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ABSTRACT

Three booklets offer guidelines for individuals with communication disorders and their families concerning: (1) alternate and augmentative communication (AAC); (2) manual communication (boards and displays); and (3) electronic communication devices. The first booklet considers the type of individual who can benefit from the use of AAC and what the user needs to be able to do. It offers a questionnaire to help determine whether an individual could benefit from AAC and a glossary of 12 relevant terms. Also provided is a list of seven publications, seven organizations, and four references. The second booklet is a guide to manual communication boards. Guidelines address when a manual system is an appropriate choice and evaluate the user's present skills through a 13-item questionnaire. A second questionnaire assists in evaluating the appropriateness of a specific system for a given user. Additional information (with illustrations) discusses what the display should look like and vocabulary selection. A listing of suppliers of manual communication boards is provided. The third booklet discusses features of electronic communication devices, such as methods of accessing, language usage, speech output, and visual display. (DB)

Alternate and Augmentative Communication: An Overview [and] Manual Communication: Boards and Displays [and] Electronic Communication Devices: A Look at Features. Information Support Packets #4, #5 and #6.

Capilouto, Gilson J.

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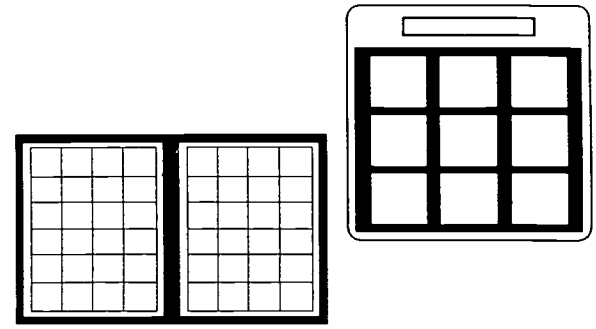
INFORMATION SUPPORT PACKET #4

Alternate and Augmentative Communication



An Overview

Prepared by
Gilson J. Capilouto MS, CCC-SLP

Alternative and Augmentative Communication (AAC) refers to the use of aids or techniques which enable a person to communicate when standard methods, such as speech, are not sufficient. AAC comes in many forms ranging anywhere from a sophisticated electronic device to a simple array of objects. These systems are highly individualized. Factors such as the age of the individual user, the cause of the disability, the course of the disability, and the user's environmental demands are all important considerations in the selection of the system and affect the user's subsequent success with the system.

This resource guide is intended to provide general information regarding AAC and to acquaint the reader with guidelines for determining whether an individual might benefit from such a system. The overview is part of a series of information support packets on Alternative and Augmentative Communication. The reader is encouraged to look over *Information Support Packet 5*, **Manual Communication: Boards and Displays**, and *Information Support Packet 6*, **Electronic Communication Devices: A Look at Features.**

Major rehabilitation centers, local speech and hearing centers, hospitals, and private consultants in speech and language pathology are often equipped to provide evaluations and make recommendations regarding the selection of alternative methods and augmentative devices for individuals. The actual person doing the evaluation and making the recommendations may be a speech-language pathologist, but often such a decision requires the cooperation of a physical therapist, an occupational therapist, a classroom teacher, a vocational counselor, and of course, the potential user and their parents or primary caregiver. Locating available professionals in your area can often be accomplished through accessing centralized information services. In South Carolina, the *Handicapped Services Information System* identifies professionals from a broad range of human services, including speech pathology, audiology, occupational and physical therapies and rehabilitation engineering.

Center for Rehabilitation Technology Services
South Carolina Vocational Rehabilitation Department
1410-C Boston Ave. ■ West Columbia, South Caroina 29170 ■ (803) 822-5362/Voice TDD ■ E-mail rerc-vr@scsn.net
OCTOBER 1996

Who can benefit from the use of AAC?

Persons who can benefit from AAC are as varied as the types of devices available on the market today. There are the obvious candidates, such as the hearing impaired population, and then there are the more subtle candidates, such as the individual who has a temporary tracheotomy. In both cases, it is important to consider the cause and the course of the disability prior to selecting an AAC system.

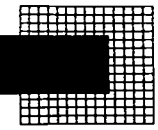
For instance, when developing a communication system for a person with a congenital condition such as mental retardation, cerebral palsy, hearing loss, deaf/blindness, autism, or apraxia, one should consider the influence that appropriate therapy and management will have on the individual's ability to acquire new skills. Consequently, the user's reliance on a system may vary. Also included here would be persons with temporary conditions such as intubation or nonchronic Guillian-Barré, who may need AAC during a critical period, but with whom fully functional speech may be re-established.

Persons diagnosed with a progressive neurological disease such as amyotrophic lateral sclerosis, muscular dystrophy, multiple sclerosis, or Parkinson's disease, present different challenges. Their conditions will result in a decrease in abilities and skills and, consequently, they will become more reliant on an AAC system. In the case of acquired disabilities such as closed head injury, cerebral vascular accident, or spinal cord injury, there are often specific deficits which must be considered for the implementation of the communication system (*refer to ISP packets 5 and 6 in this series for more information regarding specific deficits*).

Individuals may sometimes be steered away from investigating the potential to use augmentative communication systems because they are under the impression that the use of AAC will prevent or impede the development of speech abilities. Research studies have shown that the use of alternative and augmentative communication actually facilitates speech production skills. Users tend to be more motivated to develop and use whatever speech abilities they have. This is not an either/or decision. AAC users should be encouraged and taught to employ any and all strategies available to them for delivering a message.

What does the user need to be able to do?

