Achieving Success in AAC: Assessment and Intervention

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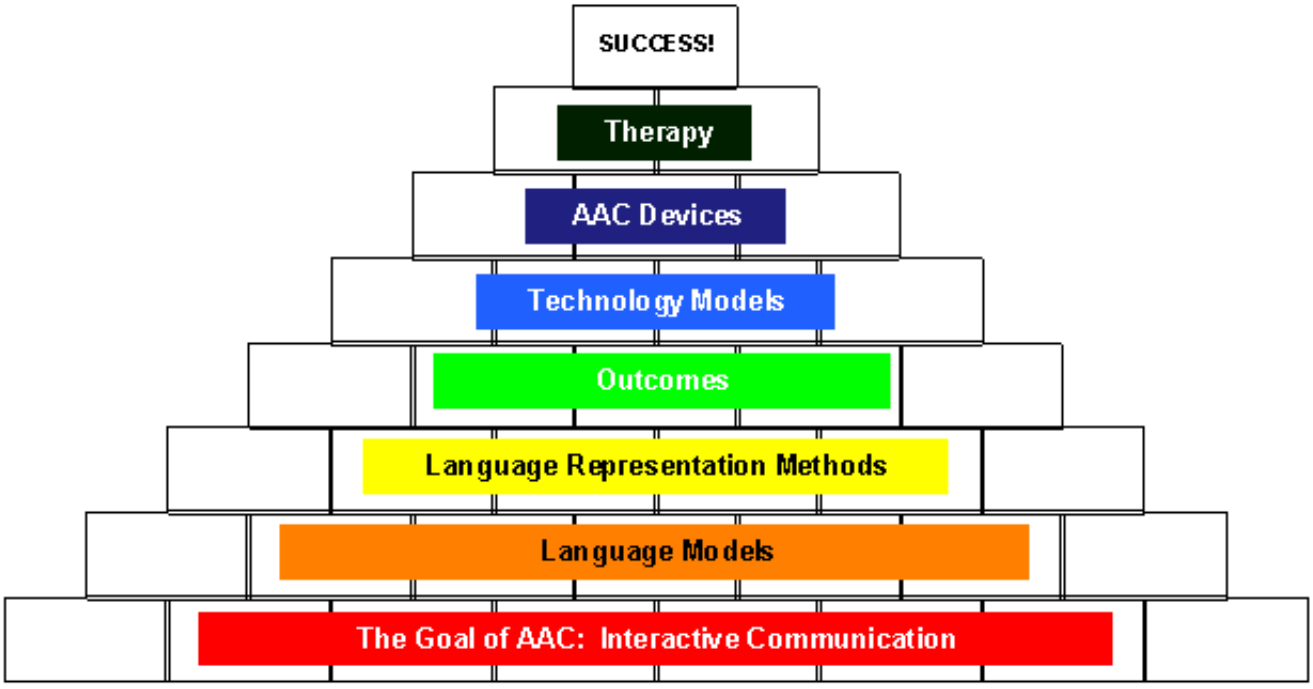


AAC Language-based Model for Assessment and Intervention
Success is the final stage of building on a strong foundation.

For people who rely on AAC (augmentative and alternative communication) and for those who have the responsibility of providing services to them, the process of achievingsuccess can be one of the greatest challenges faced in life. Success may only be reached through the application of a structured and scientific approach to assessment and intervention. The AAC field's focus is moving away from an assessment of devices - who can use what type of AAC device and a concentration on the technology per se - onto the development of effective interventions (Sevcik and Romski, 2000). This paper offers some suggested guidance for pursuing an evidence-based approach to this process. The following model conceptualizes an alternative to a technology and feature-focused assessment and intervention process. The model serves as a metaphor for building success on a strong foundation. Starting at the bottom, each level of the process should be completed and supported with evidence before moving up to the next level. A multi-disciplinary team approach is recommended with each level of decision being led by an

individual with the appropriate professional knowledge and experience. Quantitative performance measurement is essential.

The Goal of AAC: Interactive Communication

The first element of a strong foundation is agreement on the goal of AAC. For people who rely on AAC, success in life can be rather directly a function of the ability to communicate. Full interpersonal communication substantially enhances an individual's potential for education, employment, and independence. Therefore, it is imperative that only the most effective interactive communication is the goal of the AAC intervention process. Anything less represents a compromise of the individual and would not be supported by most professional codes of ethics. For example, Principle of Ethics I from the ASHA Code of Ethics (ASHA, 2001) reads: "Individuals shall honor their responsibility to hold paramount the welfare of persons they serve professionally."

