Augmentative / Alternative Communication

A Way of Thinking

Supporting Technical & Non-Technical Augmentative / Alternative Communication Systems in the Classroom

December 2000

BRITISH set COLUMBIA

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Preface

About SET-BC

Special Education Technology British Columbia (SET-BC) is a Provincial Resource Program designed to assist BC school districts in meeting the technology needs of students with physical disabilities and visual impairments.

SET-BC's mandate is:

1. to lend assistive technologies (reading, writing, and communication tools) where required to ensure students' access to educational programs, and
2. to assist school districts in providing the necessary training for students and educators in the use of these technologies.

Each BC school 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 assitive technology, check SET-BC's web site at <www.setbc.org>.

About this guide

The purpose of this guide is to introduce augmentative / 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, team collaboration, and curriculum modification. The guide includes strategies for utilizing technical and non-technical augmentative communication systems within the BC curriculum.

SET-BC staff contributing to this guide:

Colette Massie, SET-BC Region 2, Lower Mainland / Southwest BC
Sharon O'Dornan, School District #44, North Vancouver
Sharon Page, School District #22, Vernon
Nedra Post, SET-BC Region 2, Lower Mainland / Southwest BC
Lois Turner, SET-BC Region 1, Vancouver Island / Central Coast
Wendy Young, SET-BC Region 5, Cariboo / Chilcotin

Introduction

Communication is a basic need and individual right of all human beings. The purposes of communication are:

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

These interactions are an essential part of our society and culture.

Expressive communication includes a variety of modes, such as speech, pointing, gestures and writing. The term augmentative / alternative communication (AAC) 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 non-technical systems as a supplement and / or back-up.

Whatever communication system is chosen, school-based teams must consider:

- student needs
- environments where the student needs to communicate
  - ie. during activities of daily living
  - ie. during educational activities
- how the student will use the system
- providing communicative opportunities
- tasks the student will communicate about
- interactions where voice output is required
- training and support of the system to the student and his / her communication partners

Individuals who can successfully coordinate their use of appropriate AAC systems will be able to:

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

Team Roles

As with any decision that involves a student, making decisions around the use of augmentative / 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.

Key members of the school team, for the process of designing and implementing an AAC system, may include the classroom teacher, resource or support teacher, speech language pathologist, occupational therapist, classroom assistant and parent. It is often less important who is involved, and more important, that this group of individuals create a collaborative working environment where all the facets of a student's communication needs can be considered.

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.

In 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
- how the team shares information

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

1. What are the student's communication needs?
2. What needs are met through current communication techniques?
3. What are the systematic AAC interventions that will reduce unmet communication needs?

AAC Assessment

There are several factors to consider when assessing students who are for practical or functional purposes, non-speaking. In the overall picture, long term and short term communication goals, communication environments, routines and various communication partners need to be identified and reveiwed on a regular basis.

At the physical level, medical, fatigue, visual, auditory and motor capabilities must be evaluated. From an educational perspective, cognitive, language, symbolic representational and literacy levels should be addressed. Personal qualities such as sociability, behavior and motivation can appear to be extraneous but can be critical to the success of the process. If the assessment includes the potential for technology, external team supports and a non-technical back up system must be considered.

No one person is expected to do this all by him or herself! There are various levels of support available, depending on geography and availability of expertise. Ongoing support is potentially available at the home level, school level, district level, provincial program level and agency level. Each student's team should be able to access the levels of support necessary to allow the student to communicate to the best of his or her abilities. If and when transition occurs, new staff around the student need to be made aware of these supports.

There are many resources available to assist you in this process. It can even be fun! First, look to your district personnel for information. The person in charge of special education or low incidence students is a good place to start. If your district team then feels that more assistance is needed, he or she can contact the appropriate provincial support program or agency. Many books and internet sites are also available (please see the references). There are people out there to help you - don't feel like you are leaping into unknown territory all alone!

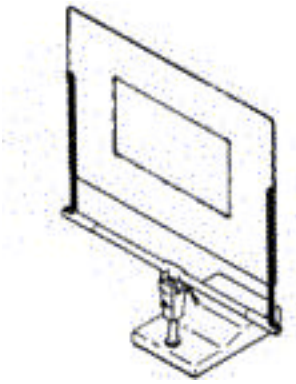
Keep in mind that a communication system or device will need to be updated or reassessed as the student progresses and needs change. If you're not comfortable doing this on your own pull in another one or two staff from the student's team for help or ideas. Additionally, some of the student's peers may have good ideas for changes and/or updates to the system.

Access Methods

The term "access method" describes how the student will select the messages he / she wishes to communicate. The occupational therapist, along with all members of the team, may consider the following access options:

Direct selection

The student points to, or directly touches, the message or symbol representing the message. He / she may use a body part such as a finger or a tool such as a light pointer or joystick for direct selection. Eye pointing is also a form of direct selection. Direct selection is a preferred access method, because it is relatively simple and quick.



An e-tran assists with eye pointing. The student gazes at attached pictures / messages to indicate 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.

Auditory 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, with the student indicating when the desired selection has been spoken. This is sometimes referred to as "listener assisted scanning" and can be a powerful access method in classrooms where peers have been given training.

When using auditory scanning with technical 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)

Message Selection

The messages on any communication aid should be constantly updated as the communication needs and abilities of the student change. It is an ongoing process. Factors influencing vocabulary selection include:

Purpose of the system

Various AAC strategies are used for various purposes. In one instance, the messages on a non-technical system for one-to-one discussions with familiar partners may be different from the messages on a technical voice-output device for class presentations. In another, the physical system may vary. The same student could use eye pointing in Physical Education, a BIGmack in Music and a joystick / computer in Math.

Motivation

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 as classroom fads change. 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.

Motivating symbols use interactive vocabulary and classroom expressions.

