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ABSTRACT

This practicum aimed to provide nonverbal students with a communication program to increase expressive language for daily living skills. Target students were four children (ages 6 to 7) with cerebral palsy. The practicum involved introducing children to pleasurable activities that encouraged communication behaviors, showing the children photographs of each activity before and after the activity, assessing the students' ability to alternate eye gaze between the activity and the service provider, teaching students a communicative signal to initiate an activity, teaching students to activate a switch to operate a computer program, having occupational and physical therapists position the students in equipment that facilitated head and trunk control to enhance vocalization and eye gaze, and conducting a group language lesson using a communication board with sequenced pictures of the story. The target group was involved in daily classroom activities over a 12-week period. Students increased their ability to eye gaze at pictures from one out of four attempts to two out of four attempts and increased the ability to give a positive response for an activity to continue by 25 percent. Students did not meet the objective concerning motor skills for computer use. Appendices provide weekly behavioral charts. (Contains 22 references.) (JDD)

IMPROVING COMMUNICATION SKILLS WITH AN AUGMENTATIVE COMMUNICATION PROGRAM FOR PRIMARY SEVERELY PHYSICALLY IMPAIRED STUDENTS

by

Paula Lanigan

A Practicum Report

Submitted to the Faculty of the Abraham S. Fischler Center for the Advancement of Education of Nova University in partial fulfillment of the requirements for the degree of Master of Science.

The abstract of this report may be placed in a National Database System for reference.

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Abstract

Improving Communication Skills With An Augmentative Communication Program for Primary Severely Physically Impaired Students.
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The practicum recognized and examined many of the general difficulties encountered in training severely physically impaired primary students. Based on a study of the current literature the author offered a view on training, implementation tools, and the requirement for evaluating student progress during training. This program was developed and implemented to provide non-verbal students a communication program to increase expressive language for daily living skills. The students needed a way to communicate that would be functional and practical, to decrease the discrepancy gap between the students' receptive language and expressive language.

Precise objectives were stated, means of providing appropriate training were discussed with emphasis on the special difficulties of severely impaired students. The purpose of the objectives were to increase communication skills by 25 percent of the students present level and computer switch activation by 100 percent. The target group was required to increase ability to: eye gaze when looking at a picture, give a positive response for an activity to begin, and increase motor skills for computer use.

The target group was involved in daily classroom activities over a twelve week period to encourage and promote communication. The target students increased ability to eye gaze at pictures from one out of four attempts to two out of four attempts and increased the ability to give a positive response for an activity to continue by 25 percent. The target students did not increase their motor skills for computer use by 100 percent. The target students had cerebral palsy which caused many limited, physically immature, reflex patterns and problematic gross and fine motor skills. These limitations restricted their ability to perform specific movements on command.

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Practicum Title Improving Communication Skills With An Augmentative Communication Program for Primary Severely Impaired Students

Student's Name Paula Lanigan

Project Site Bunnell Elementary School Date 5/6/94

Observer's Name Judy A. Phillips *please print* J A Phillips *please sign*

Observer's position Speech/Language Therapist Phone # 904-439-3580 (home) 904-437-7533 (school)

Observer's comment on impact of the project (handwritten):

Ms Lanigan worked closely with me in the classroom of physically impaired students. Carrying out the Language/Augmentative Communication project. I observed excellent facilitation of the activities.

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Chapter I

Purpose

Severely impaired mentally handicapped individuals experience great difficulty with speech and the application of symbols. Developing a communication program for students with severe mental handicaps has challenged educators for several years. A functional communication system for the students who can not communicate verbally needed to be established. Identifying a mode of communication can be difficult because nonverbal communication is not easily observed or even recognized by the attending adult (Siegel-Causey and Guess, 1989). Educators need to be knowledgeable about computer technology that provides the nonverbal individual with an effective speech output for communication. For the past two years the author of this practicum has taught non verbal students in the classroom and has observed the students difficulty with communication. There was a significant gap between the student's receptive and expressive language. If nonverbal students could communicate in an effective and efficient way, their opportunity to increase their expressive language would greatly increase.

