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A Cognitively-Based Communication Curriculum for Persons with Multiple Handicaps Functioning Between 0-24 Months Developmentally

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A COGNITIVELY-BASED COMMUNICATION CURRICULUM FOR PERSONS WITH MULTIPLE HANDICAPS FUNCTIONING BETWEEN 0-24 MONTHS DEVELOPMENTALLY

BY
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This curriculum is dedicated to my husband, Bob, who supported me throughout its development and to our son, Ronnie, who successfully completed the curriculum as it was in the final stages of being written.

ABSTRACT

This curriculum is designed to provide appropriate communication programming for the multi-handicapped student functioning at a developmental age of 0-24 months. It is conceptually based on the developmental theory of Piaget and the movement-based model of communication of van Dijk. Goals included are the development of causality, object permanence, and imitation as well as receptive and expressive language development.

Information is given on how to assess individual children and how to adapt the curriculum to meet their special needs.

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CHAPTER ONE

Introduction

Teachers of the multi-handicapped have generally labored without the benefit of adequate curricula. This has resulted in haphazard education and training. Because many multi-handicapped students have unique combinations of sensory, physical, cognitive, and communicative deficits, at first glance, they may appear to be extremely low-functioning. However, these students do have the potential for growth if these deficits are adequately addressed. Educational programming for the multi-handicapped needs to be approached from two viewpoints: that of development (Uzgiris & Hunt, 1975) and that of function (Brown et al., 1979). Systematic efforts are needed to move the child up the cognitive ladder and to provide a functional communication system that is recognized by important persons in that child's environment.

Education of the Multi-handicapped

With the advent of the Education for All Handicapped Children Act (P.L. 94-142) in 1975, a large number of multi-handicapped children who had not previously received services

were brought into the educational system. These children had been excluded from school on the grounds that such children were "unable to profit" from school attendance (Abeson, 1972). Because multi-handicapped children have two or more of the following handicaps in any combination: blindness or visual impairments; deafness or hearing impairments; cerebral palsy and/or other orthopedic handicaps; mental retardation; seizure disorders; and attentional or other behavior deficits, they are not usually able to follow the regular elementary and secondary school curricula. Since P.L. 94-142 mandates that "every school system must make provision for a free appropriate public education for every child between the ages of 3 and 21, regardless of how, or how seriously, he or she may be handicapped," (Hallahan & Kauffman, 1978, p. 22) there is a need for curricula to address a variety of skills not previously included in most school districts' curricula. Although regular school curricula may be appropriate for some multi-handicapped students, the majority of multi-handicapped children begin school at skill levels far lower and with needs that are very different than those of their non-handicapped peers. The more severely and profoundly multi-handicapped student may still be functioning at an infantile level in many areas when he/she first enters school.

Language Development in the Multi-handicapped Child

Most language curricula begin at levels which are too high or have gaps in their provisions for the lower levels of development. This is perhaps because symbolic language is thought to begin toward the end of Piaget's sensorimotor stage--substage 6, inventions of new means through mental combinations (Gallagher & Reid, 1981). For the purposes of this curriculum, it needs to be recognized that communication begins at birth and is not merely a maturational process (Enright, 1977). Movement through the sensorimotor substages to the point of symbolic language is dependent upon physical and social experiences. One or more of the multi-handicapped child's sensory and/or motor channels for experience are abnormal. As a result, her/his social experiences are abnormal as well. Because of this, programming must begin at the point where normal development deviated (Anderson, 1978). The educator, then, attempts to help the child give meaning to unstructured and possibly distorted perceptions and movements. Physical and social experiences must be structured for the child and anticipatory behavior encouraged (van Dijk, 1965).

This curriculum relies on the developmental theory of Piaget (1952) and on van Dijk's (1965) movement-based model of communication. Piaget's sensorimotor stage outlines normal cognitive development in infancy. Most multi-handicapped children's progress through the sensorimotor substages is

delayed because of the difficulty they have in interacting with the environment. In order to facilitate the multi-handicapped child's progress through these substages, adapted activities to increase the variety of sensorimotor experiences available to them must be provided. Likewise, even though van Dijk's model was developed for use with deaf-blind students, it also needs to be adapted for use with the severely multi-handicapped population (Stillman & Battle, 1984). Many students in this population function in more than one of the sensorimotor substages and more than one of the van Dijk levels because certain sensory and/or motor deficits make the development of particular skills and therefore, the cognitive structures associated with those skills, difficult or impossible to obtain. So it is possible that a student may not have a clearly established concept of object permanence partly because of visual impairment (Fraiberg, 1977), but may have developed a means for achieving environmental events (Fieber, 1978). The same student may also be at the level of prompting in one situation and demonstrate imitative skills in another situation. This necessitates reinforcement of the more highly developed skill and remediation of the less developed skill.

Piaget's Sensorimotor Stage

Piaget's sensorimotor stage consists of six substages (Enright, 1977). See Table 1 for specific examples. (Portions of the information in Table 1 are cited from Enright, 1977; DuBose & Robinson, 1978; Gallagher & Reid, 1981.) The first substage is the reflexive substage and it is characterized by uncoordinated spontaneous action. The early reflexes for sucking, grasping, kicking, and crying are repeated over and over until these random movements eventually become refined and voluntarily controlled. These refined movements become the child's first habits in the second substage, primary circular reactions. During this time, the child repeatedly performs reflexive activities with the emphasis being on the child's body and the sensations experienced. Objects are viewed in terms of the action the child relates to them. The child will also begin to repeat movements which create novel events during this substage. Eye-hand and ear-hand coordination begin to emerge with the increased number of sensorimotor events the child encounters. During the third substage, secondary circular reactions, the child grows more proficient in reproducing interesting environmental events through repetitive behavior. Objects are explored with the emphasis being on the object's characteristics rather than the child's body. By the end of the first year of normal development, the child is in the fourth substage, coordination of secondary schema.

Table 1

Cognitive Skill Development in the Sensorimotor Stage

Sensorimotor Stage	Object Permanence	Causality/ Means-Ends	Spatial Relationships	Imitation
Reflexive	Visual pursuit of an object through 180° arc	Reflexive grasp	None	May cry if other infants are heard crying
Primary Circular Reactions	Maintains gaze at the point of an object's disappearance	Hand watching behavior Repeats movement which produces an interesting effect Visually directed grasp Uses same motor schemes with a variety of objects Signals for the continuance of an activity	Switches gaze from one object to another	May show motor recognition of a familiar movement but does not imitate

Table 1 (continued)

Cognitive Skill Development in the Sensorimotor Stage

Sensorimotor Stage	Object Permanence	Causality/ Means-Ends	Spatial Relationships	Imitation
Secondary Circular Reactions	Looks for object at the point of expected reappearance Visually searches for an object dropped out of view Uncovers a partially hidden object	Moves toward object that is out of reach Uses a simple tool to obtain an object or effect	Visually follows a rapidly moving object Retrieves objects behind her/him	Imitates familiar movements which he/she can see self perform

Table 1 (continued)

Cognitive Skill Development in the Sensorimotor Stage

Sensorimotor Stage	Object Permanence	Causality/ Means-Ends	Spatial Relationships	Imitation
Coordination of Secondary Schema	Finds object that has been visibly covered by one of two or three screens	Removes obstacles to obtain object Uses adult as a resource for obtaining desired effects	Beginning understanding of near-far; back-front; in-out	Imitates familiar movements which he/she cannot see self perform Imitates unfamiliar movement which he/she can see self perform by gradual approximations

Table 1 (continued)

Cognitive Skill Development in the Sensorimotor Stage

Sensorimotor Stage	Object Permanence	Causality/ Means-Ends	Spatial Relationships	Imitation
Tertiary Circular Reactions	Finds object that has been invisibly covered by one of two screens Finds object that has been invisibly covered by one of three screens	Attempts to activate toy after demonstration Uses tools to solve spatial problems	Brings two functionally related objects together Empties container by dumping Builds a tower of 2-3 blocks	Imitates unfamiliar movements which he/she can see self peform directly Imitates unfamiliar movements which he/she cannot see self perform by gradual approximation

Table 1 (continued)

Cognitive Skill Development in the Sensorimotor Stage

Sensorimotor Stage	Object Permanence	Causality/ Means-Ends	Spatial Relationships	Imitation
Invention of New Means Through Mental Combinations	Searches for lost objects which may not have been seen for a period of time	Solves problems through foresight without trial and error behavior Infers cause and effect	Moves around obstacles to gain object that has been removed from view	Imitates unfamiliar movements which he/she cannot see self perform directly

The child is consistently performing intentional behaviors and combining behaviors to gain a desired object. Active search behavior and a beginning understanding of spatial relationships is seen during this time. In the fifth substage of the sensorimotor period, tertiary circular reactions, the child's repertoire of behaviors increases greatly with the child using trial and error patterns to explore. The beginning of formalized language use is seen during this period. In the final substage, invention of new means through mental combinations, representational thinking emerges as well as simple problem solving. During this substage the child begins to use tools to act upon objects and demonstrates an understanding of the functional use of objects. This substage is the transitional stage into Piaget's second period of cognitive development, the pre-operational stage.

Van Dijk's Movement-based Model of Communication

According to Myklebust (1964) there are three important prerequisites to language development: 1) identification with another human; 2) imitation; and 3) internalization, mental representation, or imagery. Van Dijk's (1965) communication model incorporates all of these (Robinson, 1975). See Table 2 for specific examples. (Portions of the information in Table 2 are cited from Sternberg, Battle, & Hill, 1980; Sternberg &

Table 2

Receptive and Expressive Communication Skill Development

van Dijk Level	Receptive Communication	Expressive Communication
Nurturance	Random body movements repeated with focus on own body Behavior changes in response to environment	Undifferentiated cry
Resonance	While in physical contact with another, responds to cues by participating in movement Repeats actions with objects; focus on object	Recognizes familiar persons and objects Participates in familiar activities Signals for continuance of activity
Co-active Movement	Anticipates next step in a sequence Comprehends tactile signals (touch communication)	Initiates familiar action with model presenting initial position Uses many signals for continuance of activities Imitates a sequence of activities with model present

Table 2 (continued)

Receptive and Expressive Communication Skill Development		
van Dijk Level	Receptive Communication	Expressive Communication
Non-representational Reference	Understands simple gestural commands Anticipates a routine event from environmental cues Understands object name if object is present	Imitates activity with a model presenting initial position Imitates new movements Points to desired objects Has gestures/words that are situation specific
Natural Gesture	Understands object name without object present	Has gestures/words that are generalized across situations Use gestures instead of pointing

Owens, 1985.) The first stage in this model is that of nurturance, which is described as communication through love and touch (Robinson & Van Eck, 1976). It helps the child develop trust in the care-giver which is necessary if the child is to emerge from her/his world of self-stimulation. During this stage the child is only passively involved and the care-giver is seen as a source of pleasure. The next stage is one which involves the resonance phenomena. Resonance is a "spontaneous and habitual activity of the child which the teacher observes and then actively performs with the child" (Robinson, 1975, p. 27). The teacher and the child are in the same body plane, child's back to teacher's front, and touching during this activity. The resonance phenomena is the basis of co-active movement and imitation. The teacher imitates a self-stimulating and pleasurable activity of the child; then, gradually the relationship and the performance of the activity with the teacher are also seen as pleasurable. When this situation is firmly established, the teacher moves the child into the co-active sequence.

