Alternative and Augmentative Communication: New Opportunities for Persons with Speech and Language Disabilities

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PREFACE

Due to a variety of causes, an individual may have difficulties to communicate with others. There are challenging situations in which a person cannot receive and understand spoken or written messages, or the person may not be able to use verbal or nonverbal means of communication to express personal needs and feelings. These challenging situations can be caused by cognitive deficits or delays, sensory disabilities (i.e., deaf and hard-of-hearing conditions), physical and multiple impairments (e.g., cerebral palsy, stroke, traumatic brain injury [TBI], spinal cord injury), and/or emotional disturbance/behavior disorders (Baumgart, Johnson, Helmstetter, 1990; Lian, 1998, 2001, 2002; Lian & Stearns, 1998; Lloyd, Fuller, & Arvidson, 1997; Poon-McBrayer & Lian, 2002).

The lack of an effective channel of communication tends to cause limited exchange of ideas, frustration, and underachievement toward personal educational and functional daily living goals. It may greatly reduce a person's potential for enhancing cognitive and academic skills, developing social and emotional competencies, and accomplishing career and individual life plans. For example, verbal or nonverbal communication may serve as a tool for facilitating a child's learning, including receiving and perceiving happenings in the environment, building concepts, helping in thinking and problem-solving processes, and expressing outcomes of intellectual and cognitive efforts as well as personal opinions and preferences. In addition, successful communication of all kinds may lead to higher self-confidence and better quality of a person's life in the integrated, interactive and challenging society that requires intensive and continuous efforts to communicate among its members.

A series of alternative and augmentative communication (AAC) approaches and devices have been developed by therapeutic and assistive technologists along with field practitioners (i.e., teachers, speech and language therapists, occupational and physical therapists, rehabilitation technicians, job coaches, and other care or service providers) to help individuals with disabilities for them to become more efficient in enhancement of communication. Through these approaches and devices, they can more successfully achieve their life goals in education, job career, family and community living, and recreation.

The purpose of this handbook is to provide educational, therapeutic, and rehabilitation practitioners, parents and families, and other service providers with basic

information relating to AAC. In addition to other references, some of the material in this work has been adapted and modified from the book by Poon-McBrayer and Lian (2002). The handbook consists of three major units: (1) general understanding of speech, language, and communication; (2) nonvocal and nonverbal conditions (i.e., various communication disabilities); and (3) approaches and devices used for alternative and augmentative communication. It does not give answers to all challenging situations. Instead, it offers a foundation of practical knowledge-based information, concepts and the "how-to" suggestions.

Users of this handbook are encouraged to collaborate in teamwork to design an individualized AAC plan for each eligible student with specific disabling conditions. In addition, it is recommended that field practitioners and other care or service providers utilize available resources in the school or local community as well as national/international supports (e.g., vendors and government-funded or non-profit organizations' assistive technology disseminating and enhancement projects) to accomplish each AAC plan with long-term goals and short-term objectives.

Besides, we are in an ongoing technology developing stage of special education and rehabilitation programs and services. New AAC devices and techniques are constantly being introduced to potential users. We need to keep up with the pace and always try to receive information regarding the new options which need to be continuously added to this handbook.

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TABLE OF CONTENTS

Unit I

SPEECH, LANGUAGE, AND COMMUNICATION

Introduction

Before we plan any alternative or augmentative communication programs for a person with speech, language, or communication disabilities as a result of cognitive, sensory, physical, learning, and/or emotional/behavior disabilities, we first need to get to know the major definitions, concepts and related issues of speech, language, and communication. For example, let us try to answer the following questions:

1. Can speech be used for communication? The answer is, "yes."
2. Are all languages speech languages? The answer is, "Not necessarily, a language can be written language, sign language, or body language as well."
3. Is there any nonspeech or nonlanguage communication? The answer is, "Yes, for example, by facial expression, gestures, and the use of real objects, photo or hand-drawn pictures, or cartoons and comics."

We start to find that there are a lot of ways to make communication successful, not just simply through traditional ways of listening and talking. Beyond the auditory channel for communication, we can receive and deliver messages by looking at each other (i.e., visual channel); tactile, vestibular, and kinesthetic sensations; and even olfactory and gustatory inputs. These additional options greatly increase the opportunity for communication to be accomplished by persons with nonvocal or nonverbal conditions.

Figure 1.1 on next page displays the relationships between speech, language and communication. *Speech* can be defined as the vocal production of a person. Further descriptions and practical concepts of speech may include the following:

1. Verbal speech can be used for language communication.
2. Nonverbal speech can also be used for communication, for example, making sounds to express emotions like feeling happy (e.g., "Ha! Ha!"), excited (e.g., "Yahoo!"), confused (e.g., "Ah...."), disappointed (e.g., "Oops!"), or surprised (e.g., "Wow!).

1

3.   There may be receptive, expressive, and transactional (two-way) speech.

4.   A person may use verbal or nonverbal speech for non-communication purposes, such as self-stimulatory vocalization or purposeless echoing of another person's speech, which may happen in a person with autism or others.

Communication   Language
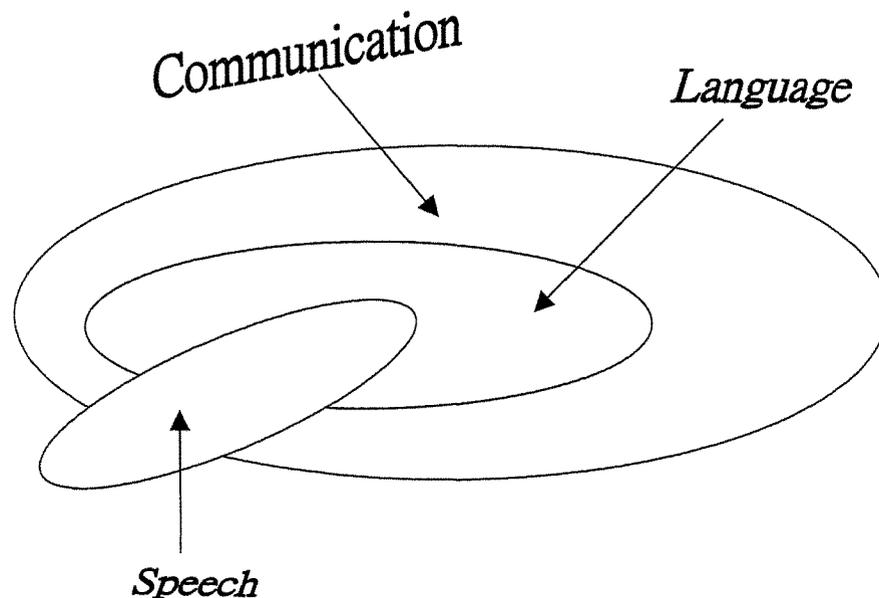
Speech

Figure 1.1 The Relationships Between Speech, Language and Communication

Source: Poon-McBrayer K., & Lian, M-G.J. (2002). *Special Needs Education: Children with Exceptionalities*. Hong Kong: The Chinese University Press, p. 154.

Language is a specifically developed and structured system for the purpose of communication (Chan, 2002). Further description and practical concepts of language may include the following:

1.   Language can be oral or speech language.

2.   Language can also be nonspeech language (so-called "silent language"), such as sign language, or language through symbols like icons, logos [see Figure 1.2 on next page for an example], as well as written alphabets, words, and sentences.

3.   Speech language or nonspeech language can possibly be written down or drawn to become written or printed/illustrated language.

4.   There may be receptive, expressive, and transactional (two-way) spoken language (e.g., face-to-face or phone conversation) or silent language (e.g.,

notes, letters, emails, or essay) (note: silent until someone tries to read out loud).

5. People have inner language; some may not have appropriate body mechanism or skills to express such inner language.

Figure 1.2   Universal Logo of Physical Disability or
Wheelchair-accessible Facilities and Services

Communication involves the transmission of messages from one person to another. Further descriptions and practical situations regarding various ways and efforts of communication may include the following:

1. A person with disabilities may be able to achieve nonverbal communication by eye contact, facial expression, hand movement, body movement, gesture/body position, non-language articulation, nonverbal speech, music/singing, use of objects, and use of pictures or other symbols (see example in Figure 1.3).
2. Communication can be through non-language speech, such as yelling.
3. It can also be through formal language (spoken, sign, or written language).
4. Communication can also be achieved without speech and language, such as gesture, facial expression, hand movement, use of objects or pictures, and body contact (e.g., shaking hands, a big hug).
5. Most people combine multiple receptive and expressive efforts to communicate, such as to listen and to look at the speaker's facial expression, or to speak accompanied with hand movement.

Figure 1.3   Arrangement of Letter and logos to show "I Love My Cat."

In everyday life, people need to communicate with each other. For example, a person may need to acquire information from a friend, express feelings to his/her parents, and learn from teachers and respond to them via verbal and nonverbal manner. Thompson and Beck (1998, p. 3) indicate that:

1. Communication plays a central role in almost every aspect of life;
2. Communication is necessary to fulfill basic needs and to establish and maintain relationships; and
3. All people have the ability to communicate; even people with the most significant physical and cognitive disabilities express wants and needs in some fashion.

Table 1.1 describes a person with multiple disabilities who managed to successfully communicate with others.

Table 1.1   An Individual Example

> . . . a young man who was nonverbal, had very limited physical movement of any kind, had a significant hearing loss, and was assessed as having a profound level of mental retardation. Whenever this person grew tired of an activity he would close his eyes and nod his head downward. When he was hungry or thirsty he would repeatedly groan noise of distress. Putting his head down and closing his eyes was his way of communicating that he was finished with an activity and was ready to do something else. Groaning was his way of telling the world that he wanted some thing to eat or drink.

Source: Thompson, J.R., Beck, A. (1998). Technologies for Communication. In J. R. Thompson, M. E. Wall, & S. M. Winchip (Eds.), *Assistive technology: Competencies and skills for teachers* (Book 3). Normal, IL: University Communications, Illinois State University, p. 3.

General Communication Process

As illustrated in Table 1.2, most types of communication, in general, include three sequential phases, the input phase, the cognitive processing phase, and the output phase:

During the first phase of communication, a person (e.g., a listener or observer) receives a message from another person (e.g., a speaker or signer), while in phase 2, the recipient of the message cognitively processes the message—he/she may refer the message to his/her previous experience—and, then, determines the need and how to respond to the message. Onto the third phase of communication, the message recipient becomes a message giver, by either verbal or nonverbal manner, to the original message giver or to a third person. *Decoding* is the cognitive ability to translate symbols into thoughts. *Encoding* is the cognitive ability to translate thoughts into symbols. A decoding effort is made when going from phase one to phase two, while an encoding effort is required when moving from phase two to phase three. (Poon-McBrayer & Lian, 2002, pp. 154-155)

Table 1.2   The Three Phases of Communication

Phase I	Phase II	Phase III
The *input phase;* → to receive message	The *cognitive processing phase;* to process the received message →	The *output phase;* to send out message
Receptive effort →	Information processing effort →	Expressive effort
Decoding →	Association/memory →	Encoding
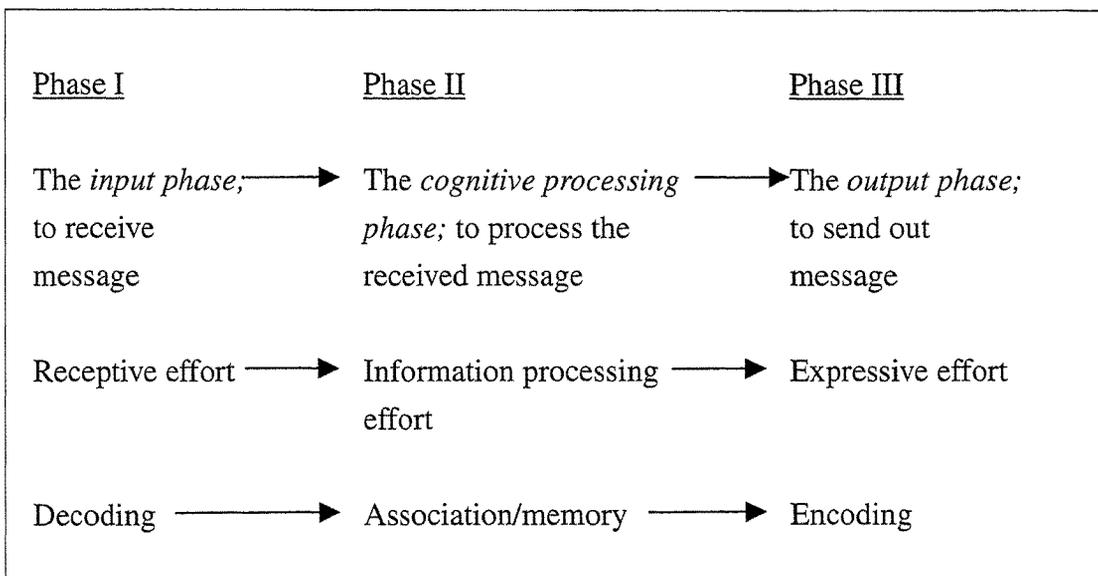
Levels of Communication

In Dr. Jan Van Dijk's language program for children who are deaf-blind, multiply disabled, or severely and profoundly disabled, different levels of communication are identified. Based on the understanding of a child's specific communication level, teachers and speech/language therapists may facilitate and encourage this child's behaviors and competencies to communicate (e.g., McMullen, 1986).