We described an extremely diverse population which might potentially benefit from AAC. Because intervention is so individualized, it is not possible to have general "candidacy" requirements that can be applied to all individuals with a particular disability. As more scientific research is published in this area, and as technology becomes more sophisticated, it appears that skills once considered prerequisites for intervention are no longer essential. Furthermore, experience with potential users indicates that trial and error approaches may be more productive than adherence to rigid prerequisites. The question may not be "Is the person ready to be a user?", but rather, "What will be the goals of intervention and the function of AAC?". The following questions are important ones to ask prior to initiating intervention. By making a clear determination of the individual's needs, the ultimate success of any system, however simple or complicated, will be more likely.



Questions to ask

The following questions should be beneficial in determining whether an individual could benefit from the implementation of an AAC system. A "yes" answer to any one of these questions would indicate the need for assessment.

1. Is there a growing discrepancy between the individual's level of comprehension and their ability to speak and/or write? ❑ **Yes** ❑ **No**
2. Would the implementation of an alternative or augmentative communication system allow the individual greater participation in an academic setting? ❑ **Yes** ❑ **No**
3. Will the use of AAC increase the individual's employment opportunities or enhance the individual's current vocational placement? ❑ **Yes** ❑ **No**
4. Does the individual need a system which will promote interpersonal relationships and allow for greater social interaction? ❑ **Yes** ❑ **No**
5. Can AAC be used to facilitate the language development and comprehension of an individual? ❑ **Yes** ❑ **No**
6. Would the implementation of a system facilitate the individual's speech development? ❑ **Yes** ❑ **No**
7. Could the use of AAC provide the listener with more information by which messages could be interpreted? ❑ **Yes** ❑ **No**

Glossary of terminology

The American Speech-Language-Hearing Association (ASHA) has stated "there is no nonspeaking person too physically handicapped to be able to utilize some augmentative communication system." While there are significant challenges which must be overcome with individuals who have severe physical limitations, the prospect of being able to successfully work with most people is becoming more promising all the time. Listed below is a glossary of terminology often used in association with discussions about augmentative and alternative communication. These definitions may be helpful in interpreting information about AAC.

SPEECH:

The expression of language with sounds. Speech depends on the precise coordination of respiration (*the act of breathing*), phonation (*the production of sound by the larynx and vocal folds*), resonation (*vibrations controlling the quality of sound*) and articulation (*use of the lips, tongue, teeth, hard/soft palates to form speech sounds*).

LANGUAGE:

The knowledge and use of a set of symbols to represent ideas and intentions. People use language to express the content of their thoughts and ideas.

COMMUNICATION:

The exchange of ideas and information between a sender and a receiver. Communication can be completed without the use of speech or language. Crossed fingers to express "hope", nodding one's head, facial expression and walking away are all examples of communication.

NONSPEAKING:

Persons who, for a variety of reasons, are unable to use speech as a primary means of expressing language.

AIDED SYSTEM:

An augmentative communication system which employs some device or equipment to transmit a message. Examples include a computer, a commercially available electronic communication device or a series of photographs depicting messages.

UNAIDED SYSTEM:

An augmentative communication system which does not employ a device or equipment to send a message (*eye blink, sign language, gestures*).

MANUAL COMMUNICATION DEVICE:

A device which does not involve any electronic parts (*picture boards, object boards, photographic displays*).

ELECTRONIC COMMUNICATION DEVICE:

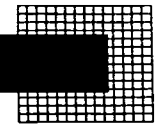
A device which uses electronic and/or computerized parts.

DIRECT SELECTION:

A straight forward method of indicating a message by pointing with a body part or adapted pointer.

ENCODING:

A specific method used to select messages from a display. The individual may use a coded matrix (*colors, numbers, etc.*) to make a selection when they cannot accurately or quickly reach all parts of a larger display. The coded matrix may be placed next to the message units on the display or they may be available on a separate chart. Sometimes they may be memorized by the user.



SCANNING:

A time and method sequenced means of indicating a message unit. The message is indicated by progressing from one unit to another until the desired vocabulary is selected.

DISPLAY LANGUAGE:

The graphic representation of the vocabulary on the display or overlay. Languages include objects, photographs, pictures, Blissymbols, and the printed word.

Publications

The following list of publications is offered as an inexpensive and informative means of staying current in an area of rapid change. These publications provide valuable clinical information as well as reviews of new products on the market.

Augmentative Communication News

Sunset Enterprises
One Surf Way, Suite #215
Monterey, CA 93940

ACS Update

Adaptive Communications
Systems, Inc.
P. O. Box 12440
Pittsburgh, PA 15231

Closing The Gap

P. O. Box 68
Henderson, MN 56044

Communication Outlook

Artificial Language Laboratory
Michigan State University
405 Computer Center
East Lansing, MI 48824-1042

Communicating Together

c/o Easter Seals Communication
Institute
250 Ferrand Drive
Don Mills, Ontario
Canada M3C 3P2

Current Expressions

Editor
Prentke Romich Company
1022 Heyl Road
Wooster, OH 44691

ECHO ON

Editor
Phonic Ear, Inc.
250 Camino Alto
Mill Valley, CA 94941

Organizations

The organizations listed below are devoted to the advancement of alternative and augmentative communication and to the needs of the nonspeaking population. They serve as helpful resources not only for professionals working in this area, but for consumers as well.

