

AUGMENTATIVE-ALTERNATIVE COMMUNICATION: AN INTRODUCTION

2.5 CE Hours / .25 CEUs

Course Abstract

This Intermediate level course immerses learners in the swiftly-changing world of Augmentative-Alternative Communication, touching on key vocabulary and definitions, common myths, potential users, and available levels of technology and their pros and cons.

NOTE: Links provided within the course material are for informational purposes only. No endorsement of processes or products is intended or implied.

**(ASHA CE BLOCK – SPACEHOLDER ONLY – COURSE IS NOT YET REGISTERED)
(Intermediate level, Professional area).**

Learning Objectives

By the end of this course, learners will be able to:

- Recall the definitions of “communication” and “augmentative-alternative communication” as well as key terminology involved in discussions of Augmentative-Alternative Communication (AAC)
- Recognize populations for whom AAC intervention may be of benefit, with attention to the role of the communication partner in AAC
- Identify common myths surrounding AAC and rebuttals to each
- Differentiate between no tech, low tech, and high tech AAC components, with attention to their pros and cons

Timed Topic Outline

I. Definitions and Terminology (10 minutes)

II. Common Myths Surrounding Augmentative-Alternative Communication (AAC) (25 minutes)

III. Who Should Use AAC and Why? (10 minutes)

IV. AAC Systems - Just What Are We Talking About? (90 minutes)

No Tech, Low Tech, High Tech

V. References, Additional Resources, and Exam (15 minutes)

Delivery Method

Correspondence/internet self-study with interactivity, including a provider-graded final exam. *To earn continuing education credit for this course, you must achieve a passing score of 80% on the final exam.*

Course Author

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Susan has worked in a variety of settings as a SLP, a Director of Education, and a Chairperson of the Speech Pathology Department. Her career has taken her to public and private schools, developmental centers, group homes, and adult day programs. She currently runs her own private practice in San Diego, providing Independent Educational Evaluations in speech-language, AAC, and Assistive Technology, as well as consultation and staff training. She presents at a variety of national conferences and provides workshops in AAC, autism, and literacy.

DISCLOSURES: Financial -- Susan Berkowitz is the owner of, and a developer at, Language Learning Apps LLC; offers materials for purchase at TeachersPayTeachers.com; and received a stipend as the author of this course. Nonfinancial – No relevant nonfinancial relationship exists.

What is Communication?

“The single biggest problem in communication is the illusion that it has taken place.” -George Bernard Shaw

As speech-language pathologists, we tend to focus on the development of speech and language skills, while sometimes forgetting their ultimate purpose: **to communicate**.

So, what is communication?

The National Joint Committee for the Communicative Needs of Persons with Severe Disabilities defines communication as, “any act by which one person gives to or receives from another person information about that person’s needs, desires, perceptions, knowledge, or affective states. Communication may be intentional or unintentional, may involve conventional or unconventional signals, may take linguistic or nonlinguistic forms, and may occur through spoken or other modes.”

Note that the focus in this definition is on the shared meaning between communication partners. It is not on speech, or even on language, but on interaction.

Note, too, that per this definition, unintentional behaviors and nonlinguistic forms can constitute communication.

Communication, then, can more simply be defined as the process of exchanging ideas and information, involving the encoding, or formulation, of ideas and the decoding, or processing of them.

Intentional communication occurs when the exchange is active: one party is deliberately signaling; the other, receiving and interpreting.

In order for intentional communication to happen, both parties involved need to:

- be aware of the cause-effect relationships between one’s behavior and the other’s
- have something to communicate or exchange

***Breakout panel: to run alongside the definition of communication*

*Language, on the other hand, is a code that has been developed in a culture that uses specific symbols that have arbitrarily been determined to mean something. (A symbol stands for something else, with no apparent prior relationship.)***

What is Augmentative-Alternative Communication?

According to the American Speech-Language-Hearing Association (ASHA), it is, “...a set of procedures and processes by which an individual’s communication skills (i.e.

production as well as comprehension) can be maximized for functional and effective communication. It involves supplementing or replacing natural speech... with aided... and/or unaided symbols...”

Note that this definition:

- refers to communication approaches that augment speech or serve as an alternative
- refers to all methods that make communication easier or possible
- may include facial expressions; gestures; an alphabet, words or picture board; a computer; and other similar systems.

According to ASHA, too, the “goal of augmentative and alternative communication use is the most effective interaction possible. Anything less represents a compromise of the individual’s human potential.”

Thus, it needs to be the goal of AAC intervention to provide our clients and students with the words to say whatever they want to, whenever they want to, wherever they want to.

Terminology

The following terms – briefly defined here – reoccur throughout discussions of AAC, and will be discussed in more depth throughout this course. (These definitions are generally accepted in the field, and come from a variety of sources/texts that are used widely.)

Access

The way in which the individual makes a selection of a word or message on the AAC system.

Direct selection involves the user pointing or touching the system directly.

Scanning involves using a switch to activate the system’s movement through the messages available in sequential order until the user activates the switch again (or a second switch) to make a selection.

Eye gaze is an access mode for those with significant motor disabilities wherein a built-in camera tracks the eye movements of the individual, allowing the user to point to the message button with their eyes. Eye gaze is faster and more efficient than using a scanning system.

Aided Communication

An AAC system that utilizes something that is external to the user, such as a communication book or device. (In contrast, speech, vocalization, gestures, and signs are examples of UNaided communication.)

Aided Language Stimulation (ALgS)

A strategy in which a communication partner teaches the AAC user the meanings of symbols, their locations, and how/when to use them, by both modeling their use and providing verbal input.

Alternative

Instead of speech; replacing speech.

Augmented

In addition to the user's speech; supplementing and/ or providing support.

Complex Communication Need (CCN)

Usually used to refer to those AAC learners who have significant disabilities and needs beyond simply replacing their speech.

Core Vocabulary

Those high frequency words which we use the most often. These words are usually useable in a variety of contexts on a variety of topics, and can be combined together in a large number of ways to create novel messages. A variety of parts of speech are represented in core words, but rarely nouns. About 80% of what we say is comprised of core words.

Fringe Vocabulary

Those topic specific words that are used less often and are less useful in a variety of contexts; they are usually nouns, and make up only about 20% of the words one would find in a 100 word sample.

Gesture

A general term for movements that are made with hands, arms, and facial expressions.

Signs are more conventional gestures that have been ascribed meaning by a group of users and become a part of the lexicon (which is, essentially, a catalogue of a language's words)

Partner Assisted Scanning (PAS)

A strategy in which the communication partner scans through the choices available on the (low-tech) AAC system, always in the same sequential order, looking for an agreed-upon response from the individual to accept an option. This strategy is usually used with an individual with significant motor or visual problems who has difficulty accessing an AAC system independently.

In contrast to computer assisted scanning, a human partner is sometimes called a "smart partner" – a computer cannot adapt to the individual's day to day or minute to minute fluctuations or read facial expressions and body language the way a live partner can.

SGD (speech generating device) or VOCA (voice output communication assistant)

Voice output can be either digital (recorded speech) or synthesized (computer generated) speech.

High tech devices are referred to as SGDs because the speech can be computer generated. However, many high tech devices also have the capability of using digitized speech in some instances.

Low tech static display devices use recorded speech only to provide the voice output.

Symbol

Something that represents or stands for something else. In the simplest form, a symbol is a signal that is interpreted the same way by at least two people.

There are 2 types of visual symbols; graphic and lexical. *Graphic symbols* include line drawings, photographs, color or black & white images. *Lexical symbols* are with letters or words.

Symbol Transparency and Opacity

AAC systems can use concrete objects, photographs, life-like drawings, or line drawing symbols. Symbols are said to be *transparent* when what they represent is obvious to any communication partner either immediately or with an initial explanation. *Opacity* refers to symbols that are abstract, don't have any resemblance to the word or concept, and which are not easily identified without the accompanying label or direct instruction.

Common Myths Surrounding AAC

The myths of AAC, a combination of misconceptions and misinformation, are both pervasive and dangerous.

They are perpetuated by mistaken beliefs, including:

- that communication must be verbal
- that use of AAC will prevent children from developing speech
- that there are prerequisite skills that must be developed before an individual is able to use AAC
- that AAC systems are too complex for individuals with intellectual disabilities
- that access to AAC, once provided, eliminates communication challenges

BUSTING THE MYTHS:

Many parents and professionals believe that AAC is only for individuals who are completely nonverbal.

Students who have some speech skills are frequently not provided access to AAC systems, in the belief that intervention should focus only on building their verbal skills. However, if speech is not functional to meet all of the individual's communication needs - that is, if the student does not have sufficient vocabulary, is not understood in all environments, or if speech is only echolalic or perseverative - AAC should be considered.