Usually, you do not need to provide vocabulary that the student already communicates appropriately using another conventional mode. For example, the student who indicates "yes" and "no" with head movements may not need these symbols on an AAC display.

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 "ei ei o" while class is singing Old Macdonald
- giving preprogrammed instruction to the class
- saying the user'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 left for the student then 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 user 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 user will still be able to *participate* in prescribed social behaviors 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. 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 systems that use mainly supplemental vocabulary, we have to start from scratch each time and the student must learn the new vocabulary items in addition to learning the lesson at hand. We need to

attempt to achieve a balance between core and supplemental vocabulary items that will meet the needs of the student so he/she can communicate with peers, adults, and about schoolwork.

Symbol Sets

There are many types of symbol sets available to use with students who require them. Some, such as Picture Communication Symbols (Mayer-Johnson), DynaSyms (Sunrise Medical) and Clip Art software are available for purchase. Other graphics from digital cameras, logos from magazines and/or advertising, and internet sites, may also be used.

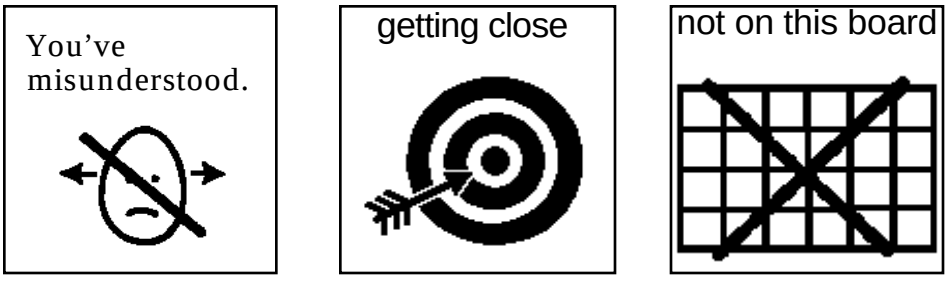
Letters, Words, Phrases and Sentences

Communication can be faster when a whole phrase is presented above a symbol. However, this also limits generating 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)



Samples of communication facilitators.

Outcomes

Measurements of the effectiveness of AAC intervention can be carried out using a number of different approaches.

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	response	imitation	cued	? other	V - Voice G – Gesture S – Sign Language VO – Voice Output P – Picture / Symbol (manual system)				Intelligible?	Utterance length	A
	S	R	I	C	?	V G S VO P	V G S VO P	V G S VO P	V G S VO P	Y N		
	S	R	I	C	?	V G S VO P	V G S VO P	V G S VO P	V G S VO P	Y N		
	S	R	I	C	?	V G S VO P	V G S VO P	V G S VO P	V G S VO P	Y N		
	S	R	I	C	?	V G S VO P	V G S VO P	V G S VO P	V G S VO P	Y N		
	S	R	I	C	?	V G S VO P	V G S VO P	V G S VO P	V G S VO P	Y N		

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 restrictions of the system, time or place. Examples are: an introduction strategy describing how the system works, symbols to repair communication breakdowns or clarify messages.

Examining participation

The Participation Model (Beukelman and Mirenda, 1998) provides an overall framework of considerations associated with enabling AAC users to communicate as their peers do. Within general education settings, there are four areas where participation patterns can be applied.

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 expected in each academic area. These levels are full, selective and none.

Intervention

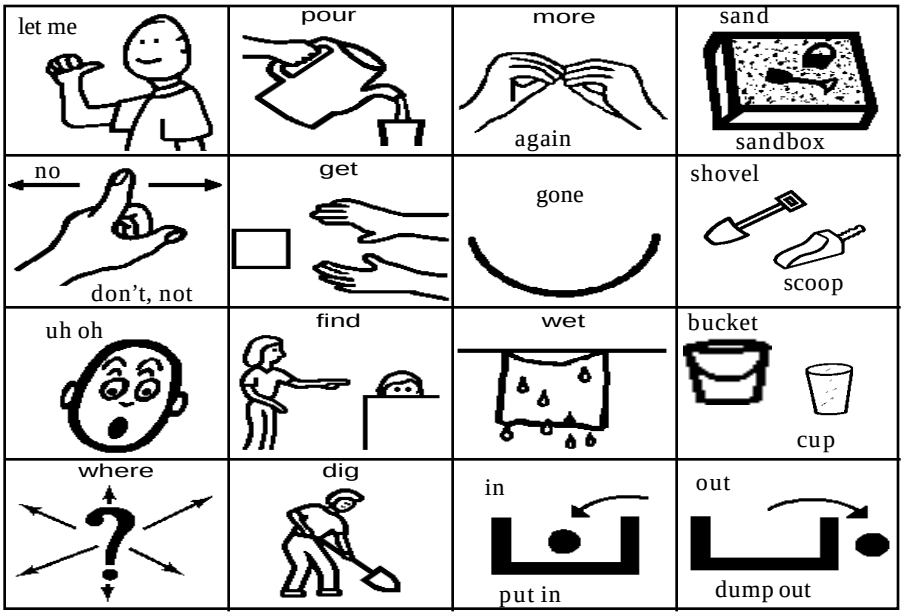
Two current models of intervention are the System for Augmenting Language (Romski and Sevcik, 1996) and Building Communicative Competence (Light and Binger, 1998). These programs can provide help for students at any stage of communicative development.

System for Augmenting Language (SAL)

A key component of the SAL is the provision of models for students learning to use augmentative communication. The facilitator should act as a user, demonstrating 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. (Romski & Sevcik, 1996, p. 66)



Sand Box

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

Building Communicative Competence

The Building Communicative Competence model describes three specific skills that have particular importance in enhancing communicative competence:

1. **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)

2. 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, as described below:

> 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. Nonobligatory turns can also convey communicative competence. 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.

