

AAC: A Way of Thinking
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Acknowledgements

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About 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.



Introduction

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 educators who are supporting non-verbal students, including long-term planning, intervention models and strategies for utilizing technical and non-technical augmentative communication systems within the BC curriculum.

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 student who has difficulty communicating verbally may need to use other communication methods, including technical AAC systems such as voice output communication aids (VOCAs). Technical methods of communication require supplementary and/or back-up non-technical 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. AAC is useful for children with delayed speech development, and is becoming more commonly used with people who are learning a second language.

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 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. 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 a child 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 child 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 someone communicating with symbols. If a child is not provided with any more symbols than they have 'mastery' of, then they have no opportunity to practice new symbols in a natural progression.

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

Truth: Voice output communication aids are often vital components of a person's AAC system. It is true that they should have access to their 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 many people who use VOCAs in most 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 student.

Section 1: Planning for the Use of AAC Technologies

Team Roles

As with any decision that involves a student, making decisions around the use of augmentative and alternative communication systems needs to have the full involvement of the school team members. Gathering and sharing information from all members of the team, and combining knowledge and expertise through the process of planning, can 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 student's communication needs can be considered. Key members of the school team, for the process of designing and implementing an AAC system, may include:

- student and parents
- speech language pathologist
- classroom teacher, resource or support teacher
- occupational therapist
- classroom assistant

As with any group striving to make changes or implement programs, it is important to identify a team leader. It is often the case manager, but 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 student may not have a clear direction and the effort spent in planning may be wasted. A strong commitment to 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.

It may be desirable to choose a team leader who is directly involved with the student at the school level for more than one year at a time. Knowing and understanding the student's communication environments will be critical to the relevance and usefulness of the AAC system. The team leader can act as a facilitator for the group, bringing the combined knowledge, and expertise together, as well as spearheading the development of the plan.

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 Selection and Use of AAC Systems

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.

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

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

For assistance with any of the above steps:

- 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.

Including Students Who Use AAC

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

- Structure the physical environment to support communication. Make sure that the student has consistent access to an appropriate technical or non-technical AAC system. Ensure proper seating and positioning so the student can access the AAC system independently.
- Provide frequent opportunities for communication. All children need opportunities to communicate their thoughts and ideas in order to learn and develop. Unlike most speaking children, students who use AAC systems may not be able to initiate, get attention, or interrupt others if they are motivated to say something. We need to structure communication situations with a shared focus of attention, so students have many chances to communicate and interact. By incorporating communication opportunities in daily classroom routines, the student will have regular chances to interact.
- Students 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 other students in the class or school how to talk to, understand, and respond to the child using an AAC system. Classmates can often find creative ways for the student using AAC to participate in activities and are usually more motivating communication partners than adults.
- Expect successful communication from the student. When we have a conversation with a speaking child, we expect interaction and responses. We must have the same expectations for students 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 student with enough time to communicate. Children who speak can often carry on conversations, interrupt and interject with great speed. Students 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 student's communicative attempts, confirming the intended message or clarifying meaning if necessary. You may want to use the student'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 student is trying to communicate. Ask the student 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. Students 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 student'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 student'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 student.
- Ensure ongoing training and support for the student's adult communication partners and teachers. Search out opportunities for professional development in augmentative communication for the student's school-based team members. Share ideas, discuss communication issues and problem solve with others with an interest in AAC.
- Supporting a student who uses an AAC system requires a long term commitment from his or her school based 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 student 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 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.

AAC Assessment

In situations where a student is unable to communicate effectively with family and peers, 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 student needs

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

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

Ongoing team process

Assessment is not the job of any single individual. It requires team collaboration and student and family input. There are many resources available to assist you in the assessment process. First, look to the resources available within your school or district. If further support is needed, your school based team or district team can assist you in accessing the appropriate provincial resource program or external agency. There are many AAC texts and web sites which can also provide you with background information. (See references in 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. Your district speech language pathologist may be able to direct you to programs or vendors which provide extended assessment or field testing opportunities.

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 a single entity that when it is over once the team has identified an appropriate AAC system for a student. Keep in mind that a communication system or device will need to be updated and reassessed as the student progresses or changes. As the student progresses, their communication needs and environments may change. Always keep in mind that any communication system or device will need to be monitored and reassessed accordingly. Student input and response to these changes is essential.

Alternate Access

The term “access method” describes how the student 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 student’s motor abilities and physical limitations, together with information on fatigue levels, vision and hearing, will help determine the preferred method of access. If your district has the services of an occupational therapist, he or she can assist you. Input from the student is also desirable.

The following access options may be considered:

Direct selection

The student 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 is also a form of direct selection. An eye-gaze board, or “e-tran”, can assist with eye pointing. The student 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 students.

Assisted direct selection

The student may use a body part such as a finger, or a tool such as a light pointer or joystick for direct selection.

Visual scanning (for electronic communication aids)

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

Listener assisted scanning

This access method is useful for students with both motor and visual challenges. In a non-technical system, the communication partner reads out each choice in a predetermined, consistent pattern. The student indicates when the desired selection has been spoken. This can be a powerful access method in classrooms where peers have been given training.

Auditory scanning

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

Considerations for Preparing for Adulthood

Most of this guide focuses on how to help a student become an effective communicator within the educational environment. We also need to consider where this person will be once they are out of the school setting. People who use AAC have unique challenges that other adolescents often do not have to face. Considering these challenges can help the team prepare their student for adult life.

Consideration of environment

People who have a disability often move out of their family home and into group homes. They are thus often with unfamiliar communication partners. Not only does someone who communicates with AAC have to be able to direct their care, they also have to be able to instruct others on how to communicate with them. For example, there is often not a familiar partner who can pass on information about how they say yes and no, when they use their system, how often a high-tech system has to be charged, etc. These environmental factors should be considered when choosing a 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 student how to create what they need 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.

Considerations about safety and the legal system

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 an individual is not able to talk about what they fear may happen, or what has in fact happened in their situation. This vulnerability can be reduced by teaching people who use AAC how to create a safe environment for themselves. Also, we can teach our students about their legal rights, and how to communicate when their rights have been violated.

Section 2: AAC Intervention

Models of Intervention

Teaching students how to use AAC as a method for communication is a long process. There are several models that can help us set long term goals and measure outcomes. It is important to note that these models are not mutually exclusive; they are not either-or approaches. Rather, they can be used to set goals for students that are both relevant and possible within the environment.

Intervention Model: Developmental Approach

Although not a formally researched approach, many teams find this way of thinking useful for setting goals for their student. 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 student 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 a child is given an AAC device, they are eager to try all of the messages (In fact, this is what adults do too when they are looking at a device). They often find a favorite message, and play it over and over again. Often, 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 disrupting a class. 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 student 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.

Intervention Model: Second Language Approach for New Systems

If a child is already a successful communicator, introducing a new AAC system can present quite a challenge. Where do we begin? 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 child 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 with a student 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, such as books with symbol translation, curriculum 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 a person who is using AAC, as they will presumably be using this system in many of their daily communication interactions.












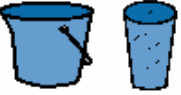




Another example is to look at the level of difference between one system and another. For example, consider moving from a four message device to an eight message device, versus moving from a communication book to a Minspeak device. Two languages may be as close as Italian and Spanish (which use the same 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.

Intervention Model: System for Augmenting Language (SAL)

A key component of the System for Augmenting Language (Ronski and Sevcik, 1996) is the provision of models for students learning to use augmentative communication. The facilitator should demonstrate how to communicate with the technical or non-technical system. It is this modeling that has a direct impact on how successful a student becomes. It is sometimes known as Aided Language Stimulation, Augmented Input or Augmentative Communication 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. (Ronski & Sevcik, 1996, p. 66)

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

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

Intervention Model: Building 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):

1. 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.

2. Linguistic Competence

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.

3. 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.

Increasing turn taking

Taking turns is the way people participate in social interactions. Turns may include spoken messages, signs or gestures, messages selected on a communication board or book, or output from a communication device. Turns may be obligatory or nonobligatory.

