I. Vocabulary Selection:

The selection of functional and motivational vocabulary is critical for effective use of an augmentative communication device. Natural speech is automatic, allowing most speakers to enter communication situations without much prior thought to the words, phrases, and stories they will use. Individuals with severe communication disabilities are not able to create and produce messages as easily, and therefore rely greatly on the vocabulary provided by others.

Vocabulary selection is an ongoing process. Initial development and subsequent support of vocabulary sets will require continuous assessment of daily communication needs and abilities. As the AAC user’s communication needs and skills change, appropriate alterations to vocabulary sets must be made. Vocabulary selection is truly a dynamic process, always changing and never complete.

Selection of appropriate vocabulary requires a comprehensive assessment of the AAC user with respect to age; gender; personal interests; where and with whom he/she will be communicating; and developmental skill levels with regard to his/her cognition, language, and literacy. This information should be gathered from all members of the AAC team, including the AAC user and his/her family, friends, and professional support staff. As much as possible, the AAC user should lead the decision-making process with support and guidance from the AAC team.

A. Profile of the AAC User

Developing a profile of the AAC user requires consideration of **age, gender, and personal interests**. Beukelman and Mirenda suggest that when AAC users and AAC facilitators represent different ages, genders, and/or social cohorts, message selection becomes complicated (1998). Certainly children use different messages than adults, and older adults speak differently than young adults, especially with respect to small talk phrases and topic choices. Men and women tend to talk about different topics, and talk differently about common topics. Furthermore, individual life experiences, family histories, and cultural backgrounds leave people with different personal interests and stories to tell.

Interest is a key factor to consider when selecting vocabulary. If vocabulary does not provide for communication on topics of interest, AAC users may have little motivation to communicate. When developing vocabulary sets, it is important to continually ask the questions:

“Is this something the AAC user would want and need to talk about?”
“Are these the words they would likely use?”
B. Communication Environments and Partners

Considering where and with whom the AAC system will be used is critical to the development of functional vocabulary sets. Ask the question “what vocabulary is needed at school, work, home, the grocery store, restaurants, the hair salon, hospitals, nursing centers, therapy sessions, church, clubs, basketball games, etc.?”. In addition, the AAC user’s social role in these various environments must be assessed. The way children interact with other children is very different from the way children interact with adults. The same is true of adult to adult, and adult to child relationships. Furthermore, the way we communicate with those we are most familiar with is quite different than the way we talk with acquaintances and those new to our lives.

The comfort level of the communication partners in the various environments must also be considered, and proper planning must be completed to enable the AAC user to introduce their communication system in a meaningful manner to their communication partners. Providing vocabulary for the AAC user to convey messages like “this is what I use to talk” and “please wait, I have something to tell you” will assist both the AAC user and their communication partners.

Finally, care should be taken to select vocabulary for topics that are of interest to the communication partners, as well as the AAC user. If the communication partners are not interested in what the AAC user is able to communicate, the AAC user will be at a great disadvantage.

When developing vocabulary sets it is important to ask the questions:

“Does this vocabulary meet the communication needs in each of the AAC user’s environments?”
“Will the vocabulary enable the AAC user to engage and maintain conversation with communication partners?”

C. Cognition and Language

Cognition and language need to be evaluated before and during the vocabulary selection process. Many individuals with severe communication disabilities have developmentally normal cognitive skills, while others may have significant developmental delays.

Communication disabilities may be expressive and/or receptive, depending on the individual’s cognitive-linguistic and physical skills. Knowing what factors are involved, and understanding how they impact an individual’s ability to communicate, are critical to providing appropriate augmentative and alternative communication (Lloyd, Fuller, & Avidson, 1997). Depending on the extent of delay, individuals may have limitations in the number and type of vocabulary words they are able to comprehend and express. They may also exhibit difficulty sequencing words into longer utterances.
Glennon and DeCoste (1997) describe criteria for considering picture-based symbolic skill levels commonly used with AAC devices, these include:

1. The expressive use of pictures: Does the individual understand that touching or looking at a symbol is communicative?
2. The receptive understanding of picture symbols: Is the individual able to discriminate between picture symbols?
3. The understanding of picture symbol sequencing: Can the individual combine two or three pictures to communicate a message?
4. The understanding of categorization and associations used with picture symbols: Does the individual understand semantic, syntactic, and functional vocabulary categories as they relate to picture symbols?
5. The use of complex picture symbol sequencing: Can the individual use categorization and association concepts to encode language using a picture-based system?