“Any child whose speech is not effective to meet all communication needs or who does not have speech is a candidate for AAC. Any child whose language comprehension skills are being claimed to be ‘insufficient to warrant’ AAC training is a candidate for aided language stimulation and AAC.” (Porter, G.)

The individual who says a few words or phrases needs to increase his vocabulary and communication functions.

The individual whose family and care staff can understand him may not be understood by others in the community. What happens when he is in a different from usual context/situation, or trying to communicate with someone who isn't familiar with him?

The individual who can repeat everything he hears - is echolalic - does not necessarily use these utterances appropriately and still cannot interact in a social, academic, or daily living exchange. What happens when he wants or needs to say something for which he does not have a stored phrase (or script), or the echolalic phrase he uses is not appropriate to the context? What would happen in an emergency situation? How do you know when something is wrong? While there has been more research and explanation into how echolalia serves a communicative function, it continues to be less functional than the individual needs for competency.

The individual who perseverates on a given utterance lacks the ability to formulate new utterances in the face of desiring to communicate. Once he has his partner's attention, how does he communicate what it is he really wants to say but cannot?

A study by Perissinoto (2004), found that children with Aspergers Syndrome frequently exhibited all of the non-interactive behaviors of communication (requesting), but few or none that were more complex (commenting, asking for information). When adults/communication partners considered echolalia episodes to have a communicative function, and responded to that verbal structure as being in aid of one of those functions, the children were found to begin to use those functions and structures more and there was an increase in spontaneous, non-echolalic speech,

While these individuals are verbal, none have sufficient functional speech to meet all of their communication needs. All are potential candidates for AAC.

BUSTING THE MYTHS:

Similarly, some parents and professionals believe that AAC is a last resort for nonverbal or minimally verbal children, and should only be used when there is no more hope for developing speech.

Unfortunately, this all too often means that children (and some adults) have no means of communicating for far too long. Research shows that any intervention delayed beyond a child's first three years has less significant impact, and that children - including those with disabilities - learn faster and more easily when they are young. Waiting too long to provide a mode of communication denies the child the opportunity to learn language, acquire vocabulary, and express himself appropriately –and the lack of an appropriate mode too often means communicating with an inappropriate one.

This can result in frustration and negative behaviors, as well as significant limitations on language development, access to curriculum in school, access to social interactions at home and in the community, and adapted living skills. Without access to communication, the individual is excluded from appropriate educational and vocational placements, restricting both social development and quality of life.

From birth, babies communicate to us. We recognize these communicative behaviors and respond to them; reinforcing them and expanding upon them. We do not wait until they can speak to us to recognize and build on their communications, nor do we wait until they can communicate independently to provide scaffolding for building more communication skills. Rather, we interpret what they are doing to communicate and model additional possibilities: we work on building both nonverbal and verbal skills simultaneously.

Similarly, we can work on AAC skills and speech simultaneously: AAC can serve as an important tool for language development, and should be implemented before communication failure occurs, rather than as a last resort.

Romski and Sevcik conclude that young children with complex communication needs (CCN) should receive services early in their development to augment natural speech and support development of language and communication. Withholding AAC intervention not only impacts building language skills, but also restricts cognitive, play, social, and literacy skills.

Case In Point:

Two years ago I attended an IEP meeting for a girl for whom I was providing consultation. The school district was appalled when I suggested an AAC system as an augmentative strategy (she was verbal; but with a repertoire of less than 3 dozen words).

Their response; "We're not giving up on speech. It's too soon!" (Note that I suggested an AAC system as augmentative to, not as a replacement for, speech.)

How old was she? She was 9.

BUSTING THE MYTHS:

Parents and professionals may also believe that use of AAC will stifle the child's potential verbal skills and/or serve as a "crutch" upon which the child will become reliant.

Children need access to appropriate and effective modes of communication as soon as possible. Struggling to learn to speak, while having no other way to communicate, leads to frustration; without an appropriate way to communicate genuine messages, individuals frequently use inappropriate behaviors to communicate, or withdraw. In contrast, those children with access to AAC tended to increase their verbal skills as well. This was reported anecdotally by speech-language pathologists and others working with AAC users for many years, and research backs these observations.

A review of research undertaken in 2003 showed that, as a result of AAC intervention, 11% of children showed no change and 89% demonstrated gains in speech (and those who showed no change did not decline in speech use as a result of AAC). AAC is now cited as evidence based practice for facilitating speech in nonverbal children.

Those working with adults with acquired speech and/or language disorders have also found benefits in the use of AAC to begin to rebuild communication skills: AAC users have demonstrated increased participation in a variety of interactions, using a variety of communication functions and forms. "Adults who are experiencing chronic medical conditions use assistive technology to participate in life situations and to stay connected with the world around them." (Beukelman, Garrett, & Yorkston, 2007).

Why AAC use promotes speech development is not precisely known. Theories include the possibility that use of AAC reduces the physical and social/emotional demands of speech, and that the symbols/words provided visually serve as consistent cues while the speech output provides consistent models.

Although the goal of AAC intervention is not necessarily to promote speech production, the effect appears to be that it is a result: evidence suggests that access to AAC has a positive impact on speech development, rather than hindering it.

BUSTING THE MYTHS:

Many times parents are told children need to have a set of prerequisite skills in order to qualify for or benefit from AAC, and that their young and/or severely disabled children (and adults) do not yet possess those skills.

In addition, some professionals believe that there is a hierarchy of AAC systems that each individual needs to move through, utilizing no- or low-technology strategies before gaining access to high technology systems.

In fact, this outlook only tends to limit the type of supports provided and limit the extent to which language may be developed. Channeling communicative behaviors and responses into appropriate language skills merely requires access to appropriate tools and sufficient vocabulary.

First, there are NO prerequisites for communication: everyone does it. And as we've seen above, all children learn to communicate before learning to speak.

Second, research shows that very young children can learn to use signs and symbols before they learn to talk. Research has also shown that very young children with complex communication needs have learned to use abstract symbols, photographs, and voice output devices during play and reading activities.

Third, research does not support the idea of a hierarchy of AAC systems. One of the things we have learned about teaching individuals to use AAC systems is that the stability of vocabulary is important: finding the words in the same location every time they use the system significantly lightens the cognitive load of creating a message. But when we make users move through a hierarchy of devices, we constantly present them with different arrangements of words. Requiring an individual to learn multiple symbol systems or AAC systems as they develop skills merely serves to make learning to communicate more difficult.

Case In Point:

Not too long ago I got a call from a mother. She was interested in looking into AAC for her child, but the school district said the child was too young. How old was he? He was 6.

Last week I had the same experience. This time, however, the child was 3. As soon as I put a dynamic display device in front of her with core words to use in our play interactions, she began to use the system independently to direct my actions and her choice of activities – including which colors of markers she wanted.

BUSTING THE MYTHS:

When working with individuals with severe disabilities - particularly intellectual disabilities - many professionals assume the individual is too cognitively impaired to use AAC, and underestimate the potential abilities of these individuals.

On the contrary, research and observation consistently indicate that there is no benefit to denying access to AAC to individuals with significant disabilities. The relationship between cognition and language is neither linear nor one of cause and effect; they are correlative, intertwined in a very complex way. We often see language skills in the (supposed) absence of expected cognitive skills.

Kangas and Lloyd (1988) wrote that there is no “sufficient data to support the view” that individuals cannot benefit from AAC because they have difficulty paying attention, understanding cause and effect, don't appear to want to communicate, are unable to acquire skills that demonstrate comprehension of language, and/or are too intellectually impaired.

We cannot say that a specific level of cognition or skills needs to be reached before language develops: they are interdependent. Thus, we must proceed with the notion of

the “least dangerous assumption:” the plan that, if we are incorrect, will cause the least damage to the individual.

Believing the individual can acquire communication skills, we provide an AAC system and intervention. Even if we are wrong, there can be no damage from providing someone with a way to communicate.

Believing the individual *cannot* acquire these skills, we do not provide an AAC system or intervention. We have done immense damage if we are wrong.

Intervention should be rooted in the idea that learning is based on the strengthening of neural connections through experiences – reinforcement of these connections, through multiple modes, facilitates learning. Poor performance is more often related to the competence of the intervention than the competence of the individual.

Providing users with rich experiences with their AAC systems builds on the neural patterns and facilitates communication skills building. Not providing AAC services based on preconceived ideas about the cognitive skills of the individuals simply continues to segregate them, and limits their access to life experiences.

BUSTING THE MYTHS:

Finally, there are those who believe that simply providing access to an AAC system will obviate the user’s communication difficulties.

While use of AAC will facilitate development of speech, language, and literacy skills, and will increase the individuals’ ability to communicate effectively, it will not do so simply by being present. No matter how complete or robust, an AAC system, in and of itself, does not benefit the individual.