United Cerebral Palsy of America

Suite 1112
1522 K Street, NW
Washington, DC 20005
(800) 872-5827

American Speech-Language-Hearing Association

10801 Rockville Pike
Rockville, MD 20852
(301) 897-5700

ISAAC (International Society of Augmentative and Alternative Communication)

P. O. Box 1762
Station R
Toronto, Ontario
Canada M4G 4A3

RESNA (An association for the advancement of rehabilitation and assistive technology)

Suite 700
1101 Connecticut Avenue, NW
Washington, DC 20036
(202) 857-1199

Amyotrophic Lateral Sclerosis (ALS) Foundation

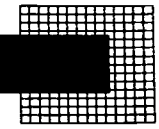
15300 Ventura Boulevard, Suite 315
Sherman Oaks, CA 91403
818-986-1793

USSAAC (United States Society for Augmentative and Alternative Communication)

P. O. Box 12440
Pittsburgh, PA 15231
(800) 274-2288
(412) 264-2288

National Easter Seals Society

2023 West Ogden Avenue
Chicago, IL 60612
312-726-6200



References

American Speech-Language-Hearing Association. (1981). Position statement on nonspeech communication. *ASHA, 23,* (pp. 577-581).

Lloyd, L. and Kangas, K. (1990). Terminology policy and issues update. *Augmentative and Alternative Communication, 6,* (pp. 167-170).

Van Tatenhove, G. (August, 1986). Personal communication.

Vanderheiden, G. and Yoder, D. (1986). Overview. In S. Blackstone (Ed.), *Augmentative communication an introduction* (pp. 1-25). Maryland: American Speech-Language-Hearing Association.

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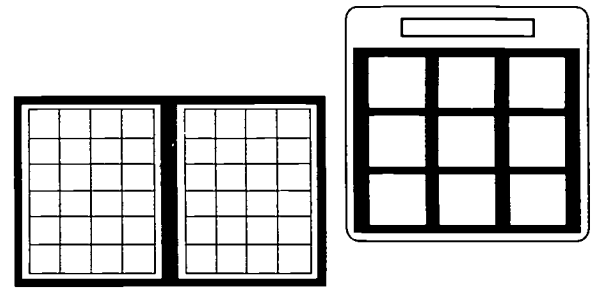
INFORMATION SUPPORT PACKET #5

Manual Communication



Boards and Displays

Prepared by
Gilson J. Capilouto MS, CCC-SLP

Manual communication boards can be an inexpensive and highly functional means by which an individual could communicate if standard methods, such as speech, were not sufficient. The term "manual" refers to the fact that the system does not involve any electronic parts. The user's message could be represented in a variety of ways, limited only by one's imagination. Objects, photographs, abstract symbols, and printed words are a few examples of what is referred to as "display language". Often it is appropriate to use a combination of "languages", as in the case of a user who is beginning to read, or an individual who recognizes only some objects in pictured form, or an individual who is learning to recognize pictorial representations of abstract concepts (*fast, hot, all gone*).

This resource guide is designed to provide the reader with information regarding the population of potential users and the questions which need to be addressed when considering the use of such a system. This is the second in a series of packets on Alternative and Augmentative Communication. The reader is encouraged to review *Information Support Packet 4*, **Alternative and Augmentative Communication: An Overview**, and *Information Support Packet 6*, **Electronic Communication Devices: A Look at Features**, for more information.

Major rehabilitation centers, local speech and hearing centers, hospitals, and private consultants in speech and language pathology are often equipped to provide evaluations and make recommendations regarding the selection of alternative methods and augmentative devices for individuals. The actual person doing the evaluation and making the recommendations may be a speech-language pathologist, but often such a decision requires the cooperation of a physical therapist, an occupational therapist, a classroom teacher, a vocational counselor, and of course, the potential user and their parents or primary caregiver. Locating available professionals in your area can often be accomplished through accessing centralized information services. In South Carolina, the Handicapped Services Information System identifies professionals from a broad range of human services, including speech pathology, audiology, occupational and physical therapies and rehabilitation engineering.

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OCTOBER 1996

When would I choose a manual system?

The primary reasons for selecting manual communication devices over electronic ones are their low cost and flexibility in design. One must consider the possibility that potential users may be more comfortable with nonelectronic solutions, and the user's communication partners may also be inclined toward low technology aids. The decision to use a manual board can be viewed as an introduction to an electronic device, although one must be cautious in this assumption, as potential users may desire and be motivated by the features that only electronic devices can provide, such as voice output and integration with a computer. It is important to ask oneself what an electronic device could offer the user that a manual board would not. Furthermore, users of electronic devices should also be provided with manual communication systems, should electronic ones need repair or be unavailable. Keep in mind the fact that many disabled individuals are best served through the implementation of a variety of systems (*signs, pictures, electronic devices*) as opposed to reliance on any one system.

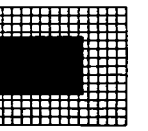
Where do I begin?

Whether choosing an electronic communication device or a non-electronic one, the first question to ask is, "How is the individual communicating now?" Discovering the individual's present modes of communication can provide information regarding with whom the individual tends to communicate, about what they tend to communicate, and how effective they are at utilizing nonsymbolic expressions: vocal, affect, tactual, gestural, physiological, body movement, and visual. It will be important to modify and/or incorporate those present strategies of interaction into the more formal communication system. The nonspeaking person's current strategies and interaction patterns should not be immediately replaced or ignored, as that may have a negative influence on the acceptance and success of a new system. Rather, through modeling and demonstration, the individual's existing methods can be gradually integrated into a new system.