With consideration of these levels of function one must decide:

“Is combining single words to create full messages appropriate?” and “Would the AAC user communicate more effectively with full phrases or sentences programmed for a single selection?”

It is quite likely the answer to both questions will be “YES.”

**D. Literacy**

AAC communicators can be considered in three general groups: 1) those who are preliterate, such as young children who have not yet learned to read and write; 2) those who are nonliterate, such as individuals who are not able to read or write, and people who have lost these abilities because of their impairments; and 3) those who are literate (Beukelman and Mirenda, 1998).

**Preliterate** individuals include young children and older individuals who have not yet had the opportunity to learn to read, write, and spell. Preliterate individuals need two types of vocabulary, **coverage vocabulary** and **developmental vocabulary**.

**Coverage vocabulary** includes a limited number of recognizable messages that enable an individual to cover a wide range of topics. Coverage vocabulary becomes more specific when it is divided into topics and put on different pages. For example, an AAC user may have pages specific to eating at a favorite restaurant, completing morning activities, or playing a board game.

**Developmental vocabulary** includes vocabulary that individuals are learning, but are not yet able to recognize or read. Developmental vocabularies encourage communication skills by adding words such as adjectives and adverbs to modify nouns and verbs, so that two or more words can be combined (Lloyd, Fuller, Avidson, 1997). Including words like “big” and “fast” to a vocabulary that already includes “boat” and “goes” will
allow the AAC user to say “big boat” and “goes fast,” and can be strung together to create “big boat goes fast.” Adding “cocker spaniel” and “dachshund” to a vocabulary that contains the word “dog” facilitates the richness of language, and may encourage cognitive development. Adding prepositions and conjunctions should encourage the expression of relationships (Lloyd, Fuller, & Avidson, 1997).

**Nonliterate** individuals have had the time and opportunity to learn to read, write, and spell but have not succeeded. Nonliterate individuals may be able to recognize words that they have memorized, but they are not actually reading. The development of reading, writing, and spelling skills are typically not the main considerations in the selection of vocabulary for nonliterate individuals; however, the possibility that these skills may develop should not be dismissed. Vocabulary selection should focus on ensuring functional communication before selecting items with potential to assist in literacy learning. The development of a symbol system likely to maximize efficient communication should be the first priority.

**Literate** individuals can read, write, and spell, so considerations for vocabulary selection are often quite different than they are for preliterate and nonliterate AAC users. Literate AAC users are able to use letters to create novel messages, so they are not restricted by vocabulary that has been selected for them. However, this does not diminish the importance of vocabulary selection if we consider the potential fatigue and time consumption of spelling each word out. Beukelman and Mirenda offer this example with respect to the usefulness of having some messages retrievable in full sentences, “Yeah, we won the game” is functional and effective if delivered at the end of the game. It has much less value if it comes 5 minutes after the game is over. All AAC users require some messages that can be retrieved and produced quickly (1998).

Consideration of the AAC user's literacy skills and anticipated development should lead to the questions:

“Is the selected vocabulary functional given his/her literacy skills?”

“Is the vocabulary likely to promote literacy learning?”

As the literacy skills of the AAC user emerge, so must vocabulary with the potential to assist in learning to read, write, and spell.