3. **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, p. 185)

   Asking partner-focused questions is a more 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

For the multiply involved student...

Anne Simonsen, a Teacher in Surrey, has developed a protocol (based on work by Barry Prizant and Joan Tough) for using VOCAs (voice output communication aids) with students with severe physical or cognitive handicaps. Please check our website or contact your regional SET-BC office for more information on working with technology with these students.

Including the Student Who Uses AAC

Communication goals should be discussed and documented at the IEP meeting. After goals are established educators, peers and support staff need to be aware of the strategies used to accommodate AAC users.

Things to consider include:

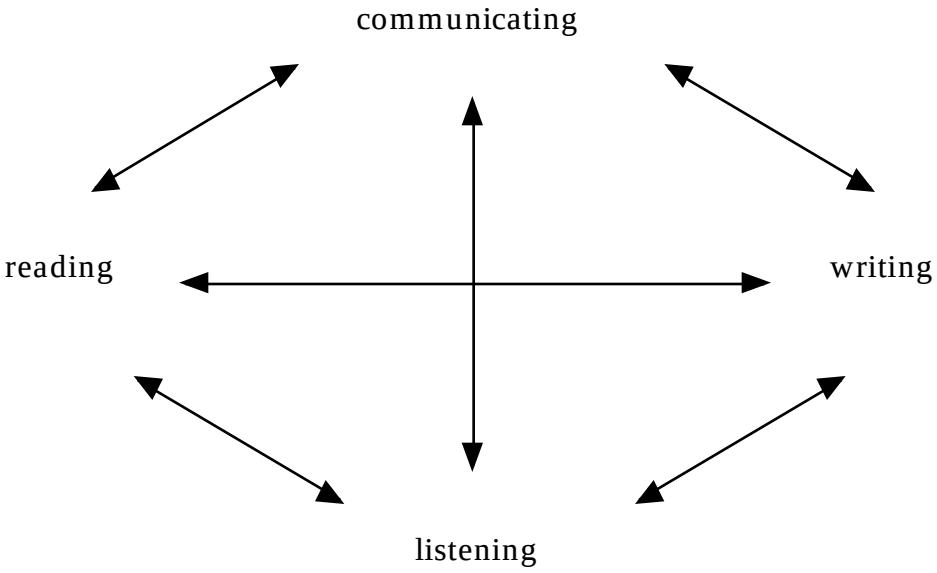
- structuring the environment to support communication (i.e., ensuring proper positioning, access to AAC, access to partners, and involvement in motivating activities).
- incorporating routines that use the AAC systems
- responding to the student's communicative attempts
- confirming the student's intended message
- ensuring a shared focus of attention
- providing opportunities for communication
- expecting a response from the student
- waiting and providing the student with enough time to communicate
- modeling the appropriate use of AAC
- training and supporting the communication partners

Literacy

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 for him/her. 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.



Based on this philosophy, no student is too cognitively or physically challenged to participate in literacy activites in some fashion. Linda Burkhart, Patti King-DeBaun and Caroline Musselwhite are some authors who have published in this area. See the references or contact your regional SET-BC office for more information.

Key factors in learning to read

Learning to read, for both verbal and non-verbal students, follows a similar process. Musselwhite and King-DeBaun (1997) describe key factors which include:

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 is vital for success.

2. **Opportunities for practice**
   Tied to expectations are opportunities for practice. Many studies have determined that, for students with severe speech and physical impairments, the opportunities for practice are greatly reduced 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 enjoy and connect with.

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 includes students with different skills. In this model goals can be clear and consistent across instructional strategies and contexts. All critical areas of successful reading and writing are addressed in the four blocks (Cunningham and Allington, 1999) of:

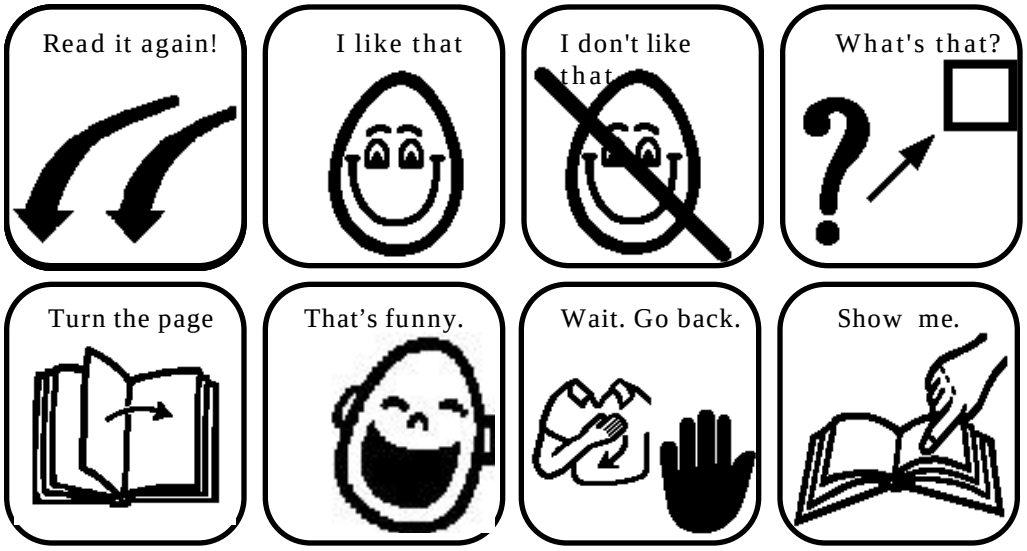
1. **Guided Reading**
   The purposes of this block are to expose children to a wide range of literature, teach comprehension and teach children how to read with books that become increasingly harder. Children either read from a basal, or from multiple copies of trade books, or from a large book. The 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) teacher read-aloud. The teacher selects books for the classroom library on themes they are studying, easy and hard library books, old favorites, new easy predictable books, etc. While the children read, 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.