During the co-active movement sequence the teacher and the child are in parallel body planes, side by side, and together move through a series of gross motor activities which the student is already able to perform. The first activity and the last activity of the sequence are the previously established movement used with the resonance phenomena. The teacher performs the resonance phenomena activity and then

includes additional gross motor activities one at a time. After repetition of the same sequence day after day, the child begins to anticipate which activity follows another. Co-active sequences may grow more complex with the inclusion of more difficult motor activities, an increased student-teacher distance, and the introduction of objects into the sequence as the child progresses. A pause may be introduced into the middle of the sequence to allow the child to anticipate the next activity. Co-active movement is followed by non-representational reference.

Non-representational reference involves an increasing awareness of body image and the use of pointing behaviors. It involves a beginning understanding of same, but separate. At first, non-representational reference is presented co-actively. With the child's hand, the teacher points to or touches a part of her/his body and then has the child point to or touch that same part of her/his body. The sequence is varied to prevent rote learning. Initially, non-representational reference is done with body-to-body reference. Later, the child may progress to using a clay model, a doll, a life-size drawing, or a smaller stick figure. Non-representational reference may also be done with objects. Both the teacher and the student have identical objects in front of them. The teacher points to or touches an object with the child, then the child points to or touches a similar object.

At this point the child is ready to begin imitation and matching activities. The beginning activities used for imitation are the same as those used in the co-active movement sequence. At first, the teacher provides verbal and physical positioning cues. Eventually after experiencing the model, the child is able to position herself/himself and perform the activity. Later the child will be asked to imitate: two consecutive movements; previously unknown movements; movements involving objects; movements from a non-representational reference; and limb positions. The ability to match identical objects is developed at this time and is followed by sorting, sequencing, and object-picture matching activities.

Representational reference is the relation of one representational form to another. Matching representational forms requires the conceptualization of concrete objects not immediately present. The child should be able to match one picture to another and to complete unfinished pictures with a model present. Representational reference prepares the child for the use of natural gestures, sign, or speech. At this point the child possesses the skills necessary for language development.

Each of the activities in the van Dijk model is appropriate during one of the different sensorimotor substages (Day, no date). Table 3 illustrates the relationship of each

of the van Dijk levels to the sensorimotor substages. (Portions of the information in Table 3 are cited from Day, no date).

Proposed Curriculum

Any curriculum for the multi-handicapped population should be referenced not only to cognitive and communicative assessments, but to functional vision, hearing, and motor assessments as well (Byren & Joyce, 1985). The results of such assessments "provide a behavioral profile of assets and deficits as a starting point for remediation" as stated by Clarke & Clarke (cited in Dubose & Robinson, 1978) as well as information pertaining to specific adaptations which need to be made because of the student's unique combination of sensory and motor deficits. This may include such adaptations as the use of a particular site of visual presentation because of a field loss, the use of a Phonic Ear to provide auditory stimulation at an increased decibel level without background interference, or the positioning of a microswitch to allow the student to have a means of acting upon her/his environment. The needs of the individual multi-handicapped child dictate the writing of specific behavioral objectives modified to meet that child's special needs. (For more information on functional assessment see Appendix A.)

Table 3

Developmental Age as Related to Sensorimotor Substages and van Dijk Levels

Developmental Age in Months	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Sensorimotor Substage	1	1	2	2	2	3	3	3	3	3	4	4	4	5	5	5	5	6	6	6	6	6	6	6	6
van Dijk Level	Resonance					Co-active Movement					Non-representational Reference							Natural Gesture and Symbolic Representation							

This curriculum provides a sequence of activities designed to help develop cognitive and communication skills in severely and profoundly multi-handicapped individuals who are functioning between 0 and 24 months. The following subskills are included: 1) The Understanding of Cause and Effect Relationships. This is addressed because without this understanding, communication is impossible; the child must expect that her/his communication will have an effect on her/his environment. 2) The Development of Object Permanence. In order for a child to communicate about an object, he/she must be able to conceptualize it when it is not present within her/his sensory field. 3) Imitative Skills. Imitation is the method of learning most frequently used by young children without handicaps; most developmentally delayed children, however, have not developed the awareness and involvement with the outside world to accurately observe and imitate. They need systematic instruction in imitation (Robinson, 1975). 4) Receptive Language Skills. Included skills are the ability to associate meaning with and to respond to communicative attempts in such a manner as to indicate some discriminate language decoding skills. 5) Expressive Language Skills. Skills included are the ability to communicate several states of pleasure and displeasure, to indicate wants and needs, and to name common objects, persons and events.

Conclusion

This curriculum endeavors to fill the need for appropriate communication programming for the multi-handicapped student functioning at a developmental age of 0-24 months. It is conceptually based on the developmental theory of Piaget and the movement-based model of communication of van Dijk. By addressing the cognitive structures involved in the development of causality, object permanence and imitation, it is hoped that use of this curriculum will help students gain the necessary skills to obtain a functional communication system.

CHAPTER TWO

> Communication is a self-initiated and spontaneous signalling behavior which occurs in an interactional process and provides a means to create shared understanding or meanings between persons. Communication can occur through the use of various nonverbal signals (e.g., gestures, facial expression, eye contact, action) and/or vocal signals (e.g., vocalizations, crying). Vocal symbols, that is, spoken language, may also be used as a means of communication. Language is a rule-governed system whereby meaningful intentions are represented through arbitrary, socially agreed upon symbols which serve, primarily, the purpose of communication (Byren & Joyce, 1985, p. 9).

As stated in the rationale, many types of communication are present before symbolic language occurs. The goal of a pre-language curriculum is to move the child to the point where symbolic language can be learned. In early infancy, most communication reflects feelings rather than intends an affect upon the environment (Bloom & Lahey, 1978). The child is reactive to or co-active with her/his environment. It is only gradually that the infant's early linguistic behaviors are assimilated and adapted to a conventional system of language.

In the latter part of their first year, infants begin to communicate more intentionally. Prerequisite skills needed for such communication include: 1) reciprocal gaze,

2) regulation of the behavior of others through gesture, facial expression, and non-linguistic vocalization, and 3) the calling of attention to objects and events, first by the showing and giving of an object, and later by pointing.

Matching Cognitive, Perceptual and Communication Abilities

Since the multi-handicapped child has difficulty assimilating and accommodating environmental events because of sensory and/or motor deficits, he/she may become "stuck" at an early level of communication development unless the environmental events are made meaningful. Van Dijk (1965) states that many deaf-blind multi-handicapped children continue to function at a reflexive level because their environment has not been organized and integrated. Since many of the basic concepts used in language are built upon motor patterns that are present in the reflexive stage, his theory emphasizes learning through motor movement. While this method has been used successfully with non-physically handicapped multi-impaired children, it must be adapted for use with the multi-handicapped child with motor impairment (Sternberg, Battle, & Hill, 1980). When primitive reflexes cannot be integrated for the attainment of normal movement and locomotion, non-conventional movements such as upward/downward movement of the eyes or tongue clicking must be accepted as signal

communication. What is needed for each student is a cognitive match (Hunt, 1960), a perceptual match (Fraiberg, 1977), and a communication match (Fieber, 1978).

In examining the relationship between meaningful expressive language and cognitive functioning, Kahn (1975) found that there was a strong correlation between the attainment of substage six functioning and expressive language output. Substage six functioning includes the invention of new means through mental combinations, the beginning of representational thought and simple problem solving. During this substage the child begins to use tools to act upon objects and demonstrates an understanding of the functional use of objects. Kahn states that if adequate assessment is not done to indicate that a child has achieved at least some substage six skills, then both the student's and the teacher's time may be wasted in the presentation of language activities for which the child is not yet ready. If a child is not yet functioning at substage six, she/he needs to be receiving systematic instruction directed toward raising her/his cognitive level.

Magin's (no date) Assessment for Language provides a method for collecting data about a child and then using that data to determine through what modality the child can best be stimulated and taught. Knowing how a child is forming concepts, gives an intervener additional information to consider when developing an individualized instructional

program for the child. Hamre-Nietupski, Nietupski, and Rathe (1986) also advocate the use of a data-based system. They outline a method for selecting nonverbal communication systems for severely handicapped students based on student characteristics. This includes evaluation of the student's environmental needs for language, the student's physical capabilities, and the cost and ease of use of various communication systems.

Pre-language Programming

In the past ten years a great deal of attention has been focused on language development in the severely handicapped (Guess, Sailor, & Baer, 1976; Bricker & Dennison, 1978; Sternberg, 1982). Because many severely multi-handicapped persons are unable to communicate using formal language systems, programming for communication must often begin at a point where communicative intentions are fostered (Sternberg, Battle, & Hill, 1980). Activities involving an individual's control of her/his environment may be necessary for those who are conceptually unable to separate themselves from their environment (Harris-Vanderheiden & Vanderheiden, 1977). These activities emphasize the object's characteristics rather than just the sensations of the child.

Van Dijk (1965) activities are designed to help the student understand 1) that he/she is separate from his/her environment and 2) that he/she can communicate about the people and objects present in that environment. Sternberg and Owens (1985) investigated the use of co-active instruction with three severely multi-handicapped individuals. All three subjects showed an increase in co-active performance of the targeted behavior. One of the subjects moved from the level of imitating a repetitively produced signal to imitating a singly produced signal and then to self-production of the signal and initiation of the behavior. Despite this success, problems in defining appropriate target behaviors and the fact that these behaviors may have been situation- and person-specific limits the generalizability of this study.

Sternberg, McNerney, and Pegnatore (1985) also investigated the effectiveness of co-active movement sequencing with three severely multi-handicapped individuals. Results indicate that the subjects showed an increase in production of the targeted behaviors and that the subjects generalized the use of these imitative behaviors to other persons. However, research design flaws (no baseline with other persons) preclude a definitive statement being made about generalizability. Also, these authors exhibited the same problem as did Sternberg and Owens (1985) in defining appropriate target behaviors. There should be some concern about the amount of

time used to teach somewhat non-functional motor behaviors to students who have limited repertoires. Meaningful movements should be used in the co-active sequence whenever possible.

Each of these last two studies examined pre-language programming for severely handicapped individuals functioning at the co-active level, but instruction is also needed by other multi-handicapped individuals functioning at both higher and lower levels than this. The Colorado School for the Deaf and the Blind has published A Prelanguage Curriculum Guide for the Multihandicapped (Farrell & Sherman, Eds., 1978). Its instructional activities begin at the level of resonance and move through the levels of co-active movement, non-representational reference, representational reference, and natural gesture. Explicit directions as to instructional techniques are given at each level. It does assume, however, that there is no physical defect which prevents the child from being manipulated through the motor movements described.

The type of programming just discussed is almost in direct opposition to the more prevalent type of intervention currently in use with multi-handicapped students. If a student has not reached substage six functioning, the programming that he/she is most likely to receive is infant stimulation. The Portage Guide to Early Education (Bluma, Shearer, Frohman, & Hillman, 1976) is a well known curriculum guide for early childhood special education that provides

programming instruction beginning at zero months functioning. It stresses an enriched environment for the delayed child and is organized by developmental milestones. However, it does not provide adaptations for the child with sensory and/or motor deficits. The American Printing House for the Blind has developed a sensory stimulation kit for the multi-handicapped. It, too, provides programming from zero months on. Both of these provide instructional sequences in which the child is passive rather than active. At the earliest levels, stimuli such as light and sound are presented to the child rather than the child interacting with the environment.

Lanconi (no date), on the other hand, strongly discounts the idea that increased stimulation or contingent reinforcement is effacious in intervention with multi-handicapped children. He believes that satiation and a decrease in the drive to develop new forms of behavior will result from the use of such procedures. Instead, he advocates a structured training approach and the use of certain behavioral techniques. He describes how to assess sensory capabilities, how to define reinforcers, how to select and train appropriate responses, and how to reduce deviant behaviors.

