners were encouraged to integrate the use of the devices into their own spoken communications by employing what we have characterized as augmented input. In the example, "Tommy, let's go OUTSIDE and ride your BIKE", "outside" and "bike" were touched on the device, produced by the speech synthesizer, and spoken by the partner. This communicative model permitted each family or teacher to incorporate the device's use more easily into individual communicative interactions. (Romski & Sevcik, 1996, p. 66)

let me 	pour 	more 	sand 
no  don't, not	get 	gone 	shovel  scoop
uh-oh 	find 	wet 	bucket  cup
where 	dig 	in  put in	out of 

This overlay can be used for both facilitator modeling and student communication while in sandbox play (Goossens, Crain and Elder, 1994, p. 128).

10. Partner Assisted Scanning

Partner assisted scanning is a technique utilized to support people to use a paper based AAC system when they can't access it independently. The communication partner reads through a predetermined pattern of messages/words/letters and the person using the system indicates when the correct item has been spoken. This gives the person using the system predictability and confidence that they know what is coming. When a predetermined pattern is not used, communication partners can differ in the questions that they ask and this is confusing for the person who is using the system.

11. PODD: Pragmatic Organization Dynamic Displays

The PODD approach was created by Gayle Porter (2007) and has been recommended by a number of clinicians including Linda Burkhart (2006). It is an AAC approach that organizes vocabulary according to communicative functions such as requesting, commenting, rejecting, etc. The approach uses partner assisted scanning to develop receptive language skills, in addition to expressive language skills. In contrast, other partner assisted scanning approaches focus primarily on giving users an expressive means of communication.

Message Selection

The messages in any AAC system should be age and gender appropriate as well as reflective of the person's personal interests and cultural background. They will need to be continually revised and updated as the communication needs and abilities of the person change. This will be an ongoing process.

Factors Influencing Vocabulary Selection

General Considerations

Various AAC strategies are used for various purposes. The messages on a non-technical system for one-to-one discussions with familiar partners may be different from the messages on a voice output communication aid used in making formal presentations and answering questions. The physical system may vary depending on the situation. The same person may use gestures and vocalizations with family members, a palmtop device when communicating with peers and communication software when composing and sending email.

The messages must be things that the person is motivated to communicate about. The team should include messages of interest to the person, as well as the current, popular phrases of the day. These phrases will have to be changed when they are no longer relevant.

When planning for specific activities, like taking out a library book, consider what questions and comments peers frequently say, and then provide generic messages that can be used during this activity.

Vocabulary that the person already communicates appropriately using another conventional mode may not be needed. For example, the person who indicates "yes" and "no" with head movements may not need these symbols on an AAC display.



Motivating symbols use interactive vocabulary and social expressions.

Message functions: participation and communication

To facilitate the team's selection of vocabulary and implementation strategies, it may be useful to conceptually divide the uses of VOCAs into participation and communication. Single message devices would be almost exclusively used as participation devices, while multiple message devices may provide a combination of participation and communication functions.

Participation functions use messages that signal that the person is an active participant in the activity; that he/she is part of the group. The particular form of participation may vary:

- "Have we fed the cat yet?" as the family is gathering to eat dinner
- "I would like to withdraw..." at the appropriate time when taken to the bank
- Making social comments such as "way to go", "far out" or "right on"
- "How was your weekend" at coffee time

With single message devices, even when the message uses communicative words, it has usually been programmed by someone else who is making the communicative decisions. The task for the person is to *participate* in that chosen activity. For people who use nonverbal communication strategies, participating vocally (via technology) can be an important skill to develop.

Multiple message devices can and should serve both functions. They provide the person with the opportunity to make independent decisions about what he/she will say. This can be in the form of a display of possible selections or the means to program totally novel and complex ideas. At the same time, the person will still be able to *participate* in prescribed social behaviours, or signal that he/she is still involved in an ongoing dialogue, e.g. "ah hah", or "right".

Vocabulary issues

Vocabulary items are most often divided into two types; core and supplemental (or fringe). Core vocabulary items are common words that can be used in more than one setting, such as "more", "here", "look", "it", "wow", etc. This allows for flexibility. Supplemental vocabulary items are words that are used only in one setting but are critical in that setting, such as "Santa Claus", "Christmas tree", "tinsel", "eggnog", "Rudolph", etc.

Using mostly supplemental vocabulary in AAC systems means that for every communication environment, new items must be learned. This can take energy that could be used in the interaction. It is desirable to provide a balance between core and supplemental vocabulary items that meet the needs of the person, so he/she can communicate most easily in many environments. Studies of typically speaking young children have shown that they use mainly core vocabulary items in their communication messages and that adults provide the supplemental items. (Marvin et al, 1994).

Visual Scene Displays

Visual scene displays were developed as a way to support the communication of people with cognitive-linguistic disabilities, including people with aphasia. A visual scene is a photograph of a scene with high personal relevance, to which messages can be attached. Examples would be pictures of individuals or families in their backyard, or a picture of the user's living room. Any number of written or recorded messages, hot spots, pop-ups, or pages can be accessed from each photograph. The visual scenes are displayed together on a main page and the user can

navigate from a particular photograph or visual scene to another page with more photographs with a similar theme.

Because visual scene displays represent people, objects, activities and events in naturally occurring backgrounds, they provide contextual support to the user. The communication partner's interaction is also supported because of the additional information contained in the visual scene, as opposed to a more generic picture. Particular events from the user's life may be captured and form the foundation for supported conversation. For users with cognitive-linguistic disabilities, the visual scenes also assist navigation from page to page more effectively than do category symbols.

Visual scenes may be loaded onto a device or they may be formatted into a low tech display. Weissling and Beukelman have created Low Tech Visual Scene Templates which are available at no cost from their website <http://aac.unl.edu> and www.aac-rerc.com.

Types of Messages

Letters, words, phrases and sentences

Communication can be faster when a whole phrase is presented above a symbol, however, this also limits the generation of new thoughts. Whole phrases may be appropriate for the beginning communicator, but the team should consider adding single words as soon as the person is able to recognize, use and combine them. Phrases and single words can be used within a single display.

Letters may be used if the person knows initial letters of words. Even if he/she can't spell an entire word, pointing to initial letters of words gives the partner a good clue to the message if the context is known. Grammatical markers can also be considered, if appropriate.

Facilitation Messages

These messages help clarify and repair communication. Examples include "not on this board", "no symbol", "please repeat", "I made a mistake", "I don't understand", "I'll spell the first letter. Please guess the rest", "almost" "you've misunderstood" and "finished". (Johnson, 1995)



Examples of facilitation messages

Messages and symbols for self advocacy

The ability to independently manage the communication system is a skill which people who use AAC need to develop. This can be assisted by including symbols/messages for appropriate functions regarding the care, maintenance and programming of the system. Examples may include: the ability to increase/decrease volume depending on the situation, the ability to ask for the battery to be charged, or the ability to request additional symbols.

Barbara Collier has created a group of page sets for DynaVox devices called “Communicate 4” which supports people who use AAC to advocate for themselves in all aspects of their lives.

Examples of Symbol Sets

There are hundreds of symbol sets to consider when determining an AAC system for a person. It can be confusing. Here are some defining characteristics of the more popular symbol sets used in BC:

Picture Communication Symbols (PCS)

- was developed at Mayer-Johnson, Inc.
- was intended to be a fairly transparent symbol set that did not require much instruction
- Boardmaker:
 - is an extremely popular software program that provides an electronic library or catalogue of the PCS symbol set
 - allows you to customize symbols and add in other graphics
 - is not the name of the symbol set

Picture Exchange Communication System (PECS)

- is a method of communication of handing a symbol to another person to transmit a message
- can use any symbol that works for your student
- promotes the notion that the communication partner is an important part of the interaction
- was created by Frost and Bundy (1994) for use by children with a diagnosis of autism
- has a very structured teaching protocol and recording method.
- is not a symbol set

DynaSyms

- is a set of symbols created by Faith Carlson (1991) for DynaVox Systems
- are similar to PCS
- are preloaded on the DynaVox family of communication devices.