Sometimes an individual is obliged to take a turn in an interaction because the partner asks a question. For example, when a partner asks, "What are you doing?", the individual is obliged to answer. Turns that follow a partner's question are obligatory turns. Sometimes an individual is invited to take a turn in a conversation but is not obligated to do so. For example, when a partner says, "I went to a great concert," the individual is invited to take a turn in response (e.g. "Cool!") but is not obligated to take a turn. Turns that follow a partner's comment or statement or turns that start a conversation are nonobligatory turns. Taking turns frequently in interactions, including those that are obligatory and those that are not obligatory, is one way for individuals to let partners know that they are interested and involved in the conversation and that they are competent communicators. (Light and Binger, 1998, p. 113)

Nonobligatory turns are important because they are one way that students who use AAC can let their partners know they are interested in the conversation. Students who already fulfill obligatory turns are potential candidates for the goal of increasing nonobligatory turns. This skill is most appropriate as a goal for individuals who have relatively efficient rates of communication. The overall purpose of working toward this goal is to encourage the student who uses AAC to participate more frequently in social interactions.

Partner-focused questions

Partner-focused questions are questions that an individual asks his or her communication partners about their thoughts, feelings and experiences. Examples are "How are you?", "What did you do on the weekend?" and "What's up?". When students who use AAC ask this type of question, they show their partners that they are interested in them.

Asking partner-focused questions fosters social closeness and enhances interaction. Asking partner-focused questions is an important component of mutually rewarding interactions. (Light and Binger, 1998, p. 185)

Asking partner-focused questions is a relatively advanced skill. Therefore, it should be a goal for students who already understand and express basic questions. In addition, these students should understand and participate in basic conversation about people or events outside the immediate environment (e.g., talking about what happened last night or plans for the holidays).

A step-by-step plan can be developed for the goals of using an introductory strategy, increasing turn taking and partner-focused questions. The team should:

- specify the goal, and complete baseline observations
- select vocabulary
- teach facilitators to provide appropriate opportunities
- teach the student to use the strategy
- check for generalization
- evaluate outcomes

4. Strategic Competence

The final skill 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 of an introduction strategy

An introduction strategy is important in providing new partners with the knowledge they require to interact effectively with the student using AAC. The strategy empowers the student who uses AAC to train his/her partners themselves.

The following is an example of an introduction strategy:

Becky, who uses some sign language and a voice output communication aid, has the following introductory message programmed into her computer: "Hi, I'm Becky. I understand what is said to me, so please speak normally. I use sign language to communicate sometimes. If you don't know sign language, just let me know, and I will type the things I want to say on this computer. You will hear my message once I finish typing it out. Please give me a few minutes to answer. I may be slow, but it's worth waiting for!" (Light and Binger, 1998, p. 46)

Intervention Model: Using Routines and Choice Making

The typical child first learns language based on what is familiar and routine in their 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.

Creating opportunities to make choices must also be one of the strategies of teaching communication. Choice making can easily be built into many activities without compromising the mandatory aspects of a lesson or task. Choices can be offered around how things are done, when they are done, with whom, or with what materials. Through choices, the student then has some degree of control over their life with all its inherent rewards, risks and consequences. In addition, if the choice making is built into the activity, then all the students in the class can model that behaviour.

A Day in the Life of a Classroom

In order to facilitate our understanding of routines, choice making and how we can map the day in language, we can consider a typical day in the life of a classroom. Each routine will require a limited script that can work within a routine.

In their book, "Can We Chat", Musselwhite and Burkhart present a methodology for developing scripts and vocabulary selection for various routines and situations. They suggest that any script should provide:

- attention getters
- a range of communicative functions (comments, questions, directing, etc.)
- vocabulary for multiple turns
- real kid language
- language matched or appropriate to the individual's personality
- vocabulary to deal with unexpected responses

Greeting

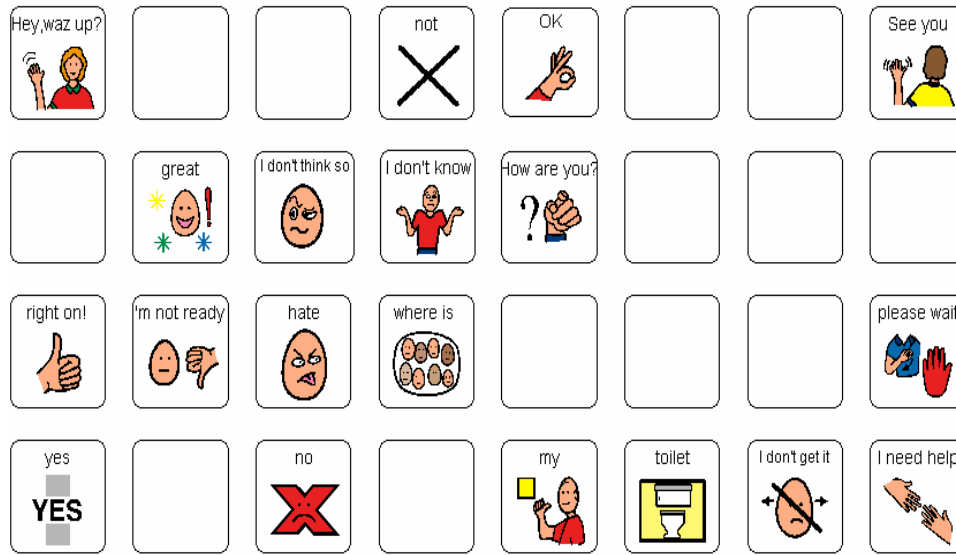
Children arrive in the classroom. The teacher greets the students. Here, the language for the routine involves greeting vocabulary, as well as commenting. Some children may require help in removing clothing or unpacking items so a help message may be appropriate.

Even though the actual vocabulary may be short on meaning or content, it provides an opportunity to feel included and to practice the dynamic of turn taking and social interchange.

Messages:

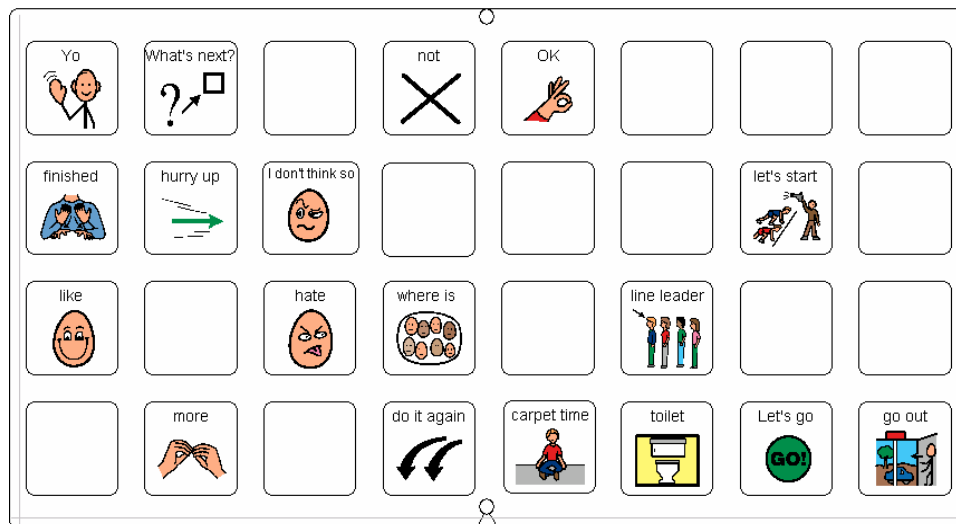
"Hi." "How are you?," "Cool!," "That sucks!," "Help please.," "Me too.," "Great!," "How about you?" (This invites exchange.)

A Day in the Life of a Classroom (Continued)



Transitions

Transition times can sometimes be neglected by the language teacher because they are between two events which are full of content. The two events which are connected by the transition may not be routine, but the transition is precisely the thing that does remain constant.