Language Models

Once the goal is established as the foundation, then the next most important step is to determine the method of achieving that goal. For most people the most effective approach is spontaneous novel utterance generation, or SNUG. SNUG is based on access to the individual words, collocations, and commonly used phrases of our language. SNUG allows a person to say anything anytime. The alternative to SNUG is the use of pre-stored sentences. While there may be some utility in pre-stored sentences, strong evidence suggests that SNUG is more appropriate for the great majority of communication. Here are six points supporting the use of SNUG.

1) Knowledge of normal language development confirms that 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, morphemes) (McCormick & Schiefelbusch, 1990). An individual knows a language when he or she understands and follows its basic units and rules (i.e. meaning, use). Knowledge of language requires both linguistic competence (understanding the rules), and linguistic performance (using these rules). The basic rules of language apply to AAC.

2) Knowledge of normal language use is a major point made by Steven Pinker, MIT cognitive scientist and linguist, in The Language Instinct (Pinker, 1994). He credits Chomsky with making the point that 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 prepare in advance the sentences that someone else may wish to speak in the future without violating the rules of language or linguistic performance?

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. Anecdotal evidence confirms this point. 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." (Peloquin, 1999)

5) Logged language samples of people who rely on AAC provide the strongest evidence on this point. In various contexts, including clinical settings as well as the natural environment, 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 therapists 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 (Balandin & Iacono, 1999). If our ability to predict sentences within topics is similar, then the useful sentences could be predicted to be 1% of those available. This is consistent with point 5 above.

The choice of vocabulary to be included in an AAC system is important 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. (Vanderheiden & Kelso, 1987, Beukelman & Mirenda, 1992, Beukelman, Jones & Rowan, 1989) Core vocabulary may have the pragmatic function of allowing the speaker to maintain participation in a conversation (Hill & Dollaghan, 1999) and should be accessible automatically for maximum speed. Vocabulary consistent with language age is important. For example, a normally developing three year old has a vocabulary of around 1100 words.

Language Representation Methods

Three basic methods are used to represent language in AAC systems. They are single meaning pictures, alphabet-based systems, and semantic compaction (Romich, Vanderheiden & Hill, 2000). 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.

Method → / Attribute ↓	SINGLE MEANING PICTURES	ALPHABET-BASED SYSTEMS	SEMANTIC COMPACTION
LITERACY	Not required	Required	Not required
SYMBOL SEQUENCE LENGTH	Short	Long	Short
SYMBOL SET SIZE	Large	Small	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 to represent this small vocabulary. Furthermore, almost all words of core vocabulary are not easily represented by pictures. They certainly are not concrete.

Therefore, the meaning must be taught. Most single meaning picture systems have a word associated with the picture. To get an idea of how difficult these systems are to use, remove the words and ask anyone to communicate using the pictures.

Bliss symbols constitute a special subset of graphics designed to be single meaning. Bliss graphics, however, encourage a certain level of polysemy, but only within a semantic family. For instance, the Blissymbol for "beautiful" can also mean "pretty," "lovely," "gorgeous," etc. Blissymbols, however, can be used for semantic compaction: they can be taken to be totally polysemous and sequenced. Blissymbols have been used in a series of softwares in the semantic compaction manner (see Semantic compaction below).

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. Word prediction can reduce the number of selections, but research shows that the communication rate is not enhanced relative to spelling. Also, the word prediction process is said to be distracting and cannot become automatic. (Koester & Levine, 1994; Koester & Levine, 1994; Venkatagiri, 1994; Treviranus & Norris, 1987) Letter coding requires rote memory since principled approaches encounter conflicts with even small vocabularies. Whole word access (orthographic 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 (Baker, 1986). The symbol set is small, fitting on a single overlay. 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. This choice is consistent with various research projects that have compared the performance of the various language representation methods (Burger, 1997) (Gardner-Bonneau & Schwartz, 1989). More recent analysis of logged data from people who rely on AAC indicates that communication rate for words selected using semantic compaction can be up to six times the rate of words selected using spelling. This may explain why these people use semantic compaction for such a high percentage of communication.