The AAC system is a tool, and as with any tool, the individual needs to know how to use it. For most of those individuals, direct, specific, and structured intervention and opportunities need to be provided.

Further, the success of the AAC system is not solely dependent upon the individual’s skills and cognitive abilities. It is also strongly dependent upon the willingness, training, and responsiveness of the individual’s partners. Communication partners have a significant responsibility.

Both users and their partners need to accept the importance of the AAC system in allowing individuals to maintain social, medical, and daily needs connections. For example, adults with acquired communication disorders such as stroke, ALS, or TBI may have difficulty accepting AAC: formerly independent communicators, they are now faced with reliance on others and on assistive tools. This difficulty of acceptance can be present on both sides of the communication exchange: it may also be challenging for caregivers to accept that AAC is a necessary tool. Caregivers often say, “I know what

he wants,” or “Oh, I understand him.” But they cannot possibly know everything that the individual might want to say.

Both users and their partners also need appropriate instruction in how to use the system, and how to develop effective communication and further language skills with the system. If partners have low expectations of the AAC learner, do not respond consistently, do not use aided input consistently, and/or do not provide sufficient communication opportunities, the AAC learner is not likely to progress.

Who Should Use AAC and Why?

People who use AAC are those individuals whose current mode of communication does not meet all their communication needs, restricting the quality and quantity of their interactions with others.

ASHA and the Joint Commission for Persons with Disabilities have a “zero exclusion” criterion, and consider not whether an individual is eligible for services, but rather where along the continuum they are currently operating as a starting point. Best practices also dictate that, while there is a relationship between cognitive and linguistic skills, this is not a causal relationship: language skills are just as likely to affect cognition as vice versa.

As long as there is a discrepancy between needs and abilities, an individual qualifies for services in AAC. There is almost no group of clients or students you will work with where you will not find some need.

There is no such thing as the typical or average AAC user: you will find individuals who need access to AAC from all age groups and a wide range of diagnostic categories.

Many congenital and acquired disabilities will require the use of AAC. The largest groups of AAC users among children are those with cerebral palsy, Autism Spectrum Disorder, and other developmental disabilities; children with Angelman’s Syndrome, girls with Rett syndrome, developmental apraxia of speech, and a host of less common or low-incidence disorders can show up on the SLP’s caseload. Among adults, cerebral palsy and developmental disabilities affect a large group of AAC users; you will also see adults with ALS, MS, and those who have suffered a stroke/ CVA or spinal cord injury. In both adults and children, traumatic brain injury (TBI) can necessitate the use of AAC.

Not all of these users require high technology AAC systems to communicate, but they do require a robust system that allows them to be effective communicators. The “...ultimate goal of an AAC intervention is not to find a technological solution to the communication problem, but to enable the individual to efficiently and effectively engage in a variety of interactions.” (Beukelman and Mirenda, 1998)

All users do, however, require partners who keep them motivated and stimulated, who provide opportunities for them to communicate, who assess their AAC systems on an on-going basis, and who provide the aided input and modeling needed for them to learn how to use their AAC system and language. Partners also need to be aware of the wide range of communication functions that should be represented in the users' toolbox.

Bear in mind that we all use a variety of modes to communicate – different modes are useful in different contexts. For example, when my husband asks me what I want to drink, I don't think I have ever responded, "I want an iced tea, please," – I simply say, "Iced tea." So I cringe when a user responds to the question "What do you want?" by pointing to the item in front of him or using a single word response, and the partner demands he use his AAC system to construct a complete sentence. We use gestures and single word responses quite often. This is important to remember in intervention.

Also bear in mind that communication needs a purpose - an intent. The individual must have something that he wishes to communicate - impart - to someone else. It is important to make situations motivating and meaningful in order to create an environment in which an individual who is just learning to communicate has something he wants to say and the means to say it.

Case In Point:

I was called in to consult with a district regarding a boy of 10 with autism.

He had been using a PECS board (further discussed in No-Tech AAC Systems) with symbols for favorite foods and activities. Additional pictures were available during specific classroom activities; these were limited to nouns, with a few activity-associated verbs.

District representatives told me he had demonstrated limited success with pictures, particularly when using them to request food (he was always hungry), but as he wasn't using them for other activities, they did not think he was "ready" for a more complex system.

*I observed him in his classroom during an art activity where he was required to cut and paste, then color. This was a boy who had poor fine motor skills – he did not like, or want to do, cutting and coloring. But the symbols available during the activity required to him say that he wanted scissors, he wanted glue, he wanted the red crayon, etc. He most clearly did **not want** any of these things – and "not" was not available among the symbols.*

In contrast, given an activity he enjoyed and appropriate symbols to use, he was able to use them. His vocabulary was limited, as he had always been restricted to a noun-based vocabulary, but he knew what the pictures were for and was able to communicate with them.

Lessons learned:

1. Verbal communicators are able to tell you when they don't want something, or don't want to say what you want them to. Nonverbal communicators should have the same right and ability to say "I don't want to" as everyone else.

2. Only giving an individual the words to say specific, limited messages does not give them the ability to communicate.

3. As Gayle Porter says, "...a child who uses speech will independently select the words she wishes from the vast array she hears/uses every day. A child who uses AAC will independently select the words she wishes to use from the vocabulary other people have chosen to model and, for aided symbols, made available for her to use." (Porter & Kirkland) And a child who uses a limited AAC system will sometimes NOT choose to select words that do not say what he wants them to.

AAC Systems – Just What Are We Talking About?

Ultimately, the most effective communication is achieved through spontaneous novel utterance generation (SNUG). SNUG allows someone to say anything they want, by combining words, word combinations, and commonly used phrases. It's based on normal language (moving from single words to word combinations), and on the notion that most sentences we use we've never used before.

Voice output, for instance, is similar to the natural give and take of verbal communication interactions: access to voice output provides both a speech model for users and clear intent to communication partners. Unlike no-technology systems, it gives auditory feedback while students are learning symbol meaning. It also allows the user to gain attention even when partners are distracted, allows for interactions with partners who are less familiar with their communication modes and strategies, and allows a user to repair a breakdown in communication when they have not been understood.

Whether no tech, low tech, or high tech, a functional AAC system is a compilation of strategies that allow the individual to effectively communicate a variety of intents, in a variety of contexts, with a variety of partners. We need to recognize that different modes of communication are useful and necessary in different contexts, while also remembering that we need to provide users with sufficient vocabulary – in whatever mode – to allow them to communicate genuine messages. And any system must provide well-organized language (both core and fringe words) and stability of vocabulary and location.

To foster the most robust AAC system, it is important to teach flexibility – the use of multiple component systems has been shown to be more effective and more natural (Erickson). Alternative means should be available for when the primary mode of

communication is not practical (or is unavailable: if a high tech AAC device is broken or malfunctioning, for example). Students might need to be able to use different communication modes in different social circumstances: what might seem appropriate with friends in an informal interaction would be totally out of place interacting with a teacher, or in a formal social situation with adults. Similarly, a student who communicates with his familiar classroom aide using signs would need to have the flexibility to communicate via a different mode in the community with individuals who do not understand sign.

So, when asked the question, "Does this individual need a low-technology system or a high-technology device?" the answer is "Yes. All of the above." At all times we should remember to focus on the individual and their communication, NOT the technology.

NO TECH

Before they begin speaking, all children learn to use communicative gestures. Some of these gestures develop into extensions or variations on other actions (for example, pointing is a more refined version of reaching), some are more formal, and some, like signs, only become communicative when a group of people assign a consistent meaning to them.

In addition to gestures, a variety of body movements can be communicative. Facial expressions are very communicative, as are shaking and nodding our heads, shrugging our shoulders, and turning away. We hold up objects for others to see, wave hello and good-bye, and hold out two items to make a choice.

Sometimes in AAC intervention we forget that we all use gestures to communicate, and that the gestures and communicative body actions of the nonverbal individual are valuable communication tools. Too often those gestures are extinguished or ignored in favor of "more appropriate" communication. While actions that are disruptive or destructive certainly should be eliminated, many gestures continue to be appropriate for communication, and should not necessarily be replaced by more formal symbolic communication.

The truly no tech AAC system is sign language, used with populations other than the deaf in the 1960's through the 1980's as research found that many persons with developmental disabilities and autism were able to learn to use signs more easily than speech. It must be noted, however, that what was being taught to these individuals were individual signs, not sign language per se. There are many subtle hand positions and other cues that go into sign language that are not present in the signs taught to other populations. Additionally, most sign-using individuals with developmental disabilities and autism use poorly articulated signs as well as idiosyncratic signs, which makes lack of comprehension an issue: often even members of the signing community do not understand the signs these individuals use.