### E. Core and Fringe Vocabulary

Functional AAC systems should enable the AAC user to initiate communication, respond, make requests, actively participate, and end or change conversation as desired. Fried-Oken and More state that, “The initial word list will influence children’s knowledge about the social uses of expressive communication” (1992). Therefore, a vocabulary of requests only (e.g., I want to eat; I need to go to the bathroom; etc.) should be avoided, given the potential for the AAC user to then interpret the AAC system as a request-only device (Romski and Sevcik, 1988). A combination of “core” and “fringe” vocabulary items, as defined below, should be selected to meet these communication needs.
Core vocabulary refers to the words and phrases commonly and frequently used by a variety of people (Beukelman and Mirenda, 1998), and typically begin with items related to basic functional needs, brief social exchanges, and other information necessary across environments (Glennon and DeCoste, 1997). Examples of core vocabulary for a child in elementary school would most likely include the following: bathroom, go, eat, drink, mother, father, teacher, yes, no, stop, and home.

Fringe vocabulary refers to the words that meet the individual’s specific communication needs and interests. Fringe vocabulary are content-rich, topic-related, and unique to particular individuals, activities, and environments. Fringe vocabulary items must be recommended by the AAC users themselves or by informants who know them and their communication situations well (Beukelman and Mirenda, 1998). One study, mentioned by Beukelman and Mirenda, examined the role of informants in vocabulary selection. The study reported that each of the three types of informants, parents, speech-language pathologists, and teachers, all contributed an important number of fringe words to the composite vocabularies for the child participants (1998). This offers further support for the need to have a sufficient number of informants to develop composite vocabularies. Examples of fringe vocabulary may include the names of specific people, locations, and activities, as well as preferred expressions.

F. Vocabulary Selection Methods

Several vocabulary selection methods have been introduced and reviewed in the AAC professional literature. There appears to be a consensus among most AAC interventionists that using a combination of these vocabulary selection methods is likely to result in more comprehensive and functional vocabulary sets, which will consist of both “core” and “fringe” vocabulary items. The following provides an overview of these approaches, along with a few descriptions of some applicable DynaVox System Software features.

- **Categorical Inventory** (Carlson, 1981): Categories are provided for AAC users and their significant others to supply vocabulary appropriately associated with people, places, feelings, foods, etc.

  **DynaVox System Software (DSS) Applications**: The dictionary pages may be helpful in providing a starting point with general lists of items.

- **Ecological/Environmental Inventories** (Carlson, 1981): Direct observation of AAC users participating in their various environments followed by documentation of communication needs.

- **Blank Page**: Informants write down all words that might be useful to the AAC user. No guidelines or limitations are provided.
• **Communication Diaries and Checklists** (Beukelman and Mirenda, 1998): Documentation of all of the AAC user’s communication attempts, successes, and breakdowns.

  **DynaVox System Software (DSS) Applications:** DSS provides usage counts for all vocabulary. These usage counts can provide valuable information for further development of vocabulary by indicating the need to drop, add, move, or modify current vocabulary items based on frequency of use.

• **Scripting** (Glennen and DeCoste, 1997): A script or dialogue is provided for specific situations.

• **Interview Method** (Yorkston, 1989): Informants are requested to provide information on a number of environments, the amount of time in each, names and characteristics of communication partners, types of activities and communication demands required, and types of objects used.

• **Storytelling Method** (Fried-Oken, 1995): Short, long, or expanded versions of stories the AAC user wants to share are developed.

  **DynaVox System Software (DSS) Applications:** DSS provides options for saving and retelling stories using save, file, and command features. Stories can be stored in short, long, and expanded forms to be varied with given situations and listeners. Different voices can be embedded into the stories to add detail and hold the attention of the listener.

• **Vocabulary Search** (DynaVox Systems LLC, 1995): Vocabulary is gathered by electronically searching a 42,000 item dictionary. Informants can specify a search by selecting from a large number of preprogrammed concepts. Vocabulary searches can be defined by concepts, parts of speech, symbols, and frequency-of-use.

  **DynaVox System Software (DSS) Applications:** Three primary reasons to use include: (1) programmer exploration to “see” what’s already in the system, (2) fast page creation through “fill from search” and “make page” DSS features, and (3) to maximize vocabulary access by creating pages/popups, or portions of pages/popups with search buttons.