Types of Communication Systems

The decision as to which communication system is best for a particular individual is determined by many things. Silverman (1980) outlines an evaluation procedure which requires that six questions be answered.

1. What is the cause of the person's communicative disorder?
2. How does the person communicate at present?
3. What are his communication needs?
4. What is his inner, receptive, and expressive language status?
5. Of the existing nonspeech communication systems, which would it be possible for him to use?
6. Of the systems he could use, which system (or combination of systems) would be optimal for meeting his communication needs? (p. 175)

The answers to these questions help the interdisciplinary team involved with the child decide which system will provide the child with the greatest functional use of language.

Speech

Some multi-handicapped individuals are capable of using vocalizations as their major means of communication. Language intervention programs involving speech usually are organized by developmental milestones and focus on receptive and expressive vocabulary (Bricker & Bricker, 1970). Wehman and Garrett (1978) reported the results of the field testing of such a program (Bricker, Dennison, Watson, & Vincent, 1973). Beginning skills in this language intervention program include attending, motor imitation, and function of

object use. Of the 21 students involved in this study two-thirds were at one of the beginning levels when instruction started. Of this group almost 80 percent advanced one or more levels while intervention was taking place. Of the other third of the group who began at higher skill levels, 100 percent advanced one or more levels, with the average level increase being six. This program appears to be of the greatest use in facilitating the development of language skills in severely and profoundly, multi-handicapped students who are already capable of verbal imitation. The authors comment that there are targeted sounds or words in each level, and that if the child learns only the targeted responses, he/she may not have really acquired that level of language. Because of this, they emphasize that language training be integrated throughout the day with both targeted and non-targeted responses from a given level being taught. It was also noted that there was no control group in this program and since one-third of the students were receiving training in manual communication at the same time, there may have been some interaction between the two training programs.

Seitz and Hoekenga (1974) reviewed the results of a program emphasizing supportive play therapy and the use of modeling techniques. In this study therapists worked with each of the four subjects in a playroom while the parents observed. Therapists commented on child activities, expanded and interpreted child utterances, and suggested appropriate

activities for six sessions. Parents were then asked to take part in the play sessions. All subjects showed an increase in total utterances and the mean-length of utterance. In addition, the number of appropriate Wh-questions asked by parents increased. This interactional type of model is considered highly effective in increasing the expressive language output of developmentally delayed children (Spradlin & Siegel, 1982).

Gestural Modes of Communication

The use of gestural modes of communication in the education and training of individuals with normal hearing, but severe, profound, and multiple handicaps has increased greatly in the past ten years (Fristoe & Lloyd, 1978). The most commonly used systems are: American Sign Language (Ameslan)--these signs are used, but they are most commonly used with English sentence structure; Signing Exact English (SEE) and American Indian Language (Amerind) (Goodman, Wilson, & Bornstein, 1978).

Hobson and Duncan (1979) attempted to determine the amount of sign language that could be taught to profoundly retarded individuals in a six week period and the amount of retention they would show after a similar period of time. Results showed an increase in expressive vocabulary in all

subjects and significant retention. It was also noted that all of the subjects showed increased vocalizations by the end of the study.

Anderson (1978) described a hierarchy of communication understanding for pre-language children. This hierarchy is applicable regardless of the communication mode, but is especially useful in the development of receptive understanding of sign language. Included are: 1) On-the-body touch cues or contact communication (Costello, 1973). This type of communication is actually a system of tactile signals which directs the child's attention to the part of the body where something important is happening. 2) Situational cues. The use of situational cues occurs when the child develops an expectation that a specific event will occur based on the reliability of familiar routines. 3) Natural gestures. These are easily understood, naturally ocurring, in-context gestures which demonstrate the action or function of an object or person. 4) Symbols. These are actually formal, representational language. They include speech, sign, or the use of an assistive communication device.

Reichle, Rogers, and Barrett (1984) suggested a system of instruction for learners beginning to use symbolic language. Their study involved teaching a severely handicapped adolescent to encode three classes of intentional communication (requesting, rejecting, and commenting) using sign language. This involved teaching object/person signs, and the signs

want and no. Want + object/person was considered a request; no + object/person was considered a rejection and any object/person named on its own was considered a comment. The learner showed significant success, after numerous training trials, in spontaneously producing requests, rejections and comments.

In addition to the communicative functions involved, several other factors must be considered in determining a multi-handicapped child's sign vocabulary. Visual or tactile iconicity is one factor to be considered. Iconicity was defined by Griffith, Robinson, & Panagos (1983) as "the associations made by a learner between a sign and its meaning that help the learner recall the sign" (p. 27). Visual iconicity is of concern with sighted learners and with visually impaired learners who have some usable vision. Tactile iconicity is of importance to blind and deaf-blind sign learners. Griffith, Robinson, and Panagos' (1983) study gives a ranked order of tactile iconicity for common signs based on their presentation of these signs to thirteen blind subjects. Another factor to be considered is the motoric requirements necessary to produce a sign (Kohl, 1981). There may be several ways of producing a sign, one of which may be physically easier; there also may be signs which have essentially the same meaning, but one sign may be easier to produce. Other considerations include how to teach signs with very different meanings which may look and/or feel very

similar and how to develop a gestural communication system for a learner who is physically incapable of producing any formal signs.

Assistive Communication Devices

Because the use of assistive communication devices require the use of movements over which the child has voluntary control, it is necessary to assess the child's ability to repeat movements on command or following demonstration (Chin, 1979). If a communication board is used, one of the three common approaches may utilize these voluntary movements. A scanning technique involves the presentation of choices, in the form of concrete objects, pictures, symbols or words. If a non-mechanical aid is used, the person trying to communicate with the child may point or tactilely present each choice and the child will indicate yes in some manner when the desired item is reached. When an electro-mechanical aid is used the child activates a microswitch through some voluntary movement and the device will begin indicating choices either through a pointer or a light appearing behind the choice. When the desired choice is reached the child de-activates the microswitch.

An encoding technique involves the indication of a desired choice by use of a pattern or code of signals. The system used may be the alphabet, the Morse code, a number or

color system, or a pictorial code such as rebus or Blissymbols. This requires the ability to agglutinate, that is to combine symbols in patterns where the meaning is different than that of the individual parts.

Direct selection is a technique in which the desired choice is indicated directly by the user. There is a means available in direct selection for immediately identifying a desired choice. This includes pointing with a limb, using a head pointer, eye pointing, or using a variety of switches.

Reid and Hurlbut (1977) reported the results of a study which involved teaching four severely physically and mentally handicapped adults to use direct selection with a communication board. They used a two-step training system which included coordination training and object identification training. All four subjects were able to identify, through pictures, leisure activities in which they desired to take part with high consistency after training was completed. Responses were generalized across a number of trainers.

A variety of electro-mechanical aids have been used with the multi-handicapped. Hagen, Porter, and Brink (1973) described the use of an auditory system in which each of a number of clicks intended a certain message. They reported moderate success with a wide range of spontaneous use by subjects. They speculated that differences in use might have been reflective of underlying differences in intellectual capacity or in motivation and perceived need to communicate.

Elder and Bergman (1978) discussed the result of a visual system using Blissymbols and series of lights to teach eye pointing. They reported significant success in rapidity of learning and retention of symbols, but they did not give any indication of how this system might be used as an independent, expressive communication system.

Review of Curricula

Several state schools for the blind and other agencies which serve deaf-blind and multi-handicapped children have published curricula. However, many of the programs written for the deaf-blind which begin at the levels of resonance and co-active movement assume the eventual communication system used will be a formal sign language which may require motor acts a physically handicapped person is not capable of performing (New York University, 1981; Hedrick, Kemp, & Thompson, no date). Likewise, curricula for the retarded and/or blind child, do not take into account concomitant handicapping conditions, but are set up to follow the normal development of speech (Makahon, field test version; Governor Moorehead School, 1984). Robinson and Fieber (1974) have developed a sensorimotor assessment and curriculum based on the work of Piaget which attempts to deal with these problems. This assessment and curriculum is an adaptation of Uzgiris and Hunt's (1975) infant assessment scale. It is set

up with ordinal, not normative, milestones and is applicable to almost all children functioning at the sensorimotor level. It is highly visual, but some adaptations are provided for the child with sensory deficits. The scale assesses basic sensorimotor schemes on several levels and differentiates between skill and concept development. Emphasis is placed on presenting the proper level and mode of communication to the child who may be functioning at several different cognitive, motor, and communication levels. Based on case studies done at Meyer Children's Rehabilitation Institute, the assessment and curriculum are presented as research, making them somewhat difficult to implement in the classroom in their present form.

Also based on the work of Piaget is the Carolina Curriculum for Handicapped Infants and Infants at Risk (Johnson-Martin, Jens, & Attermeier, 1986). It is designed for use with handicapped children functioning in the 0-24 month developmental age range and recognizes that the most seriously handicapped children can not be made "normal" with intervention. Therefore, it encourages the teaching of "nonnormal" but adaptive skills when necessary. Some, but not all of the items, include adaptations for the visually impaired. It is divided into 24 areas of development and stresses allowing the child to exert control over her/his environment. Communication is one of the major means of

exerting such control. A strong point of this curriculum is that it includes whole subsections on gestural and verbal imitation as well as gestural and verbal communication.

Characteristics of a Successful Curriculum

Byren and Joyce (1985) critically analyzed 43 language intervention studies which were published during the 1970's in order to answer two questions:

> 1) to what extent had the studies applied the theoretical models and empirical findings derived from current psycholinguistic research and 2) to what extent had these intervention studies been successful in increasing the communicative competence of their severely impaired, primarily nonverbal, subjects (p. 7).

They found that except for an understanding of the nature of the different communication systems and an awareness of the necessity of evaluating gains, the studies had not integrated current psycholinguistic thinking. They also found a group of characteristics which differentiated the successful studies from the unsuccessful ones. The characteristics found in the successful studies were: 1) a tendency to adapt programming to match the cognitive, social, motor, and language abilities of the subject, 2) ongoing environmentally-based language training, 3) establishment of structured, functional goals which stress the use of spontaneous communication for a variety of functions, 4) use of interactional

intervention methodology, and 5) an understanding of the interdependency of the communicative, cognitive, social, and environmental systems.

CHAPTER THREE

This curriculum is based on the belief that communication should be the major focus of a curriculum design for the multi-handicapped (Johnson-Martin, Jens & Attermeier, 1986). Each of the first three long-range goals (see p. 43) of this curriculum may be considered a pre-language goal directed toward providing the cognitive structures necessary for language (Gallagher & Reid, 1981). The fourth and fifth long-range goals involve receptive and expressive communication skills.

The first and second long-range goals emphasize the development of cause and effect relationships and object permanence as described by Piaget (1952) who theorized that these cognitive structures are formed as the child learns to differentiate herself/himself from her/his environment. Adaptations are based on the work of Uzgiris and Hunt (1975); Robinson and Fieber (1974); and Johnson-Martin, Jens and Attermeier (1986) all of whom have tried to develop systematic adaptations of Piagetian sensorimotor tasks for developmentally delayed children.

The third long-range goal is based on the work of van Dijk (1965) and deals with imitative skills. Skill sequences are derived from A Prelanguage Curriculum Guide for the

Multihandicapped (Farrell & Sherman, Eds., 1978) and the Callier-Azusa Scale (Stillman, 1977) which was specifically designed for the assessment of deaf-blind, severely handicapped children.