According to Sternberg (1991. 1994), Van Dijk's *preresonance level* is at the beginning stage of a child's predictable behaviors. The child may demonstrate:

1. Random body movement which is not in response to stimulation.
2. Undifferentiated cry.
3. Changes of behavior when stimulated orally, visually, or tactually.
4. Different movements or vocalizations for specific discomfort.
5. Repetitive movements with focus on own body.

The *resonance level* is the beginning of consistency, perceptual response, and communication. The child may:

1. Participate in another's modification of his/her environment, e.g., movement modification.
2. Give indication of recognition of familiar person or object.
3. Recognize and react to familiar activities.
4. Participate in familiar motion after teacher, parent, or other care giver's initiation; physical contact may be necessary.
5. Duplicate another's movement while in physical contact with another.
6. Signal teacher, parent, or other care giver to continue activity.
7. Display purposeful and repetitive behaviors on objects, with focus on what happens to the object.

At the *coactive movement level,* the child begins to establish concepts (beginning of child's conceptual responses). The child may:

1. Briefly remember where object was located after interruption.
2. Comprehend tactile signals for movement.
3. Imitate movement as long as model present.
4. Anticipate next movement in sequence.
5. Explore new object.
6. Use multiple signals to continue activities.
7. Display familiar actions on familiar toys.

At the *differed imitation level,* the child engages in expansion of concepts (e.g., imitating sequential movements). The child may:

1.   Actively search for hidden object.
2.   Combine separate behaviors to reach desired end.
3.   Anticipate event from cues.
4.   Look for object in place where last saw object.
5.   Understand simple gesture commands.
6.   Imitate movements after teacher finishes movement; no cues necessary.
7.   Imitate new behavior while behavior is being modeled.
8.   Anticipate routine event from cues.
9.   Has gesture that are specific to certain situations; no generalization.
10. Duplicate sequence of movements after sequence is modeled.
11. Use gestures for objects as long as object is present.

The *natural gestures level* is the beginning of expressive behaviors. The child may:

1.   Imitate activity sequence.
2.   Understand gestures for objects provided with focus on use; object needs not to be present.
3.   Use gestures for objects or activities across various situations and for generalization.
4.   Use gestures for objects in absence.
5.   Engage goal-directed activities.

The *reversing level* is the beginning of understanding and using symbols. The child may:

1.   Request using symbols.
2.   Use symbols as meaningful only in terms of item's use.

The *expressing level* is the beginning of idea generation and using reference. The child may:

1.   Have idea generation.
2.   Use single sign, gesture, or words.
3.   Start using reference.

At the *expanding level,* the child works on increase of vocabulary, multiple sequential signs, gestures, words, actions, etc. The child displays related behaviors to

demonstrate:

1.   Increase of vocabulary.
2.   Use of multiple sequential signs, gestures, or words; the child may show actions with objects.

At the *generative communication level*, the child applies all communication behaviors and skills to various daily living situations. The child may demonstrate:

1.   Self-initiated new patterns of signs, gestures, words.
2.   Generated new signs, gestures, words, or requests for new signs, gestures, words.

Similar to Van Dijk's levels of communication, Dr. Thomas W. Jones developed his *language development sequence* in his *Manual for Language Development* for the Mid-Atlantic-North and Caribbean Center for Services to Deaf-Blind Children, Florida, U.S.A.:

Level I   The nonresponsive child.

Level II   The child with differentiated crying.

Level III   The child who demonstrates "stimulus-response" behaviors to situational cues.

Level IV   The child who pushes and pulls with situational cues.

Level V   The child who pushes and pulls without situational cues.

Level VI   The child with inner language.

Level VII   The child who points and gestures.

Level VIII   The child who uses signs.

Level IX   The child who uses preacademic language.

Level X   The child who uses academic language but has language problems.

Both Van Dijk's levels of communication and Jones' language/communication development levels and sequence may serve as a guide for teachers and

speech/language therapists to assess a person's entry-level nonverbal and verbal communication performance and develop and implement instructional/therapeutic plans for fulfilling individualized communication needs and goals.

Purposes of Communication

There are specific functions of efforts for communication. Table 1.3 on next page shows examples of potential purposes of communication. Teachers and speech/language therapists may utilize and expand these examples to increase an individual's motivation and potential for broader application of functional communication skills.

Table 1.3   Specific Purposes of Communication

Purpose	Examples
Protests	"Not now, maybe later." "This is not a toy. Please don't touch." "That really ticks me off."
Comments	"You are silly." "That is a pretty outfit."
Requests	"May I have some more?" "Please feed me more slowly."
Social exchanges	"Good morning." "See you later alligator."
Initiation	"Do you have time to talk?" "I have something important to say."
Repair	"That's not what I meant." "I don't understand. Can you explain to me again?"
Information	"My birthday is June 10." "My stomach hurts."
Clarification/questioning	"Who did that?" "Tell me what you think I meant."
Manners	"Thanks for helping me." "Please move my chair for me."
Negatives	"Please don't tell mommy." "I don't want to go."

| Termination | "Well, I better get back to work."
"I'm tired now and need to rest." |
| Fun stuff | Riddles, jokes, wisecracks, slang, etc. |

Source: Handout materials distributed at the Communication Technology Camp, Lake Bloomington,
Illinois, U.S.A., Summer, 1996.

General Prelanguage and Language Skills

In this section, general terms and concepts regarding prelanguage and language skills are defined:

Prelanguage skills may include social attention, eye contact, constancy of perceptual responses, on-task behavior, functional play with toys and functional use of objects and tools, motor imitation, following directions, sound and beginning verbal imitation, anticipation and awareness of routine activities and events, and object permanence (i.e., the awareness of an object's or event's continuous existence even it is not in front of the person at present time).

General language skills include phonological, semantic, syntactic, morphological, and pragmatic skills.

Phonology refers to how a persons organizes sounds, including vowel sounds, consonant sounds, and blending sounds.

Semantics is about meaning of words, written symbols, and manual signs (i.e., vocabulary of sign language).

Syntax is about word order in a sentence (i.e., sentence structure).

Mean length of utterance (MLU) is the average number of words a person is able to appropriately put in a sentence. Table 1.4 shows Roger Brown's central (median, Mdn) level and upper limit of MLU at each of the five stages of early language development.

Table 1.4   Central and Upper Limit of MLU

Stage	Central	Upper Limit
I	1.75	5
II	2.25	7
III	2.7	9
IV	3.50	11
V	4.00	13

Source: Brown, R. (1973). *A first language.* Cambridge, MA: Harvard University Press.

At Stage I, a child's verbal expression tends to be holophrasic or telegraphic. *Holophrasic* expression refers to one-word sentence. For example, the child may say "mama" to mean "I want you to be with me" or "I need some milk." There are three types of holophrasic language responses:

1. imperative - come, look, etc.
2. expressive - expression of sensation, e.g., Oh! En! Ah!
3. denotative - referential, e.g., referring "milk," "bottle."

Telegraphic expression causes omitting of words, e.g., "Me mommy apple" ("Mommy and I are eating apple"). The omitted words may include:

1. functors - e.g., conjunctions.
2. verb and b-verb.
3. auxiliary - e.g., have, do, will.
4. inflections - e.g., "Put box" means "Put the doll in the box."

At Stage I, a child may start to use formal NV (noun + verb) sentence construction, for example, "Daddy come" and "Baby cry."

At Stage II, a child starts to add objects, location, and possessives to the NV sentence structure, for example, "I see dog" (agent + action + object); "Mommy come here"; and "See daddy chair." There may still be grammatical errors, e.g., "come" instead of "comes."

11

At Stage III, a child starts to ask "WH" questions, e.g., "What . . .," "When . . .," "Where . . .," and "How . . .?" The child also starts to use negatives in a sentence, e.g., "No," and "I don't want to."

At Stage IV, a child becomes able to use compound sentences such as "I want taxi go bye-bye" (I want to take a taxi to go out to play") or "I think I can do it."

At Stage V, a child can compose a sentence with comparatives, e.g., "He is slow but kind."

Table 1.5 is an example of using a vocabulary priotization recording form for selecting appropriate vocabulary words and phrases to teach students with severe disabilities (Snell, Ruth, & Patterson, nd).

Table 1.5   The Vocabulary Prioritization Form

	Potential vocabulary words and phrases				
Below are 12 criteria for selecting vocabulary to teach. Put an "X" in the grid for "yes" (i.e., the vocabulary meets the criterion), and an "O" for "no" (i.e., the vocabulary does not meet criterion).					
1. Is the word/phrase/sentence chronologically age-appropriate?					
2. Does the word/phrase/sentence elicit a response that is reinforcing for the individual?					
3. Is the word/phrase/sentence used frequently in a setting?					
4. Is the word/phrase/sentence used frequently across different settings?					

5. Do teacher, parent, and/or friend consider the word/phrase/sentence critical?					
6. Does the word/phrase/sentence represent a basic human need?					
7. Does the word/phrase/sentence represent a response with stimulus-specific reinforcement?					
8. Does the activity in which the word/phrase/sentence is used occur at least once a week?					
9. Will the word/phrase/sentence probably be used in future environments?					
10. Can the word/phrase/sentence be used among a variety of people?					
11. Does the word/phrase/sentence represent a familiar object?					
12. Is the word/phrase/sentence in the individual's receptive vocabulary?					
TOTAL					

Source: Snell, M.E., Ruth, B., & Patterson, L. (nd). *Curriculum development process for oral communication in school-aged persons who are severely handicapped.* Unpublished manuscript, University of Virginia, Charlottesville, Va.

Like semantic and syntactic skills, ***morphological skills*** are critical language skills. The skills are for a child to be able to understand and use specific morphemes which change the meaning of a message, for example:

1.   singular and plural, i.e., bird-birds, bus-buses, man-men, fish-fish, deer-deer, stimulus-stimuli.

2. present, past, future, and past complete tenses, i.e., go, went, going, gone.

3. be + verb plus -ing (e.g., doing, studying) to form:
   - present progress tense, for example, "I am doing my homework" and "Mary is studying for tomorrow's exam."
   - future tense, for example, "I am going to school" (movement) and "I am going to quit" (plan, mean).

4. verb plus -ing to form:
   - a noun, for example, "Swimming is my favorite sport" and "Seeing is believing."

5. use of appropriate words, e.g.,
   - The duck is _____ to eat.   (going to eat)
                                     (about to eat)
                                     (ready to eat) or
                                     (delicious to eat)

6. Use of prepositions, e.g.,
   - before the table . . .   (position)
   - before you go . . .   (time)

Generally, language has its *pragmatic function*. In others words, there is social linguistic and goal-oriented use of language. In addition, children learn specific language skills for:

1. *displacement*, i.e., to communication about something which is not here and now, for example, the television show of last night or a field trip to the museum next month, and

2. *generalization*, to talk to a different person, and to use the learned language in various social context.

All the language skills mentioned above can be applied for social situations such as lunch room conversation, calling or answering phone, asking for or providing information and direction, writing an email or a letter, and so on.

Assessment of Language Performance

Based on the major concepts and focus of prelanguage and language skill development, a number of assessment instruments were developed and utilized in education, therapeutic, and rehabilitation programs for persons with and without communication disorders. Donald Hammill and his associates, for example included particular language skills in a series of tests of language development at different age levels, i.e., early childhood, adolescent, and adult (see Table 1.6).
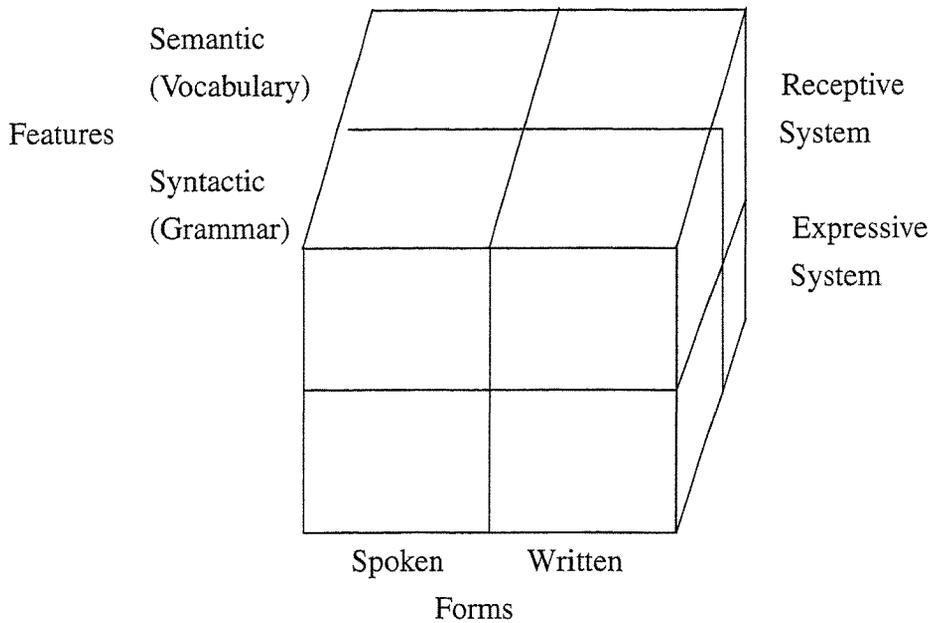
Table 1.6   Assessment of Language Development

1.   Test of Early Language Development (TELD) (Hresko, Reid, & Hammill, 1991)

Language Dimension

		Content	Form	Use
Language Model	Receptive			
	Expressive			

Content = semantics

Form = phonology, morphology, syntax

Use = pragmatics; social aspects/use of language

2. <u>Test of Adolescent Language</u> (TOAL) (Hammill, Brown, Larsen, & Wiederholt, 1987)

Features

Semantic (Vocabulary)

Syntactic (Grammar)

Receptive System

Expressive System

Spoken   Written

Forms

3. <u>Test of Language Development</u> (TOLD) (Newcomer & Hammill, 1997)

2-Dimension Model of Language Structure

Linguistic Features	Linguistic System	
	Listening (Receptive Skills)	Speaking (Expressive Skills)
Semantics	Picture Vocabulary	Oral Vocabulary
Syntax	Grammatical Understanding	Sentence Imitation Grammar Completion
Phonology	Word Discrimination	Word Articulation

The language assessment instruments and accompanying training kits developed by Hammill and his associates (Hammill, Brown, Larsen, & Wiederholt, 1987; Hresko, Reid, & Hammill, 1991; Newcomer & Hammill, 1997), e.g., the Test of Early Language Development (TELD), the Test of Language Development (TOLD), and the Test of Adolescent Language (TOAL), may include the following subtests. A few sample testing items are listed under each of the subtests:

1. Sentence Combining
    - We found a ball.
      We found a glove.
      (Answer: We found a ball and a glove.)
    - The ship was large.
      The sails were blue.
      It was build in Japan.
      It was built three years ago.
      (Answer: "The large ship with the blue sails was built in Japan three years ago.")