The target school was located in one of the fastest growing counties in Florida. Until 1987, the target school was the only only elementary school in the county. At present, there are three elementary schools and construction for a fourth elementary school is soon to begin. The target school is situated in one of the counties three communities. The community has a population of 2000 residents and comprises 6.25 percent of the county's total population. A federally funded public housing project for low-income families is within walking distance of the school. The elementary-age children living in this housing project attend the school. A large, unincorporated rural area is located in the western section of the county. Many of the children who attended the target school also live in this area. Families residing in this area represent both the oldest and newest residents. The older families, who control large parcels of land within the county, make up the agribusinesses of cattle, cabbage, potato, and timber. While many of these older families, are land-rich and live a comfortable lifestyle, they are not wealthy. Many of the more recent families have moved into this rural area because of the low cost land and housing. These families represent a lower socioeconomic position than the older families; both groups are represented within the target school.

The target elementary school has Pre-Kindergarten through fifth grade with a total student population of 772 students. Of the 772 students, 638, or 82.6 percent, were White, and 104, or 13.5 percent, were Black. There were only 27 Hispanic students, or 3.5 and three

Asian students, or .4 percent. These percentages closely parallel the district's figures of 78.2 percent White, 16.2 percent Black and 4.3 percent Hispanic. Also within the district there were 1.3 percent Asian and .1 percent Indian students (Florida Department of Education,1992).

Of the 624 students enrolled at the target school, 56.7 percent of the students received free or reduced lunch. This was 10 percent higher than both the district and the state figures of 46.5 percent and 46.1 percent. This was a reflection of the economic status of the school community and indicated additional student educational needs reported by the 1992-1993 Florida School Report for the target county.

Many of the students participated in the many diverse educational programs at the school. These programs included: whole language, art enrichment, music enrichment, positive action program, cooperative learning groups, reading buddies, and thematic units and were directed toward the seven Florida educational goals. Technology education is enhanced with a television production and broadcasting studio, computer lab and the target school newspaper. The science and environmental education program includes a science lab, nature trail, and greenhouse. Special attention was given to expose the students to a wide choice of careers with special events for a month such as; wearing an occupational hat on Hat Day, viewing many vehicles used in various occupations on Truck Day, and watching videos during the morning announcements of people talking about their career.

The special education program at the target school offered

special programs to meet the needs of individual students such as; Pre-Kindergarten Exceptionalities, Moderately / Severe handicapped, and Mildly Handicapped. Twenty percent, or 126 students had mild disabilities such as specific learning disabled, emotionally handicapped, visually handicapped, and physically handicapped. This was five percent higher than district and eight percent higher than state figures of 15.5 percent and 12.0 percent . There were seven, or 1.1 percent, students with moderate or severe disabilities such as; mentally handicapped, autism and severely emotionally disturbed. This figure was closely parallel with both the district and state figures of 1.2 percent and 1.7 percent. There were 20.7 percent, or 160 students in federal compensatory educational program, who were provided extra assistance. This was 3 percent higher than both the district and the state figures of 17.5 percent and 14.7 percent. These figures show that the target school had a higher percentage of students with mild disabilities and in federal compensatory education programs than other schools in the district and state.

The school has a total of 73 staff members, ranging from 41 teachers, one administrator, and 31 support staff. The average class size was 24 pupils. The target Severely Physically Impaired class had six students, a teacher, and two aides.Two of the students had adequate verbal communication skills. The writer of this report was a teacher with three years experience, one year in regular education and two years in special education as the teacher of physically impaired. During the last

three years, the writer received teacher certification in elementary education , learning disabilities, and varying exceptionalities. The writer had received thirty two training in Mobility Opportunities Via Education (M.O.V.E.), and forty hours training in Teaching With Technology. The writer had an additional thirty hours of training in the classroom for adaptive computer software and twenty one hours of training on the "Whispering Wolf" an augmentative communicative device. The writer attended two communicative evaluations at the Communication System Evaluation Center in Orlando, Florida. Due to the fragile medical condition of three of the students the writer had received training in suctioning, seizure procedures, and first aide for administering medication and cardiopulmonary resuscitation (CPR).