The fourth and fifth long-range goals are related to the development of receptive and expressive language skills and have been derived from the Receptive-Expressive Emergent Language Scale for Assessing Language Skills in Infancy (REEL) (Bzoch & League, 1971). The fourth goal involves responding to the communicative attempts of others and the fifth goal deals with the communication of feelings, the indication of wants and needs and the naming of objects, person, and events.

Intermediate-range objectives A through E are related to long-range goal I. They include the demonstration of a directed reach and grasp, repetition of a motor movement to keep an object active, the overcoming of an obstacle in order to get a desired object, the use of a simple tool to obtain an object or effect, and the seeking of adult help in solving problems. These objectives were taken from the Carolina Curriculum for Handicapped Infants and Infants at Risk (CCHI) (Johnson-Martin et al., 1986) which emphasizes the importance of allowing the child to exert control over her/his environment and The Sensorimotor Cognitive Assessment and Curriculum for the Multihandicapped Child (Fieber, 1977) which describes a number of ways to accommodate cause and effect tasks to the motor repertoires of severely handicapped children.

Intermediate-range objectives F through I are related to long-range goal II. They include following an object present in the sensory field through a 180° arc by head or hand movement, searching for a moving object that has moved out of the sensory field, searching for an object that is within reach, but is covered, and searching for an object that has fallen downward out of the sensory field. These are adapted forms of object permanence items which require oculomotor control from the Assessment in Infancy: Ordinal Scales of Psychological Development (Uzgiris & Hunt, 1975) and the Infant Development Program: Sensorimotor Activities (Fieber & Robinson, 1974).

Intermediate-range objectives J through N are related to long-range goal III. They include continuation of a movement or vocalization initiated by a care-giver, imitation of a movement or vocalization already in the child's repertoire, imitation of a sequence of activities or vocalizations already in the child's repertoire, and approximation of unfamiliar gross motor activities, fine motor activities and/or vocalizations after a demonstration. These have been drawn from a variety of sources who recognize imitation as being an important prerequisite to the development of language (Robinson & Fieber, 1974; Uzgiris & Hunt, 1975; Stillman, 1977; Farrell & Sherman, Eds., 1978; and Johnson-Martin et al., 1986).

Intermediate-range objectives O through U are related to long-range goal IV. The receptive communication skills included are: responding to an adult's attempt to interact by quieting, responding to one's own name, vocalizing or gesturing in response to an adult's speech and gesture, performing a previously learned task on verbal or gestural command, pointing to or looking at a named object/person, following simple commands and matching similar objects. These items were taken from the CCHI (Johnson-Martin et al., 1986) and the REEL (Bzoch & League, 1971) which assesses early decoding and encoding behaviors.

Intermediate-range objectives V through CC are related to long-range goal V. The expressive language skills included are: demonstration of different states of pleasure and displeasure, repetition of an activity or vocalization that gets a reaction, the use of consistent signals for requesting more of a stimulus and rejecting a stimulus, the indication of wants and needs through gestures or vocalizations, the anticipation of regularly occurring events, the use of word labels for requesting and commenting, and the identification of representational forms of objects. These reflect the work of Johnson-Martin et al. (1986) and Bzoch and League (1971). Objective X involves the development of a resonance activity into a consistent signal as described by Anderson (1978) and objectives Y and BB are drawn from the work of Reichle,

Rogers, and Barrett (1984) who described a method for establishing requesting, rejecting, and commenting communicative behaviors in mentally retarded individuals.

These goals and objectives have been chosen in order to increase the ability of the multi-handicapped child to exert control over her/his environment. Intermediate-range objectives are divided into subcategories and presented in an ordinal sequence moving from simple to increasingly complex behaviors. These goals and objectives may be adapted to match a variety of cognitive, social, motor, and language abilities and their use is intended to lead to the establishment of a spontaneous expressive communication system.

Long-range Goals

LRG I: The learner will develop an understanding of cause and effect relationships.

LRG II: The learner will develop an understanding of object permanence.

LRG III: The learner will develop motor and/or verbal imitation skills.

LRG IV: The learner will develop receptive language skills so that he/she will associate meaning with and respond to communicative attempts.

LRG V: The learner will develop expressive language skills so that he/she will be able to communicate several states of pleasure and displeasure, to indicate wants and needs, and to name common objects, persons, and events.

Intermediate-range Objectives

Cause and Effect

IRO A: The learner will demonstrate a directed reach and grasp.

IRO B: The learner will repeat a motor movement systematically in order to keep an object active.

IRO C: The learner will overcome an obstacle in order to get a desired object.

IRO D: The learner will use a simple tool to obtain an object or effect.

IRO E: The learner will seek adult help in solving problems.

Object Permanence

IRO F: The learner will follow an object present in the sensory field through a 180° arc by head or hand movement.

IRO G: The learner will search for a moving object that has moved out of her/his sensory field. (180° arc)

IRO H: The learner will search for an object that is within reach but has been covered.

IRO I: The learner will search for an object that has fallen downward out of her/his sensory field.

Imitation

IRO J: The learner will continue a movement and/or vocalization initiated by a care-giver.

IRO K: The learner will begin a movement and/or vocalization already in her/his repertoire when a care-giver begins the movement.

IRO L: The learner will imitate each of a sequence of activities and/or vocalizations within her/his repertoire.

IRO M: The learner will approximate unfamiliar gross motor activities after a demonstration.

IRO N: The learner will approximate unfamiliar fine motor activities and/or vocalizations after a demonstration.

Receptive Communication

IRO O: The learner will respond to an adult's attempt to interact by quieting.

IRO P: The learner will respond to her/his name.

IRO Q: The learner will vocalize or gesture in response to an adult speaking and gesturing to her/him.

IRO R: The learner will perform a previously learned task on verbal and/or gestural command.

IRO S: The learner will point to or look at objects or persons named.

IRO T: The learner will follow simple commands.

IRO U: The learner will match similar objects.

Expressive Communication

IRO V: The learner will demonstrate a differentiated cry and a vocal and/or gestural sign of pleasure.

IRO W: The learner will repeat an activity or vocalization that gets an interesting reaction from adults.

IRO X: The learner will use a consistent signal to indicate a desire for "more."

IRO Y: The learner will use a consistent signal to indicate the rejection of a stimulus.

IRO Z: The learner will reach toward, point at, look at, or vocalize about an object in order to indicate a want or need.

IRO AA: The learner will demonstrate anticipation of regularly occurring events through gestures or vocalizations.

IRO BB: The learner will use word labels to request or comment upon an object, person, or event.

IRO CC: The learner will identify representational forms of objects.

CHAPTER FOUR

The Curriculum

	Objective	Enabling Activity	Evaluation
A.1	The learner will demonstrate a directed reach.	After a preferred toy, (one with visual, auditory, and/or tactual features of interest) has been brought into the child's sensory field, he/she will extend his/her arm and reach in the direction of the toy. (See Appendix B for information on instructional prompting.)	For 8 out of 10 times for 5 consecutive days of programming.
A.2	The learner will demonstrate a directed reach and grasp.	After a preferred toy (one with visual, auditory, and/or tactual features of interest) has been brought into the child's sensory field, he/she will extend his/her arm, reach in the direction of the toy, and grasp the toy. Notes: 1) It may be necessary for the child's hand to be touched to the toy at first, especially if the child is visually impaired.	For 8 out of 10 times for 5 consecutive days of programming.

Objective	Enabling Activity	Evaluation
	2) Any type of grasp is acceptable. 3) The child should be presented with a variety of toys in order to maintain her/his interest.	
B.1 The learner will keep an object active.	The child will keep an object which produces a visual, auditory, and/or tactual spectacle active by systematically exhibiting at least one type of motor movement. Notes: 1) This may include any movement of the upper or lower extremities or of the head. 2) A ribbon or piece of yarn that is attached to a particularly reactive mobile or toy may be tied to the ankle or	For 8 out of 10 times for 5 consecutive days of programming.

Objective	Enabling Activity	Evaluation
	wrist of an extremely physically handicapped child so that the slightest movement will produce a result. 3) An easily activated pressure switch may provide an extremely physically handicapped child with a means of keeping a battery operated device active. (See Appendix C for more information on microswitches.)	
B.2 The learner will keep an unfamiliar object active.	The child will attempt to use the same movement as exhibited in B.1 to activate an unfamiliar object. Notes: 1) If the child does not attempt to activate the object, the child should be presented	For 8 out of 10 times for 5 consecutive days of programming.

Objective	Enabling Activity	Evaluation
	with a demonstration of how to activate the object using a motor movement within her/his repertoire. 2) Any attempt using the same movement exhibited in B.1, whether it actually activates the object or not, should receive credit.	
B.3 The learner will use two or more motor movements to produce an effect.	The child will use two or more different motor movements to activate or produce an effect in a single object OR the child will use two or more different motor movements to activate or produce an effect in two or more different objects. Notes: 1) This may include different movements made by a single body part.	For 5 times per movement within 2 consecutive weeks of programming.

	Objective	Enabling Activity	Evaluation
		2) Again, using a variety of microswitches may allow the child to have the opportunity to produce different effects.	
C.1	The learner will remove a transparent obstacle in order to obtain a desired object.	When a desired object is covered by a transparent screen (saran wrap) the learner will remove the cover OR signal an adult to remove the cover in order to obtain the object.	For 5 times within 2 consecutive weeks of programming.
C.2	The learner will overcome obstacles in order to obtain desired objects.	When presented with a simple obstacle (desired object placed in a container or behind a transparent screen) the learner will remove the obstacle OR signal an adult to remove the obstacle in order to obtain a desired object.	For 2 different obstacles overcome each day for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
D.1	The learner will use a simple tool in order to obtain an object or effect.	When a desired object is placed out of reach, the learner will use a variety of means (pulling an attached string, pulling a piece of material the object is sitting on, turning a lazy susan the object is placed on) in order to obtain or activate the object.	Use of 1 tool to obtain 4 different objects or effects OR use of 2 tools to obtain 2 or more objects or effects.
E.1	The learner will seek adult help in solving problems.	When presented with a toy that the learner is unable to activate, the learner will hand the toy to an adult OR signal for an adult's attention and vocally and/or gesturally indicate that he/she wants the toy activated.	For 3 out of 5 times for 5 consecutive days or programming.
		When the learner desires an object or activity that is not within reach, the learner will signal for an adult's attention and reach toward, point at, look at or vocalize about the object or event.	For 1 time per week for 4 consecutive weeks or programming.

