Augmentative and Alternative Communication Decisions

The Goal: Interactive Communication

Success in life can be directly related to the ability to communicate. Full interpersonal communication substantially enhances an individual's potential for education, employment, and independence. Therefore, it is imperative that the goal of augmentative and alternative communication (ACC) use be **the most effective interactive communication possible.** Anything less represents a compromise of the individual's human potential.

The Importance of Language

The next step is deciding how to achieve this goal. For most people, the most effective approach is SNUG, **spontaneous novel utterance generation** . SNUG allows a person to say anything he or she wants at any time. SNUG is based on access to the individual words, word combinations, and commonly used phrases of our language.

The alternative to SNUG is the use of pre-stored sentences. While there is some utility in pre-stored sentences, e.g., faster communication, pre-stored sentences do limit what can be communicated. If what a person wants to say is not stored, then the person either chooses a stored sentence that is close (and perhaps not that close) to what he or she wants to communicate or decides not to communicate at all.

Six Points Supporting SNUG

1. In *normal language development* , young children begin to speak using individual words and word combinations, not full sentences. As language develops, children apply the rules governing the sequencing of language's basic units (i.e. words, word endings, prefixes, etc.) to express meaning for a specific communication situation. AAC uses these same basic rules of language.
2. The vast majority of the sentences we use in our daily communication are sentences that we have never used before in our lifetimes. Furthermore, those *sentences have never been spoken by anyone in the history of mankind.* This being the case, how could we possibly store in advance the sentences that someone else may wish to speak in the future?
3. Casual observations of the communication of people who rely on AAC can be made at the many events at which they gather, including conferences and meetings. *Pre-stored messages are rarely used in conversations* occurring in the natural environment.
4. Statements by people who rely on AAC clearly indicate that they *do not find pre-stored sentences useful* for most of what they want to say. Ray Peloquin is typical: "95% of the time, I find myself having to create a sentence, and that's what takes time."
5. *Logged language samples* of people who rely on AAC provide the strongest evidence. In various contexts, including clinical and natural conversation settings, logged data suggest

that individuals communicating at the highest levels use pre-stored utterances for less than 2% of communication.

6. In an Australian research project, Sue Balandin and Teresa Iacono asked speech-language pathologists to *predict the topics* that would be useful to employees in a sheltered workshop during breaks. The success rate was dismal, less than 10%. If sentences were pre-stored based on these predicted topics, the sentences would have little relevance to the actual conversations occurring.

To maximize SNUG, choice of vocabulary is critical to success. Vocabulary can be divided into two vocabulary categories, ***core*** and ***extended*** . Core vocabulary consists of those few hundred words that constitute the vast majority of communication. Extended vocabulary consists of the remaining words that are used infrequently. Core vocabulary may have the pragmatic function of allowing the speaker to maintain participation in a conversation and should be accessible automatically for maximum speed. Vocabulary should be consistent with language age. For example, a normally developing three year old has a vocabulary of around 1100 words.

Language Representation in AAC Systems

The next decision is the method or methods that will be used to represent language in the AAC system. There are three basic methods: *single meaning pictures* , *alphabet-based systems* , and *semantic compaction* . With single meaning pictures, each picture means one word. Alphabet-based systems include spelling, word prediction, and letter codes. Semantic compaction (Minspeak) is the only patented system and is based on multi-meaning icons.

It is important to know the attributes of these methods. The following chart can help in this understanding:

SINGLE MEANING PICTURES	***LITERACY***	***LENGTH OF SYMBOL COMBINATION***	***NUMBER OF SYMBOLS REQUIRED***
ALPHABET-BASED SYSTEMS	**Not required**	**Short**	**Large**
SEMANTIC COMPACTION	**Required**	**Long**	**Small**
	Not required	**Short**	**Small**

Single meaning pictures do not require literacy. By their very nature, the symbol sequence length is short, just one picture. However, the symbol set is huge for any significant vocabulary. Back to the normally developing three-year-old, a symbol set of 1100 pictures is needed. An AAC system with, for example, 50 keys would require at least 22 pages of pictures to represent this vocabulary. Furthermore, almost all words of core vocabulary are not easily represented by pictures. Therefore, the meaning behind the picture must be taught. To help remember this meaning, at least for users with literacy, most single meaning picture systems have a word associated with the picture.