The user's skills will dictate the design of the system. Through careful assessment of an individual's abilities, one can be assured that the system will account for the user's physical limitations, visual abilities, and cognitive skills. Any assessment whose goal is to prescribe an alternative or an augmentative communication system, whether manual or electronic, should seek to match the user's skills and the system's capabilities.

Questions for the User

The following questions should serve as a useful guide in determining a user's specific abilities relative to AAC. While it is not an exhaustive list, it is representative of the types of issues which should be carefully considered prior to the prescription of an augmentative or alternative communication system (AAC).



1. **How is the individual currently positioned?**
   ❑ Wheelchair ❑ Car seat ❑ Scooter ❑ Regular chair ❑ Other: _____

2. **What changes or adaptations could be made to current positioning which might result in improved movement for accessing a communication device?**
   ❑ Stabilizing an arm or foot ❑ Head supports ❑ Trunk supports ❑ Foot rest
   ❑ Other: _____

3. **What is the user's most energy-efficient and reliable means of indicating a response?**
   ❑ Eye gaze ❑ Arm movement ❑ Digit movement ❑ Head movement ❑ Foot movement

4. **What is the range of motion of the physical movement chosen for access?**

5. **How large does the target need to be for the individual to utilize it accurately, reliably, and quickly?**
   ❑ One inch ❑ Two inches ❑ Other: _____

6. **Where is the fastest access area?** ❑ To the right of midline ❑ To the left ❑ In the center

7. **What are the visual skills of the potential user?**
   ❑ Tracking ❑ Gaze shift ❑ Perception ❑ Other: _____

8. **Who will be receiving the user's messages?** ❑ Family ❑ Peers ❑ Caregivers ❑ Coworkers

9. **Where will the listener(s) be located in relation to the user?**
   ❑ Next to the user ❑ In front of the user ❑ Behind the user

10. **Will the user be able to remember the messages and vocabulary displayed?** ❑ Yes ❑ No

11. **What does the "display language" need to be in order to accommodate the user's present cognitive level?**
    ❑ Objects ❑ Pictures ❑ Symbols ❑ Words ❑ Other: _____

12. **Given the user's cognitive skills, what is the best way to organize the display?**
    ❑ Alphabetically ❑ Situationally ❑ Categorically ❑ Other: _____

13. **How many steps can the user recall and execute?** ❑ One ❑ Two ❑ Three
    ❑ More than three

Questions for the System

It is equally important to define what the system or device itself should be capable of, if it is to be truly beneficial to the user. The questions listed below are examples of the type of information needed to make such a determination.

1. **What is the goal of the system?**

   ❑ Increase academic participation ❑ Employment opportunities ❑ Social interaction ❑ All of these

2. **Will the system allow the user to function more independently?** ❑ Yes ❑ No

3. **Can the user change displays independently?** ❑ Yes ❑ No

   If not, are the listeners willing to do that? ❑ Yes ❑ No

4. **How portable does the system need to be?**

   ❑ With the user at all time ❑ Compatible with the user's method of mobility

5. **Is the system attractive to the**

   ❑ User ❑ His/her communications partners

6. **How much will the system cost? How much time will be involved in developing the system? How much training will be required for the user? Other costs?**

7. **How durable does the system need to be?**

8. **Will listeners be able to understand the operation of the system?** ❑ Yes ❑ No

9. **Are the messages easily interpreted?** ❑ Yes ❑ No

10. **Will the system allow the user to**

    ❑ Correct misunderstood messages ❑ Interrupt ❑ Control conversation ❑ Gain attention
    ❑ Other: _____

11. **Can the system be adjusted to accommodate for fatigue?** ❑ Yes ❑ No

12. **How flexible is the system?**

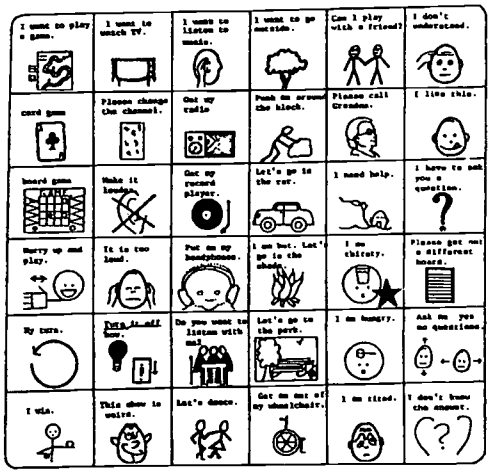
    ❑ Accepts additional vocabulary ❑ Accepts changes in routine
    ❑ Accepts temporary vocabulary ❑ Other: _____

It is obvious that evaluating for AAC is a difficult and often lengthy process with few easy answers or perfect solutions. It is also a process which, more often than not, will require input from a wide variety of professionals.

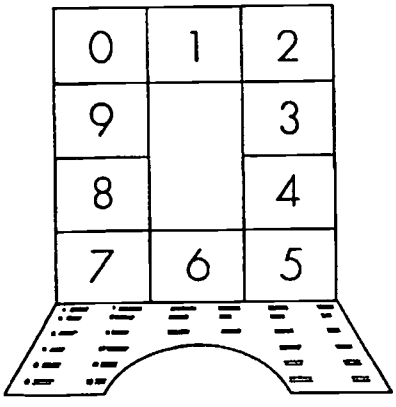
What should the display look like?