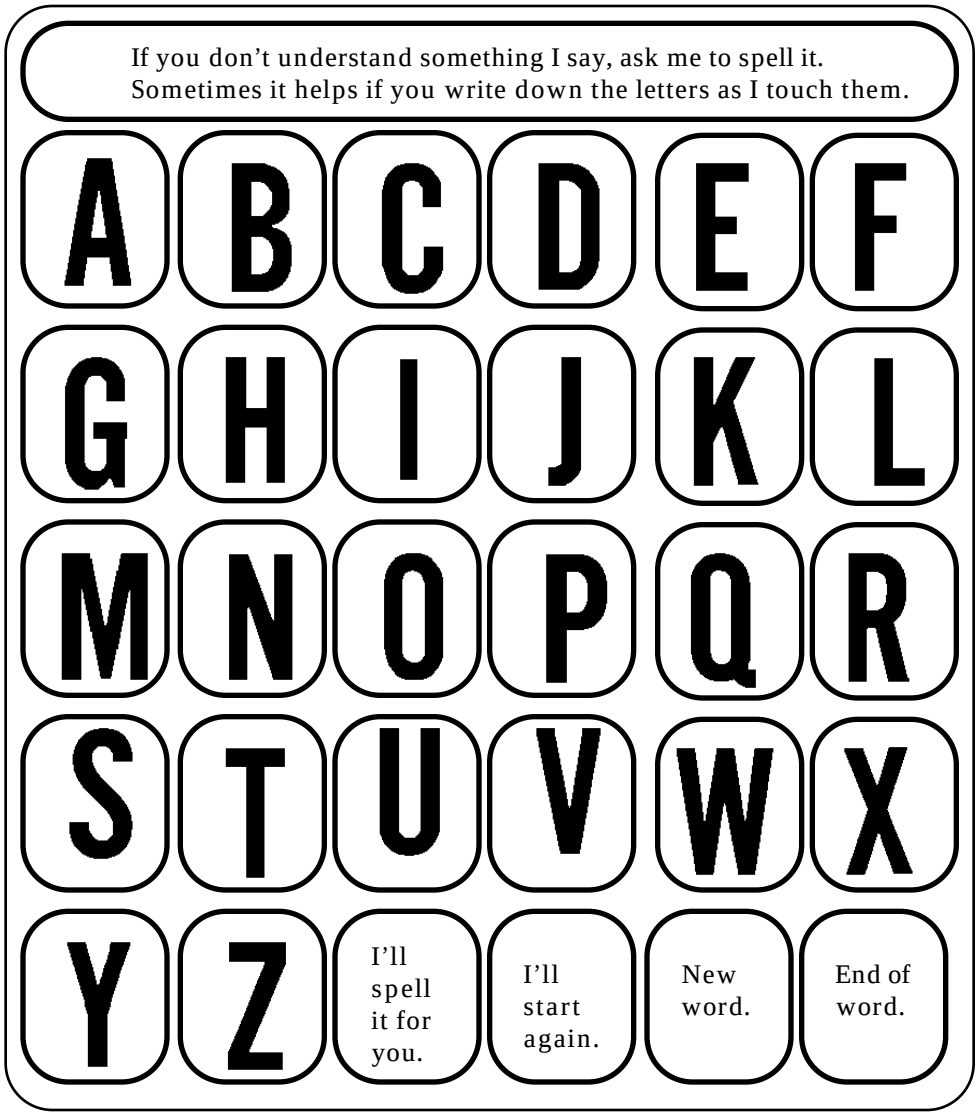
3. **Writing**
   The Writing block is carried out in "writers workshop" fashion. It begins with a mini-lesson (10 minutes) where the teacher writes and models all the things writers do. Next the children go to their own writing. They are at all different stages of the writing process -- finishing a 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 words block, children learn to read and spell high-frequency words and learn the patterns which allow them to decode and spell lots of 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 20-25 minutes of words time is given to an activity which helps children learn spelling patterns.

Not all students will learn to read, 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)



General reading phrases



Sample alphabet board

Using portfolios in literacy assessment

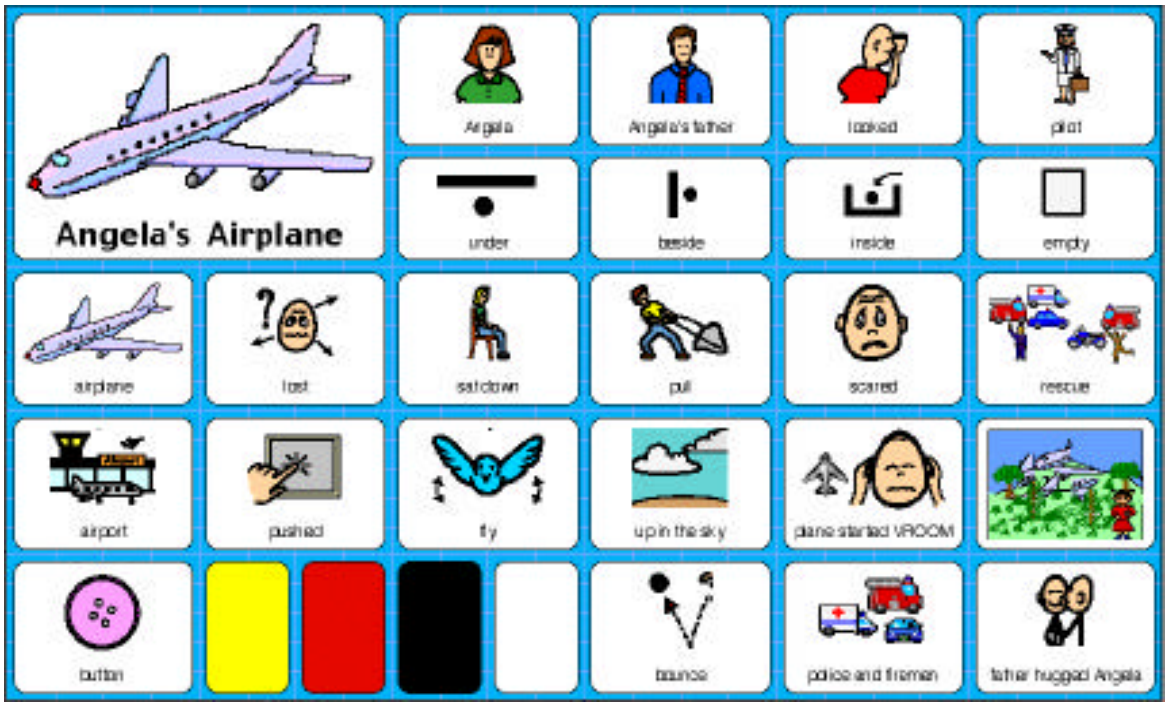
Assessment of literacy skills is a valuable process for all students and should not be overlooked for students with disabilities. Documenting progress in a positive manner is an important and essential task. Portfolios can serve as a useful part of assessment for all students. "The emptiness of portfolios, 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, C. and King-DeBaun, P. 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.