Outcomes

Determining desired outcomes is based on the previous foundational steps of the model. Teams should not develop outcomes before choosing language representation methods, but need to develop outcomes at this point in the process in order to evaluate technology features. Outcomes 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. The selection of performance summary measures should coincide with the development of outcomes. Until recently, AAC practitioners have relied on traditional qualitative data gathering methods to collect evidence and measure outcomes. Today, the use of automated performance monitoring tools facilitates the quantitative analysis of performance data.

For teams in the AAC assessment process, outcomes cannot be developed until the language representation methods have been chosen. First, the 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 only supporting single meaning pictures. For the outcome mentioned above, use of performance monitoring tools would indicate the frequency of use for word prediction along with the vocabulary accessed using this method. Second, consideration of language development and communicative competence should be reflected in the identified outcomes. Again, observational methods and performance summary measures can be gathered that reflect a language approach to the assessment and intervention processes. Finally, the outcomes identified by a team working with an individual relying on AAC should reflect their long-term commitment to the goal of AAC.

Technology Models

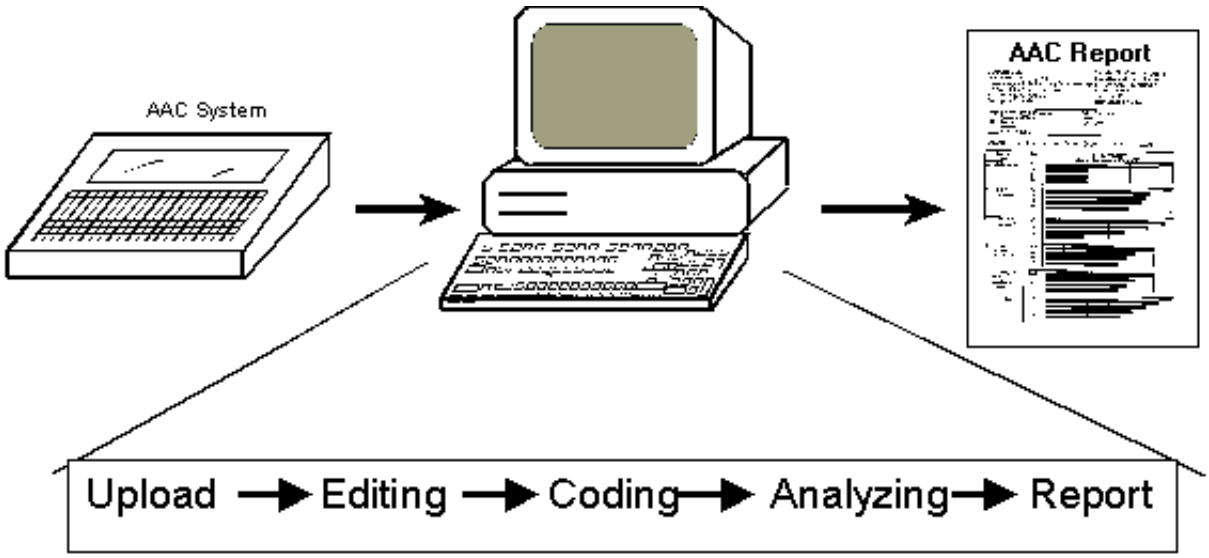
A set of specifications for the features of the AAC system will guide the selection process. Many technology considerations can be made. These decisions should be weighed against how technology considerations influence the chosen language representation methods, selection rate, and communication rate. Typically, these considerations can be divided into two categories: required features and desirable features. Decisions must be made relative to physical access, output modes, mounting, and other areas. Quantitative measurement of selection rate in bits per second (Romich, et.al, 2001) assures that this component of communication rate is optimized. The traditional feature match process is applied at this level as long as teams make recommendations that have a positive impact on effective communication. Approaches that avoid feature choices based on personal preferences that have little functional application to the chosen language representation methods should be encouraged. New features such as automated language activity monitoring (LAM) allow evidence-based practice to occur and should be included whenever possible. (Hill & Romich, 2000)

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 that maximize selection rate and communication rate. 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.

Therapy

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. This includes logging of communication and the editing, coding, analysis, and reporting of summary measures based on language sampling in controlled contexts and natural environments over time. In addition to regular therapy, this information can provide a scientific process for characterizing performance or communicative competence and a valuable record of progress. Today's growth in telerehabilitation services and distance learning is opening up new venues for intervention. For example, the AAC Institute web site www.aacinstitute.org includes a language sample library. (Contributions are welcome.) A service of the Institute is the analysis of LAM language samples.



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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