A Day in the Life of a Classroom (Continued)

Often nonverbal cues are used to signal a transition, such as flicking a light on and off, or the teacher sitting in her “Circle Time” rocking chair. This type of routine is very easy to label with language. It is a teachable moment. The underlying actions and events which the language describes are predictable and constant. Energy can thus be focused on learning the specific vocabulary and the communicative dynamic. The meaning of the language is already understood while the form is one that needs to be practiced by the student using AAC.

Messages:

“Time for...”, “Finished”, “Clean up”, “I want to do more.”, “No more”, “Not yet”

Circle Time

Circle time usually represents the introduction to the day. It may provide orientation to the date, season, weather, awareness of who is present, and an outline or map of the day. The more structured the circle time, the easier it will be to predict the required vocabulary. For all of the components of circle time, the teacher will want to provide redundancy in the message by using pictures, printed words, spoken words and whatever other coding system the student uses.

Example activities for circle time:

1. Who is here/absent today? All kids have name cards on the floor. As they enter the room they find their own name and place it into the wall chart to mark their presence. Cards are left on the floor indicating those who are absent.

The children then sit on the floor. Depending on the students’ need for structure they may sit randomly or be assigned specific places to sit. Seating places may be designated either by name, or another form of coding which may correspond to the current theme (e.g. types of dinosaurs, colours, types of whales, etc.).

2. How many people are here today? The helper must count all of the people, then all of the boys, then all of the girls and must find the card numbers that correspond. The numbers can be found on the random number board on the wall. The helper places the numbers on the chart.

_____ people are here today.

_____ people are away.

_____ boys are here.

_____ girls are here.

The number of boys and the number of girls can then be added up to make the total.

A Day in the Life of a Classroom (Continued)

- Clapping hands rhythmically and singing to the tune of “The More We Get Together”

Here we are together, together, together.

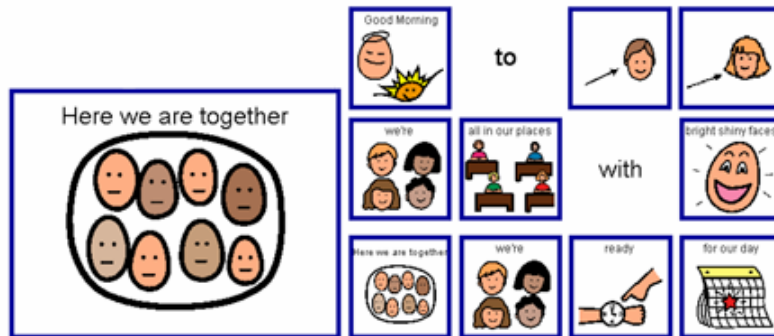
Here we are together; we're ready for our day.

Good morning to (child's name) and (child's name) and (child's name).

Good morning to Michael and Lisa and Mathew.

We're all in our places with bright shining faces.

Here we are together we're ready for our day.



- What is the date? In the calendar activity, the helper of the day finds the appropriate number for the day from a selection of random numbers on the wall. The helper then counts out loud, e.g. May first, second, third, fourth, etc., up to the present date. All the numbers are arranged in patterns and the child must recognize the pattern and continue it. The patterns are made from two shapes from the season or theme of the month, e. g. pumpkins and witches for October.

Mother's Day

May

May 2002

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
			1 	2 	3 	4
5 	6 	7 	8 	9 	10 	11
12 	13 	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

A Day in the Life of a Classroom (Continued)

5. What is the day of the week? Go to chart for days of the week. The helper picks the appropriate day cards for each of the slots choosing from all the days of the week.

Today is Tuesday, May 2, 2003.
Yesterday was _____.
Today is _____.
Tomorrow will be _____.

Sing the following to the tune of Frere Jacques:

Yesterday was Sunday, yesterday was Sunday.
Today is Monday, today is Monday.
Tomorrow will be Tuesday, tomorrow will be Tuesday.
How are you? Fine, thank you.

A nice variation is to clap hands while singing. For *yesterday* (past) clap hands in back of you. For *today* (present) clap hands over your head. For *tomorrow* (future) clap hands in front of you.

6. What is the weather like today? Have pictures of all types of weather you want arranged in chart fashion. Then have the helper colour in the appropriate box.

Sunny	Cloudy	Rainy	Windy	Foggy	Snowy
X		X		X	
X				X	
X					

Make a sentence with either word cards or write out "Today the weather is _____."

7. How long have we been in school? Use coffee stir sticks arranged in bundles of ones, tens, and hundreds. Write the target number on a board or paper that can be placed above the actual stir sticks after they are counted out. Ask the students "How many groups of hundreds do we need?" "How many groups of tens?" After the right number of sticks has been laid out, then the class counts from 1 up to that number. Count together by tens and by fives.
8. Review the alphabet and sing the alphabet song.
9. Who has some news to share? The teacher writes the date as if writing a journal and has specific children dictate a statement that they would like to share with the class. The teacher then writes the sentence with the input of the students, asking what letters to use and what sounds words begin or end with. Familiar prewritten key words on cards are inserted appropriately in the sentence.

A Day in the Life of a Classroom (Continued)

Centre Time

This is a common time for making choices in primary classrooms. Rather than letting students go randomly where they want to, this is an opportunity to practice coding. The names and pictures of the various centres can be listed on individual pockets on a chart. Students then indicate a choice of activity by placing their name card into the appropriate pocket. This way the teacher and the students can keep track of which centres are full, or how many students are in each centre.

The student using AAC can make the selection or they can ask a classmate to do it, making the request with their communication system. Specific overlays or communication arrays relative to each centre can be provided for this student.

Journal Time

Vocabulary for this activity will require a:

- basic core vocabulary that can be used for any topic, as well as
- extended vocabulary, or specific topic vocabulary.

Since the extended vocabulary list is the more open ended, it would be useful to provide another cuing system such as an alphabet array (for the more literate student) so they can begin to spell out their topic selection to their listener. If this is beyond their capabilities, a teaching assistant could offer topics and the student could respond with a yes/no, or use their main overlay to direct the listener.

Lunch Time

Lunch time arrays may be similar to transition arrays. Modification of the routine to provide “commandable” tasks is recommended since communication is the goal, rather than actually eating lunch.

One part of the routine may be to hand out cups or napkins. This would require a job assignment with opportunities for choosing the “worker”, colours of cups, or napkins, etc. Also, the name of the person distributing would have to be “announced”. Other tasks could include assignments of lunch monitors or a clean-up crew.

Extended vocabulary is required to provide for the randomness of typical lunch conversations. Schools which offer a lunch program with a distribution routine would provide a greater opportunity for a communication script or routine than a school where students brought their own bagged lunch.

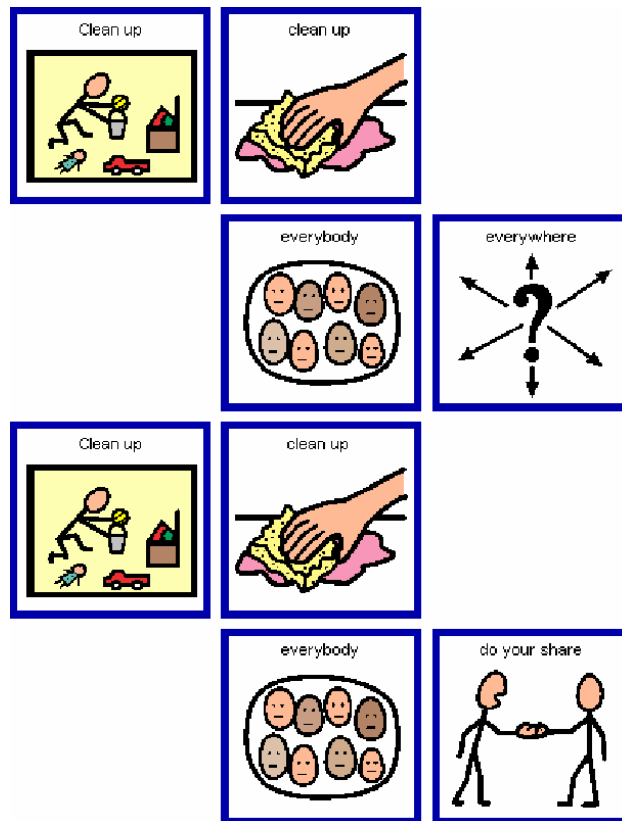
A Day in the Life of a Classroom (Continued)

Home time

Similar to greetings and introductions, departures and farewells are common communicative routines where the communicative intent is readily understood but the opportunity for confident and errorless coding of the language can take place.