2. Characteristics
    - All trees are oaks. *(Answer: False)*
    - All jackets are coats. *(Answer: True)*

3. Word ordering
    - party, fun, was, the   *(Answer: The party was fun.)*
    - Bobby, who, his, walk, dog, saw *(Answer: Who saw Bobby walk his dog?)*

4. Generals
    - perch, bass, trout *(Answer: fishes)*
    - yearling, fledgling, gosling *(Answer: young animals)*

5. Grammatical comprehension
    - John always forget where he lives. *(Answer: forgets)*
    - I will lay down and rest. *(Answer: lie)*
    - A person who sings is a _____. *(Answer: singer)*
    - A cake might be small, but a cup cake is even _____. *(Answer: smaller)*

Based on the prelanguage and language development theories, contents, and need for related skill training, Kent (1974) created a framework of the *Language Acquisition Program*

for the convenience of teachers and speech/language therapists:

1. Pre-Verbal Section
   - *Attending phase.* This phase is designed to teach the child to sit quietly, to look wherever the trainer directs, and to look at trainer prior to the presentation of a command. Parts include sitting still, elimination of inferring behaviors, looking at objects, and pre- trial eye contact.
   - *Motor imitation phase.* Specific motor responses, such as pointing are assessed and taught.

2. Verbal Section - Receptive
   - *Basic receptive phase.* The purpose of this phase is to assess and teach a limited range of receptive vocabulary. The child is required to respond by pointing to, or finding, various objects, body parts, and room parts.
   - *Receptive Expansion Phase I.* The purpose of this phase is to teach appropriate responses to a variety of commands which make use of the vocabulary items introduced in the preceding phase. This includes performance of action named relating to pointing to body parts, objects, and room parts, and finding concealed objects.
   - *Receptive Expansion Phase II.* The child is taught to identify ownership of body parts, room parts, give pairs of objects, and sort colors.
   - *Receptive Expansion Phase III.* The child must follow complex commands, including verb + adverbial place (where commands & body/space awareness), vocabulary expansion (nouns), finding objects named, sorting big/little, and pointing to colors named.
   - *Receptive Expansion Phase IV.* Move vocabulary and counting behaviors are taught, including verb + noun + adverbial place (where commands), verb + noun commands (new nouns), pointing to big ones, "Give me 1 - 5," and pointing to objects named.
   - *Receptive Expansion Phase V.* Same as the preceding phase with vocabulary expansion (nouns-continued), finding object named (toy box search-continued), pointing to big/little one, and pointing to 1 to 5 + objects.

3. Verbal Section - Expressive
   - *Vocal Imitation phase.* The child learns to articulate names of

18

approximately ten vocabulary items from the preceding phase.

- *Basic Expressive phase.* This phase teaches the names of body parts, objects, and room parts used in preceding phase.
- *Expressive Expansion Phase I.* The child must respond to such questions as "Whose nose is this?" "What is on the floor?" "What is gone?" and "Where is the shoe?" which includes discriminating possessing ("whose") with body parts, naming objects in prepositional relationship to room part, naming missing objects (What's gone?) naming room parts in prepositional relationship to object, and mending actions (verb-noun).
- *Expressive Expansion Phase II.* The child is assessed taught to utter two types of two-word noun phases, e.g., naming colors, concealed colors, 2 objects, naming objects + room part in prepositional relationship, and counting to 5.
- *Expressive Expansion Phase III.* All vocabulary is assessed and taught from pictures with vocabulary expansion (naming nouns, "What's gone?" with three objects), mending actions (verb + noun with new nouns), naming color + object, and counting disappearing objects.

The ABCs in Communication Development

There are numerous training or remediation topics regarding nonverbal and verbal communication. Table 1.7 shows a number of these topics. Speech and language teachers or therapists may utilize a series of appropriate training or intervention topics to evaluate a student's entry-level communication skills and his/her potential for improvement (Lian, 2001). Like Kent's (1974) *Language Acquisition Program (LAP)*, many of the selected training or intervention topics can be written into lesson plans for advancing and enriching a child's daily nonverbal and verbal communication performance.

Table 1.7 The ABCs in Communication Development

Action/verb vocabulary	Receptive	Expressive
Alphabets		
Analogies		
Animals		
Answering phone		
Asking for help		

Auditory comprehension		
Augmentative communication		
Body language		
Body movement		
Comment		
Communication on weather		
Comparison/contrast		
Compound sentences		
Concept of body parts		
Concept of color		
Concept of size		
Concept of measurement		
Concept of money		
Concept of time		
Days in a week		
Definition of words (semantics)		
Department store		
Differentiated voice		
Drama		
Express negatives		
Eye contact		
Facial expression		
Field trip		
Flowers		
Following 1-step directions		
Following 2-step directions		
Following 3-step (or above) directions		
Foods/drinks		
Fruits		
Functional use of objects, tools, & utensils		
Gestures for communication		
Grammar-tense		
Greeting		
Holidays		
Interview		
Jobs/Employment/vocation		
Letter/word identification		

Manual communication-sign language		
Manual communication-finger spelling		
Memory-objects		
Memory-persons		
Months in a Year		
Morphological aspects of communication		
Motor imitation		
Names of family members, care givers, teachers, peers		
News report		
Non-verbal communication		
Number concepts		
Object constancy		
Object permanence		
Object sorting		
Object vocabulary		
Outdoor activities		
Ownership		
Picture vocabulary		
Picture-object matching		
Possessives		
Pragmatics in communication		
Protest		
Request for help		
Restaurants		
Role playing		
Sequential memory		
Show and tell		
Show appreciation		
Show apology		
Sign language		
Social language/communication		
Sound imitation		
Sport		
Story telling		
Supermarket		
Synonym/antonym		
Syntax		

Table games		
Travel		
Use of 1-word (2-word, 3-word, ..., etc.) sentences		
Use of objects for communication		
Use of pictures for communication		
Use of preposition		
Use of "WH" questions		
Weather		

Unit II

THE NONVOCAL AND NONVERBAL CONDITIONS

Introduction

Due to a variety of causes, a person may receptively or expressively, or both, become nonvocal or nonverbal. A *nonvocal condition* occurs when an individual is not able to use his/her human sound-making system (i.e., to produce human voice). A *nonverbal condition* is when the person is not able to use verbal language to communicate. The nonvocal and nonverbal conditions may cause an individual to face the challenging situations of being unable to receive and understand spoken or written messages as well as express personal feelings and needs through various traditional means of communication.

Types of Speech, Language, and Communication Disorders

A person with nonvocal and/or nonverbal conditions may have one or more of the following speech, language, and communication disorders:

1.   The *articulation disorder* causes inability of a child to make certain sounds, such as /k/, /t/, /l/, and /w/. There may be deformities in a child's lips (e.g., no lip closure), teeth (e.g., missing front teeth), tongue, nasal area, throat, larynx, pharynx, or other parts of his/her sound-making system, as well as his/her central nervous system (CNS) (Lian, 2001, 2002). The child may have too tight, too loose or fluctuating muscle tone (i.e., hypertonicity, hypotonicity, or athetosis), or lack of sound-producing coordination or breathing control. As a result, he or she may use the following ways to compensate (Heward, 1999; Poon-McBrayer & Lian, 2002):

- *Substitution*, e.g., to say "tat" for cat; 'doze" for those; 'glight" for flight; and "der-der" for gar-gar (brother in Mandarin Chinese pronunciation).
- *Omission*, e.g., to say "ea" for eat, "cool" for school; "uk' for book or look; and "amp" for lamp.

- *Distortion*, e.g., to say "schwim" for swim; and zleep" for sleep.
- *Addition,* e.g., "hamber" for hammer.

2. The *phonological disorder* prevents a child from being able to make the right sounds due to sensory and perceptual impairments, mental or cognitive delay, behavioral (e.g., attention) conditions, or environmental and cultural disadvantages. For example, a student with deaf or hard-of-hearing conditions may pronounce a number of sounds incorrectly. A child with attention deficits may read or say a word or a sentence incompletely, e.g., "car" for Carol, milk carton, or even music record (Poon-McBrayer & Lian, 2002). Students from many Asian language-speaking families may have trouble pronouncing certain sounds in English, e.g., /f/, /th/, etc. Speech, language and communication teachers and therapists should note that the child does not have an articulation problem, but he/she is still not making the sound right.

3. The *voice disorder* may be relating to one or more of the following situations (Heward, 1999):
    - Pitch, e.g., too low, too high;
    - Volume, e.g. too loud, too soft; or
    - Quality, e.g., harsh, breathy, rough, and nasal.

    For example, a communication disorder may be caused by the difficulty "to coordinate the air flow in the lungs, the vibration of the vocal folds in the larynx, and the two resonance in the oral (mouth) and nasal (nose) cavities" (Rice, 1988, p. 241).

4. The *fluency disorder* may be regarding:
    - Rate and rhythm, e.g., stuttering (i.e., repeated vowel or consonant sounds or words) and cluttering (i.e., too fast and unintelligible speech) as influency of speech language (Heward, 1999); or
    - Breathing, e.g., may need many breaths to complete a sentence (Poon-McBrayer & Lian, 2002).

5. *Psycholinguistic disorder* may be relating to deficits in visual or auditory reception, association, sequential memory and expression.

6. *Language disorder* causes a child's inabilities to develop concepts and skills regarding phonemes (pronunciation), semantics (words' meaning and

vocabulary), syntax (word order in a sentence), morpheme (specific structure and organization in a sentence for different meanings), and pragmatics (social use of language). Practitioners and parents using this handbook are encouraged to review the section of General Prelanguage and Language Skills in Unit I (pp. 10-16) for more details.

7. *Behavioral/emotional disorders* may exist in children who have temper tantrum, verbal aggression, withdrawal response, etc., which may interfere a person's speech, language and communication efforts.

Potential Causes

Speech, language, and communication disorders may possibly be caused by one or more of the following factors:

1. *Developmental disabilities.* Due to mental or cognitive delays, autism, or other developmental disabilities, a child may not build age appropriate but critical concepts, such as object association and permanence. He or she may not pass Piaget's sensory-motor stage, may not develop adequate short-term memory (STM), and may not have adequate understanding of body gestures, signs and symbols (Poon-McBrayer & Lian, 2002). As a result, the child may have difficulties in moving to a higher level of language. Thompson and Beck (1999) indicated that "whether an individual's delays stem from difficulties in processing auditory information, formulating ideas, producing sounds, or a combination of all three, it is evident that many individuals with developmental disabilities have great difficulty in acquiring functional speech and language" (p. 4). Children with developmental disabilities may have difficulty in using both vocal and manual communication.

2. *Hearing impairments.* Children with hearing loss tend to be limited in receiving oral messages and in use of vocal and speech communication (Li, 1999). The hearing loss may be caused by conductive or sensorineural factors in one ear (unilateral loss) or both ears (bilateral loss) (Lartz & Prendergast, 1998). As Thompson and Beck (1999) indicated, "Children with deaf and hard of hearing conditions have difficulty learning to speak because of their exposure to the sounds of speech . . . the fewer sounds a person hears, the more difficult it is to produce intelligible speech" (p. 3). Because of this,

persons with hearing impairments tend to communicate using manual instead of oral methods.

3. **_Brain injury._** Brain injury may be caused by traumatic accidents, stroke, and brain tumor, which may lead to severe speech, language, and communication disabilities, e.g., expressive or receptive aphasia (National Information Center for Children and Youth with Disabilities, 2000; Nelson, 1993).

4. **_Physical and health impairments._** Children who have challenging conditions such as cleft palate and/or lips, breathing difficulties (e.g., the need to breathe through mouth, spastic or stiff oral muscles, tonic biting and jaw thrust reflexes, lip pursing/retraction movements, and fluctuating arm movements (i.e., athetosis), may have vocal and manual communication difficulties (Cheney, 1997; Fraser & Hensinger, 1990; Poon-McBrayer & Lian, 2002). For example, some persons have difficulty speaking due to a physical disability, which causes difficulty in their control of muscles and sound-making organs. Consequently, they become unable to produce clear, articulate speech. A condition such as cerebral palsy (CP) or traumatic brain injury (TBI) may interfere tongue and facial muscle control and cause unclear articulation of sounds. Severe damage to the pharynx and larynx systems could result in unintelligible speech.