Tangible Symbols

- are three dimensional symbols used to represent various concepts
- are often a beginning step on the path to more conventional AAC systems
- were created by Rowland and Schweigart (2000) for use with people who have severe, multiple disabilities

Minspeak

- is a symbol set used with the linguistic system of semantic compaction
- is found on specific devices produced by Prentke Romich Company
- is based on the concept that a finite group of symbols can represent more than one meaning, depending on the order in which they are used.
- requires intensive teaching at the beginning, but after that period it allows for generative language to be produced

Orthography

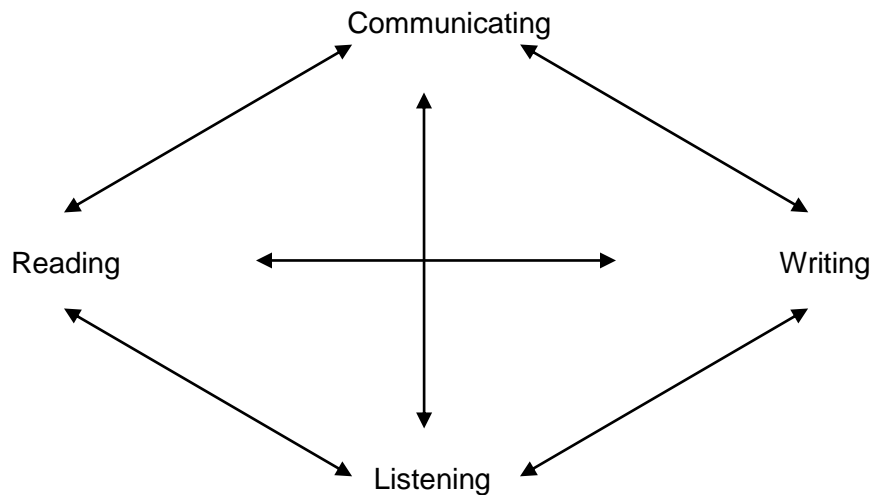
- is standard written language
- is an extremely valuable symbol set for a student who is non-speaking
- allows individuals who are non-speaking to communicate their original thoughts and feelings by spelling

Literacy & AAC

The non-speaking person who can spell has the power to create all of his/her own messages, without having to rely on someone else to create symbol message displays. Even the person who has beginning spelling skills can use strategies to enhance communication; for example, pointing to an initial letter to provide “clues” about what he/she would like to say.

Emergent Literacy

Emergent literacy activities can be conducted with everybody. Koppenhaver et al (1993) have adapted a model from Teal and Sulzby that includes communication, reading, writing and listening as basic components of literacy. All components of the model are interrelated and learning in one area will positively affect the others.



Communicating, reading, listening, writing

Based on this philosophy, nobody is too cognitively or physically challenged to participate in literacy activities in some fashion. Linda Burkhart, Patti King-DeBaun, Karen Erickson and Caroline Musselwhite are some authors who have published in this area.

Key Factors in Learning to Read

Learning to read follows a similar process for both speaking and non-speaking students. Musselwhite and King-DeBaun (1997) describe a number of key factors that influence the development of reading skills.

1. Expectations of learning

Students with severe speech and physical impairments often do not have high expectations placed on them for educational performance. Care of physical needs is very time consuming and a necessity, however, expectations for these students in the area of literacy achievement are vital for success.

2. Opportunities for practice

Tied to expectations are opportunities for practice. Many studies have determined that students with severe speech and physical impairments have greatly reduced opportunities for practice in the classroom.

3. Attention to meaning rather than form

Literacy activities are most powerful when they are meaningful and serve a purpose.

4. Models of reading: being surrounded by reading and readers

The immersion approach of providing models of purposeful reading in a frequent, consistent and high profile manner has a positive influence in the learning of literacy skills by students with severe speech and physical impairments.

5. Motivation

Motivation is a powerful force. Literacy materials should be focused around materials that students can connect with and enjoy.

6. Success

In order for students to hold a positive self-image and be motivated to improve their literacy skills, they must experience success, and experience it often.

Balanced Literacy Instruction

Balanced literacy instruction (Erickson, 1999) is a model that allows for the inclusion of students with different levels of literacy skills. This balance of clear and consistent goals across instructional strategies and contexts is based on the Four Blocks system developed by Cunningham and Allington (1999).

Not all students will learn to read and write, but all will benefit from opportunities to interact around print-based activities. Long before students develop conventional literacy skills, they can use the alphabet and knowledge of print to communicate in sophisticated ways. (Erickson, 1999)

1. Guided reading

The purposes of this block are to expose children to a wide range of literature, teach comprehension, and teach children how to read with books that become increasingly harder.

2. Self-selected reading

The self-selected reading block allows students to choose what they want to read. The teacher selects books for the classroom library on themes they are studying, easy and hard library books, old favourites, predictable books, etc.

3. Writing

The writing block gives students the opportunity to “write for a purpose” and is carried out in “writers’ workshop” fashion. Students have the opportunity to brainstorm, plan, draft, revise and publish their writing.

4. Working with words

In the working with words block, children learn to read and spell high-frequency words and learn the patterns which allow them to decode and spell words.

The SET-BC website (www.setbc.org) has further information on strategies for including students who use AAC in each of the four block activities.

The Four Block strategies are being used with success with adults who use AAC and wish to learn how to read. For more information, contact CAYA staff.

Using an AAC System as a Tool for Literacy

Over the last few years, advances in technology have led to improved interfaces between high-end voice output communication aids and computers. Integrated systems allow for an opportunity to use both speaking and writing software. These types of connections can be an excellent tool for both linguistic and literacy skill building. The proliferation of email and internet messaging provides a useful and motivating opportunity to utilize the written component of communication. The current popularity of bulletin boards and websites such as Facebook allows for the written messages to be constructed in an environment that is not time dependent and begins to level the playing field for those who use AAC strategies.

Using an AAC system to operate a computer allows the person to write using standard or assistive word processing software and, if required, their individualized method of access. By sending whole words or phrases, the person using the device can concentrate less on the physical task of typing letter by letter, and more on the expression of ideas. This increase in efficiency can lead to increased output, decreased fatigue and frustration, and improved literacy skills.

AAC Outcomes

Outcome measurement, or evidence based practice, provides information on the effectiveness of AAC intervention and a rationale for all decisions about AAC intervention. It requires both a qualitative and quantitative component and data can be gathered and analyzed using a variety of different approaches. All data collection needs to begin with baseline information.

Collecting Data

Language Samples

Growth in communication skills can be measured through language samples. AAC samples must include multiple systems. For example, growth could include:

- ability to persist in relaying a message by trying different systems and approaches until intent is understood
- increased length of utterances, consisting of signs, voice and picture symbols
- increased spontaneous utterances in comparison to cued or imitative responses

The following form can be used to collect language samples of people who use AAC (Burkhart, 1993).

Language Sample of Expressive Utterances

Name: _____ Date: _____ Recorder: _____

Time	Spontaneous	Responses	Imitation	Cued	Other	V = voice G = gesture S = sign language VO = voice output P = picture / symbol (manual system)	Intelligible?	Utterance length
	S	R	I	C	?	_____ VGSVOP VGSVOP VGSVOP VGSVOP	Y N	
	S	R	I	C	?	_____ VGSVOP VGSVOP VGSVOP VGSVOP	Y N	
	S	R	I	C	?	_____ VGSVOP VGSVOP VGSVOP VGSVOP	Y N	
	S	R	I	C	?	_____ VGSVOP VGSVOP VGSVOP VGSVOP	Y N	
	S	R	I	C	?	_____ VGSVOP VGSVOP VGSVOP VGSVOP	Y N	

Several communication devices have built in monitors or software to collect quantitative language sample information. The Language Activity Monitor (Romich & Hill 1999; Hill & Romich 2002) and

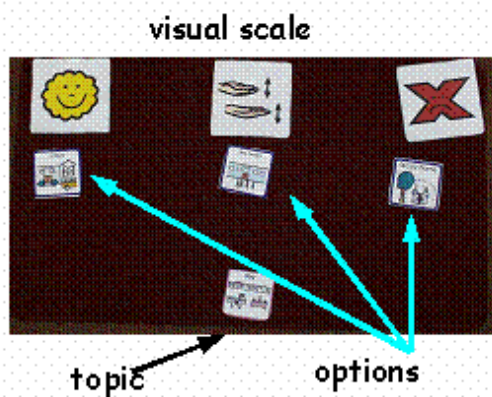
software applications such as the Augmentative Communication Quantitative Analysis (ACQUA) (Leshner, Rinkus, Moulton, & Higginbotham, 2000) are two such tools. DynaVox has a feature in its system that counts the number of times a button was activated.