The classroom for the physically impaired was equipped with an adequate amount of positional equipment which included standers, chair frames, special swings, and walkers. The classroom had the latest technology in computers, computer software, concept keyboards, and various switches to operate the computer for the students that had no functional use of their fingers. The students received services in the classroom from occupational, physical, and speech therapists twice a week for one-half hour sessions. The therapists also worked closely with the teacher to help implement an appropriate program that met the needs of each student.. Three girls and one boy made up the target group of students. All four students were diagnosed as having cerebral palsy. Their ages ranged from six to seven years of age. Three out of

the four students were on free lunch and Medicaid. The students lived at home with both of their parents. Three of the children had sisters and brothers and one child was an only child. All of the students had supportive parents. The three girls had extensive medical problems and their specialized medical attention carried over into the classroom. These procedures included administering seizure medication, suctioning, and tube feeding. The three students with severe medical problems could not eat or drink by mouth because of aspirating and had respiratory problems. The students displayed many limited, physically immature, reflex patterns and problematic gross and fine motor skills. Their limitations restricted their ability to perform novel or specific movements on command. Although they may have been able to accomplish the movement spontaneously, these students needed to maintain weight bearing on open hands to develop strong hand and finger joints. In supported sitting and supported standing, head control was adequate for short periods as long as correct position was maintained. The four students had difficulty controlling hands in midline or across midline and using hands and eyes together. The students had little or no visual contact with their hands. One student could not isolate her eyes from her head movement. Two of the students attended better visually and the other two students attended better auditorily. The objectives were to increase use of the hands for functional purposes and increase eye contact for communication.

Four out of the six students in the physically impaired class had very limited communication skills. The target students used their eyes and ears to gain information about their environment. Due to weakness of muscles and lack of muscle control, it was very difficult for the students to hold their heads up and maintain this position for more than two or three minutes without causing fatigue. The students had very limited functional use of their hands, therefore writing, pointing, signing, or using the keyboard for communication are not options for them. Because of the students' motor disorder, this also affected oral-motor, laryngeal, and respiratory movements. These movements were needed to produce sounds, voicing, and breathing patterns necessary for intelligible speech. Weakness in coordination of the speech muscles has been called dysarthia, a motor disorder of speech which impairs the ability to produce sounds voluntarily, effortlessly, and accurately. For all of these reasons, a unique and practical communication program using the students' visual and auditory strengths was of the utmost importance. Two of the more advanced students received an opportunity to be evaluated in Orlando at the Communication System Evaluation Center, (1993) presently called Assistive Technology Educational Network of Florida. Each child was evaluated by a team of experts in the field of communication. The team consisted of a physical, occupational, and speech therapist, and a classroom teacher. After using a variety of communication aids, it was determined that the students had good understanding (receptive language) and very limited ability to express themselves (expressive

language). The students' language comprehension was significantly greater than their ability to express themselves. The students understood most of what was said to them, but due to their limited expressive communication it was difficult to assess their comprehension accurately. But it was clear, from assessments that the students knew more than they could express. The students abilities to learn new tasks through picture identification and eye pointing skills; awareness of cause and effect in operating a switch; and their motivation to communicate were strengths which should have facilitated the use of an augmentative communication system. Without an addition to current communication modes, their ability to demonstrate their language skills were very limited. This left a significant discrepancy gap between receptive and expressive language. The students communicated by making noises, laughing or smiling when happy and crying when sad or upset. It was important for each of the students to express simple choices and requests.

All of the students wore diapers and were developing toilet skills with minimal success. The students needed to communicate their toilet needs and express when a soiled uncomfortable diaper needs changed. The students needed to communicate hunger and thirst. The ability to express some of these daily life skills needed to be taught.

The target group of four students at this present time had no means of communication except the ability to laugh or cry about something the students like or dislike. It was relevant to the students'

education and daily life skills that a communication system be implemented into the classroom that could be used at home.