5. **_Environmental factors._** Environmental factors may include appearance and communication responses of teachers, parents, or peers, and the existence of specific social or situational cues, through which a child may feel discouraged or encouraged to listen or talk; he/she may be socially punished or reinforced to share his/her feelings or opinion (Poon-McBrayer & Lian, 2002). In addition, speech, language, and communication disorders may also be results of child abuse and neglect which may cause a child's emotional and behavioral maladjustment (Nelson, 1993). Besides, children who come from language minority backgrounds may have a communication _difference,_ instead of a communication disorder. As Heward and Orlansky (1992) explained:

Communication differences are of little concern as long as they do not impair our ability to express or receive speech and language. Social, cultural, educational, and geographic variables contribute to the communication differences all of us exhibit. When a communication difference is so pronounced, however, that it has an adverse effect on a child's achievement in

26

school or interaction with his or her peers it may become a communication disorder. (p. 95)

6.   *Behavioral factors* may include lack of eye contact and short attention span, low motivation for communication, inappropriate play with toys and lack of functional use of objects and tools, interrupting and aggressive behaviors, and hyperactivity (Ho, 2000; Nelson, 1993). The situation may become even more complicated when a child's communication efforts are neglected or punished, while his/her non-communication efforts are reinforced.

Related Implications

As mentioned earlier, lack of an effective channel of communication tends to cause limited exchange of ideas, frustration, and underachievement toward personal educational and functional daily living goals. Hsu (2000) pinpointed that a person who cannot communicate freely with others tends to be misunderstood, feel segregated, and develop a sense of helplessness in his/her life. She shared a disabled woman's feeling of isolation, ". . . When you cannot communicate with others, they'll think of you as mentally deficient; just like persons with physical disabilities, it's hard to change other people's perception of you" (p. 38).

Other implications may include underachievement in school and, later, in successful community living (Baumgart, Johnson, Helmstetter, 1990; Beukelman & Mirenda, 1998; Glennen & DeCoste, 1997; Lian & Stearns, 1998; Lloyd, Fuller, & Arvidson, 1997; Male, 1997; Woltosz, 1994) which, in turn, may lead to less expectations of higher standard of individual performance in schools, in the family and community environments, and at work. As a result, lack of effective communication may lead to lower quality of personal life.

Students in the classroom need successful communication to gain knowledge and the skills to apply it to daily living activities (Hawkridge & Vincent, 1992; Lazzaro, 1993; Li, 1999; Lindsey, 1993; Smith & Luckasson, 1998). As McSheehan, Sonnenmeier, and Jorgensen (2002) described:

> Communication is the primary method of demonstrating learning in a classroom. Without a thorough examination of the supports provided to students in this context, we cannot clearly and confidently speak to their

abilities. Without increasing our knowledge and skills in supporting various means of communication, we will not see increases in the full participation and learning by students in the classroom. Our awareness of the relationship among communication, curriculum, and quality supports is becoming increasingly clear. (pp. 8-9)

Intervention

Speech, language, and communication intervention may include a number of strategies. The following list is based on ideas from Craft (2001), Hallahan and Kauffman (1994), Kaderavek and Pakulski (2002), Lian (2001, 2002), Lloyd, Fuller, and Arvidson (1997), Marge (1984), Romski (2002), Silverman (1995), Telzrow and Bonar (2002), and Wei (2002):

1. *Diagnostic assessment*, including hearing acuity, auditory perception and conception, speech and language development, and ecological inventory of communication performance.

2. *Hearing training,* including the use of hearing aids and cueing for enhancement of auditory perception and response.

3. *Speech training,* including appropriate articulation, voice control, etc.

4. *Cognitive training,* e.g., concepts of color, shape, picture, size, and object constancy, association, permanence, functional use of objects and tools, and concept of time and money.

4. *Language development/therapy,* i.e., enhancing phonological, semantic, syntactic, morphological, and pragmatic skills.

5. *Alternative and augmentative communication,* including manual methods, use of communication aids, and use of communication codes.

6. *Follow-up services.*

System of Support

McSheehan et al. (2002) suggested a team-oriented system for students who can benefit from alternative and augmentative communication. This system of support consists of four phases:

1. Conduct needs assessment, which has three steps:
    *   develop an orientation to the student, family, and school situation, including any questions or concerns;
    *   gather specific information about the student, family, and team; and
    *   synthesize information gathered from the needs assessment to provide a deeper understanding of the situation, including team functioning and capacity in supporting the student's learning.

2. Explore and describe, which consists of exploring specific strategies that will support the student as a learner, enhance the learning environment, and develop meaningful and relevant supports. Considerations include:
    *   ways to physically access the communication system (direct or indirect methods of selection);
    *   seating and positioning that enhance access;
    *   the type of symbol(s) and the messages of instructional activities and conversation;
    *   color-coding;
    *   size of symbols;
    *   number of items on the display and their placement; and
    *   output (voice, print).

3. Observe and document, in which a checklist is developed to guide and document the ongoing delivery of supports, and student work samples, videotapes in instructional situations and data on the use of the communication system are assembled.

4. Review and reflect, from which recommendations and revisions are provided.

Unit III

ALTERNATIVE AND AUGMENTATIVE COMMUNICATION

Introduction

The American Speech-Language-Hearing Association (ASHA) (1989) defined *alternative and augmentative communication* (AAC) as "[a] practice that attempts to compensate (either temporarily or permanently) for the impairment and disability patterns of individuals with severe expressive communication disorders" (p. 107). Thompson and Beck (1998) elaborated that "the key [of AAC] is to establish and support a communication system that enables a communicator and his/her communication partners to exchange the greatest possible range of information in the most effective and efficient manner" (p. 4).

Examples of *alternative communication* may include eye contact, facial expression, gestures, body language, use of real objects and/or pictures, written language, as well as the augmentative communication devices that have been developed in case a person is having difficulties in achieving traditional oral communication. *Augmentative communication* can be further defined as "supplemental communication techniques that are used in addition to whatever naturally acquired speech and vocalization may be present" (Poon-McBrayer & Lian, 2002, p. 164). According to Franklin and Beukelman (1991):

> Augmentative communication refers to the variety of communication approaches that are used to assist persons who are limited in their ability to communicate messages through natural modes of communication. These approaches may be unaided, as is manual sigh and adapted gestures, or aided, with utilization of communication boards or electronic devices. Regardless of the communication mode employed, the goals of augmentative communicators are similar to those of natural speakers, that is , to express wants and needs, to share information, to engage in social closeness, and to manage social etiquette. (p. 321)

Facilitated communication (FC) is a method of alternative communication which "involves a trained facilitator providing physical support to a person with a disability to allow people who otherwise have limited verbal or written

communication skills to communicate through typing [the keyboard of an FC device] (Weiss, 2002, p. 3).

Factors to Consider

There are a number of factors to be considered when selecting alternative and augmentative communication systems (Lian, 2001):

1. Communication needs, i.e., motivation, interest level, goals, emotional maturity, family/community perception.
2. Receptive and expressive language skills.
3. Motor abilities, i.e., range of motion of arms, wrists, and hands (or feet) including flexion and extension of shoulder, elbow and wrist joints; hand moving across midline of body; upright standing or sitting position (by the use of a regular chair, wheelchair, crutches, or other adaptive equipment); and muscle strength, endurance, and coordination (e.g., hold and release of hand).
4. Perceptual skills, i.e., eye contact, visual tracking, matching, figure-ground spatial relationships, and other visual-auditory abilities to be able to recognize objects, pictures, and symbols.
5. Conceptual/intellectual skills, i.e., object permanence, causality, imitation, reading, spelling skills.
6. Academic, vocational, and leisure/recreational skills.

Options within AAC

A person with speech, language, and communication disabilities may find some options of alternative and augmentative communication to be more feasible based on his/her abilities, needs, and environmental situations. Potential options include manual systems, communication aids, and communication codes.

Manual Systems

According to Nietupski and Hamre-Nietupski (1979) the **manual systems** require a person to use his/her arms, hands, and/or fingers to communicate, for example:

1. To use facial expression, generally understood gestures, and body movements

to communicate,

2.   To use sign systems, i.e., sign language to communicate, and

3.   To use finger spelling to communicate.

Table 3.1 consists of commonly used words, concepts, and messages that can be passed from one person to another by signing or fingerspelling. Teachers and other school and community-based service providers, as well as the general public, are encouraged to take available classes to learn and practice on the signs and fingerspelling of these words, concepts and messages.

Table 3.1   Topics for Sign Language Communication or Fingerspelling

A	August	Book	Cent
About	Autumn	Boot	CD
Act	Avoid	Boy	Chair
Accident	Awful	Bread	Chicken
Add		Break	Chopsticks
Addition	**B**	Breakfast	Class
Again	Baby	Bright	Clean
Aggressive	Ball	Bring	Clear
Airplane	Banana	Brother	Clock
Alert	Bathroom	Brown	Coat
Alive	Be	Buddy	Coffee
All	Beautiful	Bus	Coffee break
Alligator	Because	But	Coke
Alright	Beef	Butter	Cold
Among	Begin	Butterfly	Cook
Amount	Beside	Buy	Cookie
And	Best		Color
Ant	Better	**C**	Come
Apple	Between	Call	Complete
Apply	Bible	Can	Cone
Appreciate	Bicycle	Candy	Copy
April	Billion	Car	Corn
Ask	Bird	Care	Correct
At	Black	Cat	Cow
Attach	Blue	Catch	Crayon
Attend	Body	Catsup	Christmas

Cry	Eleventh	Funny	Horse
Cup			Hour
Cut	**F**	**G**	House
Cute	Faith	Gain	How
	Fall	Game	Hundred
D	Family	Get	Hungry
Dad	Fast	Girl	Hurt
Dance	Fear	Give	
Day	February	Glad	**I**
December	Feel	Go	I
Die	Fifteen	Goal	Icecream
Different	Fifth	God	If
Differentiate	Fiftieth	Gold	Ill
Dinner	Fifty	Good	In
Disk	Find	Grandma	Inch
Disk drive	Fine	Grandpa	Index
Divide	Finish	Green	Ink
Do	First	Guess	Injury
Don't	Fish		Intend
Dog	Five	**H**	It
Doll	Flower	Ham	Itself
Dollar	Fly	Hamburger	Itch
Down	Foot	Hand	
Draw	For	Happy	**J**
Drink	Forget	Hard	January
Drive	Fork	Hard disk	Jealous
DVD	Fortieth	Has	Job
	Forty	Hate	Join
E	Fountain	Have	Joy
Eat	Four	Hear	Judge
Egg	Fourteen	Help	Juice
Eight	Fourth	Here	July
Eighteen	French fries	Holiday	Jump
Eighth	Friday	Home	Jumper
Eightieth	Friend	Homesick	June
Eighty	From	Hope	Junk
Elephant	Fruits	Hot	Just
Eleven	Full	Hot dog	Justice

	Minute	Old	Pudding
K	Mom	Omit	Punch
Keep	Monday	On	
Key	Money	One	**Q**
Kindergarten	Month	Open	Quarter
Kleenex	Moon	Or	Quality
Knife	More	Orange	Q-tips
Knock	Morning	Our	Question
Know	Movie	Ours	Queen
	My	Ourselves	Quick
L	Myself	Out	Quiet
Laser		Over	Quit
Last	**N**		Quiz
Later	Name	**P**	
Leave	Napkin	Paint	**R**
Left	Need	Pants	Reach
Lemon	Next	Paper	Red
Let	New	Pay	Relate
Like	Night	Pay attention	Remember
Line up	Nine	Peach	Repeat
Listen	Nineteen	Peanut	Restroom
Long	Nineteenth	Peanut butter	Rice
Look	Ninetieth	Pencil	Rich
Love	Ninety	People	Right
Lunch	Ninth	Picture	Ring Role
	No	Pink	Roller blade
M	Noodle	Pizza	Roller skate
Make	November	Plan	Root
March	Now	Plate	Rose
May	Number	Play	Rotate
Maybe	Nurse	Please	Route
Me		Plus	Ruin
Meat	**O**	Poor	Run
Meter	Obey	Popcorns	
Milk	O'clock	Popsicle	**S**
Million	October	Potato	Sad
Mine	Off	Pretty	Same
Minus	OK	Problem	Santa

Saturday	Spoon	Thirst	Upon
Say	Spring	Thirteen	Us
School	Stand	Thirteenth	
Second	Stand up	Thirtieth	**V**
September	Start	Thirty	Vacation
Seven	Stay	Thousand	Veal
Seventeen	Stop	Three	Vegetable
Seventh	Student	Through	Very
Seventieth	Sugar	Thursday	Victory
Seventy	Sun	Time	Vocation
Shirt	Sunrise	Tire	Vomit
Shoe	Surprise	Tired	
Short	Summer	To	**W**
Show	Sunday	Today	Wait
Sick	Sweet	Toilet	Walk
Sign	Swim	Tomorrow	Wake
Silent		Town	Wash
Sing	**T**	Toy	Watch
Sister	Take care	Treat	Water
Sit	Take a break	Tree	Watermelon
Six	Teach	Trick	We
Sixteen	Teacher	Trillion	Wednesday
Sixth	Telephone	Tuesday	Week
Sixtieth	Tell	TV	Where
Sixty	Ten	Twelfth	White
Skate	Tenth	Twelve	Who
Skip	Test	Twenty	Will
Sky	Thank you	Twentieth	Winter
Sleep	That	Two	With
Slowly	Their		Wish
Smell	Theirs	**U**	Work
Snack	Them	Under	Worse
Snake	Themselves	Understand	Worst
Sorry	There	Undo	Wow!
Soup	They	Unit	Write
Spaghetti	Think	United	
Speak	Third	Until	**X**
Spell	This	Up	X-ray

Xylophone	Yes	Yourself	Zebra
	Yesterday	Yourselves	Zest
Y	You		Zip code
Year	Your	**Z**	Zone
Yellow	Yours	Zealous	Zoo

Communication Aids

According to Nietupski & Hamre-Nietupski (1979), the **communication aids** are "display devices which contain objects, pictures of objects or actions, symbols, or printed words" (p.111). Poon-McBrayer and Lian (2002) indicate that *techniques* and the *symbol systems* are the two main topics when using communication aids. Table 3.2 shows the three common techniques for using a communication aid.