Questionnaires

One way to measure outcomes and hopefully document progress is through the use of questionnaires. In the last ten years or so, several have been created and are available. Research is ongoing.

- **Talking Mats**

Talking Mats are a tool designed to assist people with disabilities to understand concepts related to their lifestyle and care. These can be quite abstract concepts and this framework can help to explain the options and consequences. The original mats, created in 1998 by Joan Murphy at the University of Stirling in Scotland, have been used in the UK and abroad with people who have acquired and congenital disabilities. On the mats are symbols representing 3 areas; the topic being discussed, the options available related to the topic and the visual scale (ie. yes/no/maybe or thumbs up/thumbs down). Recent research has proved that this process improves the quality and quantity of information gained and discussed.



- **Framing a Future**

Framing a Future is a self-discovery survey that supports students and teams to plan for life after school. The questionnaire is divided into seven major life categories: community membership, control of personal health and welfare, pursuit of lifelong learning, developing talents and interests, creating healthy relationships, self-reliance, and developing a personal sense of spirituality. After the survey is completed the student and team identify priorities, complete a planning worksheet and develop annual goals for the coming year.

“Framing a Future is a tool developed to assist students and their families in creating a vision of the future so they can begin the transition planning process. Supporting transition from school to the adult world is critical to future success. Successful adults are able to direct their own lives, speak up for their own rights, initiate making their own goals, take responsibility, cope with the consequences of their own decisions and obtain a desired level of independence.

While the focus of preparing students for transition has logically been placed on providing work experience and training, we know that many other areas of life need to be addressed. Students with disabilities need to explore their own interests and preferences, understand some of the

challenges they may face, and be better prepared to advocate for their own interests.” (King, Unger, Tooney, 2005)

- **Quality of Life Profile**

At the University of Toronto, staff at the Quality of Life Research Unit in the Department of Occupational Therapy has created profiles to assess the quality of life for adolescents, adults and seniors. Several versions of the profile are available for purchase and include versions for people with sensory and physical disabilities and developmental disabilities.

There are three main domains that are measured by this instrument: being, belonging and becoming. 'Being' looks at who the person is as an individual and considers the areas of physical, psychological and spiritual well-being. 'Belonging' looks at how a person fits into their environments and with other people and considers the areas of social, community and ecological belonging. 'Becoming' looks at how the person achieves their goals and considers the areas of practical, leisure and growth domains.

- **Goal Attainment Scaling**

This is a procedure whereby a person works with their team in order to identify lifestyle goals. The goals are then placed into a format that allows for them to be measured in a systematic fashion. This individualized scale allows for five possible outcomes for each goal: much more than expected (+2), more than expected (+1), most likely outcome (0), less than expected (-1) and much less than expected (-2). The expected outcomes are individualized for each person based on their current abilities. Training is required to teach the clients and teams this procedure so that they can determine the goals and expected/potential outcomes.

- **Portfolios**

In the schools, the Portfolio is a powerful tool for documenting evidence of student progress. Parents of special needs students often don't get the opportunity to see samples of their children's performance over time and often only hear about what their children cannot do. Portfolios can document what the student can do when tasks and tests are modified to meet their specific needs. They are also invaluable during times of transition and can support the learning process that people in a receiving environment must engage in, in order to prepare to support the student.

There are two main types of portfolios. A process portfolio documents a person's learning over time and demonstrates progress. A product portfolio is designed to demonstrate mastery and would contain only best work. Both types of portfolios are useful to anybody who wishes to show others what he/she is capable of.

Analyzing Data

Once data has been collected, it can be analyzed according to the chosen intervention model. Communicative Independence can be observed, Communicative Competencies can be measured, Social Networks can be examined and Access and Opportunity barriers can be evaluated. Progress can be tracked and new goals and objectives targeted.

Reporting Data

Progress and performance can then be reported in the “Individualized Education Plan” (IEP) at school and in “Care Plans” at residential facilities or health units in the adult world. This data is important because it ensures that behaviours are monitored and skill development is tracked, and that we do not lose sight of either baseline skill level or the goals for the future. For example, many adults actually become more restricted in their communication and abilities after years in residential care. Additionally, data collection is important in monitoring quality of care. When plans are documented they are less likely to be lost. Finally, data collection on a larger scale can be used to justify requests for additional funding.

Section 3: Voice Output Communication Aids

Technical & Non-Technical Communication Systems

Technical and non-technical communication systems may address different people's needs. Non-technical systems can be very effective with familiar partners. This can be especially true for the person who does not use direct selection for access. Eye-pointing on an e-tran may be faster, with familiar partners, than selecting messages through electronic scanning and switch use. Non-technical systems can also be very effective in situations where vocabulary updates and other system maintenance must be done quickly.

Voice output technology may be necessary when the person needs to speak with groups and/or people who can't see and interpret non-technical selections. The young student who needs to increase social interactions with peers may benefit from voice output for initiating these interactions and using the same phrases and intonation as other students. Voice output can be beneficial for the secondary student and adult who is meeting more unfamiliar partners.

People who are non-verbal should always have a non-technical communication system in place. When necessary, voice-output technology should be available as well. The needs addressed by technical and non-technical systems may be different, and system messages and implementation should reflect this.

The following section describes the features and possible uses of different types of voice output communication aids. This information allows for a comparison of the main categories of VOCAs and will assist in the process of matching technology to individual needs. Durability and after-market support are very important features to consider as well. Within each category, examples of specific products are provided. Of course, all AAC technologies on the market are not able to be listed here.

In this document devices are placed into the following categories:

- single message
- multiple message
- dynamic display
- icon sequencing
- text to speech

Single Message Devices

A single message device is used for inclusion and participation, can be easily programmed and reprogrammed, can be pressed directly or used with a switch, is battery operated, is portable, and has approximately 20 - 75 seconds of digitized speech

Peter is a 22 year old non-verbal adult with multiple handicapping conditions including cerebral palsy, cortical visual impairment and a moderate cognitive deficit. Peter's arms and legs are very spastic. His legs stiffen into extension. His arms are flexed in a total flexion pattern. Amazingly he manages with his right hand to use a customized joystick to operate a power wheelchair in learned settings both indoors and outdoors. He loves music and plays the drums. He uses adapted drumsticks and is able to hit the drums and keep the beat. Peter loves being with people. He interacts with others through smiling and laughing. He has a great sense of humour.

When presented with familiar objects, he can communicate acceptance and rejection. He smiles if he likes something and ignores or turns his face away if he doesn't want something. Now that Peter is a young adult living in a group home, he does not have as many communication partners as he did when he was attending school. He appears more isolated and less satisfied with the quality of his life. He needs a way to interact with the people that he sees regularly on an everyday basis. He also needs a way to get the attention of unknown people that he encounters in the community. Peter has enough controlled movement in his right hand that he can hit a single switch.

In addition to collecting information through observations and talking to people who know Peter well, the Participation Model was used to further identify Peter's communication needs. The Participation Model is an assessment and intervention model by Beukelman and Mirenda (1998) that compares the functional participation of persons using AAC with same age peers. Other members of the group home were observed to gain the attention and greet both familiar and unfamiliar people. They could engage in interactive communication with their peers and caregivers in their environment. Peter was unable to participate in a similar manner to his peers.

It was decided that a single switch communication device that would record a sequence of messages would meet Peter's communication needs. The device that was chosen was the Step by Step Communicator with levels.

Peter's communication goals emphasize his emergent communication needs. Jokes recorded in multi-steps enable Peter to interact with familiar people. Jokes make the listener laugh which Peter loves to do. In addition, Peter is learning about getting the attention of the listener and turn-taking in conversation. A series of greetings recorded on the Step by Step enables Peter to interact with unknown people he meets in the community. Recently Peter has become the official greeter in his family's church which has brought him and others much joy. This could possibly develop into a job for Peter. For example, he could possibly become a Wal-Mart greeter for an hour or two a week.