In summary, the problem was to resolve the communication problems of the four students in the physically impaired class by implementing a communication program to increase expressive language for daily living skills. Students needed to be able to communicate needs and wants, make specific choices, and requests. The students had a discrepancy gap between receptive and expressive language and implementing the practicum was to decrease this discrepancy and help the students gain some independence and some control over their environment. An evaluation chart is shown in Table 1:11 which illustrates for each target student, how quantitative improvement was to be measured.

The four target students were physically and mentally impaired and were at different stages developmentally together with different degrees of physical impairments making their communication behaviors unique for each student. Because these students did not have an adequate or consistent eye gaze or other means of communication, the speech pathologist had been unable to test the target students. Two of the students were evaluated at the Assistive Technology Educational Network of Florida and it was determined that the two students had a significant gap between their receptive and expressive language.

The students were involved in daily classroom activities over a twelve week period to encourage and promote communication. The

students' progress was measured daily for twelve weeks and data collected the first week established the students' pretest level. The purpose of the objectives was to teach the students a way to communicate, decrease the gap between the students' receptive language and expressive language and increase communication skills by 25 percent of the students' present level and computer switch activation by 100 percent. (See Table I : 11)

The precise objectives were for the target students to meet the following criteria:

(1) Over a period of 12-weeks the target students will increase their eye gaze when looking at a picture from one out of four to two out of four attempts (Table 1:1).

(2) Over a period of 12-weeks the target students will increase communicative behavior by a positive response by 25 percent as measured by teacher observation (Table 1:11).

(3) Over a period of 12-weeks the target students will increase motor skills for computer use when responding to verbal command by 100 percent (Table 1:11).

Table 1

Performance Objectives Chart

Pre-Test Level

	A	B	C	D
1	Target Students'	Looks at Object	Communicates	Activates
2	Present Level		for "More"	Switch
3				
4	Target Student 1	1/4 times	0 times	2 times/min.
5				
6	Target Student 2	1/4 times	1/4 times	1 time/min.
7				
8	Target Student 3	1/4 times	2/4 times	1/8 times
9				
10	Target Student 4	1/4 times	2/4 times	1/8 times
11				
12	Target Students'	Looks at Object	Communicates	Activates
13	Future Level		for "More	Switch
14				
15	Target Student 1	2/4 times	1/4 times	4 times /min.
16				
17	Target Student 2	2/4 times	2/4 times	2 times/min.
18				
19	Target Student 3	2/4 times	3/4 times	1/4 times
20				
21	Target Student 4	2/4 times	3/ 4 times	1/4 times

Chapter II

Research and Solution Strategies

Research

Severely impaired mentally handicapped individuals encounter tremendous difficulty with speech and the application of symbols. Developing a communication program for students with severe mental handicaps has challenged educators for several years. As educators our efforts needed to be directed toward understanding and creating an educational program that functionally meets the needs of each individual who has not obtained or will not obtain the level of communication in which most adults refer to as conventional modes (e.g., speaking, writing) of communication. Many people believed that if a person can not communicate the conventional way, that person does not have the ability to communicate. Even the most profoundly handicapped children do communicate. It may be achieved in a variety of ways that are not easily observed or even recognized by the attending adult. Educators needed to be sensitive to the means by which the child is trying to communicate (Siegel-Causey and Guess, 1989).

What is communication? Communication is the process of sharing. The transferring of information by which individuals affect each others thoughts and actions is called the process of communication.

Most people have communicated by the use of spoken language which is comprised of a system of symbols and grammatical rules. Another form of communication has been nonsymbolic such as gestures, vocal sounds, eye contact, body movements, and facial expressions. Most behavior has had the potential to be communicative. For communication to take place the behavior needed to be observable by the recipient and be discriminative from the other stimuli to which the care giver and learner are frequently revealed. For nonsymbolic communication to take place effectively it has been imperative that intervention efforts are concentrated on the child's present means of communication (Siegel-Causey & Guess, 1989). Berstein and Tiegerman (1993) stated that a person who does not establish eye contact usually communicated a lack of interest or did not feel a part of the communicative interaction.