Table 3.2 Techniques for Using Communication Aids

Direct selection is one type of decoding techniques. Among a number of pictures or symbols, a person, or this person's personal care attendant (PCA), can choose by pointing to the exact picture or symbol to communicate. A person who has too limited arm movement to do sign language and finger spelling may benefit in the use of:

1. a head pointer with pen light,
2. a mouth piece, or
3. foot/toes.

If direct selection cannot be achieved right away, the effort of selecting the right picture or symbol to communicate can still be accomplished via *manual scanning* (i.e., by a personal care attendant) or by electronic *autoscanning,* which also fall under the category of the decoding systems.

The *encoding systems* include a set of pictures/icons, numbers, alphabets, etc., which can form various combinations and each combination can be pre-scheduled to mean a specific message. The following are examples of the combinations:

Numbers of   1, 7, 3 = "Hello! How are you today?"
Colors of   pink + yellow = "Thank you!"
Icons of   apple + boy + full cup of water = "Johnny is full; he can't eat any more."

Another common topic in using a communication aid is the ***communication symbols***, which may include:

1. Objects, such as a cup of water, fruits, toys, utensils, classroom or school items (e.g., pencil, crayons, eraser, paper, desk, chair, calculator, computer), and community-based objects (e.g., street or bus stop signs, groceries, checkbook, and park and recreation facilities),

2. Pictures and icons, such as sun, umbrella, bathtub, bathroom, foods and drink, familiar faces or activities, and specific theme-icons (e.g., weather, greetings, religion, hobbies, consumer-based or job-related messages), and

3. Alphabets, words, sentences (i.e., verbal or written language communication symbols).

Poon-McBrayer and Lian (2002) further suggest that:

Generally, younger children or persons at lower cognitive levels may use more concrete symbols such as real objects or pictures, and 2-digit combinations of numbers. More mature individuals or persons at higher cognitive functioning levels may be able to use more abstract symbols like alphabets, words, and sentences. It is also possible that different symbols are used together, e.g., blue + 2 + 2, or A114, to make it easier for the users to learn and memorize. In addition, a specific symbols can be used to mean a designated theme, e.g., the icon of apple = the "food and eat" topic; red color = warning; and blue color = emotional status. (p. 163)

The picture below show an example of a ***communication book***, which has pages of colorful photo pictures or icons with plastic coverings for increasing the book's durability. The pictures and icons, along with words or phrases of descriptors, can be arranged for more convenient and time-saving use.
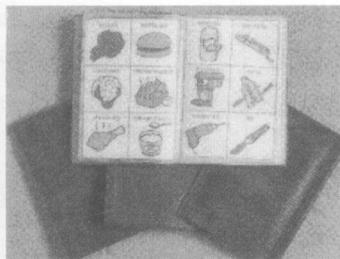
Similar to communication books, there are generally made or customized ***communication boards***. The communication board on next page (see Table 3.3) can be for older children who have already learned a set of basic vocabulary and sentence structures. On this communication board, general words that are nouns (e.g., foods

Table 3.3 Example of a Communication Board

YES   NO

    Hello, my name is Johnny Smith.   Please   Thank you!

I	Mom	This	be	get/got	foods
My	Dad	That	am/was	give/gave	hamburger
Me	teacher	These	are/were	say/said	hot dog
You	friend	Those	is/was	tell/told	French Fries
Your	grandma	It	being	keep/kept	cookie
He/She	grand pa	There	been	think	sugar
His/Her	uncle	What	have	thought	Coke
Him/Her	aunt	When	has	come/came	milk
We	brother	Where	had	go/went	juice
Our	sister	Which	can	ask/asked	on
Us	Mrs. Jones	Why	could	like/liked	off
They	PT	How	may	take/took	at
Their	OT	or	do	see/saw	from
Them	SLT	but	does	know/knew	with
HKU	Mary	will/would	did	let	for

1	2	3	4	5	6	7	8	9	0	a/an	The	and	not
A	B	C	D	E	F	G	H	I	J	if	of	down	up
K	L	M	N	O	P	Q	R	S	T	try	again	because	
U	V	W	X	Y	Z	,	.	:	;	-s	-es	-ed	-ing

$ ¢   ?   !   &   %

and drink), pronouns (e.g., I, you, he, she, they), persons' names (e.g., Mary, PT for physiotherapist, OT for occupational therapist, SLT for speech and language therapist), be-verbs (e.g., am, are, is, was, were), verbs (e.g., give/gave, tell/told, and think/ thought at present tense, past tense, and potential future or past complete tense), auxiliaries (e.g., will, have/has/had), articles (i.e., a, an, the, It, This), infinitives (e.g., on, in, at, from), "WH" words (i.e., Who, What, When, Where, Why and How), conjunctions (e.g., and or &, but, or) and punctuations as well as greetings (e.g., Hello, my name is . . . for self-introduction), quick answers (e.g., Yes, No) and courtesy works (e.g., Please, Thank you) can be included. There are numbers and quantity or calculation symbols (e.g., $, %) for in case a conversation includes time (e.g., year, hour), money, amount and/or measurements. Besides, there are alphabets for when a word is not on the board and the user has to spell it out.

Duris (2002) indicates that children with disabilities need adequate vocabulary and related symbols on an AAC device for them to become able to participate in classroom learning activities, such as Mathematics. For children who are younger or at lower cognitive and language ability level, however, the communication board shown in Table 3.3 appears to be too complicated and overwhelming. Simplified communication boards, with motivating colorful pictures or icons added, will be more appropriate. The Boardmaker™, available through the Mayer-Johnson Company, is a database of more than 3,000 Picture Communication Symbols (PCS) which makes it convenient for teachers and speech/language therapists to design customized communication boards and select and put on a communication board. Instead of the traditional, time-consuming tasks of manual cutting and pasting of these symbols onto a communication board, these tasks can now be handled electronically on a PC or a notebook.

(Source: http://www.mayer-johnson.com/software/Boardmkr.html)
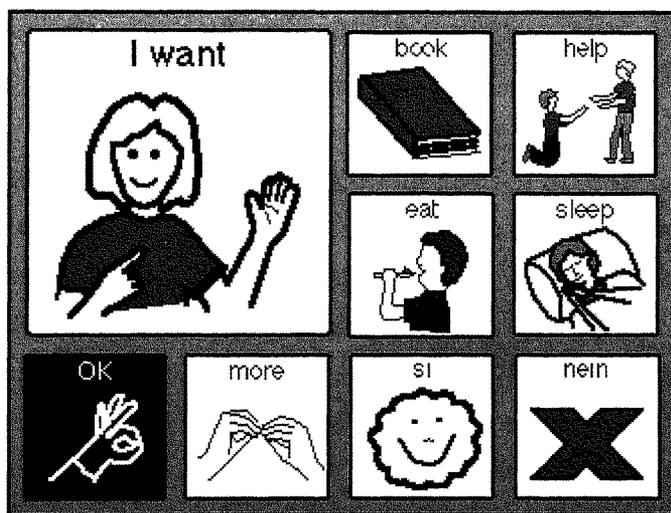
A person with a communication disability may use a communication board to deliver his/her messages by finger pointing or, in case he/she has difficulty of hand movement for accurate pointing, he/she may rely on his/her teacher or personal care attendant to point for him/her. And, then, he/she will respond by a communication code to tell if the pointing is correct about what he/she intends to communicate. More information regarding communication codes (e.g., smiling of nodding head to mean "Yes," and turning face away to mean "No") will be provided later in this section of communication aids.

For a person who has communication disabilities and limited motor control to become more independent in using a communication board, messages on a communication board can be re-arranged to fit on a convenient spinner. The All-Turn-It Spinner (see picture below), for example, can be activated and stopped by an adaptive switch, for the dial to turn to a specific message for communication, or for responding to others (e.g., a teacher who is asking a question). Available through the AbleNet, Inc., this battery-operated device has double overlays for customized messages. (Source: http://www.ablenetinc.com)

Many electronic or computer-processed communication devices have become available during the past two decades. These devices may "combine the use of meaningful pictorial images with the latest technology to enable people who cannot speak to communicate easily and quickly with their families, friends and others" (Prentke Romich Company at http://www.prentrom.com/index.html). A number of the more popular ones are selected and introduced below, some of which may printout or show a window/screen of messages, while others may record and playback human speech or produce synthesized and digitized (artificial) voices.

BIGmack™ Communication Aid

Available through the LAB Resources, the BIGmack™ is designed with colorful, enlarged touch button for younger users (i.e., preschoolers with communication disabilities), nonverbal users at lower functioning level, or beginner

users. It is especially designed for in case the users have motor, visual or cognitive disabilities. With a 9-volt battery installed, this communication device can conveniently record human voice up to 20 seconds.

(Source: http://www.execpc.com/~labres/able_big.html)

One-Step™ Communicator 20

The One-Step Communicator 20 is a smaller BIGmack which is designed with a greater angle. Like the BIGmack™ it is easy to set-up and use, and it has 20 seconds of memory (i.e., recorded human voice).

(Source: http://www.execpc.com/~labres/able_big.html)
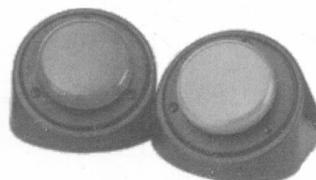
Step-by-Step™ Communicator 75

The Step-by-Step™ Communicator 75, available through the Lab Resources, can be further designed for it to be used throughout the routines of a regular day, for example, for a students to use in the classroom from entry to exit. A series of messages in appropriate sequential order are recorded for up to 75 seconds (as compared to the 20 seconds of the BIGmack™ Communication Aid and the One-Step™ Communicator 20.

(Source: http://www.execpc.com/~labres/able_big.html)
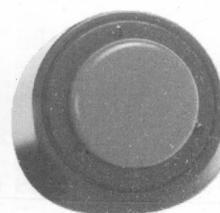
CheapTalk 4/CheapTalk 8

Available through the Don Johnston, Inc., the CheapTalk 4 and CheapTalk 8 uses 2-inch picture cards for activating the prerecorded messages. Based on the ability and needs of the user, the device has a total of 12 levels for him/her to switch between. There can be up to 48 messages and the total recording time is 300 seconds or about 6 seconds per message.

(Source: http://www.donjohnston.com)
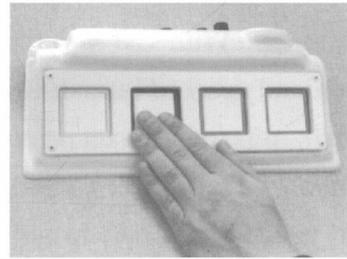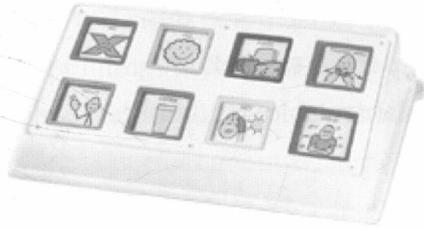
Hip Talk

Available through the Technical Solutions in Australia as well as in the United States, the Hip Talk communicator plays a message at a person's waist when one of the buttons is pushed. It comes with 3 interchangeable templates plus plastic keyguards, which allow 3, 6, or 12 messages to be chosen with touch, and the user can repeat recording and rerecording messages. Out of the 3 durable paper overlays, the total recording time can be up to 75 seconds.

(Source: http://www.tecsol.com.au/HipTalk.htm)
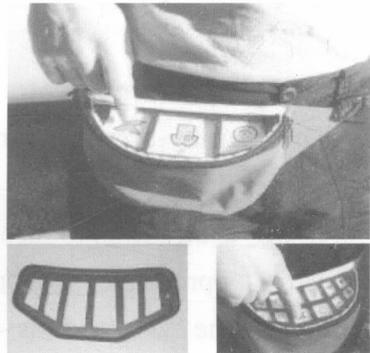
Talk Trac™ Wearable Communicator

Wearing the TalkTrac™ Wearable Communicator on the wrist, a user can utilize this four-message communication aid to communicate with others, by activating the 1" x 1" touch keys. It is one of the most portable, convenient, and natural look devices (like wrist watches or brace lace as fashion). This device has 3 interchangeable templates for more messages. The total recording time is the same as the Hip Talk, i.e., 75 seconds.

(Source: http://www.neatinfo.net/equipment/talktrakwearable.html)

Tech/TALK™ 8/Tech/TALK™ 32

Using four AA alkaline batteries, the Tech/TALK™ 8 and Tech/TALK™ 32 are activated by the use of changeable 2 x 4 or 4 x 8 overlays that are developed through the Mayer-Johnson Boardmaker. Available through the Mayer-Johnson Company, the two devices are lightweight (approximately 2.0 lbs) and portable, conveniently sized (12.5" x 6.5" x 2.5"), durable and water-resistant, and easy to clean. They play back high quality recorded human voices, and they can also be hooked up to external speakers. Other products of the Mayer-Johnson Co. includes the Tech/Four™ and the Tech/Scan™ & Talk/Scan 8™.

(Source: http://www.mayer-johnson.com/hardware/Techdevs.html)

MessageMate 20

Available through the Cambridge Adaptive Communication, the MessageMate 20 is a lightweight, single-level communication device which can record human voice for up to 20 messages or a total of 120 seconds. It is operated by the membrane keyboard with easy-to-understand icons, or by adaptive switch access.

