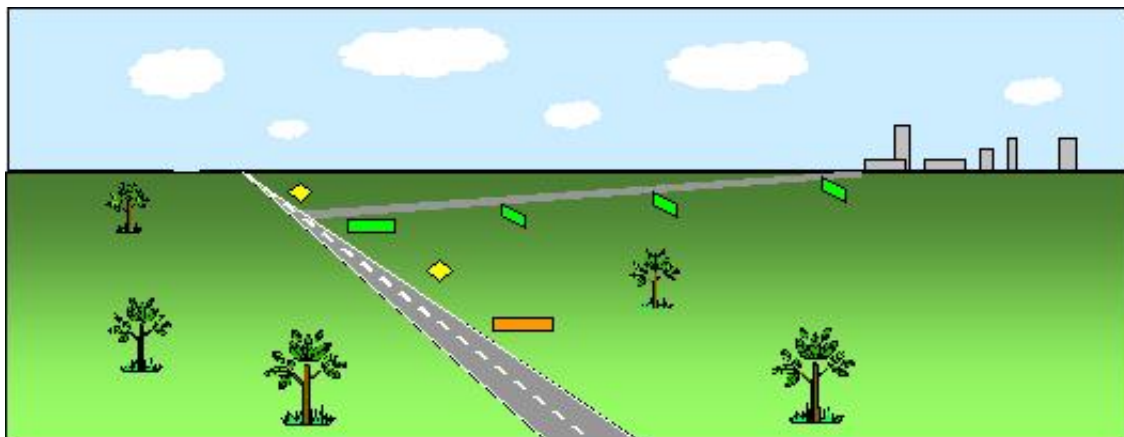


The AAC Road Trip to Fluency

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The goal of AAC intervention is to provide the services, systems, and supports that result in the most effective communication possible for the individual being served. People who rely on AAC are on a journey that is taking them from the village of First Words to their destination, the City of Fluency. Along the way, decisions must be made relative to the course that will avoid the hazards and get them to their destination. Join us now for a virtual road trip to the City of Fluency.



The nature of communication and the process of developing communication competence are complex and multi-faceted. Speech-language-pathologists (SLPs), by virtue of their language expertise, often are the lead professional in the service delivery process. Yet, most SLPs find the challenge of achieving the goal of AAC, the most effective communication possible, to be daunting. The purpose of this paper is to provide some structure to the long term big picture, of which the service delivery decisions of today are a contributing component.

Where are we going? (Start with the End in Mind)

As with any journey, the intended destination is a constant influence on the decisions made along the way. The vision of arriving at the destination is with us always. In our minds we visualize the expected conditions.

For an early communicator, the only appropriate vision for that person is fluency. We are compelled to make the assumption that fluency is attainable until the evidence otherwise is clear and well documented. If we fail on this point, we may well be selling the individual short on the future of life. If we do

assume the potential for fluency, then our service delivery decisions must honor and support that vision. The vision of fluency will sustain us throughout the journey.

The City of Fluency is two states away from our point of departure, yet we can see it in the distance. We know many people who have arrived at the City of Fluency. We know how they got there. We know what it means to them to have arrived. We know how they communicate 1) from our anecdotal observations, 2) from what they tell us, and 3) from the collection and quantitative analysis of their language samples. This knowledge and the vision of the good life that can be enjoyed in the City of Fluency are the fuel for our journey.

State 1: Single Meaning Pictures **The Village of First Words**

The journey begins when a new communicator is introduced to a first set of words. First words may be represented for young children as visual, auditory, or spoken symbols. Typical early AAC symbol sets have been classified as either unaided (such as manual sign language) or aided (such as picture symbols) (Lloyd, Fuller, & Arvidson, 1997). The beginning communicator may get stalled at the start of the journey if delays occur about readiness for AAC symbol representation, type of mode for communication, or type of symbol set. Emphasis on selecting symbols based on teaching or targeting specific communicative functions may also stall the journey to fluency. The most important consideration is about providing access to first words.

Most children progress from beginning communicators to fluent speakers during their first 2 to 3 years of life (Sigafoos, Drasgow, & Schlosser, 2003). Yet, individuals who rely on AAC may spend years on the road to fluency or may never reach that destination. When AAC interventions focus on modes of communication, symbol sets, and communication functions rather than early words, then the fuel to reach fluency is insufficient. The research-base or empirical data on early vocabulary acquisition is well documented. By age two, a toddler has an expressive vocabulary of about 150-300 words (Owen, Metz, & Haas, 2000). These first words allow children to make word combinations that follow a predictable pattern. For example, throw ball, eat cookie, more drink, big doggie. By age three, that vocabulary has grown significantly and consists of articles, adjectives, auxiliary verbs, prepositions, pronouns, and adverbs (Brown, 1973). AAC research on vocabulary selection considerations suggests using the vocabulary frequency lists of children without disabilities as the foundation of first words for AAC intervention (Banajee, Dicarolo, & Stricklin, 2003; Marvin, Beukelman, & Bilyeu, 1994).