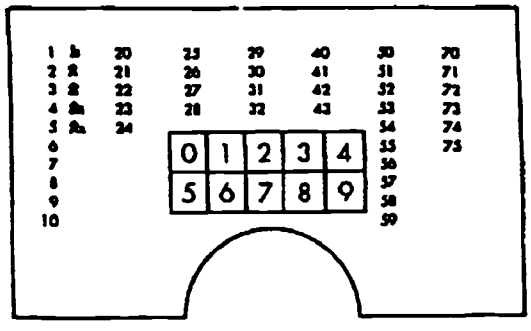
There are no "shoulds" for displays, other than those dictated by the user's skills. For instance, if the user can only use his right hand and he has difficulty crossing the middle of his body, most frequently used vocabulary should be on the right of the display. If the individual needing AAC is visually impaired and cannot recognize pictures, then the display(s) should consist only of objects. If the user's skills dictate a need for large symbols, the use of several displays, strategically located throughout the user's environment, should be considered. If thorough investigation of the user's abilities in all skill areas has been completed, the design of the system will easily follow.

Communication board displays are traditionally organized into one of the following formats:



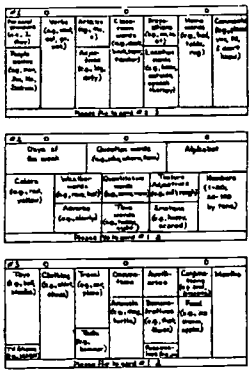
SINGLE SHEET DISPLAY refers to the fact that one display accommodates all of the user's selected vocabulary. In many instances, it is necessary to have several single sheet displays, possibly related to a variety of the user's activities. In this way, communication is incorporated into all of the user's daily activities.



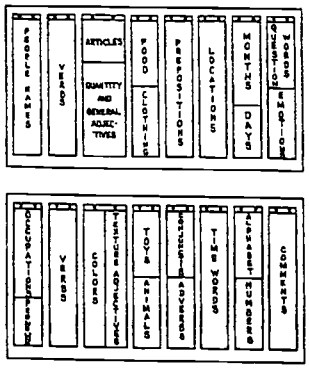


ENCODED DISPLAYS utilize encoding to express a message. Some common forms of encoded displays include number, pattern, or color encoding.

MULTIPLE DISPLAYS refers to a collection of displays organized to meet the user's language and physical needs. Multiple displays come in two forms.



Multiple Simultaneous is a series of displays which expose all linguistic classes, but do not expose all words of the class at the same time.

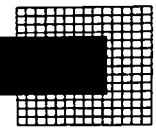


Multiple Sequential is a series of displays that expose selected linguistic classes or groups of words.

How do you select vocabulary?

There are a wide variety of ways to select vocabulary for communication board displays. Listed below are examples of the most common practices.

- ▲ Conduct structured, face-to-face interviews with caregiver (family, speech-language pathologist, teachers). Questions are structured by context and environment, communicative function (How does person get information?), and/or semantic category (places, people, foods).
- ▲ Conduct a structured interview with the individual. Responses, would be dependent on the user's age and abilities.
- ▲ Directly observe the individual in a natural context/role playing activity.
- ▲ Review vocabulary from an available source list(s).
- ▲ Ask caregivers to complete a questionnaire.
- ▲ Observe normal speaking individuals in the same activity.
- ▲ Ask the caregiver to maintain a communication diary.
- ▲ Ask the individual to select symbols they want to use from a book of symbols.
- ▲ Observe what vocabulary adults and peers need to provide models.
- ▲ Develop with a caregiver a script for a particular activity.
- ▲ Ask caregivers to prepare a list of vocabulary needed.
- ▲ Conduct (or train caregiver to conduct) a formal environmental inventory.



Once this initial list is acquired, it is very important to prioritize and balance that vocabulary against other factors including language development, the motivational value of the item, the user's preferences and the caregiver's preferences. It is also critical to determine whether a user already has a functional and interpretable way to indicate a message since ignoring a previously accepted method would be confusing and frustrating.

Suppliers of Manual Communication Boards

Variety Ability Systems, Inc.

3701 Danforth Avenue
Scarborough(Toronto) Ontario
CANADA M1N 2G2
416-698-1415

Buchart-Horn, Inc.

P O Box M-55
55 South Richland Avenue
York, PA 17405
717-843-5561

Crestwood Company

6625 North Sidney Place
Milwaukee, WI 53209
414-352-5678

Don Johnston Developmental Equipment

P O Box 639
1000 N. Rand Road, Bldg 115
Wauconda, IL 60084
800-999-4660
703-526-2682

Imaginart Communication Products

P O Box 1868
25680 Oakwood Street
Idyllwild, CA 92349
714-659-5905

Pitts Corporation

4260 North 650 East
Provo, UT 84604
801-225-6441

Zygo Industries, Inc.

P O Box 1008
Portland, OR 97207
503-684-6006

Attainment Company

504 Commerce Parkway
P.O. Box 930160
Verona, WI 53593
608-845-7880
(800) 327-4269

Baggeboda Press

107 North Pine Street
Little Rock, AR 72205
501-664-8183

Cleo, Inc.

3957 Mayfield Road
Cleveland, OH 44121
800-321-0595
216-382-9700

Communication Skill Builders

P O Box 42050
3830 East Bellevue
Tuscon, AZ 85733
602-323-7500

Easter Seals Communcation Institute

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Don Mills, Ontario
CANADA M3C 3P2
416-421-8377 ext. 2313

Fred Sammons, Inc.

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Brookfield, IL 60513
800-323-7305

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Brownsburg, IN 46112
317-852-4427

Oakland Schools, Communication Enhancement Center

2100 Pontiac Lake Road
Waterford, MI 48024
313-858-1901

Mayer-Johnson Co.