(Source: http://www.cameleon-web.com)
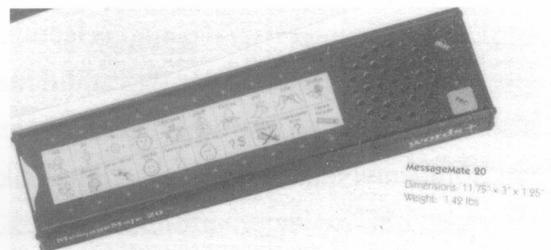
ChatBox/ChatBox-DX

ChatBox and ChatBox-DX, available through the Prentke Romich Company (PRC), are designed for use by individuals with cognitive, language, visual, and motor limitations, such as brain dysfunction and cerebral palsy. Both models can be programmed for the appropriate vocabulary, voice and native tongue of their user. The PRC's unique Minspeak (minimum effort speech), which is a language system based on combining multi-meaning icons to generate naturally spoken output via words, phrases or sentences" is installed in the two models. Previous products of the PRC include the AlphaTalker/AlphaTalker II, DeltaTalker, TouchTalker, LightTalker,

Liberator, Vantage, Vanguard, and Pathfinder. The AlphaTalker/AlphaTalker II and Pathfinder will be further introduced later.

(Source: http://www.prentrom.com/index.html)

SpeakEasy™

The SpeakEasy™ Communication Aid of AbleNet can be used to store 12 messages for a total of four minutes and 20 seconds of recording time. The messages are accessible via keypad or external switches

(Source: http://www.execpc.com/~labres/ablenet.html).
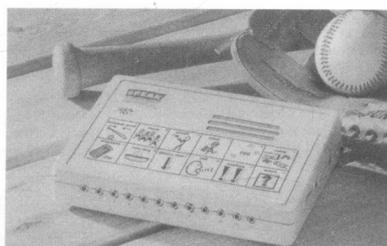
AlphaTalker/AlphaTalker II

Available through the Prentke Romich Company (PRC), the AlphaTalker II which produces digitized speech has 32 (4 x 8) enlarged keys with icons and keyguard for younger person's convenient selection and entering of simple keyboard commands, e.g., theme keys plus one or two additional keys for specific messages. This talker can also be used to access other technological devices (e.g., a PC or a notebook, or an environmental control device). AlphaTalker II is lightweight for high portability.

(Source: http://www.prentrom.com/index.html)
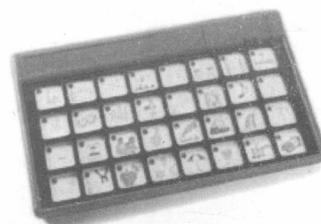
Sidekick

Also available through the Prentke Romich Company (PRC), the Sidekick is a pocket-size, lightweight, but powerful communication device, with 24-key (4 x 6) overlay, which produces digitized speech. It also has auditory scanning function and feedback cues for persons who have visual impairments.

(Source: http://www.prentrom.com/index.html)

Cannon Tape Communicator

The *Cannon Tape Communicator*, available through Crestwood Company, stores up to 7,000 characters and prints out frequently-used phrases. This communication device provides speech and large print and can be operated by adaptive switches for raw and column scan intersect

(Source: http//:www2.gasou.edu/tools/cannon.htm)
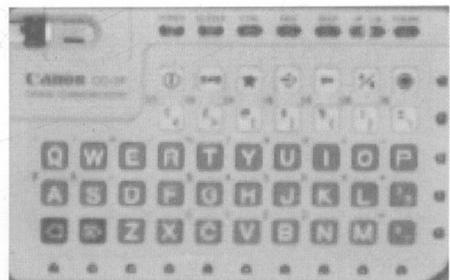
Holly.Com/Holly.Com E-Lite

The Holly.Com and Holly.Com E-Lite of the Communication Devices, Inc., are portable communication aids for persons with nonvocal and/or nonverbal conditions. Originally, the devices were developed for an primary school student with cerebral palsy, Holly. "Her inability to vocalize her thoughts and needs proved to be her greatest frustration. For 5 years, at home and at school, Holly used her Holly.Com and Holly.Com E-Lite to communicate her needs as well as to actively participate in daily conversation." It turned out "Holly enjoyed the new challenges presented by her communication systems . . . Holly.Com and Holly.Com E-Lite allowed Holly the

opportunity to become familiar with picture symbols, grasp the spelling of some and complex words, develop her fine motor skills and choice-making capabilities."

(Source: http://www.comdevices.com)

Dynamo

Available through the Sunrise Medical, Dynamo is a communication device which offers 25 minutes of record and speech time and 3,300 DynaSyms symbols. One of the main features of Dynamo is its easy-to-understand graphics and the convenient interface for quick display of the theme-oriented icons on the touch screen.

(Source: http://www.sentient-sys.com)

Dynavox

The DynaVox 2 and 2c Augmentative Communication Devices, also available through the Sunrise Medical, can be used to assist persons with physical and multiple disabilities. Like the Dynamo, DynaVox 2 and 2c use a convenient touch-screen display that leads the user smoothly through the time-saving but natural message-formation process.

(Source: http://www/augmentative.com/acs-dvsp.htm)
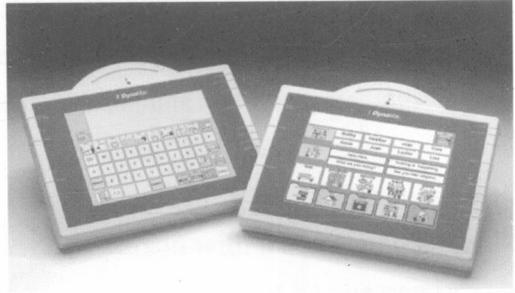
Cantonese Artificial Speech Aid (CASA)

Available for students at the John F. Kennedy Centre, a school for students with physical and multiple disabilities in Hong Kong, CASA is a lightweight, portable microprocessor that store frequently-used Chinese words and short sentences, and produces Cantonese speech output. With built-in "Speaking Dynamic" software program and optional keys in Chinese, English, easy-to-understand icons and a durable keyguard, the device can be for an ambulatory person or an individual using a wheelchair.

(Source: http://www.jfk.edu.hk)

Pathfinder

According to the Prentke Romich Company (PRC), "the advantages of the Pathfinder tool start with its vivid, high resolution, half VGA color display, [which] maintains readability in a wide variety of lighting environments and incorporates touch screen technology for easy access." The keyboard of this communication aid may use 32, 64, or 128 overlays with icons, plus there is a enlarged window (a screen). Like the ChatBox and ChatBox-DX, Pathfinder produces synthesized speech through the user-friendly Minspeak (minimum effort speech). In addition, there are added special features such as word and icon prediction, touch screen, and a digitized speech function that produces fun sounds, songs and additional languages. Users of the older-generation devices of PRC, such as the TouchTalker, LightTalker, Liberator or DeltaTalker can easily transfer to the Pathfinder. Pathfinder has build-in Language Activity Monitoring (LAM) software, which records language "events," including letters, words, phrases, and so on, a helping tool for speech and language therapists to monitor a student's progress in communication.
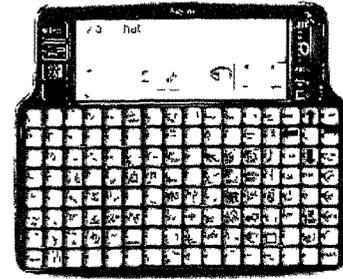
Communication Codes

In addition to the manual systems and communication aids, a series of *communication codes* can be another choice for successful alternative communication. It is a customized arrangement (i.e., an agreement between two communicating individuals), which makes a person with a communication disability become able to voluntarily give answers to yes and no questions. He or she may do one of the following (Poon-McBrayer & Lian, 2002):

1.   Turning head: right = yes; left = no.
2.   Knocking table or blinking eyes: once = yes; twice = no.
3.   Smiling = yes; frowning or turning face away = no.
4.   Raising head (with head extension) = yes; looking down = no.
5.   Raising hand = yes; putting hand down = no.

Selecting an Auxiliary Communication System

Table 3.4 lists factors to be considered when selecting an appropriate auxiliary communication system for a person with nonvocal or nonverbal conditions. These factors tend to be addressed by a teamwork to which members such as teachers, speech and language therapists, physical and occupational/rehabilitation therapists, job coaches, leisure and recreational coordinators, and families/parents as well as the person himself/herself will contribute their expertise and concerns.

According to Table 3.4, the convenience of using a manual system for communicating with others is that it is "portable"; it goes with the person with a communication disability wherever he/she goes. In addition, he/she can take initiative to start a conversation with others, instead of being always a passive communicator who waits for others to start up. However, the disadvantages of the manual system are

that (1) it requires good hand and finger movement and motor coordination as well as cognitive abilities and memory; and (2) it requires the audience to be trained as well as to pay constant attention especially when there is quick movement in signing and fingerspelling.

There are a number of advantages in using a communication aid. With the help of certain sophisticated technology, the requirement of a person with a communication disability to have upper extremity motor skill and coordination so that he/she can use a communication aid has been greatly minimized. The portability concerns may possibly be solved. The need for the audience to be trained to receive and understand the messages from the communication aid and for the audience to pay constant attention are almost minimal when compared to the manual systems. In addition, the person with a communication disability will be able to take initiative to start a conversation with another person (Nietupski, & Hamre-Nietupski, 1979).

Table 3.4

Factors to be Considered When Selecting an Auxiliary Communication System.

	Motor skill requirement	Portability	Training required by audience	Constant visual display	Allow students to initiate and respond to communicative attempts
Manual Systems	Extensive	No problem	Fairly extensive if standardized signs are used	For some signs or finger-spelling	Yes
Communication Aids	Minimal to extremely minimal	Problem for ambulatory students, especially if using crutches	Minimal	Yes or no	Yes
Communicative Codes	Extremely minimal	No problem	Minimal	Yes	No, only to respond

Source: Nietupski, J., & Hamre-Nietupski, S. (1979). Teaching auxiliary communication skills to severely handicapped students. *AAESPH Review, 4*(2), 107-124.

Regarding the communication codes as another option of AAC, the requirement of motor skill is minimal (e.g., for turning head, smiling, eye blinking) and, like using the manual systems, the communication codes are portable. The audience can be trained to be ready to communicate with the person can be within minutes. However, the disadvantages of using communication codes include (1) the person with a communication disability can only respond (i.e., to give yes and no answers after being asked a question), not being able to initiate a conversation, (2) the audience may need to pay constant attention to his/her answers (since the motor movements are minimal), and (3) some audience may not be efficient in asking exclusive questions to get right to the point of the person who is having trouble getting a message across by passively expressing yes and no in his/her answers (Nietupski, & Hamre-Nietupski, 1979).

Meeting Individual Needs

Thompson and Beck (1999) suggested the following approaches to assure fulfillment of individual needs for alternative and augmentative communication:

1. Complete a thorough assessment to identify a potential AAC user's unique strengths, limitations, needs, and preference for the type and nature of communication, in order to identify specific communication strategies and techniques.
2. Engage teamwork to find information relating to the potential AAC user's current communication skills, literacy level, and functional motor skills, as well as the situations in his or her daily environment.
3. Develop a convenient and practical checklist to help select an appropriate AAC system and related devices, which match the user's needs and his/her lifestyle.
4. Provide encouragement and ongoing support for the advancement of learning and use by the AAC user and his/her communication partners.
5. Devote time and energy to operate essential features of the AAC device and make efforts to troubleshoot when the device is not operating effectively.
6. Use available resources and assistance from special education teachers, speech and language therapists, assistive technologists, physical and occupational therapists, as well as manufacturers and communication organizations.

To the suggestions mentioned above, Mintz (2001) added the inclusion of families of the AAC users. Without support and active participation of parents, siblings, spouses, and other members from the family, the efforts of a teamwork cannot achieve the maximum potential of AAC accomplishment.

Table 3.5 gives an example of an AAC assessment checklist recommended by Vanderheiden and Lloyd (1986). AAC diagnosticians and service providers are encouraged to revise in order to fit the specific situations and needs for the users in their programs.

Table 3.5   AAC Assessment Checklist

AAC User: _____   Date: _____

AAC System Description: _____

System Requirements	Does not meet user's needs	Meets user's needs some	Meets user's needs well
A. Provides a full range of communicative functions			
- Communication of basic needs			
- Conversation			
- Writing and messaging			
- Drawing			
- Computer Access			
B. Compatible with other aspects of individual's life			
- Seating systems and all other positions			
- Mobility			
- Environmental controls			
- Other devices, teaching approaches, etc.			
C. Does not restrict communication partners			
- Totally obvious yes/no for strangers (from 3-5 feet away)			
- Useable/understandable with strangers and those not familiar with special techniques or symbols			
- Promotes fact-to-face communication			
- Useable with peers/community			
- Useable with groups			
D. Useable in all environments and physical positions			

51

- Always with the person (always working)			
- Functions in noisy environments			
- Withstand physically hostile environments (sandbox, beach, travel, classroom)			
E. Does not restrict topic or scope of communication			
- Any topic, word, idea can be expressed.			
- Open vocabulary			
- User definable vocabulary			
F. Effective			
- Maximum possible rate			
- Very quick method for key messages (phatic, emergency, control)			
- Yes/no communicable from a distance			
- Basic needs communicable from a distance			
- Ability to interrupt			
- Ability to secure and maintain speaking turn (e.g., override interruptions)			
- Ability to control message content (e.g., not be interrupted)			
- Ability to overlay emphasis or emotion on top of message			
- Law fatigue			
- Special, super efficient techniques for those close to the individual			
G. Allows and fosters growth			
- Appropriate to individual's current skills			
- Allow growth in vocabulary, topic, grammar, uses			
- New vocabulary, aspects easily learned			
H. Acceptable and motivating to user and others			
- Individual			
- Family			
- Peers/friends			
- Education or employment environment			
- Computer Access			
I. Affordable			

- Purchase			
- Maintenance			

Source: Vanderheiden, G., & Lloyd, L. (1986). Communication systems and their components. In S. Blackstone & D. Bruskin (Eds.), *Augmentative communication: An introduction* (pp. 49-161). Rockville, MD: American Speech-Language-Hearing Association.