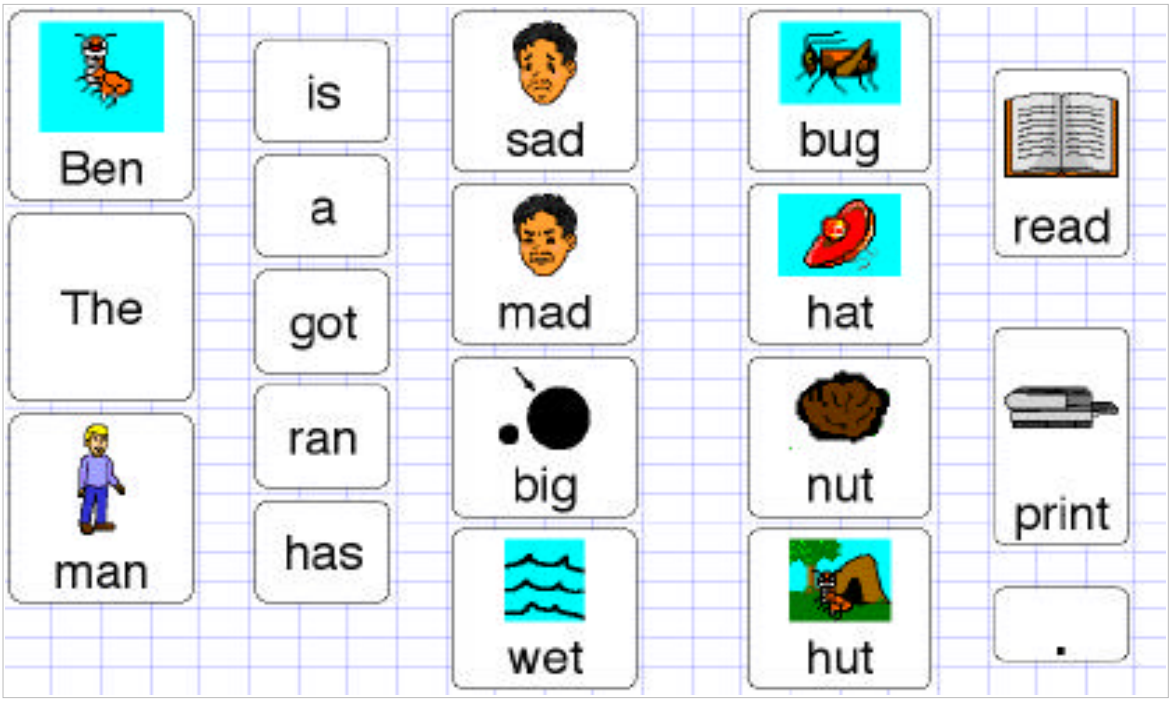
1. **Provide rich literacy environment**
   An early and ongoing rich literacy environment where stories and other literacy materials are heavily supported with graphic symbols (e.g. Mayer -Johnson PCS) is important. This allows both the adult and the student to point to the symbols in order to make 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 that have been found useful include: BIGmack, VoicePal, EasyTalk, AlphaTalker, DeltaTalker, and Speaking Dynamically.

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. IntelliTools, Speaking Dynamically, Ke:nx, and BoardMaker paired with a word processor or KidPix. 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.