	Objective	Enabling Activity	Evaluation
F.1	The learner will follow an object present in her/his sensory field through a 180° arc by head or hand movement.	When an object providing sensory stimulation (visual--light or visually attractive object; auditory--noisemaker; tactile--objects which provide a tactile input without touching the child--a hair dryer set on low or a mini-fan) is presented to the learner and moved slowly through a 180° arc, the learner will follow that movement by turning her/his head or by reaching out and following the movement with her/his hand. Note: The child should be encouraged to do this with every sense he/she has available to him/her.	For 5 out of 5 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
G.1	The learner will follow the path of an object within her/his sensory field in a 180° arc and then search for the object when it moves out of her/his sensory field at the point of disappearance.	After following the path of a moving object through a 180° arc, learner will search for the object by waiting (maintaining head and body position) for its reappearance at the point of disappearance.	For 4 out of 5 times for 5 consecutive days of programming.
G.2	The learner will follow the path of an object within her/his sensory field in a 180° arc and then search for the object when it moves out of her/his sensory field at the point of original appearance.	After following the path of a moving object through a 180° arc, the learner will search for the object by waiting for its reappearance at the point of disappearance and then turning to the point of its original appearance. Note: For both objectives G.1 and G.2, it may be necessary to present the object in the 180° arc several times before the object disappears for a prolonged period of time. This allows the child	For 4 out of 5 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
		to learn that the object has a particular path with a definite beginning and ending point.	
H.1	The learner will search for an object that is within reach but that is partially covered.	When a favorite object has been partially covered in the learner's presence, the learner will reach for and uncover the object OR signal for adult attention and indicate vocally and/or gesturally that he/she wants the cover removed. Note: Covers may at first be transparent or only a small portion of the toy may be covered. Cloth and paper covers as well as containers with lids are acceptable.	For 4 out of 5 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
H.2	The learner will search for an object that is within reach but that is fully covered.	When a favorite object has been fully covered in the learner's presence, the learner will reach for and uncover the object OR signal for adult attention and indicate vocally and/or gesturally that he/she wants the cover removed.	For 4 out of 5 times for 5 consecutive days of programming.
H.3	The learner will search for an object that is within reach but that has been visibly covered by one of two or three covers.	When a favorite object has been covered in the learner's presence under one of two or three covers, the learner will uncover the object directly OR signal for adult attention and indicate vocally and/or gesturally the specific cover that he/she wants removed. Note: The child may at first search in the place where the object was on previous trials before learning to search directly in the correct place.	For 4 out of 5 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
H.4	The learner will search for an object that is within reach, but that has been invisibly covered by one of two or three covers.	When a favorite object has been covered by one of two or three covers without being observed by the learner, the learner will search for the object when asked, by checking under each cover until finding the object OR signal for adult attention and indicate vocally and/or gesturally each of the covers that he/she wants removed until the object is found.	For 4 out of 5 times for 5 consecutive days of programming.
I.1	The learner will search for an object that has fallen downward out of her/his sensory field.	When an object has fallen downward out of a learner's sensory field, he/she will search for it by reaching down toward the object OR by adjusting her/his head and/or body position in order to find the endpoint of the object's trajectory.	For 4 out of 5 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
J.1	The learner will continue a gross motor movement, a fine motor movement, and/or a vocalization already in her/his repertoire after initiation by a care-giver.	When a care-giver initiates a behavior (e.g. rocking, clapping, making an "m" sound) and assists the learner in performing that behavior, the learner will continue to perform the behavior for at least five seconds after the care-giver stops.	For 5 out of 5 times for 5 consecutive days of programming.
K.1	The learner will begin a movement and/or vocalization already in her/his repertoire when a care-giver begins the movement and/or vocalization.	When a care-giver begins a behavior that the learner already knows how to perform, the learner will begin to perform the behavior within thirty seconds. Note: Behaviors should be able to be performed easily and visibly by the child. Practicing imitation skills in front of a mirror may be helpful with some children. Actions should be accompanied by verbal descriptions.	For 4 out of 5 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
L.1	The learner will imitate each of a sequence of three activities and/or vocalizations within her/his repertoire.	The learner will imitate each activity in a sequence after its presentation by the care-giver. The learner will imitate the behavior as long as the care-giver is also performing it. Note: Gross motor activities should be done at first if the child is capable of performing them.	Imitation of all 3 activities on 4 out of 5 days of consecutive programming.
L.2	The learner will imitate each of a sequence of three activities involving objects within her/his repertoire.	The learner will imitate each activity in a sequence after its presentation by the care-giver. The learner will imitate the behavior as long as the care-giver is also performing it. Note: 1) Activities might include scooting along a bench, picking up a ball and putting it in	Imitation of all 3 activities on 4 out of 5 days of consecutive programming.

	Objective	Enabling Activity	Evaluation
		a box, ringing a bell, or turning on a pressure switch.	
L.3	The learner will imitate each of a set of activities within her/his repertoire in any order.	The learner will imitate each activity after its presentation by the care-giver. The learner will imitate the behavior as long as the care-giver is also performing it.	Imitation of all activities on 4 out of 5 days of consecutive programming.
L.4	The learner will perform a behavior already in her/his repertoire after the care-giver provides verbal and physical positioning cues.	The learner will perform the next activity in the sequence when the care-giver demonstrates the starting position for that behavior (e.g. if the next behavior were clapping, the care-giver would hold her/his hands out in front of her/his body with palms facing each other and say, "Clap").	For 4 out of 5 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
		The learner will perform a behavior already in her/his repertoire singly when the care-giver demonstrates the starting position for that behavior.	For 4 out of 5 times for 5 consecutive days of programming.
L.5	The learner will imitate two consecutive movements and/or vocalizations within her/his repertoire after a demonstration.	After the care-giver performs two behaviors, the learner will imitate both of the behaviors in sequence. Note: At first, these two movements should be taken from a longer familiar sequence. If the learner can do this, it should be tried with a variety of different behaviors in the learner's repertoire.	For 4 out of 5 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
M.1	The learner will approximate an unfamiliar gross motor activity after a demonstration.	After a demonstration, the learner will attempt to imitate the activity within fifteen seconds. Note: 1) Exercise-type movements or movements utilizing a large piece of equipment (e.g. trampoline) may be used. 2) If the learner is limited to fine motor movements, go to objective N.1.	For 4 out of 5 times for 5 consecutive days of programming.
M.2	The learner will approximate an unfamiliar gross motor movement involving an object after a demonstration.	After a demonstration, the learner will attempt to imitate the activity within fifteen seconds. Note: This should be a gross motor activity such as kicking a ball or waving a flag.	For 4 out of 5 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
N.1	The learner will approximate an unfamiliar fine motor activity which is visible to herself/himself after a demonstration.	After a demonstration the learner will attempt to imitate the activity within fifteen seconds. Note: 1) Hand movements are the most appropriate activities for this objective. 2) Omit for significantly visually impaired learners.	For 4 out of 5 times for 5 consecutive days of programming.
N.2	The learner will approximate an unfamiliar fine motor activity which is invisible to herself/himself after a demonstration.	After a demonstration the learner will attempt to imitate the activity within fifteen seconds. Note: 1) Invisible activities may include; eye blinking, opening and shutting one's mouth, and tongue movements.	For 4 out of 5 times for 5 consecutive days of programming.

Objective	Enabling Activity	Evaluation
	2) If this activity is difficult for the child, mirror play may help.	
N.3 The learner will approximate an unfamiliar fine motor activity involving an object after a demonstration.	After a demonstration, the learner will attempt to imitate the activity within fifteen seconds. Note: Selected activities should be within the physical capabilities of the child. This may require some creative thinking when being done with a severely motorically involved child. An activity similar to one the child can already perform should be selected (e.g. introducing a grasp pressure switch instead of a push pressure switch makes use of a concept the	For 4 out of 5 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
		child already understands--using the switch makes the toy work).	
O.1	The learner will respond to an adult's attempt to interact by quieting.	When agitated, the child will quiet to tactile, visual, and auditory stimulation by an adult.	Once a day for 4 out of 5 consecutive days.
P.1	The learner will respond to her/his name.	When the child's name is called or signed within her/his sensory field, the child will turn toward the adult.	For 4 out of 5 times for 5 consecutive days of programming.
Q.1	The learner will continue to vocalize or gesture when an adult imitates her/his vocalizations and/or gestures.	When an adult interacts visually, auditorally, and/or tactually with the learner, he/she will smile in response.	For 4 out of 5 times for 5 consecutive days of programming.
		When an adult imitates a motor activity initiated by the child, the child will continue the motor activity.	For 4 out of 5 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
		If the child vocalizes: When an adult imitates the child's vocalizations, the child will stop and then vocalize when the adult pauses.	For 4 out of 5 times for 5 consecutive days of programming.
Q.2	The learner will vocalize or gesture in response to an adult speaking and gesturing to her/him.	When an adult initiates a motor activity already in the child's repertoire, the learner will respond gesturally.	For 4 out of 5 times for 5 consecutive days of programming.
		If the child vocalizes: When an adult initiates a vocalization already in the child's repertoire, the learner will respond vocally. Note: The learner's response need not be direct imitation.	For 4 out of 5 times for 5 consecutive days of programming.
R.1	The learner will perform a previously learned task on verbal and/or gestural command.	When given a verbal and/or gestural command, the learner will demonstrate the associated behavior.	For 3 out of 5 times for 5 consecutive days of programming.

Objective	Enabling Activity	Evaluation
	Note: 1) Gestural commands need not be formal sign language. They may be single demonstrations of the expected behavior. 2) Simple games may aid in the development of this type of behavior. Adult claps--child assisted by adult claps--adult claps--pause to see if child will clap.	
S.1 The learner will point to or indicate body parts when they are named.	When asked, "Where is your _____?" or "Show me your ____," the learner will indicate where the body part is. Note: 1) In the case of the physically handicapped child, the ability to perform this objective may be limited by her/his range of motion.	Indication of the correct body part 4 out of 5 times for 5 consecutive days of programming. Work on this objective should be ongoing as the child's receptive vocabulary increases.

Objective	Enabling Activity	Evaluation
	2) Begin with larger body parts and sense organs: head, arms, legs, tummy, eyes, ears, mouth, nose, hands and feet.	
S.2 The learner will point to or look at objects or persons named.	When asked, "Where is the _____?" or "Show me the _____," and the object or person named is within the child's sensory field, the learner will point to or look at the object named. Suggested words for initial noun training: ball, bell, bowl, brush, comb, cookie, cup, daddy, doll, drink, drum, favorite toy, glasses or hearing aid, light, mommy	Indication of the correct object or person when 2 or more choices are present 4 out of 5 times for 5 consecutive days of programming. Work on this objective should be ongoing as the child's receptive vocabulary increases.

Objective		Enabling Activity	Evaluation
		name of self names of family members names of friends pants shirt shoe sock spoon teacher toothbrush	
T.1	The learner will respond to the command "No" or "Stop."	When the child is engaging in an inappropriate activity, and told, "No" or "Stop," he/she will cease doing that activity.	For 5 out of 10 times within 1 consecutive week of programming.
T.2	The learner will follow a simple one-step command.	When given a command to perform a simple action that is within the motor capabilities of the child, the learner will follow the command within twenty seconds. Suggested commands: clap hands open hand pat/rub (body part) put arms/head up	For 3 out of 5 times for 5 consecutive days of programming. Work on this objective should be ongoing as the child's receptive vocabulary increases.

	Objective	Enabling Activity	Evaluation
		shake head/arm/leg stomp feet throw kiss touch (body part)	
T.3	The learner will follow a one-step command involving an object.	When given a command to perform an activity with an object, that is within the motor capabilities of the child, the learner will follow the command within thirty seconds. Suggested commands: bounce ball comb hair drink eat cookie get (object) hit drum hug doll knock on table open box pull (object) push car push microswitch ring bell roll ball touch (object)	For 3 out of 5 times for 5 consecutive days of programming. Work on this objective should be ongoing as the child's receptive vocabulary increases.

	Objective	Enabling Activity	Evaluation
U.1	The learner will match two similar objects with one distractor.	When shown an object and told, "Show me the same," the learner will indicate which of two objects is the same.	For 5 out of 5 times for 5 consecutive days of programming for 5 different objects.
U.2	The learner will match two similar objects with four distractors.	When shown an object and told, "Show me the same," the learner will indicate which of five objects is the same.	For 5 out of 5 times for 5 consecutive days of programming for 5 different objects.
U.3	The learner will sort a number of like objects into two different categories.	Given several of each of two different type objects, and told, "Put the same together," the learner will sort the objects into two piles or containers.	With 80% accuracy for 4 out of 5 consecutive days of programming.
V.1	The learner will demonstrate a differentiated cry.	The child will cry in response to hunger, discomfort or a perceived need for attention.	Care-giver observation that the child cries differently for different needs.