• **Core Vocabulary Lists** (Beukelman and Mirenda, 1998): Lists of words commonly used by a variety of individuals, developed from research and clinical reports for various ages and specific environments. Three resources to identify core vocabulary sets include:

  1. Word lists based on the vocabulary-use patterns of other successful AAC system users.
  2. Word lists based on the use patterns of the specific individual.
  3. Word lists based on the performance of natural speakers or writers in similar contexts.
II. Vocabulary Organization:

Vocabulary organization refers to the way pictures, words, phrases, and sentences are displayed. According to Blackstone, “the purpose of a communication display is to arrange language in space so individuals can, by selecting from the available options, say what they wish to say as quickly as possible, and can do so with a minimal amount of effort” (1993).

The **physical design factors** that can be manipulated include:

- Number of items
- Size of items
- Placement of items
- Color of items

In addition to these physical factors, the **cognitive-linguistic complexity** of the system must be organized. Three organizational strategies include (Beukelman and Mirenda, 1998):

- Environmental or activity based
- Grammatical category based
- Semantic category based

Both the physical and cognitive-linguistic display design factors are driven by the AAC user’s characteristics with respect to:

- Developmental age
- Visual acuity
- Motor function
- Selection method (direct selection versus scanning)

In designing communication displays, both static and dynamic, it is critical to follow principles of **logic** and **consistency**. It is important to ask the following questions:

“Does the organization of items on the display make logical sense to the user?”

“Is there consistency within the system (i.e., between the pages and popups)?”

“Is there consistency between the AAC system and what the AAC user is already familiar with?”

A. Types of Displays

**Static displays** are made up of communication overlays or pages that do not change. All available vocabulary is presented on a single display. Changing vocabulary sets requires the physical removal and/or changing of overlays, or coding to retrieve messages. **Dynamic displays** change based on the AAC user’s selections. By activating certain areas on the electronic display, the selection set can be changed to a new set of vocabulary items.
B. Systems of Navigation on Dynamic Display Systems

In their most basic form, dynamic display AAC systems require the user to navigate through pages to gather vocabulary for a message. Navigation/branching refers to the method of moving between pages to access vocabulary. Navigational systems may be developed to offer minimum to maximum assistance to the user, depending on his/her ability to independently move between the pages to gather vocabulary.

Burkhart (1994) has discussed three navigational (or branching) strategies:

**Natural/logical branching** is movement within the system that does not require forethought. The user does not need to understand how to move between the pages to retrieve vocabulary. Consider as an example a four button master page with links to vocabulary related to toys, foods, places, and people. When the AAC user selects toys from the four choices, a message will likely follow and the vocabulary set will automatically change to additional items related to the topic “toys.” The AAC user is not required to understand how or why this linking has occurred.

**Simple branching** begins to give the user some conscious control of moving between the pages within the system. Consider the four button master example offered above. If, from the page of vocabulary related to toys, the AAC user selects the “go back” option to return to the master page, this is an example of simple branching. The AAC user is beginning to demonstrate an understanding of how to move within the system to gather vocabulary.

**Navigational branching** gives the AAC user conscious control over movement between the pages to gather vocabulary. The AAC user demonstrates understanding of how to move within the system to gather the necessary vocabulary. Independent use of link buttons to move between pages and popups, and/or to generate vocabulary searches, are examples of navigational branching.

1. **Key DynaVox Terms to Know:**

   **Page:** A collection of buttons that represent words, phrases, sentences, commands, or links to other pages and popups.
   **Popup:** A mini page displayed on top of a full size page, usually containing vocabulary related to a specific topic or activity.
   **Link buttons:** File folder-shaped buttons used to move between pages and popups.
   **Search buttons:** Buttons that show the vocabulary resulting from searches.
   **Master Page / Main Menu:** Pages or portions of pages used for navigating.