For effective communication exchanges to take place, an educator needed to observe and promote language in the student. Severely handicapped infants and youth have not been aware that certain behavior can produce a change in their environment. It was the awareness of this fact that initiated the acquisition of cognitive and communication competence (Burkhart, 1987).

The caregiver's ability to predetermine and translate the infant's signals provided the infant with a feeling that his or her signals do cause a predictable social reaction from the care giver. A complicated regulatory feedback system amongst the care giver and infant was functional at birth. Infants have been born with the ability to behave in a

way that acts as communicative signals to the caretaker.The care giver played an important part in providing circumstances for social exchanges and in providing the structure for communicative interactions suggested (Goetz, Guess, and Stremel-Campbell 1987).

The way the adults interact with the students and the environment played a very important part in the amount of communication the students initiate. Immediate feedback and access to wanted materials and requested assistance have been positive consequences for communication. Ostrosky (1991) recomminded sessions should be brief and positive to reinforce the children's use of language and social time with adults.

An interaction was actually a series of communications where each partner has a turn to communicate and each has responsibility to respond. Reciprocity referred to the partners' dual part to establish and reply in communication. The service provider considered the importance of teaching the learner the skill of both establishing and replying in communication. Siegel-Causey & Guess (1989) concluded reciprocity was absent when one partner controls the interaction and the other was left only to reply.

It was not only important to provide opportunities for the learner to iniate and respond to communication but also to acquire a feeling of interpersonal sharing. It was the interpersonal sharing that turned impersonal communication into interpersonal communication. Learners

needed to understand that it was their interaction with another person and not just their actions that created predictable effects (Siegel-Causey & Guess 1989).

To reflect communication as an interpersonal skill was a process of establishing trust. Trust was built on familiarity with the responses of others, with how others react to their responses, with consistent routine of events that they have with each other and with how they and their partners together accomplish goals and cause things to happen. This trust grew by providing opportunities for the learner to practice interactive skills and by creating an environment that fostered mutual involvement to accomplish desired goals stated (Siegel-Causey& Guess 1989).

Burkhart (1987) stated that lack of active participation on the learner hindered what was being taught and assessment of knowledge learned. Burkhart (1987: 4) compiled a list of reasons disabled children were not participating in active communication.

1. Physical Limitations: Because of the lack of muscle control stabilizing the body requires much energy.
2. Cognitive Limitations: Children learn at a slower pace and need predictable and repetitive instruction.
3. Frustration from Past Failures: Children may develop a trust in a relationship in order to try again.
4. Emotional Impairments : Again, a child needs to trust in a relationship to depend on predicable caring behavior.
5. Lack of Opportunity: Because many things are difficult for a handicapped person to do, it is easier for the caretaker to do it.
6. Delayed Response: It takes the handicapped person a long time to respond because of the difficulty to receive and process information and think through a plan of action.

To encourage shared understanding, the service provider must have been able to determine learner's reason for communicating and be able to help learners achieve their goals. It has been important that the learner realize for communication to be shared anticipated responses needed to occur. The service provider's consistently appropriate reaction to the learner's communication was the principal way to convey shared understanding.

Siegel-Causey et al., (1989) suggested the learner learned the value of communication through these consistent responses. Highly motivated activities for the learner were used to promote communication and increase the service providers opportunity to express shared understanding. It has been important for the learner's family to receive feedback on methods of communication so as to foster anticipated responses and iniate an interaction between the communicating partners.

A study by Dattilo & Camarata (1991) concluded the importance of communication skills to iniate speech and stated that it was not sufficient to teach students how to use an augmentative communication device. Basic self-initiated conversational skills needed to be implemented into the training and teaching of augmentative devise. Two male adults with severe motor and speech disabilities resulting from cerebral palsy were taught to use a augmentative communication device, "Touch Talker." The subjects had no previous experience with augmentative communication. One subject had a full-range IQ of 122 and communicated verbally at a

very slow rate due to a severe motor handicap. The subject participated in this study to increase the production of speech. The other subject had an IQ of 14 and had a diagnosis of profound mental retardation. With verbalization of two identifiable words "mama" and "no" the second subject participated in the study to develop the skills needed to use an augmentative communication system daily with consistency. The system used by both subjects was the "Touch Talker."