Client/ Student needs to be able to:

- depress a switch with some part of the body that has purposeful movement
 - a smaller switch can be connected to the device if the client would have more success hitting a smaller, strategically placed switch rather than the actual device
- really no other prerequisites – user will develop skills by using the device

Team needs to be able to:

- record appropriate messages on the device
- make sure device is available for the client's use
- provide opportunities for the client to use the device
- make sure the battery is charged
- measure progress of client and team

Examples of uses for single message devices:

- initiating or entering a conversation – "Come over here; I have something to tell you from my communication book."
- calling for attention – "Hey guys, you forgot about me."
- message delivery – "Here's your attendance sheet."
- games - Red Rover Red Rover, Simon Says.
- requests – "I need a break." "I need some help."
- jokes - Retell a favourite joke.
- greetings – "Hey! How's it going?"
- comments – "I can't believe it!" "You look maaaaarvelous."
- literacy - production of a line or a repetitive phrase during a class reading. Appropriate sound effect during a story, e.g. for Cookie Monster book – "Yum, yum, yum"
- work experience – "The sewing machine needs re-threading."
- drama and presentations - "Speaking" lines from a play, poem or report.
- giving instructions - Student presents instructions that would normally be given by a teacher, e.g. "Put your name on the test, and number your paper from 1 to 35."
- songs - "Sing" the song chorus or add sound effects.
- adjunct to a more sophisticated communication device - Single message devices may be reprogrammed quickly for a fast-changing situation. These devices may also be more portable for certain situations. A single message device, paired with a voice output communication aid with multiple message choices, may be the technical solution for some students.

For more curriculum ideas, see work by Peggy Locke and her colleagues at AbleNet.

Something to think about....*If a client is using his single switch device to make a request such as "I need a break" and is learning to use the device whenever he needs to communicate this message, it would not be a good idea to change the message. If the client was getting frustrated and hit his switch to communicate that he needs a break and he got another message instead such as "Hey, How's it going?", it could confuse and further frustrate him.*

Examples of single message devices:

- BIGmack Communication Aid, AbleNet, Inc.
- Step-by-Step Communicator, AbleNet, Inc.
- Hip Step Talker, Enabling Devices, Inc.



This BIGmack is programmed to sing "Happy Birthday".

Multiple Message Devices

Multiple message devices are dedicated communication devices with more than one message appearing at a time, which utilize recorded speech and paper communication overlays. They can have multiple levels, varying lengths of 'talk time' and come in many shapes and sizes.

Debbie is 24 years old, has a diagnosis of 'on the autism spectrum', walks, does not talk and lives in a group home setting with two other clients. If she is interested in the topic, she will engage in it for up to half an hour. She will remember routines and smile, giggle and participate, and then she will toss the objects when she is finished. She dislikes getting up in the morning, going to bed at night and any unexpected changes in her routine. Her weekly leisure activities are: swimming, library, the mall, walks along the river, TV, movies, and monthly dances. Her household chores are: grocery shopping, laundry and taking dishes in and out of the dishwasher.

Debbie communicates for the functions of: greetings (waves, makes a vocal approximation), requesting (gets object, uses symbol binder if on appropriate page for the activity) and protesting (pushes, throws).

She requires interpretation of her communication messages in order to be understood. She will point to symbols in a binder organized by activity. She uses mostly nouns, but will create two and three word sentences if prompted. Debbie found dynamic displays overwhelming and confusing; they were too heavy and the symbols were too small for her to see on palm top devices. She had access to a classroom computer at school and used software such as Bailey's Book House. Her group home has an XP desktop computer with a colour printer.

Debbie's communication partners are: Mom, Dad, adult siblings, group home staff, fellow group home clients, casual acquaintances she meets in the community (some of whom may also use AAC) and strangers (e.g. store employees and bus drivers).

Based on the information gleaned from observing Debbie and interviewing significant others in her life, it has been determined that the following components will make up her individualized AAC system:

- A multiple message device with overlays created to communicate in the environments of: the mall, walks, TV/movies, groceries, laundry, dishes and social chatting.
- Keep the current symbol binder and add printed copies of any new overlays into it for back-up.
- Symbol pages for the communication activities of: swimming (bungee cord the page to a flutter board), library and walks (for when it rains), meals (on a placemat) and washroom activities (on the walls).
- Her personal dictionary needs to also document her gestures, body language and sounds that are communicative.

It was decided that a multiple message device such as the Tech Speak was the most appropriate device for Debbie to use at this time.

Debbie's overall communication goal is to learn how to use the components of her AAC system to communicate effectively in the environments that she lives in. The initial objectives for her device are learning to operate the on/off switch and volume control appropriately (operational competency); learning to independently combine 2 symbols to create a two word sentence (linguistic competency); learning to ask staff how their time off was, ie "How was your weekend/day off?" (social competency) ; and learning to use the symbol "what I want to say is not on my device" instead of acting out or throwing the device(strategic competency).

Client / student needs to be able to:

- activate the device or switch
- understand several symbols
- make choices

Team needs to be able to:

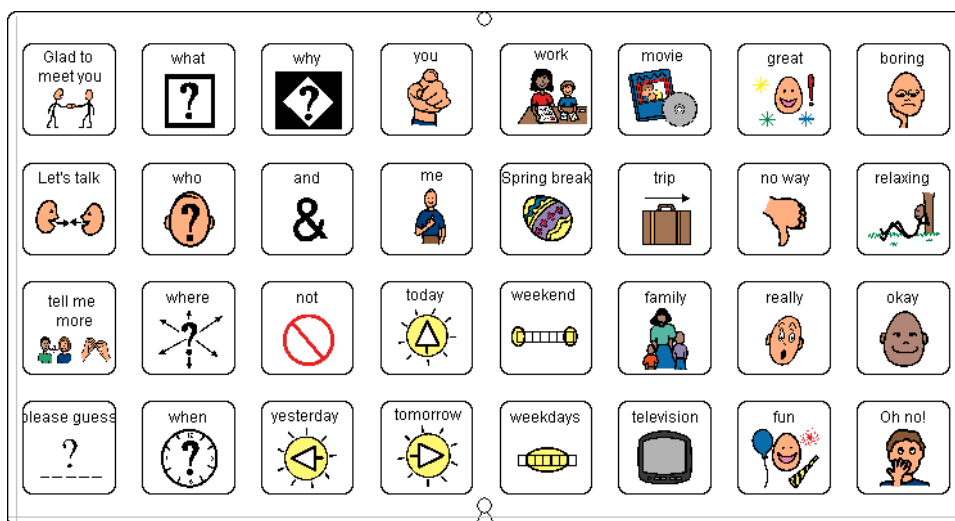
- determine the vocabulary and layout
- create the device overlays
- teach how to use the device
- monitor the use so vocabulary remains current.

Other considerations:

- laminating the overlays will make them more durable and easier to insert into and remove from the device
- another person records the messages into the device. Then at some point the Client/Student will activate the square and the message will be spoken. So while it is important that the person recording the message be as close as possible in age and gender to the person who will be using the system, it is not mandatory. If no one else is available and a message needs to be changed, change it. It is the content of the message that is the most important thing.

Examples of uses for multiple message devices:

- consistent activities - preprogrammed vocabulary to increase level of participation in various community and educational opportunities
- literacy participation - retelling, or sequencing stories with each square being a new line or phrase
- academic subjects - oral report giving, theme related vocabulary for participation or answering questions in class
- social conversations - sharing information, restaurant vocabulary for dining out, or enquiring about somebody's weekend
- supporting independence - making choices, anticipating transitions, staying on task.



Example of an overlay for a lunch time conversation.

Features of multiple message devices:

- allows message selection from a set of choices
- provides opportunities for sequencing symbols
- increases potential for more independent communication and participation
- can use with one or more overlays
- can customize size and number of messages within device boundaries
- can often accommodate head pointing, scanning or other access methods.

Examples of multiple message devices:

- TechTalk/Speak/Scan, Advanced Multimedia Devices, Inc.
- Message Mate, Words+
- Advocate, DynaVox
- GoTalk, Attainment Company, Inc.
- Auditory Choice Making Communicator, Enabling Devices, Inc
- Partner 4, Advanced Multimedia Devices, Inc.
- 7 Level Communication Builder, Enabling Devices, Inc.
- iTalk2, AbleNet, Inc.

Dynamic Display Devices & Software

Dynamic Display devices utilize a computer screen with picture symbols. When certain symbols are activated, the display then changes, providing a new set of symbols and messages. All symbols, messages and displays can be programmed and modified specifically for the student by the team.

Cole is a student in Grade 8 who experienced a Traumatic Brain Injury (TBI) as a young child. He uses a walker and has difficulties with fine motor tasks such as writing, drawing, and keyboarding. He does not have recognizable speech, but can indicate yes/no with gestures and sounds.

Cole has a modified curriculum at school. He has developing literacy and math skills, but these are at the Kindergarten - Grade 1 level. Cole has one resource block per day at school and is integrated into regular classes, although he is not doing the same work as his peers. He receives support from an educational assistant at school.