Pre-stored Messages

AAC interventions based on increasing participation during daily routines frequently rely on pre-stored messages. These approaches are characterized by identifying messages or scripts that complement a targeted activity or need. The beginning communicator usually

activates a voice output switch or light tech device to produce an utterance appropriate to demonstrate participation in the activity or routine. The routine is flexible enough to ensure any message can be correct and reinforced. In addition, the beginning communicator can be given credit for having achieved an outcome based on a communication function. However, use of pre-stored messages does not provide opportunities for making word combinations. An individual is on a road with no outlet to fluency when pre-stored messages are being used to gage success.



Understanding What Most Effective Communication Is

The field of AAC, while leaving room for much more development, is well beyond the stage of infancy. The earliest work in the area of AAC assistive technology is now nearly four decades old. Today tens of thousands of people use AAC. Many are experiencing reasonably full participation in society. We need only to know these people to form a vision of what is meant by the most effective communication possible, within the constraints of the present state of development of the field of AAC. When we observe their use of their AAC systems, we can understand what makes them so good with their communication. It is this understanding that can contribute to our service delivery decisions for those who are in the process of achieving the most effective communication possible.

Our understanding of the most effective AAC communication is based on a foundation comprised of multiple elements. We make casual observations of individuals, both in isolation and as part of larger groups of people who use AAC. The biennial Pittsburgh Employment Conference for Augmented Communicators, the largest gathering in the world of people who use AAC, is an ideal venue for such observation.

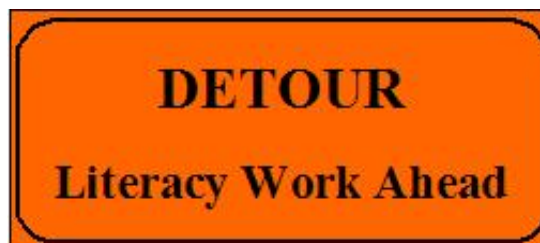
We also talk with people who use AAC and listen to what they say about their production of communication and what is important to them. They consistently report that the two most important values for them are being able to say exactly what they want to say and being able to say it as fast as they can.

Perhaps the most valid and useful component of our understanding of the most effective communication is the quantitative analysis of logged language samples of people who use AAC. For several years now, tools for automatically recording language events have been commonly available and in clinical use. Both natural environment and clinical recordings can be used to generate the AAC Performance Report, a set of seventeen quantitative summary measures of communication performance.

The results of the above three different methods of gathering information on best use of AAC are consistent. A synthesis of the above sources of information provides a strong foundation upon which we can build recommendations for AAC service delivery.

The Detour to Work on Literacy

For many people who use AAC, Literacy may be another destination to visit. However, that destination should not be confused with Fluency. Fluency and Literacy are separate and mostly unrelated, destinations. Literacy can be a useful method for accessing extended or fringe vocabulary, around 15% of what is said, but literacy is generally not useful for accessing core vocabulary, those words that constitute the vast majority of communication. Individuals can be highly literate and not fluent, or highly fluent and not literate, or both literate and fluent.



Words cannot be used as communication symbols because they cannot be accessed in an automatic way. A normally developing three-year old, for example, has a vocabulary of around 1100 words. Using the words themselves to access that vocabulary cannot result in fluency. If fine motor skills allow pointing to a limited number of keys, then some method of navigating or coding is necessary.

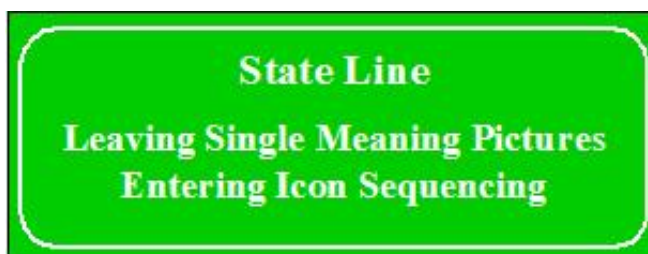
Page navigation can be very slow, regardless of whether the symbol is a word or a picture. Page navigation can never become automatic and being automatic is a requirement of the journey to Fluency.

Looking ahead down the road, the Dead End sign is getting larger and larger. Continuing on the present course will lead to the Wasteland of Silence. It is clear that turning off this road is the only way to get to Fluency. The turn must be made before the number of items in the vocabulary exceeds the number of locations in the AAC system selection area that can be seen at the same time.