Stephen Calculator devised a system of Enhanced Natural Gestures (ENGs), which have been found to be easily taught to, and effectively used by, individuals with Angelman's Syndrome, among others. Unlike contact gestures, such as taking objects from partners or pulling partners toward preferred activities, ENGs do not require physical contact; instead, they are natural intentional gestures that may already be in the individual's repertoire, or can be easily taught. ENGs represent what they mean, so are easily understood by others in context: for example, an individual might be taught to hold a cup to his mouth to indicate a desire for a drink.

No tech also includes object-based systems, as well as paper-based systems that may or may not be created with a computer, using letters, words, and/or picture symbols.

Examples include:

1. Object boards (with or without symbols or text). Object boards are sometimes used for individuals who relate better to concrete objects, or those who have severe vision impairments, or who are deaf-blind, and who have difficulty understanding the symbolic nature of pictures. This often limits those students' available vocabulary, and restricts their access to a variety of communicative intents.
2. Single pictures (or photographs) for labeling items in the environment or for making simple requests. Even without technological solutions and equipment, there is a lot that can be done in classrooms for students who need AAC (but might not yet have it) using pictures taken from software, websites, magazines, or other educational sources.

Pictures/symbols can be used to teach categorization and to define and describe. They can be used to learn and sort words/symbols by parts of speech. They can be used to teach phonological awareness skills for literacy learners, such as initial and final sounds, word families, and rhyming words. They can be used to create word webs to teach vocabulary skills and help to strengthen the connections needed for finding vocabulary within some AAC systems. You can also use pictures/symbols to teach prepositional concepts and the concept of same and different.

Pictures or symbols can be used for playing a variety of thematic "Guess Who" games similar to the popular Milton-Bradley game (to build describing skills and questioning skills), and to create language-based cards for a variety of card games.

Use single pictures to teach a single core vocabulary word. Use two pictures to teach a yes/no response or to teach choice-making.

3. Single communication boards. These can be created in several different styles and means of vocabulary organization.

Topic or activity boards are created for specific activities, or situations and environments with a specific vocabulary: for example, menus for restaurants, or available options within an environment (such as a choice of animals to visit at the zoo).

(fig. 1)

Activity board on a Teach Speak static device for reading activity

(fig. 2)

These boards may increase communication speed during a specific activity by limiting extraneous vocabulary, but they also potentially restrict the possibility of off topic comments or functional communication responses. When individual boards are compiled, on the other hand, individuals often find it difficult to find the words needed for creating messages, and speed of communication is often decreased by the need to flip back and forth between multiple pages to combine words for different messages.

Activity-based boards can be placed in the exact site or location in the environment where the activity occurs, rather than keeping them in a single book. However, taking the board out of a larger communication book restricts the user from talking about the activity somewhere else, or using other vocabulary during the activity (such as a request for break, bathroom, other activity, specific person; stating something is wrong; etc.). Unstable vocabulary – moving and/or unavailable depending on the activity – hinders the speed of learning.

Core vocabulary or general interaction boards are used to allow for communication with core words throughout a variety of environments or situations. They use a vocabulary made up of multi-use words, for a variety of communication intents. These provide the AAC user with a variety of useful words in all situations, but can lack availability of specific words to expand the elaboration of intent.

4. **Phrase-based books.** These are for students whose language is limited and who need quick access to general messages, or for an AAC user to use in social situations whose exchanges have some predictability. These are limiting and are far too often used as a complete AAC system, when they are not.

5. **PODD books.** Developed in Australia, and originally used in very early intervention and home programs, PODD stands for Pragmatic (the ways language is used for social interactions) Organization (the systematic ways words and symbols are arranged) Dynamic Display (pages that change throughout the communication interaction). PODD is a way of organizing the word and symbol vocabulary in an AAC system to provide immersion in symbol communication and modeling for learning.

PODD books begin by establishing a variety of communicative intents through use of pragmatic branch starters that signal intent or purpose, and aim to provide students with

sufficient vocabulary to communicate all of the time, in all environments, on a variety of topics, and for a variety of messages.

PODD 16-location Something's Wrong page
(fig. 3)

In a conventional communication book the navigation usually involves turning the pages one at a time looking for a specific symbol, or needing to remember which categorical page to turn to. Individuals learning to use AAC can become frustrated if they cannot find a specific symbol quickly, and/or distracted as they focus on and point to symbols of interest that are not part of the intended message.

Some simple yet effective features are incorporated into the PODD to improve the efficiency of page turns. These features support communication autonomy by enabling the person using the PODD to (learn to) independently direct movement between pages, even though a partner may physically turn them, at least initially.

“Go to page (number)” instructions are associated with symbols that function as part of the navigation system to move between levels in the communication book. Using “go to page (number)” rather than “go to page name” allows adults and older children to use their knowledge of the sequence of numbers to find a required page more efficiently.

Colored page tabs matching the color of the “Go to page (number)” instruction add another cue to assist with the efficient location of the required page.

Symbols for specific operational commands such as “TURN THE PAGE,” “GO TO (CATEGORY),” AND “GO BACK TO PAGE (NUMBER)” are included to facilitate the individual’s control of movement between levels. These operational commands also provide both the AAC user and the communication partner with ideas of which page to move to next, in order to continue and expand communication.

6. Picture Exchange Communication System (PECS) books. Picture exchange systems are widely used with individuals with complex communication needs, with developmental disabilities, and with autism. PECS books use velcro to move symbols between their pages and the cover sentence strip.

PECS was developed to teach children with autism how to approach others to get their communication needs met. It was meant to reduce the frustration of children who had been taught to point to pictures, but not to gain attention to their communicative action. PECS was also meant to reduce the disparity between teaching children to discriminate pictures and relate the picture symbol to the object, but not how to actually use the picture symbol to get the item.

PECS has its own intervention system, which is delineated in its teaching materials (Bondy, Frost, 2002). In brief, the system involves beginning with something that motivates the child – an item that has strong reinforcing value.

The first step, or Phase 1, teaches communication initiation using that reinforcing item, a symbol/picture, and two people: one to facilitate, the other to guide. The guide has the child hold the picture and guides him to approach the other person (who has the reinforcer) while holding out the picture. An exchange is made between the child, who hands over the picture, and the partner, who hands over the item. (This is the simplified version of the initial phase.)

Phase 2 involves making the communication exchange more realistic, but increasing the distance between the child and the symbol as well as the partner.

Phase 3 involves teaching discrimination between pictures and adding them to the communication array. This phase of intervention includes adding “distractors,” or items the child does not want.

Phase 4 introduces sentence structure with the “I want...” sentence strip. (Focusing solely on wants means that requesting is the communicative intent taught to the exclusion of all others at this phase.)

Phase 5 teaches answering questions, using the question, “What do you want?”

Phase 6 teaches commenting, using the carrier phrase, “I see...”

PECS is widely used in school districts as the AAC system provided to students, and is good for establishing communicative intent in those who do not evidence this basic understanding. Beyond that stage, however, PECS may create more problems than it solves.

For example, the pictures in a PECS book are constantly moving between their pages and the cover sentence strip, and users and their partners may stick them back into the book randomly; even when the book is organized by categories, pictures move around on each page. This means that they can be in a different location every time the child opens the book, and too much cognitive energy can be consumed by trying to find the picture wanted. Learning through motor planning, which research has shown to be effective for some, can be stymied by shifting vocabulary positions (consider how difficult it would be to drive a car if the position of the brake pedal were constantly changing).

While some verbs and adjectives (usually colors) are eventually included in some users' books, in general the systems tend to lack many types of messages and restrict vocabulary growth beyond nouns. Syntax development is also restricted, usually to “I want + __,” “I see + __,” and “I have + __” carrier phrases – and many individuals are never given more than the “I want” strip to use. Practitioners tend to get stuck at the “I want__” phase and their students get no further with communication functions.

According to more recent AAC research, mere picture discrimination does not translate into use for communicative purposes, while using pictures in the system with good

modeling and aided input obviates use of the discrimination phrase of learning (Berkowitz, Calculator). Picture stability, use of core words, and focus on aided language stimulation and on increased communication function all provide practitioners with alternative teaching strategies that are more realistic, naturalistic, and allow for more communication autonomy.

Case In Point:

I once encountered a young girl who was small and slight. She had a PECS book that was a large 3-ring binder with many pages full of velcro'd pictures. It was almost as heavy as she was; in fact, someone else was required to carry it around for her. It was an effort for her to find the word she wanted at each communicative attempt. And while teachers, SLPs, and parents continued to add vocabulary to it, most of the vocabulary available was nouns.

How was she expected to expand her language skills without the building blocks of syntax? Where were the adjectives (other than colors) to allow her to elaborate?