P O Box 1579
Solana Beach, Ca
92075-1579
619-481-2489

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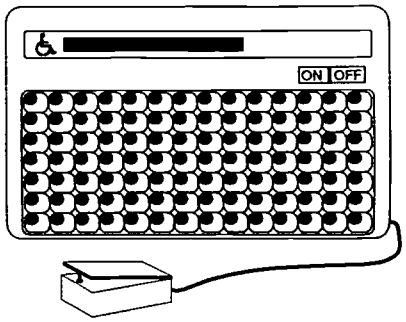
INFORMATION SUPPORT PACKET #6

Electronic Communication Devices



A Look at Features

Prepared by
Gilson J. Capilouto MS, CCC-SLP

The versatility and flexibility afforded by today's electronic communication devices can make them an excellent alternative when standard modes of communication, such as speech, are not sufficient. The use of the term "electronic" refers to the fact that these devices utilize electronic and/or computerized parts. The past few years have seen a tremendous increase in the number of high technology systems available for use by the nonspeaking population.

This resource guide is designed to provide the reader with general information regarding electronic communication devices and to offer a look at the variety of features available for these devices. This is the third in a series of packets on alternative and augmentative communication, and the reader is encouraged to review Information Support Packet 4, ***Alternative and Augmentative Communication: An Overview***, and Information Support Packet 5, ***Manual Communication: Boards and Displays.***

Major rehabilitation centers, local speech and hearing centers, hospitals and private consultants in speech and language pathology are often equipped to provide evaluations and make recommendations regarding the selection of alternative methods and augmentative devices for individuals. The actual person doing the evaluation and making the recommendations may be a speech-language pathologist, but often the decision requires the cooperation of a physical therapist, an occupational therapist, a classroom teacher, a vocational counselor, and of course, the potential user and their parents or primary caregivers. Locating available professionals in your area can be accomplished through accessing centralized information services. In South Carolina, the Handicapped Services Information System identifies professionals from a broad range of human services, including speech pathology, audiology, occupational and physical therapies and rehabilitation engineering.

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South Carolina Vocational Rehabilitation Department
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OCTOBER 1996

When would I choose an electronic communication device?

A few of the reasons one might choose to investigate the use of an electronic communication device include a desirability for voice output, the dual use of the device as a writing aide, and the ability to access computers and other electronic services (*e.g. environmental control systems*). The ability to construct and hold a message and the increased number of communication partners (*nonreaders for example*) are also attractive and appropriate features for particular individuals. Effective utilization of certain electronic communication devices will also afford users the opportunity for printed output, word processing, drawing, playing games and even creating music!

Since we have been witness to a proliferation of electronic communication devices in the last decade, professionals and consumers often make the mistake of believing that electronic devices are necessary and that nonelectronic solutions are not needed. In reality, it is imperative that users who opt for electronic alternatives also have manual systems in place, should other devices need repairs or changes. Also important to consider is the fact that certain situations might preclude the user's ability to access an electronic system.

In an effort to provide the potential user with the greatest possibility for success, it is critical that professionals and caregivers have realistic expectations about electronic communication devices. A common misconception is that the nonspeaking individual will become a speaking person. Unfortunately, this is usually not the case. While the use of such a device will certainly afford the user much greater independence, speech remains the most rapid and efficient way to transmit a message. In addition, consumers are often disappointed when some users continue to rely on their former ways of communicating (*gestures, vocalizations, facial expressions*) instead of using their new device. For many users, their old ways of communicating may be faster and easier. However, once an individual becomes more skilled in using the device, they rely less on previous methods of communicating.

Where do I begin?

As in the case of implementing any augmentative communication system, whether manual or electronic, the starting point is in defining the goals of the system. By making a clear determination of the client's needs, the ultimate success of any system is more likely.

Information Support Packet 4, ***Alternative and Augmentative Communication: An Overview***, provides a series of questions which should be of assistance in determining the goals of a system for a particular individual. Subsequent to those answers, a careful investigation of the potential user's skills should follow.

Information Support Packet 5, ***Manual Communication: Boards and Displays***, provides the reader with an extensive list of questions which would be beneficial in defining the user's skills and the user's needs relative to a potential augmentative communication system.

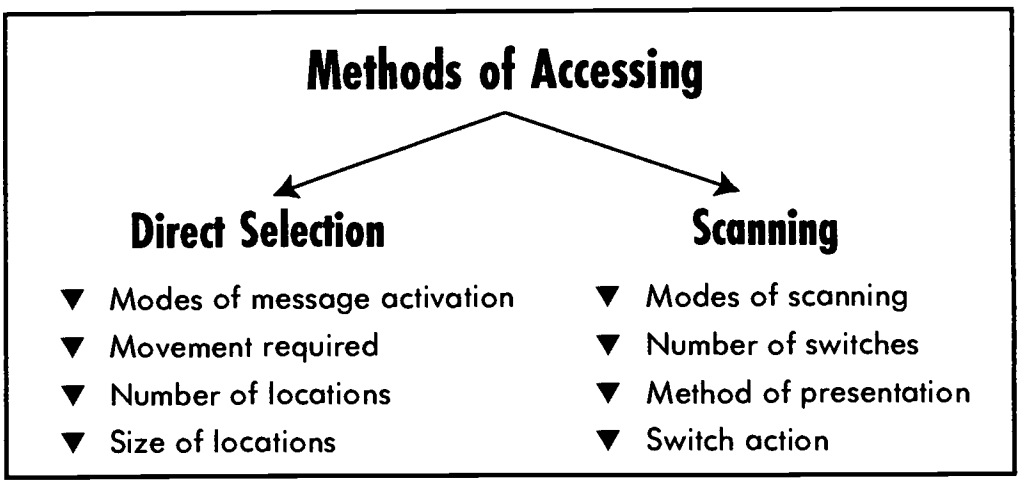
Features of Electronic Communication Devices

As a consumer, potential user or as a professional, it is important to evaluate the variety of features available in today's market of electronic communication devices. By being informed of these features, one is in a more advantageous position to match the user's skills and needs with the appropriate commercial device.