State 2: Icon Sequencing

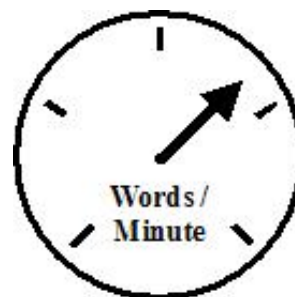
Soon after the turn, we leave the State of Single Meaning Pictures and enter the State of Icon Sequencing. Now we are picking up speed as access to core vocabulary is faster and faster.



Nearly all of what we say, our core vocabulary, can be accessed using icon sequencing. However, we may still use either single meaning pictures or alphabet-based methods (spelling, word prediction, etc.) for fringe vocabulary. We notice that our speed deteriorates when we use these methods and so we are careful to avoid them whenever possible.



The speedometer of AAC is the measurement of communication rate in words per minute. One of the most important things to people who use AAC is speed of communication. AAC evidence-based practice requires periodic performance measurement, including measurement of communication rate. Other summary measures of performance can be valuable in driving the therapy process. The AAC Performance Report, a set of seventeen quantitative summary measures, can be generated from Language Activity Monitoring (LAM) data (Romich & Hill, 1999) using Performance Report Tool (PeRT) software. Additional information on the AAC Performance Report and PeRT can be found at the web site of the AAC Institute (www.aac institute.org).



State 3: Automaticity

One observation that is made of people using AAC most effectively is that the production of much of their communication (core vocabulary) is a motor act. This is as much true of their use of AAC as it is true of the production of speech by a natural speaker. Automaticity could not be achieved in the state of Single Meaning Pictures but is a natural result of Icon Sequencing.



Destination: Fluency

Our first state was Single Meaning Pictures. Then we passed through the State of Icon Sequencing. While there, we learned the skills required to enter the State of Automaticity. Once we enter the State of Automaticity, Fluency is the natural destination. The most effective communication possible, which is the goal of AAC, is based on fluency and leads to the highest possible personal achievement.



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Human Factors and AAC

Human factors refers to issues regarding the interaction between a person and a machine or an object, such as a tool, appliance, vehicle, computer, etc.

When a person uses an AAC system, various human factors issues come into play. Appropriate consideration of these issues is required for achievement of the most effective communication possible. Here are a few such issues.

Ease of use at first encounter may be contrary to most effective long term use (Norman 1980; King 1999). Therefore, following a short evaluation, if one chooses the AAC system that appears easiest, one may also be choosing the system that will be least effective in the long term.

Proficiency in performing a task develops over time. For even able-bodied adults with no cognitive disability, hundreds or thousands of iterations of a task may be necessary to reach the achievable level of skill (Jagacinski and Monk 1985). Therefore, performance following a short trial on a selection method (keyboard, headpointer, etc.) or language representation method may offer little or no indication of what can be achieved.

When arrays of selections change, such as with word prediction lists or pages of single meaning pictures, this constitutes a discontinuous cognitive process (Romich 1994). A discontinuous process prevents the development of automaticity, a basic requirement of fluency. Therefore, core vocabulary may be most effectively accessed using a static (non-dynamic or non-changing) set of symbols. When the size of the vocabulary exceeds the number of selections directly available, then icon sequencing may be required to maintain automaticity.

Selection rate, measured in bits per second, is the rate at which a person can enter information into a system. The upper limit of selection rate is thought to be around 100 bits per second using physical techniques (Lucky 1991). Selection rate directly impacts communication rate.

The time required to make a selection is proportional to the logarithm of the distance to the target and inversely proportional to the logarithm of the size of the target (Fitts 1954). Therefore, the relative locations and sizes of elements to be selected can have a profound impact on communication rate.

Design tradeoffs are inherent in nearly everything (Petroski 2003). Rarely does a product design address all possible interests. When a product is designed to meet the needs of a funding agent or reimbursement policy, for example, then features that can result in more effective communication may need to be omitted.

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The authors recommend the Human Factors and Ergonomics Society (www.hfes.org) as a source of additional information on human factors issues.

ABOUT THE AAC INSTITUTE

The AAC Institute, established in 2000, is a resource for all who are interested in enhancing the communication of people who rely on AAC. Organized as a 501c3 not-for-profit charitable organization, the AAC Institute offers information and provides services worldwide. AAC Institute promotes the goal of AAC, the AAC Rules of Commitment, and evidence-based AAC clinical practice. This mission is accomplished through service delivery, research, information dissemination, and education. The AAC Institute Press publishes peer-reviewed materials to support AAC evidence-based practice and advance the field of AAC clinical service delivery.

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