Cole loves interacting with peers at lunch. However, he's an observer rather than an active participant. He loves listening to music and swimming. He lives with his mom and younger brother.

Cole's communication profile is that of a Context-Dependent Communicator. He communicates well in structured environments with adult partners. However, he does not tend to communicate in open-ended situations, does not initiate communication often, and communicates with few peers.

Cole communicates non-verbally without hesitation, but needs encouragement to use his communication book. He responds to others' communication more than he initiates. He has limited communication functions and, for example, rarely comments. He has difficulties building a topic and 'conversations' are usually short. He is able to move between pages of his communication book, but uses single symbols to communicate. He will repeat a two symbol phrase if it is modeled. The team feels he is ready for a dynamic display communication device.

Cole's communication goals are equally balanced in content, form, and use. Cole's team has prioritized that he learns new vocabulary, begins to combine vocabulary into two-symbol combinations, and that he use his communication book meaningfully.

Cole will use his communication book to respond to questions from his teacher as well as questions from his peers. His teachers, E.A. and therapists will model communication using two-word combinations. His peers will model answers in group activities using a duplicate communication book. As well, he will learn one new symbol a week and will have the opportunity to use it at least 10 times during the week.

Cole's team decided on a MightyMo dynamic display device from DynaVox Technologies.



Client/student needs to be able to:

- recognize pictures and/or auditory prompts
- categorize vocabulary into meaningful groups
- understand number, order, and sequencing concepts
- recall what messages are available on various displays and navigate to them
- remember desired message as they move through the displays to construct it
- It is helpful if the student/client is already familiar with using several displays in a non-electronic format, such as a communication book.

Team needs to be able to:

- choose the appropriate vocabulary
- teach the location and use of the symbols in the device
- learn to program individualized messages
- allow time to program individualized messages
- allow adequate lead time for the programmer to program and teach appropriate fringe vocabulary

Examples of uses for dynamic display devices and software:

- Dynamic displays can be created for any activity at school or home, from informal interactions to sentence construction.

Features of dynamic display devices and software:

- multiple access methods including mouse, joystick, touch screen, switch, head pointer, etc.
- speech is either recorded/digitized or computer generated/synthesized
- varying degrees of portability specific to device.

Examples of dynamic display devices:

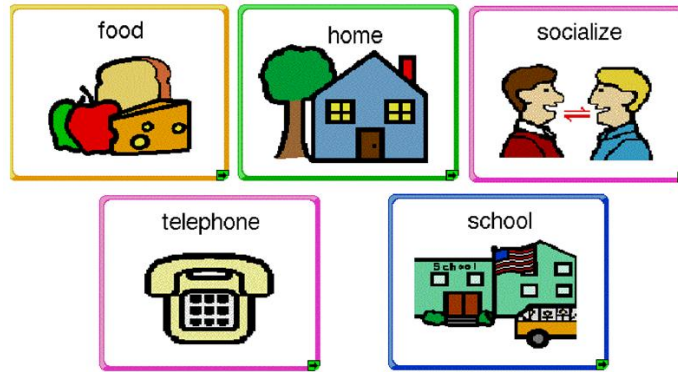
- Tango, Blink-Twice
- IChat3, DynaVox Technologies
- V and Vmax, DynaVox Technologies
- DV4 and MT4, DynaVox Technologies
- MiniMo and MightyMo, M3 DynaVox Technologies
- Eco-14, Prentke Romich Company (PRC)
- Vantage/Vanguard, PRC
- Springboard, PRC
- Chat-PC, Saltillo
- Tufftalker and Freedom Toughbook, Words+



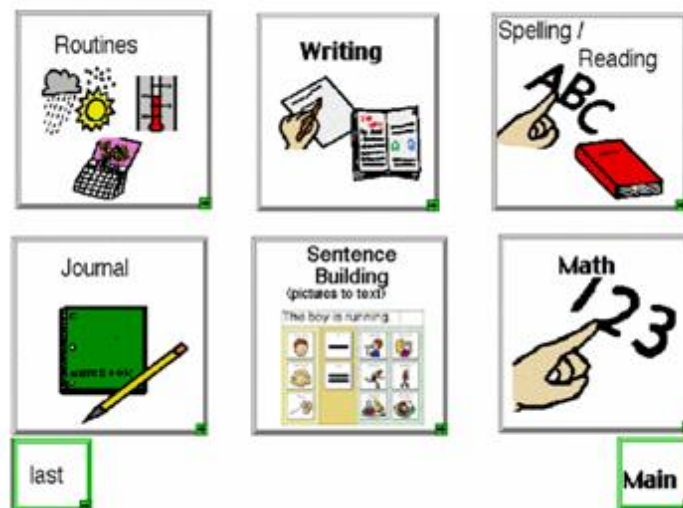
- The Tango has synthesized speech and displays 6 choices at a time. Arrow keys move you to menus, to more choices, or back a level.

Examples of Dynamic Display Software:

- Series 5 Speaking Software, DynaVox Technologies
- Speaking Dynamically Pro (SD Pro), Mayer-Johnson, Inc.
- Talking Screen, Words+
- Say-it! SAM PC, Words+
- Communicator 3, Viking Software



Sample screens from a *Speaking Dynamically Pro* software. The “school” button on the display above is connected to the following topic boards. Each topic board contains sub-topics and/or phrases and vocabulary.



Examples of Additional Board Sets:

- WordPower and Picture WordPower for DynaVox or PRC Devices
- WordCore and AQLS for PRC Devices
- Functionally Speaking for SD Pro
- Quickpage for Talking Screen, Words+
- Velocity, DynaVox Technologies



Picture Word Power is designed to allow access to over 100 core vocabulary items with a single hit. Linked page buttons are shaped as file folders. An onscreen keyboard includes word prediction.

Icon Sequencing Devices

Icon sequencing is based on the concept of semantic compaction which means that an icon can represent more than one thing dependent on its sequence with other icons. For example, when an apple icon is selected, food group pages can be accessed as well as the verbs “eat” and “feed”, the adjective “hungry” and the group noun “food”. This organizational system in a communication device is faster than spelling letter by letter, provides easy access to core vocabulary related to topics and has accessible grammatical markers in order to produce complete and grammatically correct output. The main symbol set used in icon sequencing is Minspeak.

Scott is an 8 year old boy with Cerebral Palsy who is in grade 2. He is just beginning to walk short distances with a walker. Scott has adequate control of both hands to use direct selection with his index fingers.

Scott’s cognitive skills fall within the low average to average range. He is an emergent reader. He is an independent communicator. He uses total communication, initiating and maintaining communications using a variety of methods including his MightyMo (which he received in Kindergarten), his communication book, gestures, vocalizations and facial expressions.

The user abilities that determine which communication device would benefit Scott in providing generative speech include; the ability to understand many symbols, make choices amongst those symbols, understand categorical concepts and patterns, remember where symbols are stored, and understand that icons can represent a variety of word is important when looking at Icon sequencing devices.

Such a device would also need to allow the pre-storage of longer messages, support emerging literacy, be portable and allow for keyboard emulation.

Scott’s team chose the Vantage with the Unity 45 full user area as the appropriate device to meet his communication needs.

The goals the team chose to work on included learning the location of the basic core vocabulary and increasing sentence length (Linguistic competency); learning to independently set up keyboard emulation as well as the Icon Tutor to learn the icon sequences that represent words (Operational competency); learning to use quick hits to gain turns in the classroom and learning to use the Notebooks to prepare and store information for later delivery (Strategic competency); learning to use the Vantage to communicate with minimal support in most environments and communicating with unfamiliar partners and in unfamiliar contexts. (Social competency)

The Vantage should be used throughout Scott’s day as his voice to participate in classroom and community activities. It should be used to ask and answer questions, to read, to write and to interact with others.

Client /student needs to be able to:

- activate a device directly or use an alternate method
- understand many symbols
- understand that icons can represent a variety of messages
- make choices from a large set

- remember where symbols are stored
- understand how words are combined to form messages
- read and spell at a basic level
- understand categorical concepts and associations

Team needs to be able to:

- understand and support icon sequencing
- commit team time to teaching the system
- learn the architecture of the system in order to customize successfully

Other considerations:

- because of the complexity of this kind of device, active involvement of a Speech Language Pathologist is strongly recommended for successful implementation

Examples of messages:

- I want peanut butter and jam on my toast, please.
- I had an awesome time at the movies with my friend last night.