2. **Types of Master Page Designs for DynaVox System Software (DSS):**
**Built-in Master Page:** This page uses one to three rows as a master. In this example from the DSS Child User, the rows are repeated on every page so the master links are always available. This allows for easy topic changes and conversational transitions.

**Standard Master Page:** This page is predominantly composed of link buttons. In this example from the DSS Concept Search User, the link buttons perform vocabulary searches to generate vocabulary. These links can be based on specific topics, categories, or environments.
**Navigational Popup**: A popup containing Link buttons is used as the primary navigational tool. In this example from the DSS Teen User, one link to the navigational popup is used on every page, and is usually labeled Main Menu or Master Popup.
**Word Prediction Keyboard Master:** The main page is a word prediction keyboard with Link buttons to additional communication pages. The DSS Speller User offers an example of this type of master page design.

![Word Prediction Keyboard Master](image)

**Core Word Vocabulary Master:** This master page contains core vocabulary with links to extended and unique vocabulary, as well as a word prediction keyboard for novel message production. In this example from the DSS Words to Self Expression-Adult User (WSE-Adult), vocabulary is arranged primarily by parts of speech.

![Core Word Vocabulary Master](image)

Another example of a core word vocabulary master is **Gateway™ to Language and Learning**, developed by Joan Bruno, Ph.D., CCC-SLP. This organizational design provides the user with access to a large single-word vocabulary that he/she can use to converse in “real-time” across a wide range of topics (1997).
3. Vocabulary Searching:

Portions of pages and popups can be programmed to display items generated by **vocabulary searches**. Scroll buttons can be used to allow all the resulting vocabulary to be displayed in the Search buttons on the page.

In this example from the DSS Teen User, a Link button is used to fill the Search buttons on the popup with vocabulary related to “feelings.” The Scroll up and Scroll down Command buttons allow the AAC user to navigate through all the vocabulary without moving from the popup.

![Image of vocabulary search]

C. Communication efficiency

Vocabulary should be organized to promote the most efficient and effective communication. This is particularly crucial when the individual has a large set of messages in his/her system. Beukelman and Mirenda discuss three organizational strategies commonly used to organize symbol sets. These include: environment or activity based, grammatical category based, and semantic category based (1998).

**Environmental or activity based** displays are created for specific environments or activities. This type of arrangement may be appropriate for static or dynamic display systems. Vocabulary displayed is specific to a given environment (e.g., the beach) or a given activity (e.g., taking photographs). The vocabulary contained should be as comprehensive as possible, allowing the AAC user to participate freely and create novel expressions. This type of display system has proven to promote language development and the creation of more complex utterances. Blockberger suggested that, “from a purely developmental perspective, this strategy is most likely to encourage early language use” (1995).

**Grammatical category** displays encourage the AAC user to learn language by mapping the symbols according to spoken word order and/or usage. Vocabulary is organ-
ized according to grammatical function (Brandenburg and Vanderheiden, 1988). One commonly used grammatical category strategy is the Fitzgerald key (or modification thereof) which organizes symbols from left to right into categories such as who, doing, modifiers, what, where, when, and so forth, with frequently used phrases and letters clustered along the top or bottom of the display. This word order is intended to promote left to right, word by word sentence construction. Symbols and grammatical categories are usually color coded to allow easier visual access and aid memory.

**Semantic category** displays group symbols according to semantic categories such as people, locations, and activities (Beukelman and Mirenda, 1998). This method may be most practical for AAC users who understand semantic categories more effectively than the activity/experiential and grammar based displays. It may also be used in combination with the more linguistic based systems to further expand the user’s vocabulary set.

D. **Visual and motor abilities**

The AAC user’s visual and motor functions greatly influence the organization of vocabulary items. Given the importance of each, a good visual and motor evaluation is critical whenever a problem in either of these areas is suspected.

Carlson explains that, “in order to ‘see’ the items on a display an individual needs to be able to both scan and discriminate the components of the display” (1997). This requires the AAC user to be able to hold his/her body and head in a position that allows him/her to look at the display and make movement shifts to scan individual parts of the display.