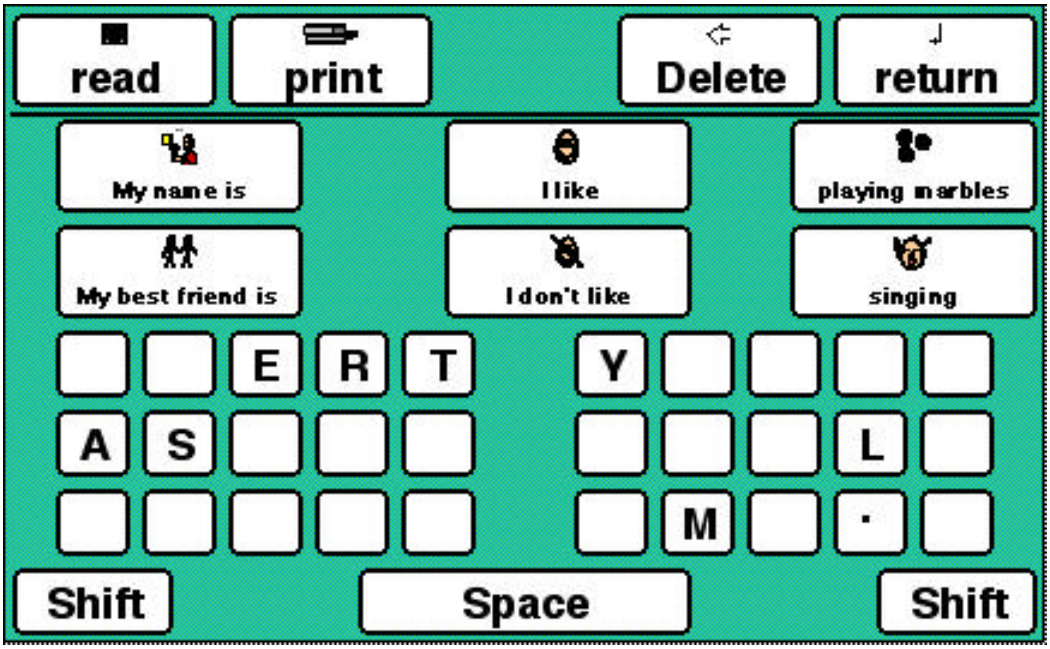


The "Ben" IntelliKeys overlay includes some sight words along with graphics.

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.

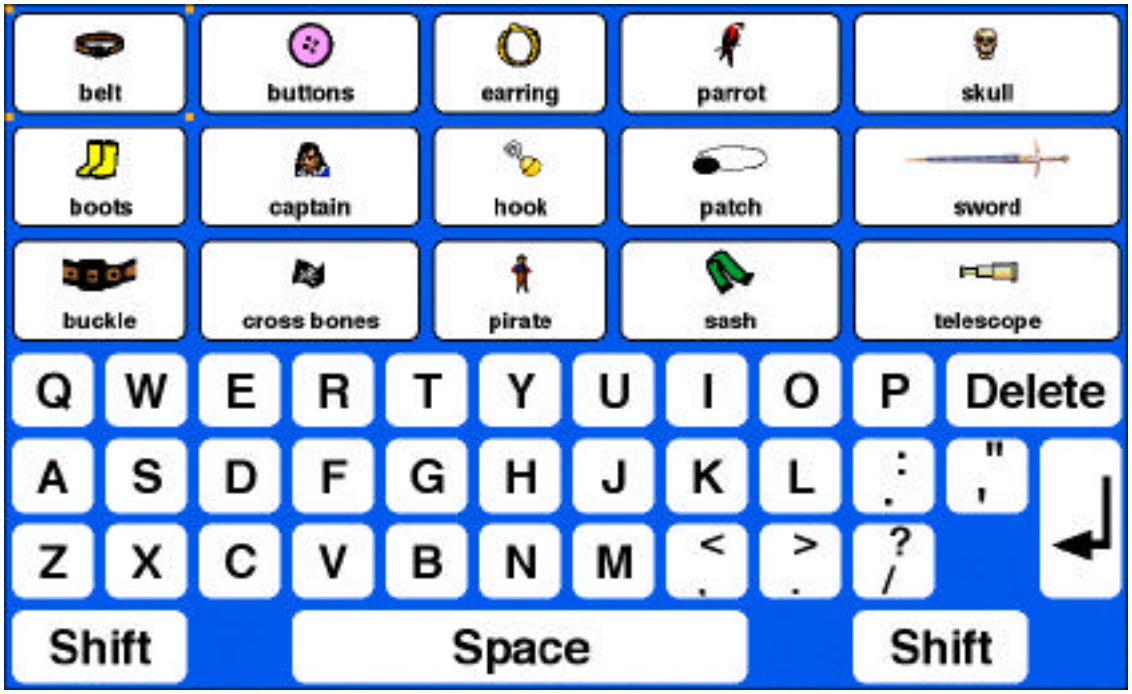
4. Introduce spelling

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 where as a board for writing a science log may still be largely graphics.