Other predictable routines that could be supported with scripts include:

- going to the washroom
- hand washing
- clean-up time



Message Selection

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

Factors Influencing Vocabulary Selection

Purpose of the system

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 for class presentations. The physical system may vary depending on the situation. The same student may use eye pointing in physical education, a BIGmack in music and a joystick/computer in math.

Motivation and relevance

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

When planning for specific activities such as "circle time", consider what questions and comments students frequently say, and then provide generic messages that can be used every day during this activity.

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



Motivating symbols use interactive vocabulary and classroom expressions.

Message functions: participation and communication

To facilitate the AAC 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 student is an active participant in the activity; that he/she is part of the group. The particular form of participation may vary:

- singing "e-i, e-i, o" while class is singing Old MacDonald
- giving preprogrammed instruction to the class
- saying the student's contribution for a show and tell activity
- making social comments such as "way to go", "far out" or "right on"
- saying "present" at role call

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 student is to *participate* in that chosen activity. For students who use nonverbal communication strategies, participating vocally can be an important skill to develop.

Multiple message devices can and should serve both functions. They provide the student 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 student 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.

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). When we create displays that use mainly supplemental vocabulary, we have to start over each time and the student must learn a new display as well as the content of the lesson. It desirable to provide a balance between core and supplemental vocabulary items that meet the needs of the student, so he/she can communicate with peers, adults, and about schoolwork.

Symbol Sets

Determining the symbol set that will be most appropriate for a student at any given time 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 student will change over time as the student, the environment, the communication partners, and the field of AAC change and progress.

An AAC system is comprised of the following parts:

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

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 students who require them. Symbols are usually categorized into "unaided" symbols, which use movement or sounds to represent meaning (e.g. gestures or sign language) and "aided" symbols (meaning that there is a board, or book, or device associated with them).

Students 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 most frequently associated with AAC devices. Some, such as Picture Communication Symbols (Mayer-Johnson), DynaSyms (DynaVox Systems) and clip art software are available for purchase. These symbols are mainly concrete in nature. Photographs, logos from magazines and/or advertising, and internet sites, may also be used.

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?

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 student is able to recognize, use and combine them. Phrases and single words can be used within a single display.

Letters may be added as soon as the student 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.

Communication facilitators

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 communication facilitators

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.

Examples of Symbol Sets

There are hundreds of symbol sets to consider when determining an AAC system for a student. 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. There is some debate about its transparency.
- 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 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

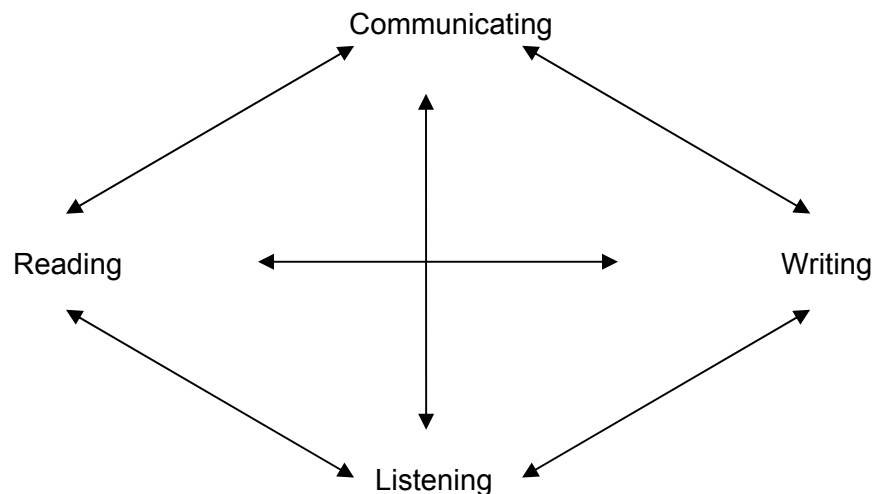
- is standard written language
- is extremely valuable symbol set for a student who is non-speaking
- allows a person who is non-speaking to communicate their original thoughts and feelings by spelling

Literacy & AAC

The non-speaking student 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 student 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 all students. 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, no student is too cognitively or physically challenged to participate in literacy activities in some fashion. Linda Burkhart, Patti King-DeBaun 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. Children either read from a basal, or from multiple copies of trade books, or from a large book. The block usually begins with a discussion led by the teacher to build or review any background knowledge necessary to read the selection. Comprehension strategies are taught and practiced during this block. This block also includes writing in response to reading.

2. Self-selected reading

Self-selected reading includes (and usually begins with) the teacher reading aloud. The teacher selects books for the classroom library on themes they are studying, easy and hard library books, old favourites, predictable books, etc.

While the children go on to independent reading, the teacher conferences with and takes anecdotal records on several children each day. The block usually ends with one or two children sharing their book with the class in a "reader's chair" format.

3. Writing

The writing block is carried out in "writers' workshop" fashion. It begins with a mini-lesson (10 minutes) where the teacher writes and models all the things writers do. Next, the children go to their own writing. They may be at different stages of the writing process -- finishing a story, starting a new story, editing, illustrating, etc. While the children write, the teacher conferences with individuals who are getting ready to publish. The piece is edited with the teacher's help and the child proceeds to the publishing table where he will copy the correct form and finally illustrate the book. This block ends with "author's chair" in which several students each day share work in progress, or their published book.

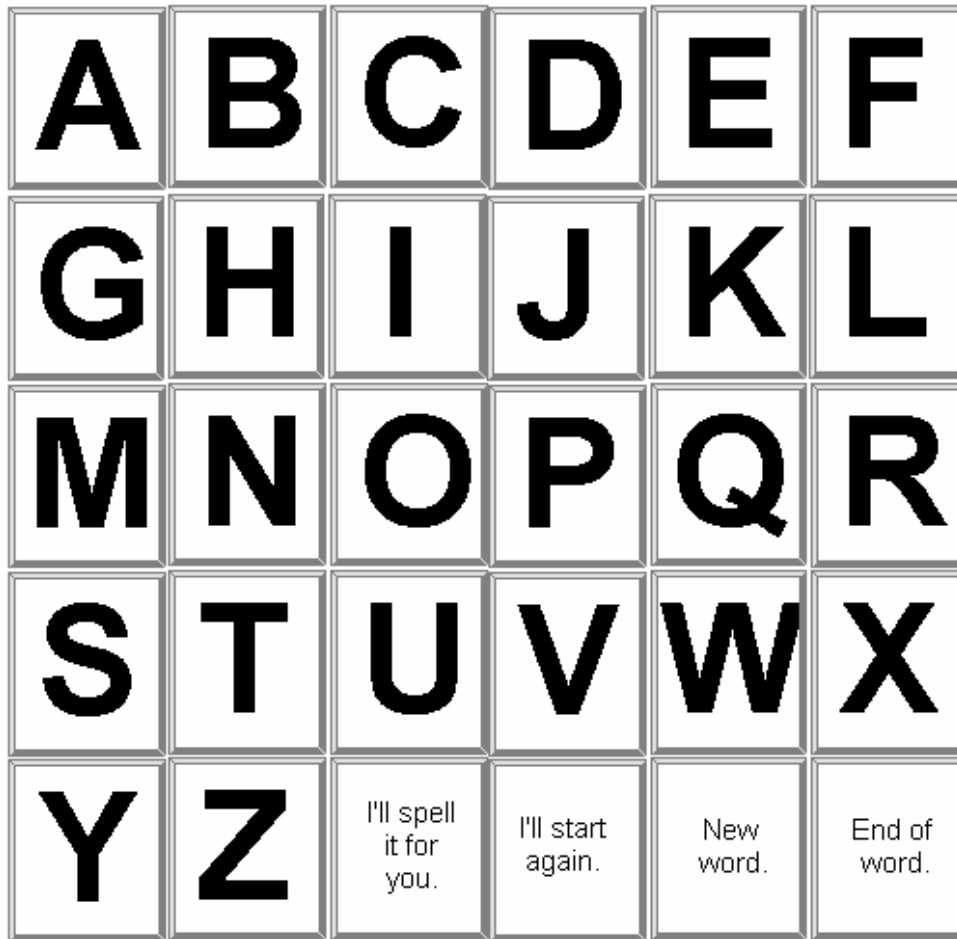
4. Working with words

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 first ten minutes of this block are usually given to reviewing the "word wall" words.