Features of electronic devices will be described under three broad categories: *methods of accessing, language features* and *other considerations.*

Methods of Accessing

The term "accessing" refers to the method(s) by which an individual might control a given system. Accessing could take the form of a collection of devices or a collection of techniques. There are essentially two methods used for accessing electronic communication devices: ***direct selection*** and ***scanning.***



Direct selection is a straightforward method of indicating a message, usually in a single action. There are various *modes of message activation* including keyboards (*as in a typewriter*), headpointers, joysticks, mouse emulators, membrane pads and a host of available switches. These modes are often referred to as *input devices.*

- ❑ Finger or other body part
- ❑ Mouthstick
- ❑ Headstick
- ❑ Light pointing
- ❑ Eye gaze

The most appropriate method for selecting a message is highly individualized for each potential user and an investigation of the user's skills in that area becomes a large part of the evaluation process. The speed and accuracy of message delivery will be highly dependent upon the chosen mode of activation.

It is also important to consider the *amount of movement* required of an individual for any given device. For instance, some electronic communication devices require less than an inch of movement for message activation. Other devices might dictate movement as great as fourteen inches horizontally or vertically. This range of movement may be mandated more by the method of accessing messages than by the actual size of the device being considered.

The *number of locations* or the number of keys on a device, indicates how many messages the device will allow. However, when we look at language features, we will see that some devices provide vocabulary expansion techniques which create the possibility of more than one message in a location. In addition to considering the number of locations available on a device, it is crucial to consider the *size of each location.* For example, some devices utilize spaces as small as three-quarters of an inch square. For many handicapped individuals, this would pose great barriers to accuracy and speed. However, there are varying target sizes available and many devices allow for the combination of several smaller squares into one larger square.

Scanning is the second method of accessing electronic communication devices and takes a variety of forms.

- ❑ Automatic scanning
- ❑ Auditory scanning
- ❑ Directed scanning
- ❑ Element scanning
- ❑ Row-column scanning
- ❑ Step scanning
- ❑ Inverse scanning

Scanning refers to the fact that selections are offered one at a time, either by group or item by item. In most cases, an input device is utilized to control a cursor which generally takes the form of a small light strategically located within each square of the device. Scanning can be achieved automatically (*referred to as automatic scanning*) or may be manually performed by the user. Other features relative to scanning include: *the mode of scanning* (*visual, Morse code, spoken/auditory*), the *number of switches* needed (one, two or four - five in the case of a joystick) and the *switch action* required (*momentary, sustained, momentary step, sustained step*). Devices which accommodate the possibility of scanning also offer adjustable scanning speeds which the user can define. In this way, the user controls how quickly the device offers selections.

Scanning methods available for use within commercially manufactured devices determine how message units will be presented.

Auditory scanning presents possible messages to the user through an audible signal. The user then makes a selection by activating an input device (*switch, mouse, etc.*) or by signalling the listener. This method is often utilized with nonspeaking individuals who also have significant visual handicaps.

Directed scanning allows the user to make a selection via continuous activation of an input device (*e.g., joystick, multiple switch array*), which moves the cursor across the display in any direction.

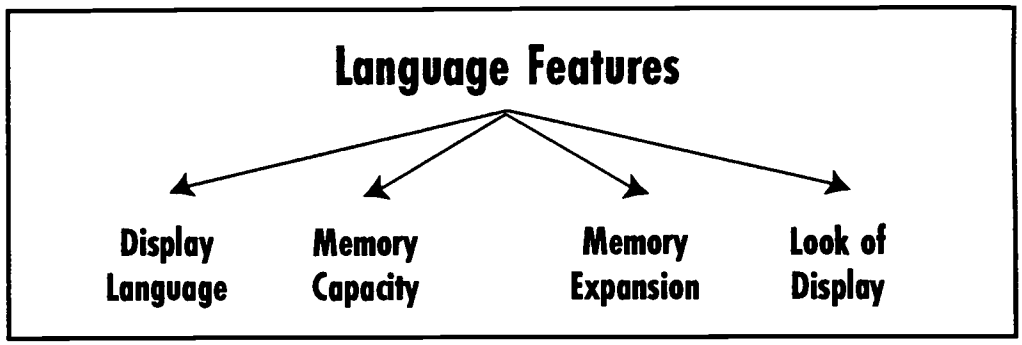
In contrast, ***element scanning*** offers selections one at a time in a sequential manner.

Row-column scanning is the term used to describe a method whereby selections are presented one row at a time. Once the desired row is selected, the items on that row are subsequently presented one at a time.

Similarly, ***step scanning*** involves the advancement of the cursor one step in the scan mode (*element or row-column*) once the input device is activated. When utilizing ***inverse scanning***, the user again moves the cursor in a predetermined scan mode (*element or row-column*) with continuous activation of the input device. However, this time the selection is made when the input device is deactivated or when a second input device is activated.

Language Features

When investigating the language features available for a particular electronic communication device, the potential user, consumer, or professional explores the type of display language(s) offered, the device's memory capabilities, it's options for memory expansion and of course when the display/keyboard provides for the user.