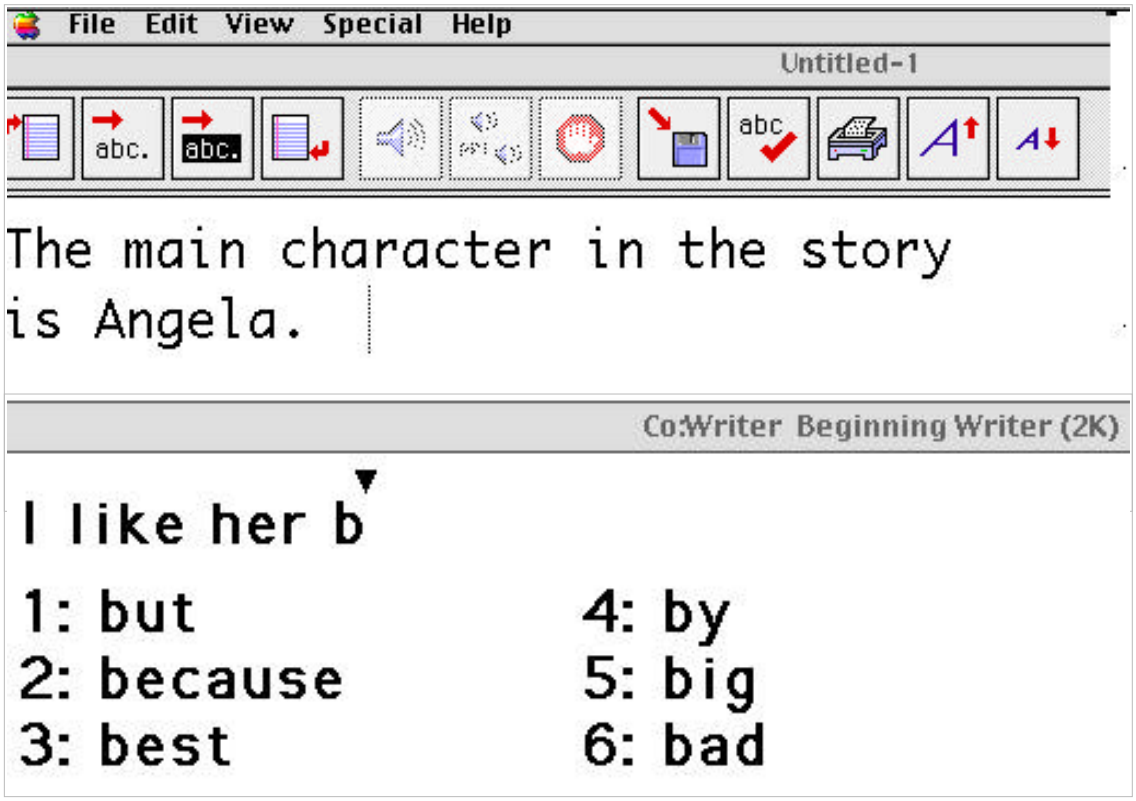


The student is now provided with a full keyboard in addition to several sight words and graphics paired with text. The overlay has been customized for a pirate theme.

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, i.e. 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 and WiVik) or as separate software (i.e. Co:Writer) that can be combined with any word processor.



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 reads a list of possible word choices.

Voice Output Communication Devices

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 will 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.

AAC systems: SET-BC supports for selection and use

Stage 1 School team identifies need for voice output communication aid

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

1. team contacts SET-BC District Partner to initiate service and discuss possible equipment loan from SET-BC (priorizing will take place)
2. school team and SET-BC Consultant develop Collaborative Action Plan (CAP) including strategies for message selection and system implementation
3. SET-BC consultant provides equipment, training and support to school team

Stage 3 Team implements the AAC technology

1. school team maintains system, including ongoing programming of messages required for current student need and classroom activities
2. 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, information is shared re:

- technology use in the classroom
- roles of technical and non-technical systems for the student
- overlays, technical tips, training ideas
- photos, a video, and a student information binder are successful strategies to consider

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** - Yo! How's it going?
- **Comments** - I can't believe it! You look maaaarvelous.
- **Literacy** - Production of a line or a repetitive phrase during a class reading. Appropriate sound effect during a story i.e. 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.

Examples of single message devices

- BIGmack
- One Step Communicator
- Step by Step Communicator

Step by Step Communicators

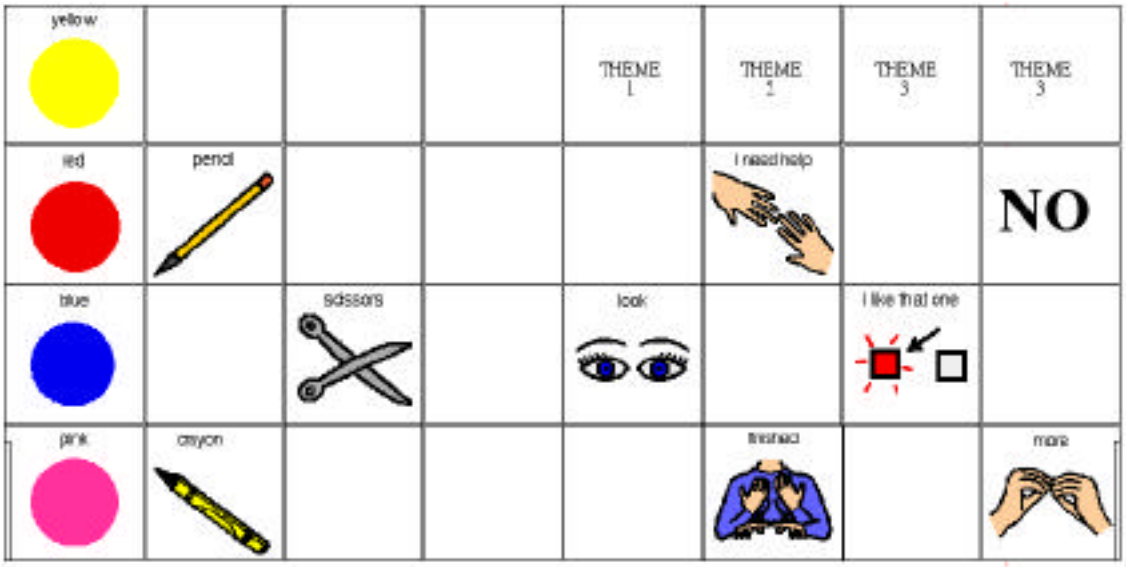
Features of single message devices

- used for student inclusion / 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

Multiple message devices

Curriculum uses for multiple message devices

- **Consistent classroom activities:** preprogrammed vocabulary to increase level of student participation (i.e. 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, vocabulary for making activity choices



AlphaTalker overlay for art activity. Student using AlphaTalker can direct partner.

Examples of multiple message devices

- AlphaTalker
- ChatBox
- EasyTalk
- Message Mate
- VoicePal Pro

Features of multiple message devices

- increases potential for independent communication and participation in a range of interactions
- provides opportunity for students to learn to sequence two or more symbols when communicating
- used with one or more overlays, for thematic or spontaneous communication
- has 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

Dynamic display devices and 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 must be 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.