Alphabet-based systems do require literacy. The symbol sequences are long. Many letters must be assembled to convey meaning to the communication partner. This is the downfall of spelling.

AAC systems that can predict words after the first several letters can reduce the number of letter selections, but predictions are not always correct. Because of this, research shows that the rate of communication is not significantly increased above spelling the whole word. Also, the word prediction process is said to be distracting and cannot become automatic.

Whole word access (spelled word selection) returns to the same difficulty experienced with single meaning pictures. The symbol set becomes very large.

Semantic compaction does not require literacy. The symbol sequences are short, typically between one and two symbols per word. The symbol set is small, fitting on a single overlay to the AAC device. This avoids the difficulties associated with changing overlays or screens. Like single meaning pictures, however, training is required.

Using multiple methods is the choice of many people who rely on AAC. The most effective communicators are highly consistent on this point. Logged data of their communication indicates that they use semantic compaction for 90-95% of everything they say (core vocabulary) while the remaining 5-10% (extended vocabulary) is split between spelling and word prediction. This evidence indicates that they make little or no use of single meaning pictures, letter coding, or pre-stored sentences. More recent analysis of logged data from people who rely on AAC indicates that communication rate for words selected using semantic compaction is about four times that of those selected using spelling. This may explain why people use semantic compaction for such a high percentage of communication.

Outcomes

The next step is determining desired outcomes. Outcome measures are objective criteria, usually developed during the assessment and recommendation process that can be used to judge the effectiveness of both devices and services. In other words, what will the chosen device and associated services allow the user to communicate in what circumstances? Today, the use of automated monitoring tools on the device facilitates the quantitative analysis of this performance.

Outcomes cannot be developed until the language representation methods have been chosen. Language representation methods determine whether an outcome is achievable. For example, use of word prediction to access extended vocabulary cannot be an achievable outcome on a system that can only use single meaning pictures. Second, current language development and communication competence should be reflected in the identified outcomes. Finally, the outcomes should reflect long-term commitment to the goal of AAC: interactive communication.

The Technology

From the above decisions, a partial set of specifications for the AAC system can be developed. To this set should be added considerations like speed of choosing the symbols of the language representation method (selection rate) and speed of communication. Quantitative measurement of selection rate in bits per second assures that this component is optimized. One must also consider the physical method for selecting the symbols; the output of the selected symbols from the system [e.g., a highlighted picture (or word, phrase, or sentence) or synthesized speech]; how the device will be moved from place to place (e.g., carried or mounted on a wheelchair); and other areas. Features should be divided into required and desirable.

Feature choices based on personal preferences that have little functional application to the chosen language representation methods should be avoided. Features such as automated language activity monitoring (LAM) allow evidence-based practice to occur and should be included whenever possible.

AAC Devices

Consider only AAC devices that meet the requirements determined in the previous steps. First, include those devices that support the chosen language representation method(s). From those, choose the devices that have the required technology features. The final step is to choose the devices that have other desirable traits.

Performance measurement data can be used to support the team's technology solution and provide a starting point for intervention. The use of this information can strengthen the proposal for funding and intervention. The consideration of cost before this final step suggests a compromise in the personal achievement of the individual and is thus inappropriate.

Rehabilitation

Most people who rely on AAC can benefit from the ongoing services of speech-language pathologists and other professionals. Evidence-based practice using observational methods, baseline data collection, language activity monitoring, and automated performance measurement tools yields the most effective results. Today's growth in telerehabilitation services and distance learning are opening up new venues for intervention.

Success!

When people who rely on AAC have the benefit of a methodical and scientific process in the selection and application of an AAC system, they also have the highest potential for personal achievement.

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