Uses for icon sequencing devices

Icon sequencing devices are intended for generative communication in all settings for all communicative functions. They are designed to produce complex language which can be spoken orally or produced in written form.

Features of icon sequencing devices:

- multiple access methods including screen, optical light pointer, infrared light pointer or switch activated scan (both visual and auditory)
- synthesized, digitized and RealSpeak voices
- keyboard emulation

Examples of icon sequencing devices:

- Pathfinder, Prentke Romich Company
- Vanguard, Prentke Romich Company
- Vantage, Prentke Romich Company
- ECO-14, Prentke Romich Company (software of all Prentke Romich devices integrated into a tablet)
- ChatBox, Saltillo



The Vantage with Unity 45 Full provides access to a large vocabulary and uses Minspeak symbols.

Text-to-Speech Devices

Text-to-Speech devices allow for the user to type messages which appear on the device's screen. The text is then spoken using synthetic speech. These devices come in a variety of sizes, allow for different access methods, can use word prediction and abbreviation expansion to enhance text input and can allow for instant messaging

Talia is in grade 12 student who has progressive polyneuropathy, a degenerative disease resulting in increasingly flaccid tone and poor muscle strength. Her cognitive skills are within normal limits. Her language comprehension is within normal limits, and she has low-average reading comprehension and spelling. Expressively, she initiates communication, directs her own care, and is capable of complex grammatical output. Fatigue is a significant issue for Talia.

Talia is auditing two grade 12 courses, Communication 12 and Law 12, and volunteers one day weekly at a local preschool. She enjoys social opportunities, watching sports, and listening to garage bands.

Talia uses a Lightwriter which she now accesses by both direct selection and by Morse code using 2 switches on her wheelchair's head rest. She also uses a plexiglass E-Tran for communication when she is out of her wheelchair.

The team that chose the Lightwriter had only looked at devices that support Morse code input. This is because of the typical progression of Talia's medical condition. Talia likes the dual screen nature of the Lightwriter because it allows the communication partner to be in front of her instead of behind her when they are reading her messages. She also likes the female voice the device has. Talia prefers to enter commands and text directly as opposed to navigating through pages on a computer based device.

Talia has been learning Morse code since Grade 9. A major communication goal is to learn to function at an automatic level when inputting Morse code. If she has to think too much while inputting using Morse code she fatigues and is less likely to communicate. She needs to spend direct time drilling and rehearsing her skills on the Lightwriter. She needs guided practice within all her communication environments.

Another goal is to continue to identify communication breakdowns and look for repair strategies when needed. She uses strategies effectively and will benefit from continued support in these areas.

In addition to developing Talia's operational competence by teaching her about the device's capabilities, she also needs to further develop her social competence. In other words, she needs to learn the most effective ways for talking to others in her environment in addition to developing technical skill with her AAC system. Moreover, the others in her environment need to learn how best to interact with Talia.

Because Talia has a degenerative condition future needs are an important consideration. Her current communication needs must be addressed but always in the context of how her current communication system can be adapted as her physical abilities change.

It is not anticipated that Talia will change her access method once she is using Morse code. The Morse code will serve her until fatigue and muscle weakness prevents any controlled

movement. Follow-up therefore consists of monitoring Talia's physical status and continued teaching for optimal use of the Lightwriter.

Client/student needs to be able to:

- have functional spelling
- either have the physical range and dexterity to access the keyboard or have attention skills adequate to support scanning or Morse code input
- have critical thinking skills and adequate memory to store and retrieve abbreviations and stored messages, or to learn other rate enhancement strategies

Team needs to be able to:

- monitor posture and placement of the device and any switches
- maintain charge on the device
- teach her to use the device's features and to problem-solve for optimal accuracy and efficiency
- teach her to take responsibility for communication. Transparent output permits communicative independence for the user even with unfamiliar listeners.

Other Considerations:

- a variety of access options including Morse code permits spelled out generative communications
- connection to computer, phone, or printer
- an experienced trainer is required to advise the user on how to code and store messages and abbreviations
- teaching the user how to program the device will empower him/her to use it at optimal efficiency
- mounting is crucial so that user has continual immediate access to device

Examples of uses for text-to-speech devices:

- face to face communication with unfamiliar communication partners as well as those who are familiar
- many devices have word processing features for academic work
- make competitive employment a possibility (provided reciprocal conversations at typical rate are not required)
- in terms of communication, a capable user can be unattended in the community because no interpretation is needed

Features of text-to-speech devices:

- synthetic speech
- form factor: size, keyboard versus tablet
- user types messages, which appear on a screen.
- configurability of the keyboard, access options
- rate enhancement strategies
 - word prediction
 - abbreviation expansions
- combination digital-synthetic speech for instant messaging or voice banking
- combination symbol- alphanumeric software and devices
- devices may connect to computers and phones and may have infrared capabilities

Examples of text-to-speech devices:

- Lightwriter, Toby Churchill
- Link Plus, Assistive Technology Inc
- Chat PC, Saltillo
- Chatbox40 XT, Saltillo
- Dynawrite, DynaVox Technologies
- V, VMax, DynaVox Technologies
- Palm3, DynaVox Technologies



Appendices: References & Resources

Appendix A: Glossary

AAC: See augmentative and alternative communication.

AAC system: Also known as a communication system. An integrated system of communication components, including strategies, techniques, skills and devices that are used to communicate.

Abbreviation expansion: The expansion of either typical (Dr = doctor) or user specific (jc = juice) abbreviations that transmit complete messages with a reduced number of keystrokes.

Abstract: When referring to symbols, a term meant to describe intangible concepts such as beliefs, emotions and ideas. With graphic symbols, abstract referents are difficult to represent in pictures and tend to be more commonly represented by arbitrary symbols.

Accessibility: When referring to AAC systems, the ability to select or activate components of an AAC system in order to communicate. The term accessible is most often used to describe parts that an individual can physically manipulate, e.g. switch.

Activity / standards inventory: An inventory developed by Beukelman and Mirenda that measures the level of participation of a person who uses AAC. The inventory also identifies barriers to participation across a variety of activities.

Aid: An assistive tool (e.g. communication board, communication software) that supports or acts as an alternative to natural speech or writing.

Alternative communication: A communication system that is an alternative to natural speech or writing.

Alternative input devices: Devices or tools that provide individuals with access to communication systems other than through direct selection, e.g. switches.

Alternative keyboard: A keyboard that is used in place of the regular keyboard. This type of hardware can be configured to meet the specific needs of the individual, e.g. IntelliKeys.

Aphasia: A condition resulting from damage to certain parts of the brain in which comprehension and formulation of language is impaired. Various aspects of communication can be affected including comprehension, speaking / signing, reading and writing either individually or in combination.

Apraxia: A condition resulting from damage to the motor control areas of the brain, which results in an inability to execute voluntary movements. Apraxia of speech is characterized by trouble sequencing and coordinating speech movements.

Arbitrary: A term used to describe symbols that do not have an obvious relationship to their referents. These types of symbols must be learned.

Assistive technology: Any technology that is used to help people perform tasks that are difficult or impossible due to disabilities.

Auditory scanning: A type of scanning for message selection in which the names of items can be heard during the scan.

Augmentative and alternative communication (AAC): A communication approach that augments or provides alternatives to natural speech or writing for persons with severe communication disorders. The term also refers to the related field of practice.

Automatic linear scanning: A technique for message selection in which the movement through the choices automatically and continuously moves according to a preset pattern. The person must stop the scan to make a selection.

Basic-choice communicator: An individual who requires the maximum support from communication partners to make basic choices.

Block / group scanning: A message selection technique in which blocks or groups of items are initially selected. The number of items in each block decreases as the person makes selections.

Cause and effect: A relationship between two events where one causes the other, e.g. hitting a switch causes a toy to move.

Circular scanning: A technique of message selection in which a pointer (like a clock hand) moves in a clockwise/counterclockwise direction, pointing at items or messages.

Collaborative consultation: A process that involves consultation among team members, usually with a variety of backgrounds and expertise, to generate solutions to problems.

Communication board: A low technology communication device that displays symbols, pictures, or text to convey messages and meaning.

Complexity: In AAC, this refers to the physical complexity of a graphic symbol (the detail, the degree to which it stands out from the background, etc.) or the complexity of movement and handshape of a manual sign.

Computer-based communication system: A computer system that has software specific to supporting and enhancing the individual's communication.