The comprehensive evaluation results of the user’s visual and motor abilities should be used to design logical and consistent displays that will enable the AAC user to successfully compensate for visual and/or motor disabilities. Careful consideration of color, size, spacing, area of placement, and complexity can promote the AAC user’s ability to see and access the display.

E. **Color, size, spacing, area of placement, and complexity**

The manipulation of color, size, area of placement, and complexity can enable an AAC user to take advantage of limited vision and/or motor function. Carlson suggests that even if an item is visually “fuzzy,” the individual may find meaning in the combination of color, shape, and distance between other items. The individual may not be able to see the display placed directly in front of them, but upright and to the left the symbols can be seen (1997).

Logical and consistent placement and color coding of items will aid memory, further facilitating functional use of items. Carlson states that, “by presenting and using symbols consistently and meaningfully, the individual can learn to use visual information maximally. The
individual may use location memory to find the symbol and trigger the memory of what it is with minimal visual information” (1997).

DynaVox Systems Software provides a framework for many compensatory arrangements, which can be used in a combination of ways to meet individual needs. These include the following:

- **Symbol Size:** Enlarging or reducing the size of a symbol as it is displayed in a button.
- **Button Size:** Enlarging or decreasing the size of a button on a page.
- **Button Border:** Including a border and adjusting the thickness and color are all options.
- **Text:** Including text labels and adjusting the size and type of font are all options.
- **Color of symbols/buttons:** Color coding to aid memory and visual clarity.
- **Placement of symbols/buttons:** Location on a page or within a button.
- **Background and Contrast:** Adjusting background, page, symbol, and button colors to maximize visual discrimination.
- **Page Layout:** Selecting a display layout that will maximize the user’s visual fields and access range.
- **Symbol Customizations:**
  - Line thickness: Adjusting symbol line thickness.
  - Symbol fill: Filling all space within a symbol.
  - Visual detail: Increasing or decreasing the amount of visual detail.

The following examples show adjustments of symbol and button size, button border and text style, and background color:
F. Vocabulary Development

The organization of an AAC system should promote natural vocabulary development. As previously mentioned, vocabulary items will continually need to be added, dropped, or maintained as the AAC user’s needs and abilities change. Providing a flexible foundation from which to build will facilitate natural vocabulary and subsequent communication development. Vocabulary can be readily expanded on dynamic display systems through simple modifications and additions to existing items.

DynaVox System Software supports vocabulary development through the use of several key features. A few examples include:

1. Making a new popup from an existing one.
2. Making a new page from an existing one.
3. Modifying buttons on existing pages.
4. Using the “pour” function to move existing vocabulary to new pages or popups.
5. Adding and concept tagging new vocabulary items.
6. Exploring the concept tree and vocabulary searches.

III. Summary

Selecting and organizing vocabulary is critical to the successful implementation of an AAC system. It is an ongoing process with the challenge of meeting the AAC user’s current communication needs, while preparing for their future needs. Initial vocabulary selection requires considering who the AAC user is, where and with whom he/she will be communicating, and his/her skill levels with respect to cognition, language, and literacy.

Logical and consistent communication displays will encourage efficient and effective use of an AAC system. Organizational strategies should enable the AAC user to successfully make communication selections. Visual and motor abilities need to be fully assessed, and compensatory arrangements designed using color, size, spacing, placement, and complexity features. Furthermore, cognitive-linguistic skills must be continually evaluated, and the results used to ensure that vocabulary sets are organized at the appropriate developmental skill level.
Finally, organization of vocabulary should facilitate natural communication expansion. The AAC system should allow for new items to be added, while others are dropped or maintained, to meet the ever-changing communication needs of the user.

Taking the first steps to understanding the important considerations and beginning the process of vocabulary selection and organization is to be commended. This initiative will provide the AAC user with functional vocabulary and the AAC interventionist with new ideas and a better understanding of how to apply the discussed principles.

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