The word wall is a display of high frequency words above or below an alphabet. The remaining 20 to 25 minutes of time is given to an activity which helps children learn spelling patterns.

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.

If you don't understand something I say, ask me to spell it.
Sometimes it helps if you write down the letters as I touch them.



Sample alphabet board.

Using Portfolios in Literacy Assessment

Assessment of literacy skills is a valuable process for all students and should not be overlooked for students with disabilities. Documenting progress in a positive manner is an important and essential task. Portfolios can serve as a useful part of assessment for all students.

The emptiness of portfolios, compared to those of typical peers, may serve as a wake up call to teachers, therapists and parents that the target student is not receiving sufficient, appropriately adapted literacy opportunities. (Musselwhite and King-DeBaun, 1997, p. 258)

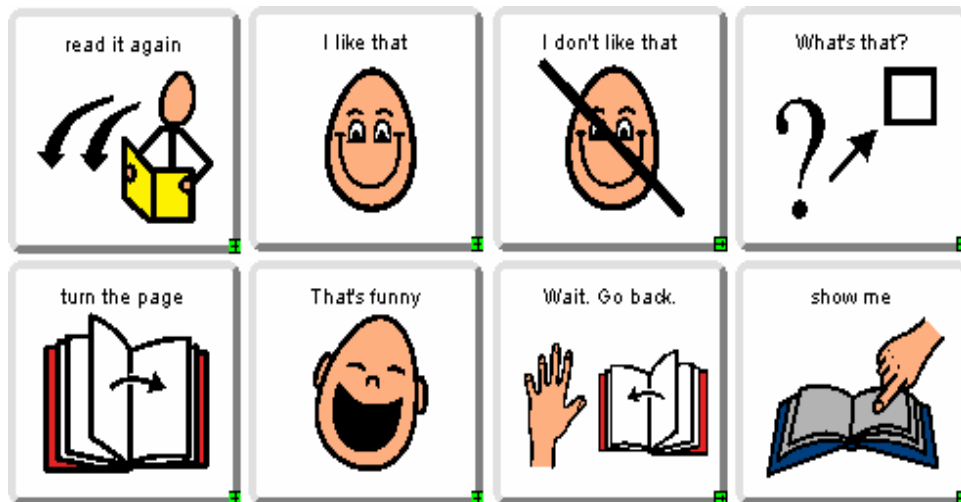
Literacy Instructional Progression

The instruction and assessment of decoding, comprehension, and written language skills with an AAC student can be aided by providing the student with the 'right' materials and technology at the 'right' time. Many of these students appear to require and respond positively to the following conditions over the course of their development of literacy skills.

1. Provide a rich literacy environment

An early and ongoing rich literacy environment where stories and other literacy materials are heavily supported with graphic symbols (e.g. Mayer -Johnson PCS) is important. This allows both the adult and the student to point to the symbols in order to make comments, or ask and answer questions. In this manner both communication and literacy goals may be addressed.

Allowing the student access to some or all of the symbols on a voice output device is preferred but not required. Examples of devices and software that have been found useful include the BIGmack, VoicePal Pro, EasyTalk, and Speaking Dynamically Pro.

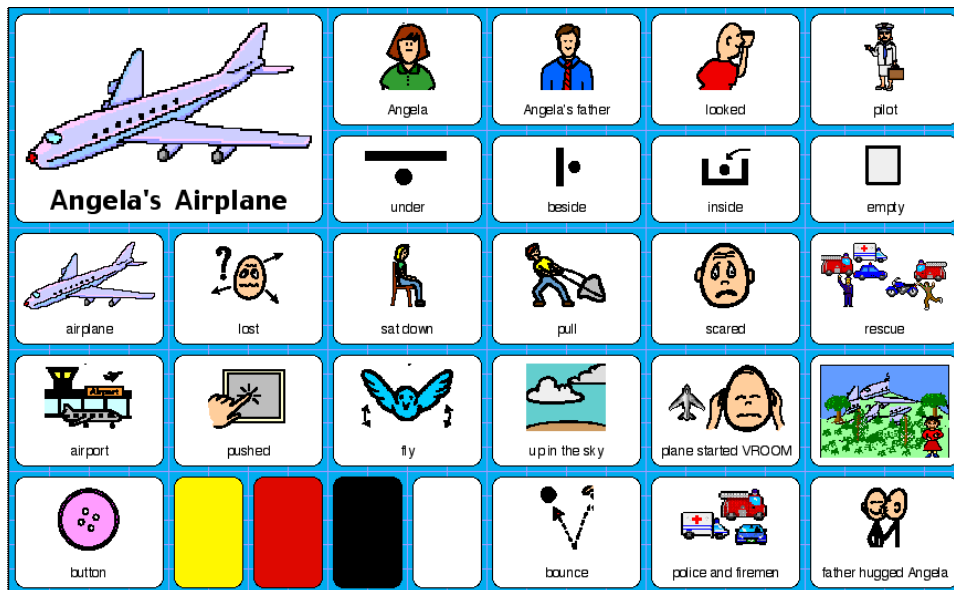


General reading phrases

2. Expose student to written language tasks

Provide early and regular exposure to written language tasks in all curriculum skill areas, if necessary limiting the requirements of the task to the use of graphics. Pairing the graphics with text increases the opportunity for sight word acquisition. Matching the graphics and text with auditory feedback is preferred.

Writing with graphics can be done by creating activities with several products, e.g. Speaking Dynamically Pro, and Boardmaker paired with a word processor or graphics program and accessed using an IntelliKeys keyboard. If a computer is not available, graphics can be photocopied, cut out, and given to the student to 'write' with by sequencing.

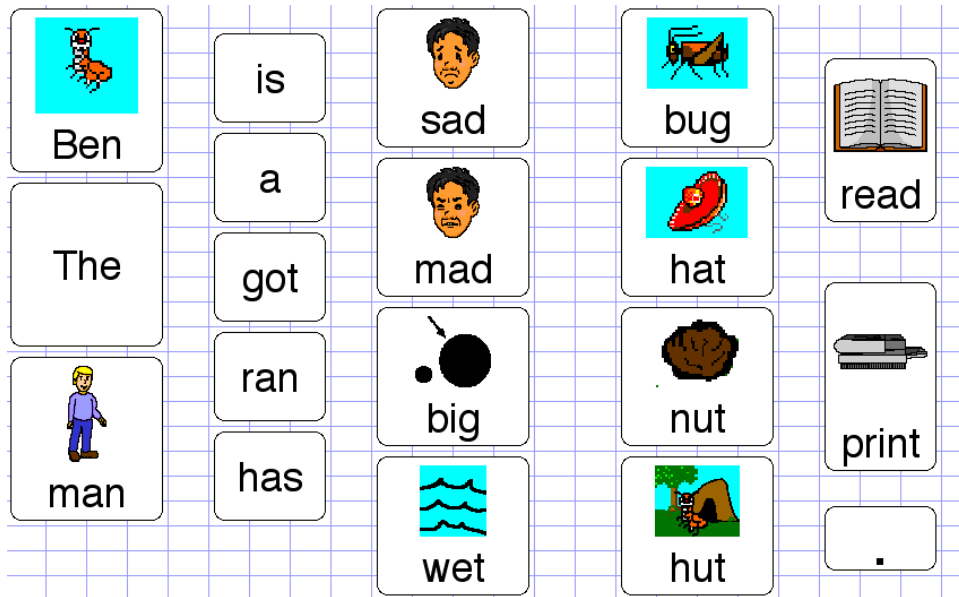


This IntelliKeys expanded keyboard overlay can be used with the book "Angela's Airplane" by Robert Munsch. The overlay matches graphics with text. When used with a talking word processor such as IntelliTalk, auditory feedback is provided, and the student can create a written product.