Examples of dynamic display devices and software

- Speaking Dynamically Pro
- Dynamyte
- Dynavox
- Hand Held Voice
- FreeStyle
- Dynamo

Features of dynamic display devices and software

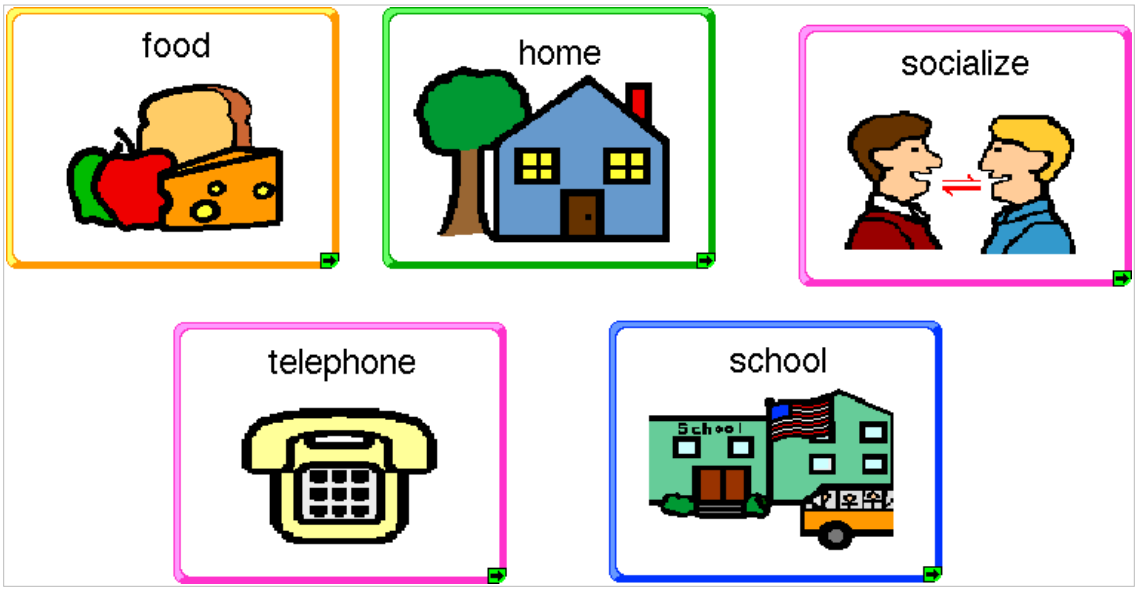
- multiple access methods including mouse, joystick, touch screen, switch
- varying degrees of portability specific to device

The student using a dynamic display must:

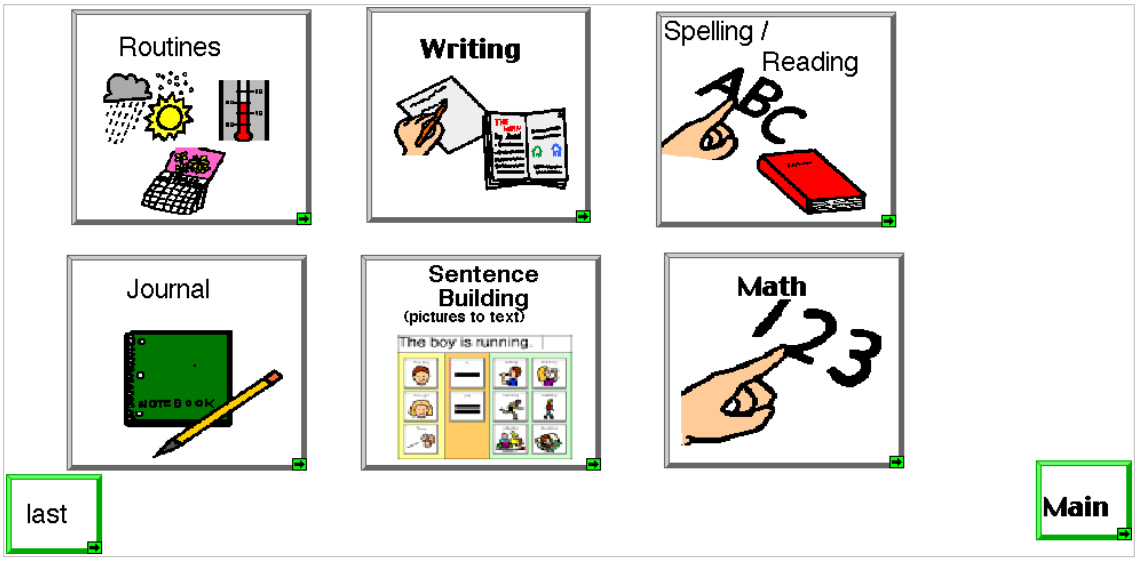
- recognize pictures and / or auditory prompts
- categorize, and recall what messages are available on various displays
- remember desired message as he / she moves through the displays to construct it

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

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.



Icon sequence devices

Communication partners often feel frustrated when having to wait 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, while 1024 two icon messages or 32,768 three icon messages are possible. 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 nonspeaking people to generate their own communication messages. He states that students who learn to use core vocabulary sequences (words that are applicable to 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.

Examples of dedicated icon sequence devices

- AlphaTalker II
- DeltaTalker
- Liberator II
- Vanguard
- Pathfinder

Features of icon sequence devices

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

The **student** who will be successful with the icon sequencing strategy needs to be able to learn:

- 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”
- 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. There are reports that Minspeak can take up to 2,000 hours of training and practice. Other complex systems also take time to learn. Therefore, there must be a plan in place for **long term** training, implementation and support.

Text-to-speech devices and 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 activities, since the user generates all of his own phrases.

Examples of text-to-speech devices and software

- LightWRITER
- Write:OutLoud
- IntelliTalk
- Co:Writer (word prediction)
- Link

Many voice-output devices, such as the LightWRITER pictured above, provide "text-to-speech" capabilities.

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.

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

For more detailed information on voice output communication aids and software, visit the SET-BC web site at <www.setbc.org>.

Or, contact your SET-BC regional office for further information on AAC issues.