Objective	Enabling Activity	Evaluation
	Note: 1) Although this is not a prerequisite behavior for further communicative attempts, it usually occurs first in the normal developmental sequence. 2) Although it is important to provide a structured routine for the child, every need should not be anticipated or the child will have no need to cry.	
V.2 The learner will demonstrate a vocal and/or gestural sign of pleasure.	The child will smile or coo when presented with pleasurable visual, auditory, or tactile stimulation.	Care-giver observation that the child demonstrates a vocal or gestural sign of pleasure during specific activities.

	Objective	Enabling Activity	Evaluation
W.1	The learner will repeat an activity or vocalization that gets an interesting reaction from adults.	When the learner produces a novel gesture or vocalization and an adult responds positively either by imitation of the gesture or vocalization or with praise, the learner will repeat the activity or vocalization.	For 4 out of 5 times within 1 consecutive week of programming. Work on this objective should be ongoing as the child's repertoire of behaviors increases.
X.1	The learner will respond to the cessation of a preferred vestibular activity.	When a preferred vestibular activity (e.g. rocking, bouncing) has stopped, the learner will respond through motor movement, ocular movement, or vocalization. Note: Any visible or audible response is acceptable. During this time, note should be made of what response is made most consistently.	For 10 out of 10 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
X.2	The learner will respond to the cessation of a preferred vestibular activity with a consistent signal.	When a preferred vestibular activity has stopped, the learner will consistently signal for more through the use of an established motor movement, ocular movement, or vocalization.	For 8 out of 10 times for 5 consecutive days of programming.
X.3	The learner will respond to the cessation of action of a preferred toy with a consistent signal.	When the action of a preferred toy has stopped, the learner will consistently signal for more through the use of an established motor movement, ocular movement, or vocalization.	For 8 out of 10 times for 5 consecutive days of programming.
X.4	The learner will respond with a consistent signal when the presentation of a preferred food or drink ceases.	When the presentation of a preferred food or drink has stopped, the learner will consistently signal for more through the use of an established motor movement, ocular movement, or vocalization.	For 8 out of 10 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
X.5	In a non-taught situation, the learner will spontaneously signal for more when a desired stimulus has ceased.	In a non-taught situation, when a desired stimulus has ceased, the learner will spontaneously signal for more through the use of an established motor movement, ocular movement, or vocalization.	For 1 time per week for 4 consecutive weeks.
Y.1	The learner will respond to the application of stimulus which is noxious to her/him.	When a stimulus which is noxious to her/him is applied, the learner will respond through motor movement, ocular movement, or vocalization. Note: Any visible or audible response is acceptable. During this time note should be made of what response is made the most consistently.	For 5 out of 5 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
Y.2	The learner will reject a specific tactile stimulus which is noxious to her/him.	When a tactile stimulus is applied which is noxious to her/him, the learner will signal no to reject the stimulus through the use of an established motor movement, ocular movement, or vocalization.	For 3 out of 5 times for 5 consecutive days of programming.
Y.3	The learner will reject a specific olfactory/gustatory stimulus which is noxious to her/him.	When an olfactory/gustatory stimulus is given to the child which is noxious to her/him, the learner will signal no through the use of an established motor movement, ocular movement, or vocalization.	For 3 out of 5 times for 5 consecutive days of programming.
Y.4	The learner will reject a specific fine or gross motor activity/manipulation which is noxious to her/him.	When physically manipulated through a specific fine or gross motor activity which is noxious to her/him, the learner will signal no through the use of an established motor movement, ocular movement, or vocalization.	For 3 out of 5 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
Y.5	The learner will spontaneously reject a stimulus which is noxious to her/him upon anticipated application of stimulus.	Upon presentation, but before application of a stimulus which is noxious to her/him, the learner will signal no through the use of an established motor movement, ocular movement, or vocalization.	For 3 out of 5 times for 5 consecutive days of programming.
Y.6	In a non-taught situation, the learner will spontaneously reject a stimulus which is noxious to her/him.	In a non-taught situation, when presented with a stimulus which is noxious to her/him, the learner will spontaneously signal no through the use of an established motor movement, ocular movement, or vocalization.	For 1 time per week for 4 consecutive weeks.
Z.1	The learner will gain adult attention when the adult is within the learner's sensory field.	When an adult is within the learner's sensory field, the learner will gain the adult's attention through activation of an alarming device (bell, buzzer, or microswitch) or vocalization.	For 8 out of 10 times for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
Z.2	The learner will gain adult attention when the adult is not within the learner's sensory field.	When an adult is not within the the learner's sensory field, the learner will gain the adult's attention through activation of an alarming device (bell, buzzer, or microswitch) or vocalization.	For 2 times per day for 8 out of 10 consecutive days of programming.
Z.3	The learner will reach toward, point at, look at, or vocalize about an object in order to indicate a want or need.	When a desired object is brought into the learner's sensory field by an adult, the learner will indicate a want or need by reaching toward, pointing at, looking at, or vocalizing about an object.	For 3 times per day for 5 consecutive days of programming.
		After gaining an adult's attention (see Z.1 and Z.2), and being asked, "What do you want?" the learner will indicate a want or need by reaching toward, pointing at, looking at, or vocalizing about an object.	For 3 times per week for 4 consecutive weeks of programming.

	Objective	Enabling Activity	Evaluation
AA.1	The learner will demonstrate anticipation of regularly occurring events in everyday care through gesture or vocalization.	During daily routines the learner will indicate anticipation visually, verbally, or motorically (e.g. after the child's bib is put on, but before being fed, the child might start looking for the bottle, smacking her/his lips, or waving her/his arms).	Demonstration of anticipation 1 time per day for 5 consecutive days of programming OR demonstration of surprise when routine is disrupted.
AA.2	The learner will demonstrate anticipation of regularly occurring events in games through gesture or vocalization.	During regularly occurring events in games the learner will demonstrate anticipation through gesture or vocalization (e.g. adult tickle--child laugh--pause--child begins to laugh as adult approaches to tickle again. Note: Almost any nursery rhyme can be adapted for game play. After several repetitions with the gestures being performed hand-over-hand, pauses can	For 3 out of 5 times for 5 consecutive days of programming.

Objective	Enabling Activity	Evaluation
	be interjected to see if the child will anticipate the movement.	
BB.1 The learner will use word labels to comment on objects.	When an object is brought into the child's sensory field and he/she is asked, "What?" the learner will respond with a gestural or verbal approximation of the appropriate word label. Note: If the child has a severe motor impairment consideration should be given at this time to the use of adaptive sign and/or a communication board.	For 4 out of 5 times for 5 consecutive days of programming. Work on this objective should be ongoing as the child's expressive vocabulary increases.
BB.2 The learner will use word labels to request objects.	When a preferred object is brought into the child's sensory field, the learner will request the object with a gestural or verbal approximation of the appropriate word label.	For 5 times per week for 4 consecutive weeks of programming.

Objective	Enabling Activity	Evaluation
	Note: See suggested word list for initial noun training under objective S.2.	
BB.3 The learner will use word labels to comment on persons.	When a person comes into the child's sensory field and the child is asked, "Who?" the learner will respond with a gestural or verbal approximation of the appropriate word label.	For 4 out of 5 times for 5 consecutive days of programming. Work on this objective should be ongoing as the child's expressive vocabulary increases.
BB.4 The learner will use word labels to request specific persons.	When a preferred person is within the child's sensory field, the learner will request that person's attention with a gestural or verbal approximation of that person's name sign or name.	For 5 times per week for 4 consecutive weeks of programming.

	Objective	Enabling Activity	Evaluation
BB.5	The learner will use word labels to comment on events.	When asked, "What do?" after 30 seconds of an action being performed, the learner will respond with a gestural or verbal approximation of the appropriate word label. Suggested words for initial <u>verb</u> training: blow bounce brush clap drink eat hug kiss open pull push ride rock shake throw	For 4 out of 5 times for 5 consecutive days of programming. Work on this objective should be ongoing as the child's expressive vocabulary increases.
BB.6	The learner will use word labels to request events.	When the learner desires an event, he/she will use a verbal or gestural approximation of the appropriate word label.	For 5 times per week for 4 consecutive weeks of programming.

	Objective	Enabling Activity	Evaluation
CC.1	The learner will match an object to a picture or raised outline of that object.	Given a common object, a picture or raised outline of that object, and a distractor picture or raised outline, the learner will match the object to the correct picture.	For 4 out of 5 times for 5 consecutive days of programming.
CC.2	The learner will sort objects into groups by matching them to pictures or raised outlines of that object.	Given two pictures or raised outlines and several objects which match each picture or raised outline, the learner will sort the objects into two groups by each picture or raised outline.	With 80% accuracy for 4 out of 5 consecutive days of programming.
CC.3	The learner will identify representational forms of objects with appropriate word labels.	When presented with a representational form of an object and asked, "What?" the learner will respond with a gestural or verbal approximation of the appropriate word label.	For 4 out of 5 trials for 5 consecutive days of programming.

	Objective	Enabling Activity	Evaluation
CC.4	The learner will match representational forms of objects.	Given several representational forms of two different objects, the learner will sort the forms into two groups.	With 80% accuracy for 4 out of 5 days of programming.

APPENDIX A

Introduction

If communication training is to be successful, then the specified goals for the individual child must be attainable. Functional vision, hearing, and motor assessments help assure that the goals selected for the child are attainable and that impaired sensory and/or motor function of the child does not prevent the achievement of those goals.

Functional Vision Assessment

For an educator to successfully plan for a visually impaired child, he/she must first observe, evaluate and record information pertaining to the child's level of visual functioning. Visual assessment includes observation of: 1) the presence or absence of basic visual responses, 2) the types of visual stimuli (light, movement, color) to which the child attends, 3) the distance at and the size of objects to which the child most consistently attends, and 4) the lighting and position in which the child functions best (Langley & Dubose, 1976). References for Functional Vision Assessment can be found on page 96.

Given below are directions and a checksheet for an informal teacher-made functional vision assessment (Portions of the information used to develop this assessment were taken from Barraga, 1978; Langley, 1980; Langley & Dubose, 1976; and State of Florida Department of Education, 1983).

Pupillary reflex:
Direct a penlight into the child's eyes from 12 inches away and observe whether the pupils constrict and then dilate when the light is removed. Be sure to observe her/his eyes before shining the light as blind children often exhibit hippus, a continual constricting and dilating of the pupil.

Blink reflex:
Place the child on her/his back and kneel behind her/his head. Pass a hand across her/his eyes, pause and repeat. A blinking reflex indicates some light perception and possibly some object perception.

Muscle imbalance:
Assessing a tendency of the eyes to deviate can be done by flashing a beam from a penlight into the child's eyes from 30 inches away. If the light is reflected simultaneously in the middle of each pupil, no deviation is present. If the reflection is centered on one pupil but off-center in the other, some form of muscle imbalance is indicated.

Fixating, tracking, and scanning:
Evaluate the child's ability to fixate, track, and scan by holding puppets, small squeeze toys, or penlights within the child's range of vision. Move them slowly from left to right, up and down, and in oblique angles. Note whether he/she locates an object efficiently and attends for at least 10 seconds.