7. Category-based books. Communication books often contain multiple pages organized by category or topic. While good for students who need visual cues for word retrieval, or during curricular activities whose vocabulary may not be used often, these books frequently lack words other than nouns on their specific category page, and provide few verbs and adjectives, which makes message construction beyond requesting difficult.

One page from Mayer-Johnson's Print n communicate book – a restaurant menu (fig.4)

8. Behavior cue books. These are used for individuals who have Autism Spectrum Disorder or other developmental or behavioral issues. These books provide visual cues for appropriate behavior and are especially helpful during transitions, waiting times, or high demand activities. These books can also include long-term visual schedules, sets of transition cues cards, or behavior contingency maps.

Different types of communication books are used for different purposes and/or different models of augmentative/alternative communication. Historically, books have been organized by taxonomy (categories), schema (activities/events), topic, or anecdote (organized by information, scripted narratives or stories).

Because communication books can be used as a part of the AAC system without being the primary component of the system, many creative ways of utilizing them for specific individuals can be found. For example:

Conversation notebooks can be created for users who need access to specific stories to tell, or who need quick access to often-repeated message in social situations. Notebooks can be created, too, with different pages of possible messages for each part of a conversational interaction, such as the attention getter, the topic maintainer, etc.

Core notebooks can contain flip book additions to a core vocabulary board, giving the user access to a variety of sections of topic specific vocabulary. Tabbed flip-through pages can be added to the top of a board, or as fold-out panels on the sides of a board. Fold-out panels can also be used to make a core vocabulary board or book contain more vocabulary.

Often users who are ambulatory don't want bulky communication books - or even devices - to carry with them. *A communication book that is wallet-sized* can be very handy. They might be used when the individual is going out to a specific location or event. They are often used by teens and adults with developmental disabilities who need to provide basic identification information or meet basic needs in the community, but don't want anything obtrusive. Wallet-sized books are also handy for people who are primarily verbal, but are not well-understood by unfamiliar listeners. They can fit in a pocket or handbag, to be used as needed.

Students who are active and spend time on the playground or playing out of doors don't want to carry a big communication book or device with them while they are climbing the monkey bars, playing handball, or going down a slide - nor would a device be safe in many playground situations. Creating a small number of *picture strips or picture mini-pages* that are placed on a ring and hung from the individual's belt loop are useful in these situations.

Two alternative systems of organizing vocabulary in communication books have recently gained more widespread use; each is developed with a different philosophy of augmented communication. Both aim to provide sufficient vocabulary to meet a student's communication needs; both feature an implementation whose procedures provide a structured format to teach AAC use.

Core vocabulary boards and books focus on providing students with those words that research has shown to be the most-used to generate language responses.

Core vocabulary is a small set of words, in any language, that are used frequently and across contexts (Cross, Baker, Klotz & Badman, 1997). It contains all parts of speech – nouns, pronouns, verbs, adjectives, adverbs, prepositions, conjunctions, and interjections – although there are very few nouns (none in early core word lists).

(Pixon boards represent one version of core word boards and books.)

Pragmatic organization, on the other hand, focuses on providing maximum vocabulary for a robust system that begins by considering and signaling the intent or function of the message.

(PODD communication books, discussed previously, are the best-known example of this type of organization.)

LOW TECH

Low tech options include a variety of simple switches and battery operated devices. These devices typically have 1, 2, 4, 8 or 9, 12, 16, 20, 32 buttons or cells for storing words or messages. The greatest number of cells in a low tech static display device is 128 (AMDi 128), but the devices with fewer cells are seen more often.

These are called static display devices because the display does not change until someone physically removes and replaces the picture overlay. Some static display devices have multiple levels so that, when the level is changed, the overlay can be changed without having to re-record messages. Six or eight different picture display overlays can be created and stored with the device, so that simply by moving a switch to change the level for the recorded speech the user can change the communication display, allowing him access to different topics.

Examples of static devices include:

1. BIGmack/LITTLEmack - A single button with a single recorded message. These may be used for gaining attention, making a request, giving a greeting, or participating in reading a repeated line book.
2. Sequencer and Randomizer buttons - The sequencer sequences messages in order, for the user to engage in a greetings exchange, tell a joke, give directions, tell a story, "read" a short book, or give a presentation. The randomizer holds multiple versions of the same messages, so that they appear fresh each time, preventing the user from sounding stiff and repetitive: *Hi, Hello, Hey there, Yo.*

The Resources section of Adaptivation, Inc.'s website has lists of ways to use both sequencer and randomizer buttons (<http://www.adaptivation.com/Resources>).

Sequencer: recite poems, tell a joke, recite days or months, trick or treat, announce today's lunch menu, talk to Santa, read a story, complain, introduce someone, buy a movie ticket, count, rent a video, recite the Pledge of Allegiance, shop for clothes, give a shopping list to a clerk, play a game, present spelling test words, add sound effects to a story, order in a restaurant, direct a game, take attendance, tell how-to __, give the weather report, play Duck-Duck-Goose, direct P.E. activity, tell about a field trip, sing songs, give recipe instructions, tell about a vacation, play Simon Says, give a book report, play 20 Questions, Show & Tell, conduct an interview, give clues in a guessing game, deliver a message, match sounds to pictures, give announcements, give a phone number, request assistance, direct self-care activities, call for a taxi, call to order a pizza, steps for a project, directions from place to place, recite the alphabet, call a pet to dinner, etc. (<http://www.adaptivation.com/uploads/documents/Sequencing.pdf>)

Randomizer: scavenger hunt, playing Rock Paper Scissors, selecting a member of the class, hellos/goodbyes, choosing a snack, etc.
(<http://www.adaptivation.com/uploads/documents/Randomizing.pdf>)

(fig. 5)

3. Hip Talker, Wrist Talker, Go Talk - These are only a few of the simple static devices that can be used for basic, functional communication responses. Responses for gaining attention, indicating the need for assistance or the bathroom or a break or a change in activity are helpful to put on these simple devices. The Go Talk devices are available in 9, 12, 20, and 32 message configurations. The larger arrays can be used for more functional activity boards.

4. Another simple AAC solution is the Talking Photo Album, originally marketed by Radio Shack for the general public. They are readily available at outlets like Amazon, Walmart, Sharper Image, and Maxi-Aids.

Ways to use a Talking Photo Album are also found on Adaptivation's site: shopping list (can use product labels or photos), picture recipes, retelling an event, presenting personal information, telling the steps to a task or activity, flash cards, picture menu, speech or book report, singing a song, sharing a collection with friends, creating social stories, picture identification, current events, simple dictionary, reminder list for chores, play scripts.

Adaptivation notes that the user is not limited to photos; ticket stubs and activity receipts, stickers, labels, etc. may also be used.
(<http://www.adaptivation.com/uploads/documents/TalkingPhotoAlbum.pdf>)

In general, static display devices can be useful for choice making and for making responses in specific situations or activities, i.e. classroom calendar time, read-aloud time, playing with a toy, arts & crafts.

However, they:

- lack sufficient vocabulary to meet many communication needs,
- often only have enough vocabulary for the specific activity,
- often have no room for off-topic messages or clarifications,
- usually have no flexibility for genuine message construction,
- may frequently change the location of vocabulary from overlay to overlay, obviating learning through automaticity, motor planning, and
- most require access through direct selection; only a few can be used with switch scanning access for students with physical impairments

That's not to say that static display devices don't have a place in the classroom or therapy situations – just that they rarely make sense as a primary or only piece of the AAC system.

Case In Point:

Simple ideas for static device use in the classroom.

- *A group cooperative activity such as labeling parts (of the digestive system, plants, solar system, etc.): The AAC user has a single switch programmed with, "put it there." A peer moves the label around on the worksheet and the AAC user uses a switch or BigMack button when it gets to the correct place.*
- *Answering questions on a given topic being studied: The teacher uses a multiple choice format and gives the AAC user a Partner 4/iTalk4 (for listing a/b/c/d response choices) so that he can answer questions. (In the best case scenario, core words are used and choices provided might be answers to multiple questions.)*
- *Media class - designing banners, posters, or a similar product on the computer: Give the AAC user a communication display with colors and shapes so that he can provide input. Spatial locations would also be useful.*
- *Language arts - parts of speech: Program the parts of speech (on a Go Talk 4 or 9, TechTalk, Partner 4 or iTalk 4, Cheap Talk). During sentence diagramming or similar grammar lessons, the teacher can list words and the AAC user can identify the relevant parts of speech.*
- *Language arts – editing: The teacher has sentences requiring punctuation on the overhead projector. The AAC user has a simple device with punctuation words programmed into it.*
- *Science - acid or base: This binary choice requires only a two-choice device. Alternately, given a larger static display with choices of liquids and other items, the AAC user could present them one at a time to a peer, who determines if they're acid or base. Using the same display, if the teacher asks for an example of an acid or base, the AAC user can pick one of the liquids.*
- *Science - life cycles (frog, butterfly, plant, etc): Program the relevant life cycle on a static device. The AAC user can list the stages in order, or identify a given stage when asked.*
- *Math worksheets: The AAC user has a static display device with numbers (i.e. 3-10 for simple addition). An aide or peer gives the user a problem; the AAC user chooses the answer from his array of possible responses.*
- *Math - order of operations: Given a complex problem, the AAC user can tell which operation to use when, or the sequence of operations to use. Or, with a word problem, he can tell which operation needs to be used to solve it.*
- *Reading: Give the AAC user a static display device programmed with events from a story. The AAC user can now participate in an activity to sequence events in*

the story, or answer when the teacher asks what comes next. AAC users needing to tell or re-tell or summarize a story can use a device programmed with transitional words to order the events. Similarly, given a four-choice array device, the AAC user can answer multiple choice comprehension questions about the story.