Table 3.6 shows results of an AAC case study with recommendations provided by a team of special educators and speech therapists (Thompson & Beck, 1998).

Table 3.6   A Case Study

Tommy is a five-year-old boy whose speech is unintelligible due to developmental apraxia of speech, a condition that causes him to be unable to produce and sequence the fine motor movements necessary for speech. He also has been diagnosed with attention deficit hyperactivity disorder (ADHD). No other sensory, physical, or cognitive impairments have been identified.

Tommy can express basic communications through a few words that he can say intelligibly (e.g., mama, papa, bye, hi), vocalizations, facial expressions, and gestures such as pointing and nodding his head or shaking his head. However, he cannot communicate his ideas that are more complex.

His teachers and parents believe that his communication difficulties have contributed greatly to a variety of behavioral problems. It has been observed that Tommy becomes easily frustrated with tasks that involve communicating. Furthermore, he does not have many friends because his peer interactions often involve screaming, grabbing, and hitting. When he does try to talk to his peers, they can't understand him and often end up walking away from him or responding inappropriately to his requests.

When Tommy was enrolled in an early childhood intervention program, the teachers designed simple, nonelectronic communication boards for Tommy's use during his school day. These boards were designed around preschool activities so that Tommy could indicate his preferences during activities, respond appropriately to his teacher's questions, and indicate when he needed a break from an activity. He learned to use these boards with a high level of accuracy and reached the point where he would select the right board for an activity. By using

these boards, Tommy demonstrated his ability to categorize objects and events. However, due to a high level of distractibility, he continued to need close attention and prompting from a teacher to use the boards consistently throughout an activity.

Although these beginning communication boards were helpful, they did not meet all of Tommy's needs. He was not able to participate in activities such as story telling, reading books, singing, and just talking with other kids. Although his behavior improved somewhat with the introduction of the boards, behavior problems continued at a level sufficient to interfere with learning and impede developing friendships with peers.

When Tommy's transdisciplinary team met to discuss his transition from the early childhood program to kindergarten, there was agreement that communication boards were not capable of meeting Tommy's communication needs in kindergarten. It was apparent that Tommy would need access to more complex vocabulary and language than the boards could provide. Moreover, it was felt that continued use of the boards would delays Tommy's language development. Tests of receptive language indicated that Tommy was slightly behind age level expectations. However, his expressive language skills could not be accurately assessed since he was not able to express complex thoughts either verbally or with the use of communication boards. The transdisciplinary team agreed that Tommy needed an AAC device that would enable him to express himself in complete sentences so that he could fully develop his language skills.

The team made the following recommendations for an AAC device. First, the device had to produce voice output to enable Tommy to participate in verbal activities. Second, since Tommy was preliterate, the device had to be picture-based. However, it needed to have the capacity to accommodate emerging cognitive, language, and literacy skills that Tommy would be developing in the early grades of school. Finally, since Tommy was an active and ambulatory young boy, the device needed to be portable and durable.

The team determined that the device that best matched Tommy's current and future needs was a Dynamite. This device is small and portable. Tommy could take it with him into all but the most rugged or wet environments. It allows for the selection of a high quality, childlike synthesized voice that sounds like a young boy Tommy's age. It also has a dynamic screen that can be programmed

with very simple, concrete picture screens. For example, a main menu screen could be programmed with pictures of drink, food, school, home, toys, and animals. If the picture of drink is selected, the device could be programmed to bring another picture screen up showing all Tommy's favorite drink selections. From this screen, he could indicate which drink he wanted.

Although the simple level of programming could be used to train Tommy on the use of the device and may be adequate to meet his present communication needs, the Dynamite could also be programmed with more complex screens to enable the construction of grammatically complete sentences and with screens that allow the user to type words and sentences. The Dynamite has a word prediction feature that can provide prediction selections that are word based only or word and picture based. This feature could facilitate Tommy's acquisition of advanced literacy skills.

Tommy started kindergarten with a new Dynamite. The special educator and the speech-language pathologist spent several session with the other children in the classroom teaching them how Tommy would be communicating with them and how they would communicate with Tommy. Tommy's teacher took responsibilities for ensuring that Tommy used his new device appropriately in various situations across the day. With input from home and Tommy's teachers, the speech-language pathologist took a lead role in monitoring the vocabulary that was programmed into the Dynamite and adding new vocabulary when needed.

The Dynamite rapidly became Tommy's prized possession. It was the one item that he never forgot to take to school and never forgot to bring home. He quickly learned how to use the various screens to communicate with his peers and his teacher. Not surprisingly, his improved communication corresponded with a marked improvement in his daily behavior. Currently the speech-language pathologist is devising more complex screens that will enable Tommy to formulate complete sentences. Tommy is also beginning to investigate the keyboard screen on his own and is typing and then speaking many of the vocabulary words that his teacher has posted around the classroom.

Source: Thompson, J.R., Beck, A. (1998). Technologies for Communication. In J. R. Thompson, M. E. Wall, & S. M. Winchip (Eds.), *Assistive technology: Competencies and skills for teachers* (Book 3). Normal, IL: University Communications, Illinois State University, pp. 12-13.

Resources

AbleNet Inc.

1081 Tenth Street S.E.

Minneapolis, Minnesota 55414-1312   U.S.A.

Phone: 1-800-322-0956 or 1-612-379-0956   Fax: 1-612-379-9143

Web address: http://www.ablenetinc.com/

Adaptive Consulting Services, Inc.

403-A Hawk Street, Rockledge, Florida 32955   U.S.A.

Phone: 1-800-515-9169

Web address: http://www.augmentative.com/acs-dv2c.htm

American Speech-Language-Hearing Association (ASHA)

10801 Rockville Pike, Rockville, Maryland 20852   U.S.A.

Tel: 1-301-897-5700 or 1-800-638-8255

Email: actioncenter@asha.org

Web: www.asha.org

博愛醫院言語治療部

香港新界元朗凹, New Territories, Hong Kong

Phone: 852-2486-8000   Fax: 852-2443-9593

Web address: http://www.poh.org.hk/speech.htm

Cambridge Adaptive Communication, Possum Controls Ltd.

8 Farmbrough Close. Stocklake, Aylesbury, Bucks HP20 1DQ UK

Phone: +44 (0) 1296-461-002   Fax: +44 (0) 1296-461-107

Email: info@cameleon.com

Web address: http://www.cameleon-web.com/

Canadian Association for People who Stutter (CAPS)

PO Box 444, Succ. N.D.G., Montreal, QC H4A 3P8 Canada

Tel: 1-888-STUTTER (1-888-788-8837)

Web address: http://www.webcon.net/~caps/

Center For Voice Disorders of Wake Forest University

Department of Otolaryngology, Wake Forest University School of Medicine

Wake Forest University Medical Center

Medical Center Boulevard, Winston-Salem, NC 27157-1034 U.S.A.

Phone: 1-336-716-4161   Fax 1-336-716-0385

Web address: http://www.bgsm.edu/voice/index.old.html

Closing The Gap, Inc.

P.O. Box 68, 526 Main Street, Henderson, Minnesota 56044 U.S.A.

Phone: 1-507-248-3294   Fax: 1-507-248-3810

Email: info@closingthegap.com

Web address: www.closingthegap.com

Council for Exceptional Children (CEC)

Division for Children's Communication Development

The Journal of Children's Communication Development

Web address: http://pegasus.cc.ucf.edu/~abrice/jccd.html

Crestwood Company

6625 N. Sidney Place, Milwaukee, Wisconsin 53209-3259 U.S.A.

Phone:1-414-352-5678   Fax: 1-414-352-5679

Web address: http://www.communicationaids.com

Don Johnston Incorporated

1000 N. Rand Road Bldg 115, Wauconda, IL 60084-0639 U.S.A.

Phone: 1-800-999-4660   Fax: 1-847-526-4177

Web address: http://www.donjohnston.com/

Don Johnston Special Needs Ltd.

18 Clarendon Ct., Calver Road, Winwick Quay Warrington, England WA2 8QP

Phone: 44-01-925-241642   Fax: 44-01-925-241745

Email: jmunro@djsn.u-net.com

DynaVox Systems Inc.

2100 Wharton Street Suite 400, Pittsburgh, PA 15203 U.S.A.

Phone: 1-800-344-1778

Web address: http://www.sentient-sys.com

Easter Seals Massachusetts

Technology and Training Centers

89 South Street, Boston, Massachusetts 02111 U.S.A.

Phone: 1-800-922-8290 x 2
Email: info@eastersealsma.org
Web address: http://eastersealsma.org/

Georgia State University
Department of Communication
Phone: 1-404-651-3200
Web address: http://www.gsu.edu/~wwwcom/comm.html

Hong Chi Association Pinehill No. 3 School
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Web address: http://www.intellitools.com/

International Society for Augmentative and Alternative Communication (ISAAC)

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Phone: 416-385-0351   Fax: 416-385-0352

Web address: http://www.isaac-online.org/

International Stuttering Association

Mohrunger Str.17, 40599 Düsseldorf, Germany

Tel: 49-211-74 1585. Fax: 49- 211-7404428.

Email:100605.2720@compuserve.com

Web address: http://www.xs4all.nl/~edorlow/isa.html

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National Center for Disability Services
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National Information Center for Children and Youth with Disabilities
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Speech to Speech (STS)
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Stuttering Foundation of America
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Phone: 1-800-869-8521   Fax: 1-805-266-8969
Web address: http://www.words-plus.com/

Review Questions

For each of the following exercise items, choose the <u>most appropriate</u> answer:

1. What may happen if a person lacks an effective channel of communication?
    - a. frustration.
    - b. misunderstanding.
    - c. lower expectation & underachievement
    - d. all of the above.
    - e. none of the above.

2. **Speech** can be a part of language--the oral production of meaningful sounds to transmit a message:
    - a. True.
    - b. False.

3. Which of the following **IS NOT** always true.
    - a. Language is a system of rules (grammar).
    - b. Language consists of only auditory or sounded symbols (vocabulary).
    - c. Language can be for communication.
    - d. Language can be for displacement.
    - e. Language can be generalized.

4. **Spoken language** can be:
    - a. verbal language.
    - b. nonverbal language.

5. To transfer thoughts, feelings, or ideas from one person to another (**to communicate**) can be by:
    - a. eye contact, gestures, sign language or motor movement.
    - b. speech language.
    - c. written language.
    - d. all of the above.
    - e. none of the above.

6. Which of the following is in a **logical sequential order**?
    - a. receptive effort → expressive effort → information processing effort.
    - b. expressive effort → receptive effort → information processing effort.
    - c. expressive effort → information processing effort → receptive effort.
    - d. receptive effort → information processing effort → expressive effort.
    - e. information processing effort → receptive effort → expressive effort.

7. Asking a child to point to an object is to test his/her:
    - a. receptive language.
    - b. expressive language.

8. Asking a child to name an object is to test his:
    - a. receptive language.
    - b. expressive language.

9. To translate a message from thoughts, ideas, and concepts into commonly understood symbols is:
    - a. decoding.
    - b. encoding.

10. Which of the following is concerning the **word order in a sentence?**
    a. phonological rules.   b. semantic rules.
    c. syntax.   d. morphological rules.
    e. articulation rules.

11. According to Roger Brown, a child, whose syntax level is "holophrasic," may have a **mean length of utterance** (MLU) of:
    a. 0   b. 1.0   c. 2.0   d. 3.0   e. 4.0

12. Which of the following is a **logical match?**
    a. imperative – come, look, see, . . .
    b. denotative – Oh! Ah! En! . . .
    c. denotative – come, look, see, . . .
    d. expressive – Momma (to mean "milk," or "bottle").
    e. imperative -- Momma (to mean "milk," or "bottle").

13. Which of the following is a **logical match?**
    a. functors = have, do, will.
    b. functors = and, that, which.
    c. auxiliary = conjunctions.
    d. auxiliary = "Put box" means "Put the doll in the box."
    e. inflections = have, do, will.

14. At which stage of **MLU** is a child most likely to start using "WH" (what, when, where, why, how) in sentences?
    a. stage I   b. stage II   c. stage III   d. stage IV   e. stage V

15. Which of the following includes a **possessive** word?
    a. "Mommy comes here."
    b. "I see a dog."
    c. "I want my toy."

16. Which of the following has a three-word **"agent + action + agent"** sentence structure?
    a. "Mommy comes here."
    b. "I want my daddy."
    c. "Mary likes children."

17. Which of the following IS (ARE) **nonverbal behavior(s)?**
    a. gesture and facial expression.   b. hand movement/body movement.
    c. use of objects and pictures.   d. a & c.
    e. a & b & c.

18. When teaching students language, we want to promote their:
    a. phonological development.
    b. vocabulary, syntax, & morpheme.
    c. appropriate social language and pragmatics.
    d. a & b.
    e. a & b & c.