Shifting gaze:
Note whether the child is able to shift her/his attention by holding two toys of equal interest approximately one foot apart in front of the child. Shake one, pause, then shake the other. Observe whether she/he shifts her/his gaze to the other toy.

Reaching for objects:
Place toys at all levels and in all directions and watch to see if he/she turns and reaches for them. These items should be interspersed throughout the evaluation to maintain interest in looking (Langley & Dubose, 1976, p. 348-349).

Convergence:
Sit before the child with the toy or light and attract his/her attention to it. When he/she attends, move the toy or light slowly in toward the bridge of his/her nose from about 12-16 inches away. Observe the child's eyes as the toy or light moves toward him/her, paying particular attention to the distance at which the eyes turn in, out, or if he/she looks away, turns his/her head, or closes his/her eyes. The eyes should continue to converge on the toy or light until it is four inches from his/her nose. Note also whether both eyes turn in simultaneously or whether one eye turns in or out. The child should follow the light or object with both eyes until the stimulus is approximately 4 inches from his/her eyes.

Eye preference:
Observe during the administration of items whether the child closes either eye to look from only one. Does he/she track with only one eye? When either eye is covered, does he/she resist? When objects are brought into the left and then the right visual fields from behind his/her head, does he/she turn to one side and not the other (Langley, 1980, p. 40)?

Confrontational vision testing: After the child is securely and comfortably positioned either in supine or upright, one of two testers should gain and hold the child's attention at midline. The second tester should slowly bring a penlight or small object from behind the child. The first tester should note the distance and position at which the child first appears aware of the light or object. Each

quadrant of each eye should be tested for response at least twice. Each eye should be patched alternately if at all possible.

FUNCTIONAL VISION ASSESSMENT

Name: _____ Date of Birth: _____

Testers: _____ Date: _____

Diagnosis: _____

O.D. _____ O.S. _____ O.U. _____

Color Vision _____ Normal _____ Type of Deficiency: _____

Other handicapping conditions: _____

\+ present - absent

Right Eye	Left Eye		Object Used	Lighting Conditions	Distance	Child's Position	Comments
_____	_____	pupillary reaction					
_____	_____	blink reflex					

FUNCTIONAL VISION ASSESSMENT
Page 2
Name: _____

Right Eye	Left Eye		Object Used	Lighting Conditions	Distance	Child's Position	Comments
_____	_____	muscle imbalance					
_____	_____	orients peripherally					
_____	_____	fixates on light					
_____	_____	fixates on 4 inches object at			____ inches		
_____	_____	fixates on 4 inches object at			12-18 inches		
_____	_____	fixates on 4 inches object at			10 feet		

FUNCTIONAL VISION ASSESSMENT
Page 3
Name: _____

Right Eye	Left Eye		Object Used	Lighting Conditions	Distance	Child's Position	Comments
_____	_____	shifts gaze					
_____	_____	reaches for object					
_____	_____	tracks light horizontally					
_____	_____	tracks object horizontally					
_____	_____	tracks past midline					
_____	_____	tracks light vertically					

FUNCTIONAL VISION ASSESSMENT
Page 4
Name: _____

Right Eye	Left Eye		Object Used	Lighting Conditions	Distance	Child's Position	Comments
_____	_____	tracks object vertically					
_____	_____	tracks light diagonally					
_____	_____	tracks object diagonally					
_____	_____	tracks light circularly					
_____	_____	tracks object circularly					
_____	_____	converges					

FUNCTIONAL VISION ASSESSMENT
Page 5
Name: _____

Right Eye Left Eye		Object Used	Lighting Conditions	Distance	Child's Position	Comments
	nystagmus (involuntary rhythmic movement of eyes)					
	Picks up or tracks 3 objects less than 1" in size a) _____ b) _____ c) _____					
_____ _____	eye preference					

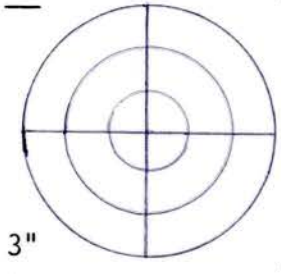
FUNCTIONAL VISION ASSESSMENT
Page 6
Name: _____

Confrontational Field Testing

Right Eye

	12"	6"	3"
upper temporal	—	—	—
	—	—	—
lower temporal	—	—	—
	—	—	—

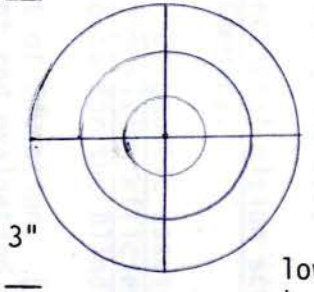
	12"	6"	3"
upper nasal	—	—	—
	—	—	—
lower nasal	—	—	—
	—	—	—



Left Eye

	12"	6"	3"
upper nasal	—	—	—
	—	—	—
lower nasal	—	—	—
	—	—	—

	12"	6"	3"
upper temporal	—	—	—
	—	—	—
lower temporal	—	—	—
	—	—	—



Additional Comments: _____

_____

Functional Vision Assessment developed by: J. Lang and V. Budzinski McMullen

References for Functional Vision Assessment

Langley, B. and Dubose, R.F. (1976). Functional vision screening for severely handicapped children." The New Outlook For the Blind, 70(8), 346-350.

Langley, M.D. (1980). Functional vision screening inventory. Chicago, IL: Stoelting Company.

Barraga, N. (Ed.) (1978). Diagnostic assessment procedure from the program to develop vision efficiency. Louisville, KY: American Printing House for the Blind.

State of Florida Department of Education. (1983). A resource manual for the development and evaluation of special programs for exceptional students volume V-E: Increasing visual efficiency. Tallahassee, FL.

Informal Auditory Testing

In order for a teacher to implement appropriate teaching strategies with a multi-handicapped hearing impaired child, he/she must have reliable information concerning the child's hearing capabilities and auditory functioning (Kukla & Connolly, no date). References for Informal Auditory Testing can be found on page 102. Often the severely handicapped child is not able to be tested by an audiologist. In such a case, teacher-based assessment can help determine the child's functional use of her/his hearing and can help identify the particular responses and sound cues that can be used to train a specific child for informal audiological testing (Bay Area Severely Handicapped Deaf-Blind Project, no date). Included here is an example of a teacher-based informal auditory assessment. (Portions of the information used to develop this assessment were taken from Kukla & Connolly, no date and The Bay Area Severely Handicapped Deaf-Blind Project, no date.)

INFORMAL AUDITORY TESTING

Name: _____ Date of birth: _____

Testers: _____ Date: _____

Pertinent diagnostic information: _____

Other handicapping conditions: _____

\+ response present

	Approx-imate dB	R/L Ear	Eyes	Search	Activity Increase	Activity Decrease	Smile/ Laugh	Frown/ Cry	Vocal-ization	Startle Reflex	No Change	Other
cymbals at 2 feet	90											
cymbals at 2 feet	90											
ping pong ball in coffee can at 1 foot	80											
ping pong ball in coffee can at 1 foot	80											
tambourine at 2 feet	70											

INFORMAL AUDITORY TESTING
Page 2
Name: _____

	Approx-imate dB	R/L Ear	Eyes	Search	Activity Increase	Activity Decrease	Smile/ Laugh	Frown/ Cry	Vocal-ization	Startle Reflex	No Change	Other
tambourine at 2 feet	70											
Fisher Price Happy Apple at 1 foot	60											
Fisher Price Happy Apple at 1 foot	60											
normal speech at 3 feet	50											
normal speech at 3 feet	50											
Fisher Price Flower Rattle at 2 feet	50											
Fisher Price Flower Rattle at 2 feet	50											
music at												
music at												

INFORMAL AUDITORY TESTING
Page 3
Name: _____

	Approx-imate dB	R/L Ear	Eyes	Search	Activity Increase	Activity Decrease	Smile/ Laugh	Frown/ Cry	Vocal-ization	Startle Reflex	No Change	Other
door slam at												
door slam at												
drum at												
drum at												
others:												

INFORMAL AUDITORY TESTING
Page 4
Name: _____

Number of trials: _____
Number of responses to the right: _____
Number of responses to the left: _____
Most frequent type of response: _____

Comments: _____

_____

References for Informal Auditory Testing

Bay Area Severely Handicapped Deaf-Blind Project. (no date). Auditory assessment and programming for severely handicapped and deaf-blind students. San Francisco, CA.

Kukla, D., & Connolly, T.T. (no date). Assessment of auditory functioning of deaf-blind/multihandicapped children. Dallas, TX: South Central Regional Center for Services to Deaf-Blind Children.

Functional Motor Assessment

Good posture and movement patterns are important for all children in that they promote maximal learning; they are even more important with the physically handicapped child who is coping with, or trying to cope with, abnormal muscle tone, movements and balance reactions. Good positioning allows the child to function freely while feeling secure and comfortable. The following questions need to be answered when instructional strategies are being planned for the physically handicapped child. (Portions of the information used to develop this assessment were taken from Finnie, 1974; Wilson, 1976; Regional Comprehensive Center for Children and Youth, no date, Bobath, 1967; & Gesell, 1969). References for Functional Motor Assessment can be found on page 114. Specific questions and problems should be discussed with the child's physical and/or occupational therapist.

FUNCTIONAL MOTOR ASSESSMENT

Name: _____ Date of Birth: _____

Testers: _____ Date: _____

Diagnosis: _____

Description of the child's posture and movements when laying on her/his back (supine)

1. Head: face and neck
   (tilted/midline; flexion/extension)

2. Trunk: chest and back
   (scoliosis)

3. Upper extremities: shoulders, elbows, wrists, hands
   (flexion/extension; contractures)
   (can hands be brought to midline; across midline?)
   (are arm movements smooth or jerky?)
   (what type of grasp and release does the child use?--see Table 4)
   (does one arm tighten when the other is used?)

4. Lower extremities: hips, knees, feet
   (flexion/extension; contractures)
   (can the child kick reciprocally?)

FUNCTIONAL MOTOR ASSESSMENT
Page 2
Name: _____

5. Changes in posture upon stimulation
   Visual:

   Auditory:

   Tactile:

Description of the child's posture and movements when laying on her/his stomach (prone)

1. Head: face and neck
   (tilted/midline; flexion/extension)

2. Trunk: chest and back
   (scoliosis)

3. Upper extremities: shoulders, elbows, wrists, hands
   (flexion/extension; contractures)
   (are arm movements smooth or jerky?)
   (can the child prop prone on elbows; prone on hands--assisted or unassisted?)

FUNCTIONAL MOTOR ASSESSMENT
PAGE 3
Name: _____

4. Lower extremities: hips, knees, feet
(flexion/extension)

5. Changes in posture upon stimulation
Visual:

Auditory:

Tactile:

Description of the child's posture and movements when laying on her/his side

1. Head: face and neck
(tilted/midline; flexion/extension)

2. Trunk: chest and back
(scoliosis)

3. Upper extremities: shoulders, elbows, wrists, hands
(flexion/extension; contractures)
(are arm movements smooth or jerky?)
(what type of grasp and release does the child use?--see Table 4)

FUNCTIONAL MOTOR ASSESSMENT
Page 4
Name: _____

4. Lower extremities: hips, knees, feet
   (flexion/extension)

5. Changes in posture upon stimulation
   Visual:

   Auditory:

   Tactile:

Description of the child's posture and movements when sitting

1. Head: face and neck
   (tilted/midline; flexion/extension)

2. Trunk: chest and back
   (scoliosis)
   (is back rounded?)
   (is trunk support needed for sitting on the floor; in a chair?)