- *History – timelines: The student can use his AAC system, programmed with specific events, to tell, “What comes next?” Or, given a four-choice device with transition words – such as first, next, then, finally/last – the student can tell which event goes where.*

There are two widely used organizational systems for arranging vocabulary on these static displays (Elder and Goossens):

Order of activity - usually used with displays of 9 buttons or less. Vocabulary words/messages are chosen based on what's most highly prioritized in an exchange during a specific activity or topic, and are organized in the order they're needed for that activity, considering the relevant sequences of events or steps. The focus is on cause/effect and sequencing objectives.

Fitzgerald key format - uses syntactic order of vocabulary. Words that appear on multiple boards should always be in the same location; opposite concepts should be placed next to each other (horizontally or vertically); nouns should be organized by category/subcategory.

***Breakout panel: to run alongside the preceding and following sections*

Color Coding AAC Systems

Whether the AAC system uses paper-based or technology-based pages, there are two or three main color coding systems used in AAC systems to code parts of speech: the Fitzgerald and Modified Fitzgerald Keys and the Goossens, Crain, and Elder System.

Use of color has been studied predominantly with young children. Initial studies reported that children find systems with bright colors appealing and are thus more apt to use them. More recent studies (Thistle and Wilkinson 2009) determined that clustering symbols by like colors aided in the speed and efficiency of locating symbols on a display. Foreground color in particular had a positive influence, while background color alone had a negative impact on location of symbols.

Color coding provides an additional visual cue to aid the user and facilitator with vocabulary organizing and locating: buttons, button borders, or the text of the button can be all color coded. If color coding is organized according to grammatical categories, the user has an additional cue to assist in learning how to sequence symbols, and to support the development of sentence-building (syntax). According to the most recent best practice, because shape is a salient clue, color-code the background, not the figure, so that the shape of the symbol will be more visible to the student.

Symbols are easier to locate if they are grouped in blocks of colors or grammatical categories. For example, a display should be organized as follows from the left side of the overlay to the right side (Musslewhite):

MISCELLANEOUS	VERBS	DESCRIPTORS	PREPOSITIONS	NOUNS
I	like	green	for	trees.

Musslewhite suggests using the Goossens, Crain and Elder color coding system.

Verbs - words which tell action {i.e. Open, Come, Eat} PINK

Descriptors - adjectives and adverbs {i.e. Pretty, Slow, Red} BLUE

Prepositions - position words {i.e. In, Off} GREEN

Nouns - person, place or thing {Cat, Hat, John} YELLOW

Miscellaneous - WH-words questions Who, What, How, Exclamations interjections, etc {i.e. Uh Oh, Wow}, Negative Words negations {i.e. No, Don't}, Pronouns; personal, possessive {I, You} ORANGE

Historically, most big tech devices have used the Fitzgerald system:

People/pronouns – he, she YELLOW

Verbs/action words – go, want GREEN

Adjectives - big, little DARK BLUE

Adverbs - slow, fast LIGHT BLUE

Prepositions - in, out PURPLE

Determiners - this, that ORANGE

Interjections - please, thank you PINK

Nouns - pretzel, mom ORANGE

Wh words -who, what, where RED

Conjunctions - and, but, or WHITE

Modified Fitzgerald Key

Blue: Adjectives

Green: Verbs

Yellow: Pronouns

Orange: Nouns

White: Conjunctions

Pink: Prepositions, social words

Purple: Questions

Brown: Adverbs

Red: Important function words, negation, emergency words

Grey: Determiners

It doesn't matter which system you choose to use in a communication book or display, as long as there is consistency among parts of the AAC system. Do not use a different set of color codes in the communication book than is used on the user's device. **

HIGH TECH

High tech refers to more complex, computer-based devices.

Dedicated Devices - manufactured specifically for AAC use and nothing else

These devices use touch screen technology to allow for finger point access, and are referred to as dynamic display devices because large numbers of pages can be linked together for fast and easy transition from one page of vocabulary/messages to another.

Dynamic display devices are typically based on a standard computer or tablet, which has been specifically modified by the manufacturer with software, protective casing, and other specific capabilities. They range in size from handheld palm sized (5" screens), to lightweight portable devices with handles and mid-sized screens (usually 7-8" but also 10" screens), to full sized screens (typically 12") that are usually used on tabletops or mounted on wheelchairs or rolling stands.

The device is programmed to scan through items on a page in a variety of patterns and at adjustable speeds. User selections can be made through one or two switches, a joystick, a head mouse, or other adapted input method. Addition of a specific module for reading eye movement can also allow input via eye gaze.

High tech devices can have only 1 or 2 buttons per page, or more than 100. They contain pre-loaded software that provides pre-determined page sets for children at various levels of development, as well as for adults with various needs. Part of the purpose of an assessment that recommends a high tech device is to determine the specific page set that a user or potential user should be using. AAC users with adequate cognitive and/or language skills can participate in this decision.

The range of available high tech devices has narrowed recently, with the increased use of iOS devices and AAC apps for communication. The remaining systems and their software make some assumptions about AAC users that need to be remembered when considering an AAC device for a given individual:

While the range of high tech devices themselves all have similar features and capabilities, the software that organizes the vocabulary and presents it in page sets can be significantly different from one device to the next. Often, within a single device, the software contains multiple different page sets designed to meet the needs of different users at different levels of linguistic and communicative competence. While this provides a range of choice meant to meet users' varying needs, it too often happens that limiting page sets are chosen for users with limited skills, and progress is restricted to the capabilities of that particular set. In other words, competence is not assumed, and therefore not developed.

A keyboard on a computer or tablet, or a text-to-speech only device, assumes the greatest level of language and literacy: the user needs to understand language at the phonological level, constructing messages by constructing words, then phrases, and then sentences. Not all users of text-to-speech actually understand sufficient language to generate sentences in this way: for example, individuals with autism with hyper-lexical skills are able to read and write/type words, without understanding what they are reading or how to join the words into comprehensible structures. (Intervention strategies that can stimulate and expand the generation of linguistic functions and syntactic forms exist, but must be applied.)

High tech systems use differing ways of structuring access to symbols in order to facilitate message generation:

1. Minspeak - a system of semantic compaction, whereby a limited number of symbols are combined to generate a maximum number of core words and phrases. Not only are core word displays designed to facilitate ease of finding needed symbols, but recently the Language Acquisition through Motor Planning (LAMP) approach has reinforced the concept of vocabulary stability and limited use of navigation seen in the Minspeak or Unity systems. This symbol and language system is found on Prentke-Romich Company (PRC) devices.

A beginning communicator might start with a Unity vocabulary where one picture represents one word

(fig. 6a)

A more advanced communicator might use a Unity vocabulary that uses short sequences of pictures to represent words or phrases

(fig. 6b)

LAMP is a therapeutic approach based on neurological and motor learning principles. The LAMP approach was developed by using motor learning principles with the Unity language system for providing AAC intervention. LAMP strategies have been found to increase the ability of children with Autism Spectrum Disorder, in particular, to communicate spontaneously in a variety of contexts with self-generated messages.

PRC devices use Minspeak/Unity icons – another set of communication symbols, based on the facts that words have multiple meanings and that a single symbol can evoke multiple ideas. They provide the following example: the word *bed* can be used to express the idea of *a bed*, whereas the picture or symbol of a bed can express not only the word *bed*, but also the idea of *sleeping, living, being tired, furniture, saying goodnight, underneath*, and maybe even the little word *butt* (as in “get your butt out of bed”). Minspeak systematically uses the multiple meanings associated with a single picture.

“Minspeak systems are developed with rules and patterns for organizing and coding vocabulary. The person using a Minspeak system learns a small set of pictures –

usually less than 100 – then learns the rules for combining those icons into short sequences (www.Minspeak.com)”.