Concrete: A term used to describe tangible referents like people, places and objects, e.g., a picture of an apple to represent an apple.

Congenital disability: A disability, usually as a result of injury or disease, that is present at birth.

Core vocabulary: Words and/or messages that have universal utility for most individuals.

Coverage vocabulary: A limited number of words and/or messages that allows the individual to communicate on a variety of topics.

Criteria-based assessment: Assessment, based on predetermined criteria, designed to show whether an individual's skills are sufficient to utilize a specific AAC system.

Daily routine diary: A record of words, phrases and sentences; this is a tool that is useful in identifying an individual's vocabulary needs to support participation in daily routines.

Dedicated communication device: A device specifically designed to be used for communication. It may also be interfaced with a computer, environmental control unit, etc.

Degree of ambiguity: A measure of the number of concepts associated with a particular symbol. The more meanings for a single symbol, the greater the degree of ambiguity.

Developmental disability: A disability that is present before adolescence or adulthood that affects specific areas of development like cognition, communication, etc.

Digitized speech: Speech produced electronically when human voice is recorded and digitized.

Directed scanning: A technique of message selection in which the user directs the movement of the scan, in four or more directions, by controlling a switch (or joystick).

Direct selection: A method of selection in which an individual using AAC uses a body part or prosthesis to indicate choices on a communication device, e.g., touching, gazing with eyes, etc.

Dvorak keyboard: A keyboard layout that allows a person who types with one hand to quickly access the most commonly used characters.

Dynamic display: A visual display that changes.

Dysarthria: A speech disorder due to a disturbance in muscular control of the speech mechanism. This can affect speed, pronunciation and loudness of speech.

Echolalia: Human speech which echoes words spoken by others.

Enhancement: The provision of visual clues to help clarify symbol meaning. They are usually faded out over time so the individual learns the meaning of the original symbol.

Environmental control unit (ECU): A device that provides remote control over objects, like fans, lights, or televisions in their environment.

Environmental inventory: A tool for gathering information on an individual's interest and daily activity vocabulary needs.

Errorless learning: A term used to describe learning in which few or no errors occur. Procedures such as stimulus shaping, fading and most-to-least prompting are used to ensure the learner has the maximum opportunity for success.

Expanded keyboard: A keyboard with a touch sensitive membrane surface that can be configured to meet the needs of an individual with motor disabilities, e.g. IntelliKeys

Eye gaze: A term used to describe the act of looking at a specific location, area or symbol. Used by some individuals for communication.

Fading: The gradual reduction of prompts used to assist an individual in producing a response. When fading has been accomplished, responses are produced without any prompts.

Feature matching: This term describes a process in which features on an AAC device are as closely matched as possible to an individual's communication needs.

Figure: With respect to graphic symbols, that part of the symbol that carries the important information or meaning of the symbol.

Fitzgerald key: On an AAC communication board, a colour-coded organizational scheme that arranges the symbols/keys from left to right in subject-verb-descriptor-object/place order.

Functional communication: Communication that allows an individual to express basic needs and wants, transfer information, and communicate socially with others. Functional communication is needed to establish an individual's independence.

Generally understood gestures: A set of gestures understood by the general population, used with and by individuals with severe cognitive disabilities.

Gesture dictionary: An inventory of gestures that are used or understood by an individual for communication.

Global aphasia: A neurological condition in which there is extensive impairment in all areas of speech-language.

Gloss: A printed word that accompanies a graphic symbol.

Ground: Contextual information of a graphic symbol that enhances the meaning of that symbol. It is important that there is good discrimination between the ground and figure.

Head pointer: An adaptive device that can be used for direct selection. It may be affixed to an individual's head, usually with a band or helmet.

High technology: A device that has synthesized speech and print output as well as programming/editing capabilities. Most often found in the "dynamic display", "icon sequencing" and "text-to-speech" categories.

Icon: A symbol or picture that represents a referent.

Icon prediction: Minspeak feature that allows the individual faster retrieval of stored messages. It requires less cognitive effort as icons associated with the first selected icon are lighted.

Ideograph: A graphic representation that suggests rather than actually depicts its referent. They are typically used with more abstract referents.

Idiosyncratic gestures: Gestures used consistently by one individual only. They remain idiosyncratic as long as others don't adopt and use them (thereby becoming conventional).

Inclusion: An educational philosophy that allows for children with disabilities to be in the same setting as those children who do not have disabilities.

Individualized education program (IEP): An educational program designed by a school based team to meet the unique needs of a specific student.

Integrated environments: Settings where individual students with disabilities function alongside student peers without disabilities.

Intelligibility: The ability of a symbol to be identified and understood without prompts or explanations.

Intervention: The provision of services designed to improve communication so that an individual can more fully and more effectively participate in daily activities.

Inverse scanning: A message selection technique in which activating the switch begins the scan and releasing the switch stops the scan and selects an item.

Joystick: A computer input device used to control movement of an object/cursor on the screen.

Language use: The pragmatics of language that have to do with an understanding and an ability to engage in social exchange with others.

Level of abstraction: The amount of detail in a symbol – the less detail depicted, the greater the level of abstraction and vice versa.

Lexicon: A collection of vocabulary words and/or manual signs.

Linear scanning: A message selection technique in which items are scanned individually in a specific sequence (like a row or circle).

Linguistic competence: In AAC, mastery of an AAC system's symbols and symbol arrangement to effectively communicate with others.

Lite technology: A battery or electrically powered device that produces digitized speech. Most lite tech devices are found in the "single message" and "multiple message" categories.

Logic: A term applied to symbol sets where inherent conformity to a set of rules allows creation of new symbols to be consistent with those already in the system.

Logograph: A letter, character or other graphic symbol used to represent a word.

Memory-based encoding: The process of forming language in which the storage and retrieval organizational scheme is committed to memory (i.e. not a chart based system).

Message: A communication that conveys meaning and has a purpose.

Microboard: is a small group of family and friends that join together to create a nonprofit society, aiming to address a person's needs in an empowering and customized fashion.

Mini keyboard: A small keyboard with small keys arranged in a tight configuration for people with limited range of motion.

Minspeak™: A system of encoding and organizing messages for storage and retrieval based on the use of icons that have multiple meanings.

Morse code: An international system of dots and dashes that can be used through communication devices for output as letters, punctuation and numbers.

Mouthstick: An adaptive device held in the mouth and used to direct select a desired object / picture / word from an array of choices.

Multimodal approach: An intervention approach that uses more than one mode of communication, e.g. gestures and graphic symbols

Needs assessment: An assessment of the communication needs of a person using AAC for the purpose of determining which AAC device would best meet his or her needs.

Nonlinguistic communication: Vocal, graphic or gestural communication that uses symbols normally not part of a linguistic system. This includes some vocalizations (pleasure, discomfort), line drawings and gestures.

Nonverbal: An ambiguous term that technically means “without language”. It is occasionally used to describe individuals with little or no functional speech.

Opaque: A term used to describe symbols that have no or very little visual resemblance to their referents.

Operational competence: The ability to independently and effectively use an AAC system.

Output: The product of aided high technology AAC systems, including voice and/or print.

Participation model: An assessment and intervention model by Beukelman and Mirenda (1998) that compares the functional participation of persons using AAC with same age peers.

Partner assisted scanning: A message selection technique in which a communication partner provides scanning by presenting items through spoken, visual or tactile means.

Phoneme: A speech sound.

Phonologic awareness: The ability to consciously reflect on the sound system of a language, to manipulate its structure and to recognize differences and similarities in phonemic properties.

Pictograph: A symbol that depicts an abstract or concrete referent using simple pictures or line drawings.

Picture Communication Symbols (PCS): A large set of aided symbols made up of mostly line drawings with the words printed above them.

Portability: A consideration when selecting an AAC device or system that must be transported by an individual.

Pragmatics: The use of language in communicative contexts – relates to how the message is related rather than content.

Pre-literate: A term used to describe an individual who has not yet learned to read and write but appears to possess the cognitive ability to do so if given the opportunity.

Prompts: The form of assistance or stimulus given to an individual to help produce a desired response or behaviour. Prompts can be verbal, gestural, physical and/or visual.

Reaction time: The time between stimulus and response.

Rebus: A representation of syllables or words by pictures with names that sound the same as the intended syllables or words.

Receptive vocabulary: Words and messages that are received and understood by a listener.

Referent: A person, place, object or abstract idea that is represented by a symbol.