3. Include sight words

Remember to include some sight words along with graphics when writing. Some AAC students require a gradual reduction in the size of the pictorial cue that goes with specific sight words before the cue is completely removed. Written language communication boards at this point often begin to reflect the left to right format of recognized grammatical structure.

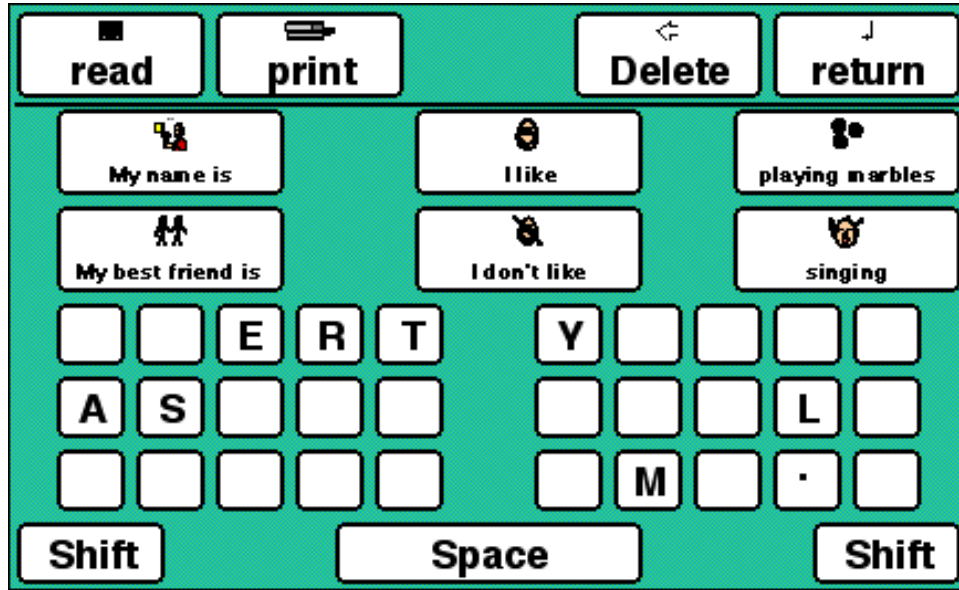
The writing process taught in the early primary curriculum can be readily adapted for AAC students who rely on graphics. By adding graphics to the text generated by classmates when brainstorming, mapping, and webbing, the AAC student can be exposed to thinking and problem solving skills without actually decoding the text.



The “Ben” IntelliKeys overlay includes some sight words along with graphics.

4. Introduce spelling

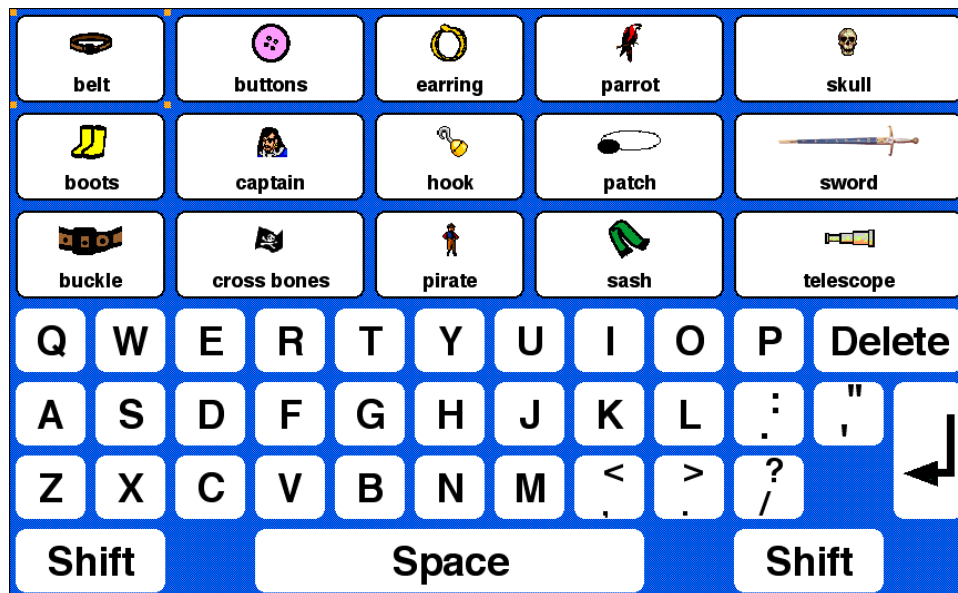
Gradually introduce the student to the alphabet, the keyboard, and spelling. This usually begins with the student's name. At this point it is useful to provide the student with keyboard templates which only introduce specific letters. The templates can include some graphics and/or sight words depending on the requirements of the writing task.



This overlay introduces only the letters for spelling a name. Graphics and sight words are included for the writing task.

5. Expand phonetic and sight word skills

Continue instruction regarding the alphabet and keyboard while expanding the student's phonetic and sight word skills. At this point the AAC student's communication writing board(s) may contain a full keyboard in addition to several sight words and graphics paired with text. The combination on the board will likely vary according to subject area and familiarity of vocabulary, e.g. a journal board may be mostly keyboard and sight words, whereas a board for writing a science log may still be largely graphics.



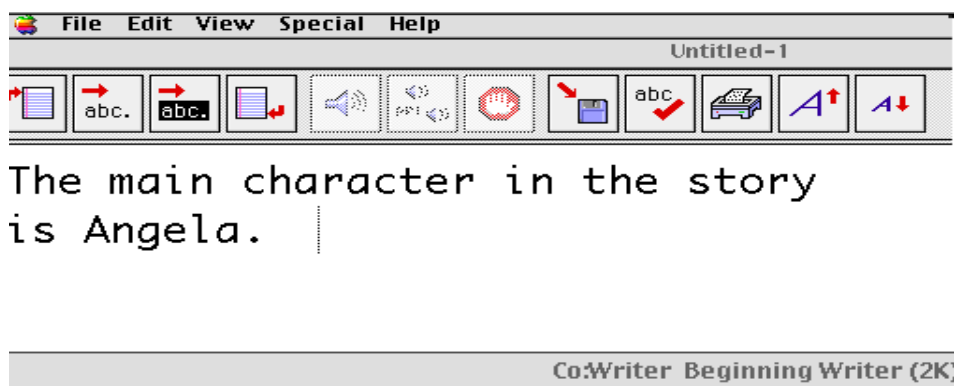
The student is now provided with a full keyboard in addition to several sight words and graphics paired with text. The overlay has been customized for a pirate theme.

6. Continue skill development and assess progress

As the AAC student's spelling and word recognition skills increase, they will likely only require a representation of a standard keyboard (for spelling) and a bank of sight words that is specific to the writing task assigned, e.g. for science, social studies, language arts, etc. Usually students at this point have written language and spelling skills in the mid-to-late grade three range. This is a critical point for assessment as the student may be ready to take advantage of word prediction software.

7. Introduce word prediction

Once the AAC student has acquired decoding and spelling skills at a mid-to-late grade three level, they can usually write with a keyboard layout and no longer require adaptations that provide access to sight words and graphic cues. At this point physical disabilities and/or spelling limitations may be compensated for by introducing word prediction strategies. This is available as a component of some software programs (e.g. Speaking Dynamically Pro) or as separate software (e.g. Co:Writer) that can be combined with any word processor.



I like her b

1: but

2: because

3: best

4: by

5: big

6: bad

The talking word processor Write:OutLoud can be used with Co:Writer to provide auditory feedback and word prediction. The student using word prediction types initial letters and then selects from a list of possible word choices.