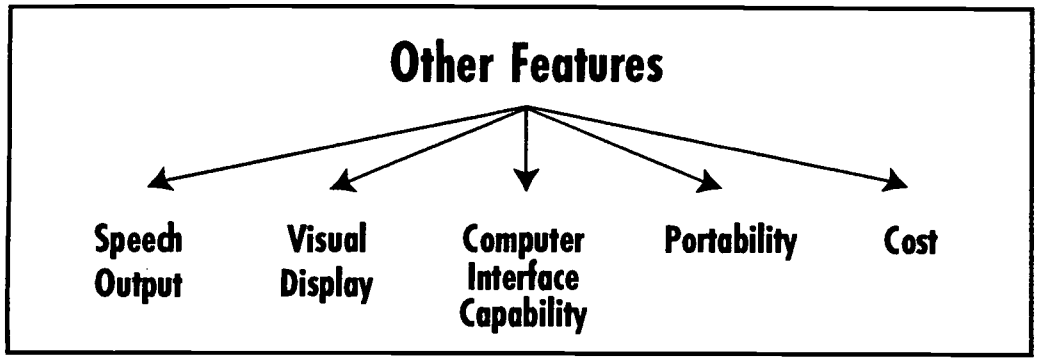
Display language simply refers to how the vocabulary or messages will be displayed. Options include pictures, sight words, the alphabet, spoken choices or some combination of these.

Memory capacity concerns the amount of storage a device can offer. This affects the number and length of the messages available to the user as well as the length of recording time available for digital speech output (*described in other features*). The variability of memory capacity across devices is great and ranges from a low of about sixteen items to a high or over eight hundred. With the additional feature of ***language expansion techniques***, the user may have as many as two thousand words available. Language expansion techniques come in several forms and may be directly accessible to the user or may require assistance from the listener. User accessible forms of language expansion include the use of ***levels*** (*several messages are stored and retrieved from one location*), ***word prediction*** (*the device attempts to "guess" a word or sentence and consequently offers choices*) and/or coded sequences (certain combinations of letters, numbers, pictures or other forms are used to retrieve information that has been stored in the device). Listener assisted options for language expansion include the use of multiple overlays designed for the user's display (*e.g., one for shopping, one for math*) or the exchange of vocabulary using a computer or tape recorder.

The ***communication display*** feature refers to what the user will be viewing. This description also includes information regarding whether vocabulary is "fixed" (*programmed at the factory where the device is constructed*), "user programmable" (*all messages are created by the user or other person*) or some combination. A description of a device display might read "128 blank squares all programmable by the user" or "36 squares of "preselected", fixed language content". In some cases, the manufacturer "preselects" vocabulary they believe to be critical. In other instances, the user may request the material to be preprogrammed or fixed.

Other Features

When researching the most appropriate communication device for an individual, it may also be important to consider the type of speech output available (*digitized* or *synthesized*), the capabilities of the visual character display, the type of printer available, the potential for computer interfacing and the potential for environmental control.



Digitized speech is a form of output which relies on natural, human speech recordings (*as in a tape recording*). As a result, it can take the form of any language or dialect and is not age or sex bound. In contrast, **synthesized speech** is accomplished through an electronic device and because it is artificially produced, has a "robotic" quality. The intelligibility of speech synthesizers is variable as is the quality of digitized speech.

Visual character displays may come in the form of laptop screens, computer monitors or liquid crystal displays (*as on a calculator*). The number of lines or characters which can be displayed at any one time also varies across devices and should be investigated. The **portability** (*weight and size*) of a device is an important consideration and is highly variable across manufacturers.

The cost of a particular device is a primary consideration in selection and cannot be ignored. Electronic communication devices range in price from around $25.00 to over $4,500.00. Many private insurance companies are willing to cover the cost of these devices. It is important that an individual's particular health policy be carefully reviewed prior to the purchase of a device, so that all the necessary requirements are clearly understood and adhered to. One should also be aware that many manufacturers provide rental programs for their devices, as well as rent-to-own options.

When all of the features of electronic communication devices are described in the confines of a single paper, the mammoth task of proper selection seems impossible. This is why the assessment process is so important and why such a decision is preferably made with the involvement of a "team" of professionals. The physical therapist can recommend the best positioning for use of the device, while the occupational therapist is skilled at determining the best method of access. The speech-language pathologist along with an educational specialist can give particular information regarding the language features the user may use successfully. The vocational counselor knows what the demands of the work environment will be and the rehabilitation engineer can design an appropriate way to mount the device on the user's form of mobility and alter the user's work environment to accommodate this additional piece of equipment. This is only one of an infinite number of scenarios, each

changing according to the particular needs of the individual with a handicapping condition. The dramatic increase in technological options for the handicapped has on one hand made life easier, and on the other hand, demanded greater expertise from all the professionals involved in their care.

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Manufacturers of Electronic Communication Devices

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Arroyo and Associates, Inc.
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(517) 787-1600

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(800) 828-4040
(516) 488-6700

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Institute on Applied Technology
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Milwaukee, WI 53209-3259
(414) 352-5678

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Petaluma, CA 94954-7600
(800) 227-0735

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Burlington, VT 05401
(800) 537-1562

Prentke-Romich Company
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Wooster, OH 44691
(330) 262-1984

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Pittsburg, PA 15203
(412) 381-4883

Texas Instruments, Inc.
Accessory Department
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Lubbock, TX 79408
(800) 842-2737

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(716) 454-5134

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Palmdale, CA 93550
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(805) 266-8500

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