Row-column scanning: A message selection technique in which scanning occurs down rows until the user interrupts the scan and then continues across the columns in the selected row.

Scanning: A message selection technique in which items are presented sequentially.

Scripting: Breaking an activity down into small steps and then recording the expressions and words needed to participate in the activity.

Semantic compaction: The encoding system used in Minspeak™ in which many associations are made with each icon.

Semantics: The meaning system of language.

Sigsymbols: A graphic symbol system of pictographs and sign-linked symbols that is composed of graphic representations from British or American Sign Language.

Social competence: The ability to communicate appropriately in social situations (when and what to talk about).

Speech generating device: A term created by Medicare in the USA to identify a range of voice output AAC systems. For funding purposes, Medicare has established codes to categorize SGDs by features. Many devices that are acceptable to Medicare have been “locked down” so that features other than speech output (ie. writing and internet access) are not available.

Speech Language Pathologist (SLP): A professional who is licensed to work with individuals with communication disorders.

Speech Language Pathology Assistant (SLP-A): A person who is employed to assist the SLP in the creation and production of AAC systems and training in their use.

Speech synthesis: Computer generation of speech from typed text or stored messages.

Static: A term used to describe symbols in which no movement is needed to convey meaning.

Step scanning: A message selection technique in which the individual moves through a patterned array of items by activating a switch each time to move to the next item. Choices are made by activating a second switch or utilizing a dwell feature.

Switch: A component of some AAC systems which acts as an interface with a communication device, allowing the user to make selections by scanning.

Symbol: Something used to represent another thing or concept. AAC symbols can be acoustic, graphic, manual and/or tactile.

Symbol set: A defined number of symbols. It can be expanded but lacks clearly defined logic or rules for expansion.

Symbol system: Symbols designed to work together for maximum communication. Includes logic or rules for expansion.

Syntax: The structural or grammatical aspects of language.

Synthesized speech: Speech that is artificially produced by means other than the human vocal tract.

System efficiency: The relationship between symbols/activations and the number of messages they convey. The more efficient the system, the less activations are needed to generate the most messages.

Tangible consequences: Positive reinforcement given by an individual's getting or maintaining access to tangible items like food or toys.

Tangible symbols: A set of real objects, miniature objects, or parts of objects that can be organized as an AAC system.

Text-to-speech synthesis: The creation of artificial speech by typing on a keyboard or keyboard emulator.

Touch screen: A transparent interface that is integrated or can be attached to a monitor or AAC device that allows input or message selection by touching areas on the screen.

Transition services: The process and/or delivery of services involved when an individual moves from home to school, school to school, or school to work.

Translucent: A term used to describe symbols that are not easily understood without first knowing the referents. Once the referent is known, the translucent symbol is recognizable.

Transmission: The sending of a message from an individual to a communication partner.

Transparent: A term used to describe symbols that are easily understood because of their close visual relationship to their referents.

Verbal: A general term that means the use of words, or "with speech".

Visual scanning: A message selection technique in which symbols are presented visually.

Visual Scene Display: A picture, photograph or virtual environment that depicts and represents a situation, place or experience. Individual elements such as people, actions and objects appear within the scene.

Voice output communication aid (VOCA): An assistive communication device that provides synthetic and/or digitized speech.

Word prediction: A word retrieval system that helps and increases word retrieval by providing high frequency words based on initial letter selection. The term also refers to software that minimizes keystrokes by presenting frequently used words based on input letters.

Appendix B: References

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Appendix C: AAC Resources in BC

Assistive Technology Seating Service (ATSS), GF Strong Rehab Centre
4255 Laurel Street, Vancouver, B.C. V5Z 2G9
Phone: (604)734-1313
Website: www.assistive-technology.ca

British Columbia Association of Speech/Language Pathologists and Audiologists (BCASLPA)
9912 Lougheed Highway, Burnaby BC V3J 1N3
Phone: (604) 420-2222
Website: www.bcaslpa.ca

Communication Assistance for Young Adults (CAYA)
105-1750 West 75th Ave, Vancouver, BC, V6P 6G2
Telephone: (604) 261-9450
Website: www.cayabc.org

Provincial Integration Support Program (PISP)
1525 Rowan Street, Victoria, B. C. V8P 1X4
Phone: (250) 595-2088
Website: www.pisp.ca

Provincial Outreach Program for Autism & Related Disorders (POPARD)
4812 Georgia Street, Delta, B.C. V4K 2S9
Phone: (604) 946-3610
Website: www.autismoutreach.ca

Queen Alexandra Centre for Children's Health
2400 Arbutus Road, Victoria, BC V8N 1V7
Telephone: (250) 477-1826
Website: www.viha.ca/finding_care/facilities/queen_alexandra_centre_childrens_health.htm

Special Education Technology - British Columbia (SET-BC)
#105 -1750 West 75th Avenue, Vancouver BC V6P 6G2
Telephone: (604) 261-9450
Website: www.setbc.org

Sunny Hill Health Centre for Children
3644 Slocan Street, Vancouver, BC V5M 3E8
Telephone: (604) 453-8300
Website: www.bcchildrens.ca/Services/SunnyHillHealthCtr/default.htm

Technology for Independent Living (TIL)
9007 Shaughnessey Street, Vancouver, BC V6P 6R9
Phone: (604) 326-0175
Website: www.tilbcits.org/

Appendix D: Websites

- 1 Voice: Communicating Together. www.1voice.info
- AAC and Employment. <http://mcn.ed.psu.edu/emp/home.html>
- AAC Institute. www.aac institute.org
- AAC TechConnect. www.aac techconnect.com
- AbleNet Inc. www.ablenetinc.com
- Adaptivation Inc. www.adaptivation.com
- Advanced Multimedia Devices, Inc www.amdi.net
- American Speech-Language Hearing Association (ASHA) www.asha.org
- Aroga Group Inc. <http://www.aroga.com>
- ASHA Division 12: AAC. www.asha.org/about/membership-certification/divs/div_12.htm
- Assistive Technology Inc. www.assistivetech.com
- Attainment Company Inc. www.attainmentcompany.com
- Augmentative Communication Community Partnership Canada www.accpc.ca
- Augmentative Communication, Inc. www.augcominc.com
- Augmentative Communication On-Line Users Group
www.temple.edu/instituteondisabilities/acolog/
- Augmentative/Alternative Communication Intervention Products & Presentations
www.aacintervention.com
- Barkley Memorial Augmentative & Alternative Communication Centers <http://aac.unl.edu>
- Blink Twice (Tango). www.blink-twice.com
- The Bridge School. www.bridgeschool.org
- Bridges Canada www.bridges-canada.com/UI/home.aspx
- Paul H. Brookes Publishing Co. www.pbrookes.com
- Canadian Association of Speech-Language Pathologists and Audiologists www.caslpa.ca

Communication Aids for Language and Learning www.callcentre.education.ed.ac.uk

Community Works. www.communityworks.info

Creative Communicating www.creativecommunicating.com/

Design to Learn (Tangible Symbols) www.designtolearn.com

DynaVox Systems www.DynaVoxtech.com

Enabling Devices www.enablingdevices.com

The Four Blocks www.wfu.edu/fourblocks

Gail Van Tatenhove www.vantatenhove.com

Inclusion Press. www.inclusion.com

Inclusive Technology Ltd. www.inclusive.co.uk

Independence, Community, Empowerment (ICE). www.ofcp.on.ca/ice/

International Society for Augmentative and Alternative Communication www.isaac-online.org

Mayer-Johnson, Inc. www.mayer-johnson.com

Oxford ACE (Aiding Communication in Education) Centre www.ace-centre.org.uk

Partners in Communication www.partnersincommunication.com

Penn State AAC Mentor Project. <http://mcn.ed.psu.edu/~mentor/>

Pittsburgh Employment Conference for Augmented Communicators (PEC)
www.sciconics.com/shout/index.html

Prentke Romich Company www.prentrom.com

Pyramid Educational Consultants, Inc. www.pecs.com

Rehabilitation Engineering Research Center on Communication Enhancement
www.aac-rerc.com

Saltillo Corporation. www.saltillo.com

Simplified Technology www.lburkhart.com/

Talking Mats. www.talkingmats.com

Technology and Integration, Inc. www.tniinc.com

Tobii. www.tobii.com/assistive_technology/home.aspx

UW Augcomm. <http://depts.washington.edu/augcomm/>

Words +, Inc. www.words-plus.com

ZYGO Industries Inc. www.zygo-usa.com