2. Word Power software - a word-based language generating system, designed by Nancy Inman. The most common 100 core words are provided, enabling generation of spontaneous novel utterances quickly and easily. Word Power page sets are available in a variety of sized of array, including Word Power 30, 42, 60, 84. Word organization is based on the Fitzgerald key, and designed for alternate modes of access. (The Fitzgerald key was originally designed as a visualization of syntactic patterns for students who were deaf.)

Most other systems that are widely used are word-based systems, with a variety of organizational patterns. The list of available systems is changing rapidly as companies rally to preserve the market for speech generating devices, in the face of competition from iOS devices and AAC apps.

iOS Devices Used as AAC Devices

The relatively low cost and ease of access to iOS devices – including iPhones, iPad Minis and iPads – has led to their ever-increasing use as AAC devices.

Putting an AAC app onto a commercially available device bypasses the lengthy evaluation and funding process. School districts are using iPads for AAC due to the significant difference between the cost of an iPad and a dedicated AAC device. Parents, tired of battling with school districts and insurance companies, are purchasing iPads and AAC apps for their children to use. Caregivers, Adult Day Programs, and workplaces are also purchasing iPads for AAC users, given their relative affordability.

One particular pro to the use of iOS devices as AAC devices is their appeal. Light, et al (2005) have noted that many dedicated AAC devices have been designed more from an adult’s perspective than a child’s, and lack visual appeal. However, devices that are more interesting and age appropriate may be used more and abandoned less: oftentimes when it is not possible to get an adolescent to use an AAC system that makes him look too different from his peers, he will accept the use of a ubiquitous iOS device.

Still, determining an appropriate AAC system must come after an appropriate assessment – it should not be forgotten, in a rush to adopt the newest technology or lower the cost, that one size does not fit all. Selecting an AAC app is a part of the assessment process as a whole: a dynamic, structured process of defining the user’s strengths, abilities, and needs, and matching them to the features of various AAC systems. As Shane and Costello warn, the iDevice must be matched and fitted to the user; not the user “fitted” to the device (Gosnell, Costello, Shane, ASHA Perspectives).

There are some specific issues that accompany the use of this technology for AAC.

First, often there is no one to guide the purchaser in selecting an appropriate AAC app for the end user, and no one to support the user once the device is purchased.

Whereas dedicated communication device manufacturers provide individualized training and support, as well as technical support, these are not available with tablet devices. Communication partners do not always know how to program or customize the app appropriately for the user.

We cannot just put a device in front of the user and expect them to begin to communicate. The AAC system - whether it is low tech or high tech - is only a tool, and the user needs to learn how to use it. Ultimately, without appropriate training and intervention, the device is not any more useful than a more expensive dedicated device would have been, and the problem is not solved.

Second, physical access is a significant issue with iOS technology.

It must be determined not only whether the individual can use an isolated finger to point to/activate the buttons of the device, but also whether he can swipe and pinch. Switch scanning is recently available for the iPad; likewise, specific AAC apps have the capacity for using scanning with bluetooth switch access. Key guards, while available for iOS devices and AAC apps, are difficult to connect to the devices – and because the device was not designed to hold a key guard, they are often disturbed and dislocated by users with spasticity or other motor issues, making them useless.

Third, the multi-functionality of iOS devices is another issue.

As opposed to dedicated devices that serve only one purpose – communication – iOS users often expect access to all of the other things that can be done on an iPad. While a feature allows the partner to lock the device into a specific app, this can cause behavior problems in some individuals who have come to expect additional access. But for users who are easily distracted, access to games, videos, and more leads them out of the AAC system and away from communicating: it is not possible to continue to communicate, when needed, while playing a game or music or watching a video. Users with ASD in particular are often so focused on watching videos or specific apps on the iPad that they frequently exit the AAC app.

Finally, it can be overwhelming to try to differentiate between AAC apps and choose the “right” one for the user.

At last count there were well over 200 AAC apps available in the iTunes store; however, the vast majority of these apps are little more than electronic choice boards. Most are not nearly robust enough to offer sufficient vocabulary to meet all of a user’s communication needs.

To match the user and an AAC app, the following features need to be considered:

- whether the app has voice output that is synthesized or digitized

- ability to adjust the voice output: rate, pitch, type of synthesized voice used (male, female, appropriate accent)
- ability to speak after each word or sentence or only when the entire message is selected from the message window
- symbol set(s) provided and the ability to import additional graphics
- ability to adjust the display for button size, array size, background color, button color, button border color, font size and color
- availability to access multiple modes, e.g. grid display, visual scene, key board
- availability of keyboard with word prediction
- ability to use abbreviation expansion, “recents” list, and/or grammatical prediction or selection
- ability to access via scanning, to use zoom feature with direct selection, to adjust dwell time for direct selectors, and/or ability to use *select on release* rather than *select on touch*.

A variety of app matrixes exist, showing the apps and their features: Childrens’ Hospital of Boston, Call Scotland, Spectronics in Oz, and the PrAACtical AAC blog offer 4 four of the most comprehensive.

What the user needs the app to do will depend upon the individual’s skills, environment, strengths and needs. Matching those to a specific app requires knowledge of an array of AAC apps and their functions. Using the iOS device as an AAC device does not obviate the need for a comprehensive assessment in order to find the features of a system that will match the user’s needs, strengths, and environments.

A few AAC apps currently worth mentioning include:

1. Sounding Board, from AbleNet: a fairly simple app using digitized (recorded) speech, up to 9 buttons per page, and importing of photos or symbols via the iDevice camera roll. Pages can be linked, offering more complexity and strength. However, the user is limited to 9 buttons per page.
(<https://www.ablenetinc.com/soundingboard-1>).

(fig.8)

2. Proloquo2Go, from Assistiveware: a robust dynamic display app that offers preprogrammed choices for a range of users. Grid displays can grow from 3x3 to 12x12, and the app offers seamless growth from one grid size to another, morphological and grammatical features within a single button, variety of voices, adjustment for voice rate, selection and access options, keyboard with word prediction, importing of photos and other graphics, and multiple customization possibilities. Proloquo2Go also offers the ability to change tone of voice, and has options for auto-conjugation and auto-pluralization. Just as the Common Core State Standards refer to Tier 1, 2, and 3 vocabulary, Proloquo2Go offers levels of vocabulary for immediate use.
(<http://www.assistiveware.com/product/proloquo2go>)

(fig. 9)

3. TapSpeak sequencer: Works just like the Sequencer button; has limited functionality. (<http://tapspeak.com/drupal/Sequence>)

(fig. 10)

4. TouchChat, from Saltillo/SilverKite: offers a variety of preprogrammed page sets (called vocabularies) to meet a wide variety of communication skills and needs, from basic expression of wants and needs through large core vocabularies. Some vocabularies offer key board access with word prediction; some offer visual scenes with programmable buttons along the periphery. Word Power page sets, some Spanish vocabularies, and Pixon Boards are available as in-app purchases. (<http://www.silver-kite.com/touchChat/>)

(fig.11)

5. Sono Flex, from Tobii: offers core and fringe vocabulary and easy navigation with prediction. It comes with 50 pre-made topic boards/pages, arranged by category, and contains over 800 core words for unique message construction, with easy access to activity-based pages that also contain core words. However, it offers no ability to change display size or button size/color, except by hiding buttons. (<http://www.tobii.com/sonoflex>)

(fig.12)

6. LAMP Words for Life: offers Prentke Romich's 84 location core word page sets, including a 1-hit page set, a transition page set, and full 84 Unity. Unity's core provides access to a full core word set with access to fringe as needed. In the full version, choosing a symbol can lead to a page where only the words that can possibly come after that word are available, which builds language skills even further. The app offers the possibility of hiding buttons until the user has increased his vocabulary. (<https://aacapps.com/lamp/>)

(fig 13)

7. Predictable: from TalkBox Apps; text-to-speech app. You can collect messages in folders for easy access later by category or topic. Available in Spanish. (<http://www.therapy-box.co.uk/predictable.aspx>)

(fig.14)

8. Talk For Me: another text-to-speech app, with a variety of simple functions for customization. (<http://www.talkforme.ie/>)

(fig. 15)

9. iMEAN: developed by a father of a child using the Rapid Prompting Method from Soma. It offers either qwerty or abc keyboards with word prediction, as well as a number board, and maximizes the size of letter buttons while using high contrast white on black.

(http://www.imean.mobi/iMean_site/Welcome.html)

(fig. 16)

10. CoughDrop: an open-source app with a growing, sharing community. There are a variety of page-sets already created that you can customize, and their cloud sharing allows for collaboration, as well as recycling of content.

(<https://www.mycoughdrop.com/>)

(fig. 17)

11. Avaz: a fully functioning AAC app that has the added power of helping to teach the child to communicate. Avaz shows you where to find words in the vocabulary so you can model effectively. It easily converts pages into a communication book for back-up, or for all of those places a device is less than optimal (like the beach).