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. This type of connection can be an excellent tool for both linguistic and literacy skill building. Messages that are generated on a VOCA and sent to a computer can be saved and examined by the student. This provides an opportunity for independent practice of linguistic skills, without the social demands of a face-to-face situation.

Using a VOCA as an input tool for a computer allows the student to write using standard or assistive word processing software. 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 information on the effectiveness of AAC intervention provides 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 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 students 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	?	_____	Y N	
	S	R	I	C	?	_____	Y N	
	S	R	I	C	?	_____	Y N	
	S	R	I	C	?	_____	Y N	
	S	R	I	C	?	_____	Y N	

New communication devices may 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.

Measuring Competencies

The Communicative Competence model (Light, 1989) suggests that communication is a dynamic and interpersonal process based on the following four interrelated areas:

1. Linguistic skills

Linguistic skills refer to mastery of the native language as spoken by the community, as well as mastery of the “linguistic” code required by the AAC system. This includes learning not only the symbols, but also the referential and grammatical aspects required to communicate meaning.

2. Operational skills

This is the development of the technical skills required to operate the system, including skills to use the access method (e.g. light pointer, scanning using a switch). It also includes proficiency in operating specific device features such as on/off and volume control.

3. Social skills

This is the mastery of the social rules of communication, including socio-linguistic and socio-relational aspects. Socio-linguistic skills are conversational strategies (e.g. initiating, maintaining and terminating interactions, turn taking), interaction functions (e.g. expression of needs and wants, social closeness, information transfer) and specific communicative functions (e.g. requests for information, protest, self expression). Socio-relational skills involve a desire to communicate with others, active participation in conversations, responsiveness to partners, and the ability to put partners at ease.

4. Strategic skills

These compensatory strategies allow the student to communicate effectively within the restrictions of the system, time or place. For example, an introduction strategy will describe how the system works, or how certain symbols can repair communication breakdowns or clarify messages.

Examining 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.

Examining and Measuring 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. Within general education settings, there are four areas where participation patterns can be analyzed.

1. Integration

Integration means that the student is physically present in the same classrooms attended by peers. However, the team must typically develop a plan to ensure academic and social participation, along with physical integration.

2. Academic participation

There are four levels of academic participation. Listed from highest to lowest level of participation, these are:

- Competitive - expectations are the same as for peers
- Active - expectations are less than for peers, although similar content is taught
- Involved - academic expectations are minimal. Student is included in classroom activities to the extent possible, with alternative activities available when needed.
- None - no academic participation expectations. Student is passive during most learning activities in the classroom.

3. Social participation

The levels of social participation are similar to those for academic participation. The student may be socially competitive (actively participating in a social group of peers), socially active (involved in social activities although not exerting much influence over the social climate of a group), socially involved (participation may be passive) or there may be no social participation by the student.

4. Independence

The school team must also plan for the level of independence (full, selective or none) expected in each academic area and measure and document their achievement.

Section 3: Voice Output Communication Aids

Technical & Non-Technical Communication Systems

Technical and non-technical communication systems may address different student needs. Non-technical systems can be very effective with familiar partners. This can be especially true for the student 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, such as in a fast-moving classroom.

Voice output technology may be necessary when the student 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 who may be meeting many unfamiliar partners.

Students 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 classroom 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 student needs. Within each category, examples of specific products are provided. Of course, there are many other AAC technologies that are not listed due to space limitations.

Single Message Devices

Curriculum 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.

Features of single message devices

- used for student inclusion and participation
- easily programmed and reprogrammed for a variety of curriculum situations
- can be pressed directly or used with a switch
- battery operated
- portable
- 20 - 75 seconds of digitized speech

Examples of single message devices

- Auditory Cueing Communicator, Enabling Devices
- BIGmack Communication Aid, AbleNet, Inc.
- One-Step Communicator, AbleNet, Inc.
- Step-by-Step Communicator, AbleNet, Inc.

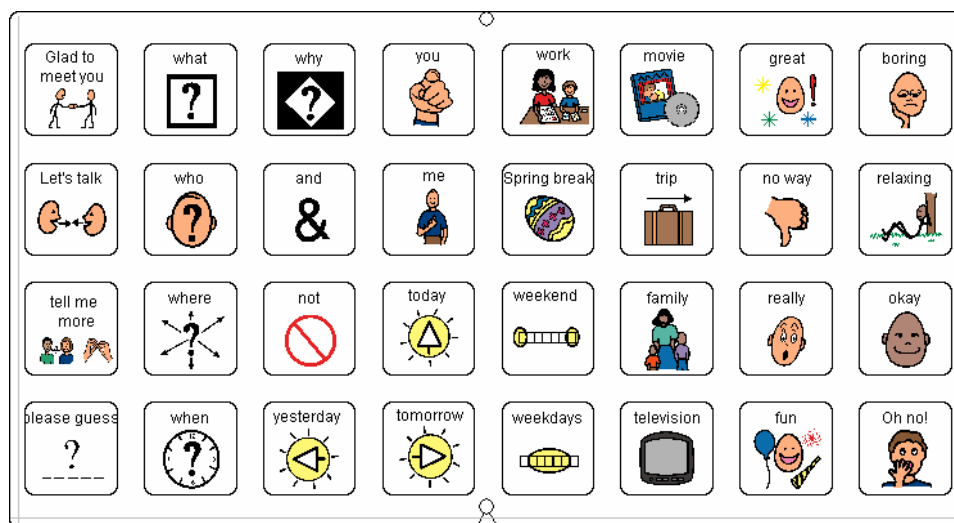


This BIGmack is programmed to sing "Happy Birthday".

Multiple Message Devices

Curriculum uses for multiple message devices

- consistent classroom activities - preprogrammed vocabulary to increase level of student participation in circle time, current events, pop machine loading, etc.
- literacy - retelling, or sequencing simple stories with each square being a new line or phrase
- academic subjects - oral report giving, theme related vocabulary for participation or answering questions
- social - sharing information about social events, conversation starters and continuers, restaurant vocabulary for dining out, or vocabulary for making activity choices



Example of an overlay for a lunch time conversation.

Features of multiple message devices

- increase potential for independent communication and participation in a range of interactions
- provide opportunities for students to learn to sequence two or more symbols when communicating
- used with one or more overlays, for thematic or spontaneous communication
- have potential for up to 40 messages
- size and number of message keys utilized may be chosen within device boundaries
- may accommodate optical head pointers or switch users with auditory prompts

Examples of multiple message devices

- GoTalk, Attainment Company, Inc.
- Hip Talk, Enabling Devices
- Partner 4, Empowering Resources, Inc.
- Tech/Talk, Advanced Multimedia Devices, Inc.
- Tech/Scan, Advanced Multimedia Devices, Inc.
- VoicePal Pro, Adaptation, Inc.



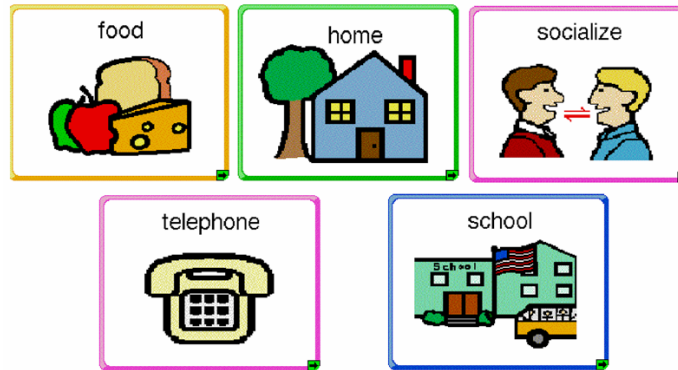
This GoTalk is programmed with messages for a camp out.