FUNCTIONAL MOTOR ASSESSMENT
Page 5
Name: _____

3. Upper extremities: shoulders, elbows, wrists, hands
(flexion/extension; contractures)
(are arm movements smooth or jerky?)
(what type of grasp and release does the child use?--see Table 4)
(does one arm tighten when the other is used?)

4. Lower extremities: hips, knees, feet
(flexion/extension)
(when seated in a chair are knees, hips and feet at right angles?)
(preferred sitting posture when on floor)

5. Changes in posture upon stimulation
Visual:

Auditory:

Tactile:

Vestibular:

Description of child's posture and movement when standing upright

1. Head: face and neck
(tilted/midline; flexion/extension)

FUNCTIONAL MOTOR ASSESSMENT
Page 6
Name: _____

2. Trunk: chest and back
   (scoliosis)
   (is back rounded?)

3. Upper extremities: shoulders, elbows, wrists, hands
   (flexion/extension/contractures)
   (are arm movements smooth or jerky?)
   (what type of grasp and release does the child use?--see Table 4)
   (does one arm tighten when the other is used?)

4. Lower extremities: hips, knees, feet
   (flexion/extension)

5. Changes in posture upon stimulation
   Visual:
   Auditory:
   Tactile:
   Vestibular:

FUNCTIONAL MOTOR ASSESSMENT
Page 7
Name: _____

Description of how the child performs the following movements

rolling from back to side

rolling from back to stomach

sitting up from laying on back

rolling from stomach to side

rolling from stomach to back

crawling on stomach

getting to hands and knees from laying on stomach

rocking on hands and knees

creeping on hands and knees

sitting up from laying on stomach

kneeling from hands and knees

FUNCTIONAL MOTOR ASSESSMENT
Page 8
Name: _____

reaching out from prone on elbows

reaching out from prone on hands

reaching out from prone on hands and knees

trunk rotation while sitting

standing up from floor

standing up from chair

shifting weight from one leg to another

cruising at a rail

walking with support (one/two hands?)

walking independently

ascending stairs

FUNCTIONAL MOTOR ASSESSMENT
Page 9
Name: _____

descending stairs

Most common positions

Positions in which the child has the most functional movement

Table 4

Development of Grasp

1. Reflexive grasp: ulnar side strongest, reaches only when eye contact is made
2. Primitive squeeze: fingers only, no thumb or palm participation
3. Palmar or squeeze grasp: no thumb participation
4. Radial-palmar or whole hand grasp: radial side stronger, thumb begins to adduct, begins transferring from one hand to the other
5. Inferior scissor or superior palm grasp: thumb is adducted not opposed
6. Radial-digital or inferior forefinger grasp: fingers on radial side provide pressure on object, thumb begins to move toward opposition
7. Inferior-pincer grasp: thumb moves closer to opposition of forefinger, beginning of voluntary release
8. Neat pincer or forefinger grasp: slight extension of wrist, full thumb opposition
9. Opposition or superior-forefinger grasp: wrist extended and turned to ulnar side, smooth release for large objects, clumsy for small objects

References for Functional Motor Assessment

Bobath, B. (1967). The very early treatment of cerebral palsy. Developmental Child Neurology, 9, 373-390.

Finnie, N.R. (1974). (2nd ed.). Handling the young cerebral palsied child at home. New York, NY: E. P. Dutton.

Gesell, A. (1969). Developmental Diagnosis. New York, NY: Harper & Row.

Regional Comprehensive Rehabilitation Center for Children and Youth. (no date). The cerebral palsy child in the classroom. Pittsburgh, PA.

Wilson, J. (1976). (2nd ed.). Analysis of posture and mobility. Chapel Hill, NC: Division of Medical Allied Health Professions, University of North Carolina.

APPENDIX B

Instructional Prompting

When a child is being taught a new skill, he/she will need some type of help or prompt to assist his/her learning. The child will learn most quickly when he/she is given only as much help as is actually needed. To help the learner achieve new skills as efficiently as possible a hierarchy of prompting should be employed. When beginning instruction, the trainer should provide the learner with the lowest level of prompt. If this is not of sufficient help to the learner the next level of prompt which provides more assistance should be given. This is done until the correct level of assistance is found. In the case of the more severely multi-handicapped child, a trainer who is familiar with the child may choose to begin at a level of prompting he/she has found successful in the past. The goal in using the correct level of prompting is to allow the child to experience successful completion of the activity. As the child learns the skill, he/she will be able to perform the task more and more independently with less help.

Verbal and/or Signed Prompting

1. The trainer instructs the learner to make another attempt at the correct response (e.g. "Try another place") or asks a leading question (e.g. "What do you want?").
2. The trainer gives the learner a specific instruction (e.g. "Scoop") or asks a question which has the correct response within it (e.g. "Do you want more?").

Gestural Prompting and Demonstration

1. The trainer points in the general direction of the utensil or item needed to perform the skill sequence.
2. The trainer points to or touches the utensil or item needed to perform the skill sequence.
3. The trainer shows the learner how to perform the skill sequence step by step.

Physical Prompting

1. The trainer taps the appropriate body part into the correct position or toward the utensil or item needed to perform the skill sequence.
2. The trainer guides the learner through the skill sequence by grasping the learner's hands or wrist and guiding it through the movements required.
3. The trainer moves the learner through the correct completion of the skill sequence by placing her/his hand around the learner's and manipulating the hand through completion of each step.

Gestural prompting, demonstration and physical prompting should be done in conjunction with verbal and/or signed prompting so that the learner will be familiar with the meaning of the verbal and/or signed prompt when the other prompts are faded out.

APPENDIX C

Microswitches are on/off switching devices which offer an alternate way of interfacing battery operated or electro-mechanical devices. Currently, microswitches are most commonly used by individuals with severe physical handicaps but normal intelligence as a means of environmental control. This may be accomplished through on/off switches for such activities as opening a door or turning on an intercom system connected to a telephone. Microswitches are also used by this population as interfaces to microcomputers for a means of communication.

Recently, microswitches have begun to be used with severely physically handicapped individuals who have sensory and mental handicaps as well. The rationale for this is that anything which allows a multi-handicapped person to become a more active participant in her/his environment increases the quality of her/his life. The use of microswitches provides such an individual with an ability to control her/his environment in some way. The ability to control one's environment can be very motivating and the sensory feedback which is an integral part of microswitch use permits the individual to

experience purpose and satisfaction in performing a specific activity. This, in turn, encourages the practice of the skill involved more and more often.

Microswitches can be used to train a wide variety of behaviors and can aid in the teaching of many different concepts. In fact, wherever there is even the flicker of movement a microswitch can be used to aid the multi-handicapped person to allow for more active involvement in her/his environment. However, microswitches are not substitutes for teaching. It is inappropriate, when using a microswitch, to have as an objective increased head control or joint mobility if it does not have a functional purpose. Motor movements that are taught through microswitch use should not be ends in themselves but should lead to the acquisition of more complex forms of behavior (Torner, 1982). References on microswitches may be found on page 125.

Microswitches provide multi-handicapped learners with sensory feedback as to the success or failure of their efforts in a particular activity. This is extremely important when there are sensory deficits in one or more areas. Microswitches also allow a student to independently practice a skill and to be given immediate reinforcement for a correct response. In addition, many microswitch interfaces can be calibrated to allow for approximation of the correct response.

Microswitches have a variety of applications in the classroom. A simple pressure switch connected to a battery operated toy or tape recorder provides a means by which to teach cause and effect relationships. A microswitch attached to an attractive stimuli can be placed for activation by any body part. The teacher manipulates the child through activation several times and points out the visual/auditory/tactile spectacle that is occurring as a result of the microswitche's activation; then the student is given an opportunity to activate the switch on her/his own. This is best taught with an already established movement when the goal is the teaching of cause and effect relationships. Later, when the child has begun to understand this, new movements can be taught using the same spectacle and activation device.

Visual and/or auditory attending behaviors can be taught with a variety of different head control switches. Light and sound effects can be paired and interfaced with a microswitch. As the child begins to turn the devices on more and more often, the amount of stimulation provided to the dominant sense is reduced (sound turned down; lights dimmed) until the child is just attending to the non-dominant sense stimuli.

Motor development can be encouraged through microswitch use. When in a prone position, the use of a mercury switch connected to a toy or tape recorder can provide the impetus for head and neck extension and looking behavior. Weight

bearing on hands, knees, or feet can likewise be encouraged when paired with the use of a double weight-bearing switch interfaced with an interesting auditory or visual spectacle. The fine motor skills involved in reaching, grasping, and releasing can also be taught by utilizing pull switches, a variety of grasp switches, and filling (objects in container) switches. All of the above switches can be calibrated to allow for the gradual development of these skills. Once the child has mastered the use of any particular switch, it can then be attached to a favorite toy or device to provide the child with an independent leisure activity (Burkhardt, 1982).

Lastly, and perhaps, most importantly microswitches can provide multi-handicapped persons with a means for communicating their needs. A simple buzzer attached to an easily accessible microswitch on a wheelchair tray can go off to let staff know, "I need help," or "I want some attention." More involved systems for indicating "yes" and "no" can be set up as well as the use of a single switch to interface with an electronic communication board. Augmentative communication systems utilizing microswitches are beginning to be commercially produced. However, these systems are very expensive and adequate assessment must be done before the use of one is "prescribed" (Vanderheiden, 1984).

In fact, before any microswitch is used a number of things need to be considered. First, the user's motor abilities must be matched with a particular type of switch and the switch calibrated to the level of those abilities. For example, a switch that is activated by the touch of a feather is not adequately matched to a user who has a voluntary reach, grasp, and release; likewise, a user who is capable of exerting only a minimum amount of pressure cannot be expected to use a pressure switch designed for weight bearing. Training requirements involved in the use of a particular microswitch must be matched with the learner's ability and response rate. Time delays which activate a device for a specified amount of time in response to a single motor movement may be needed for some learners. Cosmetic appearance and interference with other functions also needs to be considered. Microswitches which are not portable or which cover an entire wheelchair tray so that no other activity can take place there, may not be valuable to the learner in the long run. Likewise, although a double cheek switch may offer a learner the possibility of making two different responses, its appearance is not necessarily aesthetic and it may interfere with other functions, such as eating. Its use is limited to specific situations. And lastly, there are medical considerations involved with the use of microswitches. Toys with flashing lights or other irregular patterns need to be used

with caution with children who are seizure prone. Also, a doctor's permission should be obtained before using microswitches with children who have heart problems or who are using any type of electronic device for medical reasons (e.g. hearing aids). Finally, all microswitch use should be supervised because the components of some microswitches contain dangerous materials (acid in batteries, lead in solder, mercury in mercury switches) and regardless of how well made the microswitch is, children can be unpredictable and accidents do occur.

A number of researchers have begun to validate the use of microswitches with the severely multi-handicapped. Kasper (1981) documented increases in the systematic behaviors of institutionalized severely/profoundly handicapped students when pressure switches were used to activate tape recorders and other battery operated devices. Rostron & Lovett (1981) found that motivation for learning was increased when severely retarded multi-handicapped children were able to actively control their environments through the use of microswitches. The use of head control switches in the establishment of appropriate head positioning has been proven effective in the research of Grove, Dalke, Fredericks, & Crawley (1975) and more recently in the work of May & McKenney (1983). These

studies indicate that appropriately used microswitches can be valuable tools in the education and training of multi-handicapped persons.

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