(<http://www.avazapp.com/>)

(fig. 18)

This is by no means an exhaustive list of currently available AAC apps, and there are some newer ones that are showing potential. Clinicians need to make themselves aware of the options and explore them, prior to making a specific recommendation; if an app has been provided to the user without an evaluation, determine whether it is appropriate to the user's communication needs.

Regardless of the iOS app or dedicated device that may be recommended for an AAC user, it is important to remember to focus on the interactions and on communication rather than the technology: the individual user and his communication partners are the most important factors in developing communication competence. The technology should not overpower the communication context.

Providing a high tech AAC system is a very small piece of the AAC puzzle. Teaching and supporting the AAC user are the crucial pieces.

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INTERNET RESOURCES:

www.aac institute.org

Core vocabulary information

www.aac intervention.com

Lots of information about AAC from where to start with literature-based boards to tips and tricks. Musselwhite, C.

www.asha.org/docs

ASHA's site contains position documents, and documents outlining their stand on the knowledge and skills, roles and responsibilities of SLPs regarding AAC

<http://autismpdc.fpg.unc.edu>

Lists all evidence based practices for autism spectrum disorder, including overview, intervention steps, and check sheets

<http://www.avazapp.com>

Avaz app website

www.candlelightstories.com

Some ebooks are free; full access costs about \$10

www.creativecommunicating.com

Patti King-Debaun's website offers materials for teaching literacy to AAC users

www.enchantedlearning.com/Rhymes.html

\$20 membership required for full site, but symbol-adapted nursery rhymes are free

http://www.icantalkclinic.com/uploads/2/4/1/0/24107263/140121_prompting_strategies_resource.pdf

Environmental Communication Teaching

www.lindaburkhart.com

Offers a multitude of free handouts on intervention in AAC with students with complex communication needs, cortical vision impairment, Rett syndrome, PODD communication books, and more, as well as how-to handouts for building switches and mounts

<https://www.mycoughdrop.com>

CoughDrop app website

<http://www.novita.org.au/Content.aspx?p=683>

PODD information and workshops

www.paulakluth.com/articles

Ideas for adapting books, including students in general ed classrooms, and literacy

www.pdictionary.com/

Internet picture dictionary provides symbols with English and Spanish words for use in adapted books or communication displays

www.prentrom.com

Look for AAC Language Lab for step-by-step intervention targets, IEP objectives, and plans. This is also the source for the Pixon Project Kit by G. Van Tatenhove

www.storyplace.org

Charlotte & Mecklenburg County public library has preschool stories with text, dialogue is highlighted, accompanying games

<http://www.usu.edu/teachall/text/reading/Frylist.pdf>

Fry's instant sight word list - all 300

www.vantatenhove.com

Gail has many handouts here on using core vocabulary, descriptive teaching, teaching Unity/Minspeak, and samples of the Pixon boards

AUGMENTATIVE-ALTERNATIVE COMMUNICATION: AN INTRODUCTION

2.5 CE Hours / .25 CEUs

FINAL EXAM

1. ASHA's definition of AAC: _____.
 - a. Does not include facial expressions; gestures; an alphabet, words or picture board; a computer; and other similar systems
 - b. Refers to select methods that make communication easier or possible
 - c. Refers to communication approaches that augment speech or serve as an alternative
 - d. All of the above

2. Symbols are said to be _____ when what they represent is obvious to any communication partner either immediately or with an initial explanation.
 - a. Opaque
 - b. Transparent
 - c. Abstract
 - d. Lexical

3. The myth: "AAC is only for individuals who are completely nonverbal." A rebuttal: _____.
 - a. If speech is not functional to meet all of the individual's communication needs, AAC should be considered.
 - b. An individual whose family and care staff can understand him does not need access to AAC.
 - c. An individual who perseverates on a given utterance is able to gain his partner's attention.
 - d. Students who have some speech skills should focus only on building their verbal skills.

4. The myth: "Use of AAC will stifle the child's potential verbal skills and/or serve as a 'crutch' upon which the child will become reliant." A rebuttal: _____.
 - a. Without an appropriate way to communicate genuine messages, individuals work harder to learn to speak.
 - b. A review of research undertaken in 2003 showed that, as a result of AAC intervention, 11% of children showed no change and 89% demonstrated gains in speech.
 - c. Evidence suggests that access to AAC has no impact on speech development.
 - d. Use of AAC adds to the physical and social/emotional demands of speech.

5. The myth: "Children need to have a set of prerequisite skills in order to qualify for or benefit from AAC." A rebuttal: _____.

- a. There is a hierarchy of AAC systems that each individual needs to move through.
- b. This outlook increases the type of supports provided and the extent to which language may be developed.
- c. Research shows that very young children can learn to use signs and symbols before they learn to talk.
- d. Stability of vocabulary is detrimental: finding the words in the same location every time they use the system increases the cognitive load of creating a message.

6. The myth: "Individuals with severe disabilities - particularly intellectual disabilities - are too cognitively impaired to use AAC." A rebuttal: _____.

- a. Research and observation consistently indicate that there is benefit to denying access to AAC to individuals with significant disabilities.
- b. A specific level of cognition or skills needs to be reached before language develops.
- c. The relationship between cognition and language is linear: one of cause and effect.
- d. We must proceed with the notion of the "least dangerous assumption."

7. The myth: "Providing access to an AAC system will obviate the user's communication difficulties." A rebuttal: _____.

- a. No matter how complete or robust, an AAC system, in and of itself, does not benefit the individual.
- b. The success of the AAC system is solely dependent upon the individual's skills and cognitive abilities.
- c. The low expectations of a communication partner do not impact the AAC user.
- d. Direct, specific, and structured intervention and opportunities need not be provided.

8. ASHA and the Joint Commission for Persons with Disabilities have a "_____" criterion, and consider not whether an individual is eligible for services, but rather where along the continuum they are currently operating as a starting point.

- a. Causal relationship
- b. Diagnostic category
- c. Skills
- d. Zero exclusion

9. Per Beukelman and Mirenda, the "...ultimate goal of an AAC intervention is _____."

- a. To find a technological solution to the communication problem
 - b. To enable the individual to efficiently and effectively engage in a variety of interactions
 - c. To provide a repair strategy
 - d. To promote speech production
10. All AAC users require communication partners who _____.
- a. Provide opportunities for them to communicate
 - b. Move their AAC systems along a no tech to high tech continuum on an on-going basis
 - c. Require them to self-motivate
 - d. All of the above
11. Ultimately, the most effective communication is achieved through _____.
- a. A high tech AAC system
 - b. A voice output communication assistant (VOCA)
 - c. Spontaneous novel utterance generation (SNUG)
 - d. Auditory feedback
12. The gestures and communicative body actions of the nonverbal individual _____.
- a. Should be extinguished or ignored in favor of more appropriate communication
 - b. Are disruptive or destructive
 - c. Are valuable communication tools
 - d. Should be replaced by more formal symbolic communication
13. PODD books begin by establishing a variety of communicative intents through use of _____ that signal intent or purpose.
- a. Pragmatic branch starters
 - b. Core vocabulary words
 - c. Pictures or symbols
 - d. Velcro strips
14. _____ teaches commenting, using the carrier phrase "I see..."
- a. Use of object boards
 - b. A phrase-based book
 - c. A low tech AAC system
 - d. Phase 6 of PECS intervention

15. A _____ holds multiple versions of the same messages, so that they appear fresh each time, preventing the user from sounding stiff and repetitive.
- Sequencer button
 - Randomizer button
 - BIGmack/LITTLEmack
 - Hip Talker
16. Static display devices _____.
- Are not useful for choice making
 - Usually make sense as a primary piece of the AAC system
 - Often have no room for off-topic messages and clarifications
 - Typically provide enough vocabulary to meet many communication needs
17. Color coding in AAC systems _____.
- Should be different in a user's communication book and on his device
 - Provides an additional visual cue to aid the user and facilitator with vocabulary organizing and locating
 - Makes symbols more difficult to locate
 - Should be based solely on the Goossens, Crain and Elder color coding system
18. Language Acquisition through Motor Planning (LAMP) is a therapeutic approach based on _____.
- Dynamic display devices
 - A standard computer or tablet
 - Word Power software
 - Neurological and motor learning principles
19. Issues that accompany the use of iOS technology for AAC include _____.
- The devices' multi-functionality
 - The devices' relatively low cost
 - Ease of access to the devices
 - Bypassing the funding process
20. _____ is a robust dynamic display app that offers preprogrammed choices for a range of users.
- TouchChat, from Saltillo/SilverKite
 - Proloquo2Go, from Assistiveware
 - Talk To Me 100, from SidSpeak
 - Sounding Board, from AbleNet