Dynamic Display Devices & Software

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

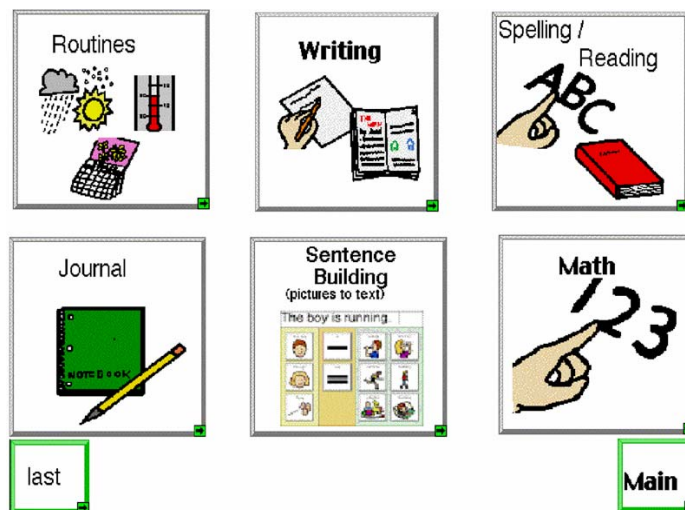
Curriculum uses for dynamic display devices and software

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



Sample screens from a dynamic display system

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.



Features of dynamic display devices and software

- multiple access methods including mouse, joystick, touch screen, switch, head pointer, etc.
- varying degrees of portability specific to device

To use a dynamic display, students need to be able to:

- recognize pictures and/or auditory prompts
- categorize, and recall what messages are available on various displays
- remember desired message as they move through the displays to construct it

It is helpful if the student is already familiar with using several displays in a non-electronic format, such as a communication book.

Examples of dynamic display devices and software

- Clicker 4, Crick Software
- Dynamo, DynaVox Systems
- DynaMyte, DynaVox Systems
- DynaVox, DynaVox Systems
- Enkidu Tablet, Enkidu Research
- Speaking Dynamically Pro, Mayer-Johnson, Inc.
- SpringBoard, Prentke Romich Company
- Writing with Symbols 2000, Mayer-Johnson, Inc.



The Dynamo has digitized speech and dynamic displays of symbols

Icon Sequencing Devices

Communication partners often feel frustrated while waiting for a student to change several boards in order to create a message. A way to reduce the number of pages that he/she has to navigate through is by sequencing icons. On a 32 square overlay, 32 single icon messages are available. By sequencing icons, the number of messages can be increased to 1024 two-icon messages, or 32,768 three-icon messages. While this strategy can be utilized with many symbol sets, Minspeak is currently the most common icon sequencing system.

Curriculum uses for icon sequencing devices

- Bruce Baker, the creator of the Minspeak system, suggests that AAC systems should allow non-speaking people to generate their own communication messages. He states that students who learn to use core vocabulary sequences (words that can be used in more than one environment) will be able to demonstrate their knowledge of language and express themselves in most curriculum and life environments.

Features of icon sequencing devices

- multiple access methods including keyboard, optical light pointer, infrared light pointer or switch activated scan (both visual and auditory)
- synthesized and digitized speech (digitized only for SpringBoard)
- can combine both icons and text in the message display

The student learning an icon sequencing system needs to understand:

- concept associations
- objects and their functions
- part/whole concepts
- category associations
- rhyming associations (“sounds like club”)
- look-alike associations (“looks like truck”)
- multiple meanings (i.e. the sun icon representing “hot”, “happy” and “yellow”)
- icon sequences
 - “sun” and “thermometer” means “hot”
 - “sun” and “theatre mask” means “happy”
 - “sun” and “rainbow” means “yellow”
- how to spell the word when the icon sequence doesn’t exist or is not known

The team teaching, implementing and supporting an icon sequencing system needs to:

- determine whether the student is an appropriate candidate for icon sequencing
- have at least one member of the team familiar with the concept of icon sequencing
- commit student and staff time to teaching the system. As with other complex communication systems, learning an encoding system can take many hours of training and practice. Therefore, there must be a plan in place for long term training, implementation and support.
- Some teams in BC report that the initial, intense training that is required can be tapered off after 2 or 3 years, once the system has been learned.

Examples of dedicated icon sequencing devices

- Pathfinder, Prentke Romich Company
- SpringBoard, Prentke Romich Company
- Vanguard, Prentke Romich Company
- Vantage, Prentke Romich Company



The Vantage provides access to a large vocabulary and displays Minspeak symbols.

Text-to-Speech Devices & Software

Text-to-speech refers to generating synthesized speech by typing in letters, words and sentences.

Curriculum uses for text-to-speech devices and software

- Text-to-speech systems can be used in any activity, since the individual generates all of his or her own phrases.

Considerations for text-to-speech devices and software

- A limitation of text-to-speech systems may be speed, since typing each letter can be time consuming. Some devices allow for encoding, where a sequence of two or more letters are programmed to generate a frequently used phrase.
- Word prediction software will also lessen the keystrokes required to create a message. Strategies such as formulating some or all of the message ahead of time can be useful

Examples of text-to-speech devices and software

- DynaWrite, DynaVox Systems
- Enkidu Handheld, Enkidu Research
- LightWRITER, Zygo
- Link, Assistive Technology, Inc.



Many voice output communication aids, such as the LightWRITER, provide “text-to-speech” capabilities.

References & Resources

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 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 in which the graphic symbols are arranged by categories branched to another display of categories or messages. The symbols themselves may also be animated.

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: Technology that uses a computer chip or circuit. In AAC it refers to a device that has speech and/or print output as well as programming/editing capabilities.

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.

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.

Low technology: Any electronic or non-electronic device that does not use computer chips or circuits.

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.

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. Includes some vocalizations (pleasure, discomfort), line drawings and gestures.

Nonverbal: An ambiguous term that technically means “without language”. 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 language pathologist (SLP): A professional who is licensed to work with individuals with communication disorders.

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.

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: An 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.

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.

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Resources in BC

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

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

Provincial Integration Support Program
1525 Rowan Street, Victoria, B. C. V8P 1X4
Phone: (250) 595-2088
Website: pacificcoast.net/~twendorf/

Provincial Outreach Program for Autism & Related Disorders (POPARD)
4812 Georgia Street, Delta, B.C. V4k 2s9
Phone: (604) 946-3610

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

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

Sunny Hill Health Centre for Children
3644 Slocan Street, Vancouver, BC V5M 3E8
Telephone: (604) 453-8300
Website: www.cw.bc.ca/Sunnyhill/SHHCC

Technology for Independent living
9007 Shaughnessey Street, Vancouver, BC V6P 6R9
Phone: (604) 326-0175

Websites

AbleNet Inc. www.ablenetinc.com

Adaptivation Inc. www.adaptivation.com

Advanced Multimedia Devices, Inc www.amdi.net

Augmentative/Alternative Communication Intervention Products & Presentations
www.aacintervention.com

American Speech-Language Hearing Association (ASHA) www.asha.org

Aroga Group Inc. <http://www.aroga.com>

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/

Barkley Memorial Augmentative & Alternative Communication Centers <http://aac.unl.edu>

Betacom Corporation Inc. www.betacom.com

Paul H. Brookes Publishing Co. www.pbrookes.com

Canadian Association of Speech-Language Pathologists and Audiologists www.caslpa.ca

Communication Aid Manufacturers Association (CAMA) <http://www.aacproducts.org>

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

Creative Communicating www.creative-comm.com

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

Don Johnston, Inc. www.donjohnston.com

DynaVox Systems www.dynavoxsys.com

Empowering Resources, Inc. www.eridevices.com

Enabling Devices www.enablingdevices.com

Enkidu Research www.enkidu.net

The Four Blocks www.wfu.edu/~cunningh/fourblocks

Gail Van Tatenhove www.vantatenhove.com

Inclusive Consultancy and Training Syndicate www.inclusive.net

Inclusive Technology Ltd. www.inclusivetech.com

IntelliTools, Inc. www.intellitools.com

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

Prentke Romich Company www.prentrom.com

Pyramid Educational Consultants, Inc. (PECS) www.pecs.com

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

Special Education Technology - British Columbia (SET-BC) www.setbc.org

Technology Integration www.lburkhart.com/

ZYGO Industries Inc. www.zygo-usa.com