19. When enhancing communication of children with disabilities, we need to avoid:
    a. asking questions one at a time.
    b. allowing time for expression of ideas.
    c. talking down to the student.
    d. recognizing deadlocks.
    e. teaching the students' associates what works.

20. According to ASHA, **expressive communication disorders** may include:
    a. Speech impairments.   b. Language impairments.
    c. Writing impairments.   d. a & b.
    e. a & b & c.

21. **Articulation** is about making sounds and **phonology** is about organizing sounds (e.g., vowel sounds, consonant sounds, blending sounds).
    a. True.   b. False.

22. Which of the following is a **logical match**?
    a. Substitution: the child pronounces "ea" for eat and "amp" for lamp.
    b. Omission: the child pronounces "tat" for cat.
    c. Distortion: the child pronounces "schwim" for swim.

23. The sentence, "I am going to school," is to describe a **movement**, while the sentence, "I am going to quit," is to describe a **plan**.
    a. True.   b. False.

24. Which of the following is a compound sentence?
    a. "We found a nickel and dime."
    b. "The duck is delicious to eat."
    c. "I think I need to go to the bathroom."

25. Which of the following is a **logical match**?
    a. content of language includes syntax, phonology, morphology.
    b. form of language includes semantics (vocabulary).
    c. use of language includes pragmatics.

26. Which of the following can be included in a child's daily communication activities?
   a. concept of size, shape, color.
   b. topics of weather and greetings.
   c. concept of money, foods, drinks.
   d. all of the above.
   e. none of the above.

27. When a child speaks with too low or too high **volume** or too high/too low **pitched sounds**, he/she may have a(an):
   a. articulation disorder.
   b. speech flow disorder.
   c. voice disorder.
   d. phonological disorder.

28. **Stuttering** or **influency** is the most common problem of:
   a. articulation disorder.
   b. speech flow disorder.
   c. voice disorder.
   d. phonological disorder.

29. Which of the following will be helpful for speech and language development?
   a. jaw thrusting or tongue thrust.
   b. lip pursing or lip retraction.
   c. tonic biting.
   d. all of the above.
   e. none of the above.

30. To identify erroneous assumptions that block conversation by clarifying or checking information, phrase-by-phrase with speaker is to:
   a. talk "up to" the child.
   b. talk "down to" the child.
   c. recognize a category.
   d. recognize deadlocks.
   e. conclude and close conversation.

31. The statement, "I don't understand. Can you explain to me again?" is usually to deliver the message of:
   a. initiation
   b. comments
   c. social exchange
   d. repair
   e. negatives

32. The statement, "The communicator is not a toy. Please do not play with it." is usually to deliver the message of:
   a. initiation
   b. comments
   c. social exchange
   d. repair
   e. negatives

33. A child who misinterpreted his/her teacher's message may have deficiencies in:
   a. receptive language.
   b. expressive language.

34. A child who made inappropriate choice of words or word combinations to convey compositional or referential aspects of the message may have deficiencies in:
   a. receptive language.
   b. expressive language.

66

35. According to **Jan Van Dijk**, a deaf-blind child who understands simple gesture commands, imitates movements after the teacher finishes movement, and actively searches for hidden object is at the communication level of:

    a. preresonance.   b. resonance.   c. coactive movement.

    d. differed imitation.   e. natural gesture.

36. According to **Jan Van Dijk**, a child who begins to understand and use symbols is at the communication level of:

    a. resonance.   b. reversing.

    c. expressing.   d. expanding.

    e. generative communication.

37. According to **Thomas W. Jones**, a child who **pulls** and **pushes** would **most likely** try to tell about:

    a. hunger and discomfort. b. likes and dislikes. c. "yes" and "no" answers.

38. To select an appropriate adaptation for a student with disabilities to successfully communicate with others, we need to consider the factor(s) of:

    a. motivation.   b. perceptual, motor, and conceptual skills.

    c. linguistic skills.   d. b & c.

    e. a & b & c.

39. Which of the following adaptive systems on a **communication board** or an **augmentative communication device** can be useful for students who are nonverbal and have limited arm movement?

    a. a head pointer or a head set with a pen light.

    b. an autoscanning system for the use of an on-off adaptive switch.

    c. an encoding system for building up a whole picture or whole concept.

    d. a & b.

    e. a & b & c.

40. **Augmentative communication** refers to supplemental communication techniques that are used in addition to whatever naturally acquired speech and vocalization may be present.

    a. True.   b. False.

41. To respond to the teacher's questions by smiling to mean "**Yes**" and turning away to mean "**no**" is to communicate through which of the following **auxiliary systems**?

    a. sign language.   b. finger spelling.

    c. communication codes. d. communication book.

    e. communication aids.

42. The **simple pairing of items** (e.g., 2 numbers or 2 icons of "sun" and "boy") in order to generate messages (e.g., 31=good morning; sun+boy=How are you?) is the:
    a. decoding technique.
    b. encoding technique.
    c. scanning technique.
    d. a & c.
    e. a & b & c.

43. If a student with severe or profound physical disabilities **DOES NOT** understand abstract linguistic symbols, which of the following options would be more applicable for this student to use in augmentative communication?
    a. spoken language.
    b. printed words.
    c. Bliss or Spence symbols.
    d. pictures, photographs and real objects.
    e. manual signs.

44. A pen light or head pointer, an expanded keyboard or touch tablet, and a voice activated device may be an alternative:
    a. input system of assistive technology.
    b. output system of assistive technology.

45. Which of the following may require the **least motor movement** and **skills**?
    a. manual communication.
    b. use of communication aids.
    c. communicative codes.

46. Which of the following may need more extensive training of the audience?
    a. manual communication.
    b. use of communication aids.
    c. communicative codes.

47. Which of the following may have the most limitation to allow students to initiate and respond to communicative attempts?
    a. manual communication.
    b. use of communication aids.
    c. communicative codes.

48. **Minspeak** means:
    a. word and letter prediction.
    b. Echo II voice box.
    c. sign language interpreter.
    d. minimum effort speech.
    e. voice recognition device.

49. The **Dynavox 2** or **Dynavox 2c** is an assistive technology device to be utilized for:
    a. screening reader.
    b. word predict.
    c. communication.
    d. expanded keyboard.
    e. single switch input.

50. The communication aid by **AbleNet**, which can be used to store 12 messages for a total of 4 minutes and 20 seconds of recording time, is the:
    a. SpeakEasy.   b. Cannon Tape Communicator.   c. FingerFoniks.

51. Sidekick is a pocket-size communication aid with:
    a. 4 keys.   b. 8 keys.   c. 12 keys.   d. 24 keys.   e. 128 keys.

52. Which of the following may be arranged to produce recorded or synthesized voices in Cantonese?:
    a. BIGmack™
    b. Step-by-Step™ Communicator 20 or 75.
    c. CheapTalk 4/CheapTalk 8.
    d. CASA.
    e. All of the above.

53. Which of the following by **AbleNet** may allow students to participate in regular classroom activities by using **inner overlay** and an **arrow**, or by a **dice overlay**:
    a. Adaptive switch.   b. IntelliKeys.   c. All-Turn-It Spinner.

54. All **AAC devices** are commercially available, and are always modified and customized for children with disabilities to increase, maintain, and improve functional capabilities.
    a. True.   b. False.

55. **Assistive technology** may include:
    a. Voice synthesizer.   b. Computer screen magnifier.
    c. Enlarged keyboard.   d. All of the above.
    e. None of the above.

56. Which of the following should be implemented as the **first step of all**?
    a. Purchasing, leasing, or otherwise providing for the acquisition of AT devices.
    b. Selecting, designing, fitting, customizing, adapting, applying, retaining, repairing, or replacing AT devices.
    c. Evaluating the needs of a child including a functional evaluation of him/her in the customary environment.
    d. Training and providing technical assistance for the child and professional to use the devices.
    e. Coordinating and using other therapies, interventions, or services.

57. **Team-working** with a speech therapists may be a way to implement:
    a. Purchasing, leasing, or otherwise providing for the acquisition of AT devices.
    b. Selecting, designing, fitting, customizing, adapting, applying, retaining, repairing, or replacing AT devices.
    c. Evaluating the needs of a child including a functional evaluation of him/her in the customary environment.
    d. Training and providing technical assistance for the child and professional to use the devices.
    e. Coordinating and using other therapies, interventions, or services.

58. The effort of using **AAC** devices and services for a child to access school programs and activities, as well as to be educated in the least restrict environment, is to:
    a. Fulfill his/her educational needs.
    b. Fulfill his/her educational wants.

59. **Assistive technology** may:
    a. Enable persons with disabilities for them to be more independent, self-confident, and productive.
    b. Lessen the impact of disabilities on a child, e.g., physical demands, stress.
    c. Increase social interaction and acceptance among peers.
    d. All of the above.
    e. None of the above.

60. **Alternative and augmentative communication (AAC)** devices should be used only to permanently compensate for the disability patterns of a person with severe expressive communication disorders.
    a. True.   b. False.

Answer:

1. d	2. a	3. b	4. a	5. d	6. d	7. a	8. b	9. b	10. c
11. b	12. a	13. b	14. c	15. c	16. c	17. e	18. e	19. c	20. e
21. a	22. c	23. a	24. c	25. c	26. d	27. c	28. b	29. e	30. d
31. d	32. a	33. a	34. b	35. d	36. b	37. b	38. e	39. e	40. a
41. c	42. b	43. d	44. a	45. c	46. a	47. c	48. d	49. c	50. a
51. d	52. e	53. c	54. b	55. d	56. c	57. e	58. a	59. d	60. b

Suggested Activities

The following suggested activities for further learning and enrichment are adopted and revised from Poon-McBrayer and Lian (2002, pp. 166-167):

1. Keep a diary for several days. Describe ways messages are sent and received. Speculate about the cause of breakdowns and identify communication barriers.

2. Select and research a type of the speech and language impairments (voice, articulation, fluency, form, content, and use problems).

3. Locate a teacher or speech therapist of children with speech or language impairments and ask him/her to record a lesson with a child with any of those disorders. Borrow the tape and listen to it. Try to identify the type(s) of impairment(s) and the age of the child. Write a short paper to report to class about how the language sample differs from the language of a typically developing child.

4. Locate a teacher or speech therapist of children with communication disorders and ask him/her to let you observe a teaching or therapy session or an assessment session. Record and discuss your observations about the lesson or the assessment instruments used, the intervention strategies applied, and the child's behavior.

5. Research the prevalence rate of speech and language impairments in Hong Kong and the types of services including AAC available for those children.

6. Identify one area of curriculum (e.g., mathematics: division; reading: comprehension; science: photosynthesis), discuss the importance of language—teachers' language, students' language, language of the subject's content—for each curricular area. Brainstorm different words and language structures for each curricular area and ways for these items to be adjusted to match the language abilities of the child.

7. Work in small groups of four to five to devise guidelines for teachers to follow in making adaptations for more successful communication in the classroom.

8. Design an advertising campaign to heighten public awareness of the new opportunities via the use of AAC devices and techniques.

9. Work in small groups of four to five to devise guidelines for consumers with communication disabilities and their families to follow when making decisions about specific AAC devices to develop or purchase.

10. Continue to acquire up-to-date options for AAC through contemporary literature review, search on internet, site visits and collaborative interactions with other AAC users or service providers.

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Author Index

AbleNet   40, 44, 56, 69
Arvidson, L.   i, 27-28, 73
American Speech-Language-
   Hearing Association (ASHA)
   30, 52, 56, 72

Baumgart, D.   i, 27, 72
Beck, A.   4, 25, 30, 50, 53-55, 75
Beukelman, D.   27, 30, 72
Bonar, A.M.   28, 75
Brown, L.   16-17, 72
Brown, R.   10-12, 64, 72

Cambridge Adaptive
   Communication (CAC)   43, 56
Chan, S.Y.   2, 72
Cheney, G.A.   26, 72
Communication Technology
   Camp (CTC)   9-10
Craft, R.   28, 72
Crestwood Company   45, 57

DeCoste, D.C.   27, 72
Don Johnston, Inc.   41, 57
Duris, A.L.   39, 72

Franklin, K.   30, 72
Fraser, B.A.   26, 72
Fuller, D.R.   i, 27-28, 73

Glennen, S.   27, 72

Hallahan, D.P.   28, 72
Hammill, D.D.   15-17, 72
Hamre-Nietupski, S.   31-36,
   49-50, 74

Hawkridge, D.   27, 72
Helmstetter, E.   i, 27, 72
Hensinger, R.N.   26, 72
Holly.com   45
Hresko, W.P.   15-17, 73
Heward, W.L.   24, 26, 72-73
Ho, H.C.   27, 73
Hsu, Y.C.   27, 73

John F. Kennedy Centre   47, 59
Johnson, J.   i, 27, 72
Jones, T.W.   8-9, 67
Jorgensen, C.M.   27, 74

Kaderavek, J.N.   28, 73
Kauffman, J.M.   28, 72
Kent, L.R.   17-19, 73

LAB Resources   40-41, 59
Larsen, S.C.   16-17, 72
Lartz, M.   25, 73
Lazzaro, J.J.   27, 73
Li, K.W.   25, 27, 73
Lian, M-G.J.   i-ii, 2, 5, 19, 23-28,
   30-31, 36-37, 48, 71, 73-74
Lindsey, J.D.   27, 73
Lloyd, L.L.   i, 27-28, 51-52, 73
Lucksson, R.   27, 74

Male, M.   27, 74
Marge, M.   28, 74
Mayer-Johnson, Inc.   39, 43, 59
McMullen, V.B.   6, 74
McSheehan, M.   27, 29, 74
Mintz, B.   50, 74
Mirenda, P.   24, 54

Subject Index