The "Touch Talker" augumentative device had a keyboard and display monitor. The programs were pre-written or self-programmed according to the individual's needs. Steps were taken to teach a subject to independently use an augmentative system to increase active communication. The results revealed the importance of combining self-initiated conversational treatment when presenting an augmentative system. Both subjects became more active conversationalist following the self-initiated treatment. Introducing a subject to a "Touch Talker" was not sufficient for the subject to iniate conversation. Also, the study revealed that higher levels of cognition was not a factor in increasing conversation ability before or after the treatment. The authors reported that results were consistent with previous reports of subjects with severe disabilities (e.g., Calculator & Dollaghan, 1982; Farrier et al., 1985; Harris, 1982; Light, 1988; Light et al. 1985), cited by Dattilo & Camarata (1991). It was intended that the authors demonstrate the importance of communication skills to iniate speech. Very limited self-initiated communication contributed to lack of opportunity.

The environmental arrangement fostered communication.

Ostrosky & Kaiser (1991) described seven environmental strategies for the purpose of enhancing the event of the child to communicate and to prompt the adult to use language about things that were of interest to the child:

1. Make a list of items that the child is interested in. If a child was interested in something then the child might be motivated to communicate. A choice of various items of interest were made available to the child and monitored to determine if the item was still of interest.
2. Make the placement of appealing materials within sight but not touch. This prompted a child to make a request for the item or activity. To increase the effectiveness of this strategy, the materials were visible, the item was shown and named, and then waited for a response from the child to request the item.
3. Give the desirable item with a part missing or limited amounts to encourage the child to communicate the need for more.
4. Give the student an opportunity to provide more than one item or activity to the child and encourage the child to make a choice. A child made a choice more readily if one item was desired and the other item was not. To promote a child to initiate language, the choice was introduced first nonverbally, with gestures, next the child was prompted to make a choice by saying "Tell me which one you want" or by saying the name of each item.
5. Provide a situation when a child needs assistance, for example being pushed on a swing.
6. Initiate a planned activity for an important material needed to complete the activity was left out. The child was encouraged to problem solve and indicate something is wrong or missing. The environment was friendly and activity brief as not to frustrate the child.
7. Create a preposterous setting. Time was given for the child to respond. This event happened when the child least expected it and was used to a certain routine.

To make these seven strategies work, the teacher needed to be aware of the student's response, the interests of the child, and to work as a team with the child to encourage and bring about a communicative response. By evaluating the child's interest regularly, only motivating materials were used to encourage the child to communicate. The use of these strategies needed to be individualized according to each child's cognitive level and responsiveness to the environment.

Ostrosky & Kaiser (1991:7). suggested using the environment to prompt language and included the following steps:

1. Focusing on making language a part of children's routines.
2. Providing access to interesting materials and activities.
3. Providing adult and peer models who will encourage children to use language and respond to their attempts to do so.
4. Establishing a contingent relationship between access to materials or assistance and use of language.

A study by Roberts, Bailey, & Nychka (1991) examined strategies of 31 special education preschool teachers, who used to promote children's communication during the daily activities in the classroom. The children in the classroom ranged in age from one to seven years old and had a wide range of disabilities: Down syndrome, cerebral palsy, mental retardation, autism, hydrocephalus, visual impairments, cleft palate, emotional disabilities, and other developmental delays. The teachers were rated on quantity,how often the communication strategy was used and quality, to what degree the strategy was consistently and completely used. Communication opportunities transpired throughout the day in

the classroom between teachers and students as well as among the children. The results of the study suggested teachers that frequently employed comments, acknowledgments, and pauses for children to answer provided an environment that fostered communication development. The children had an opportunity to communicate during lunch, play, and as they interacted in various daily activities. Communication should not only have been taught in a language activity, but also included in all classroom routines and activities.

A study by Sappington, Reedy, Welch, and Hamilton (1989) assessed the communication needs of nonvocal persons. All the subjects were quadriplegic, wheelchair bound and diagnosed as having cerebral palsy. The four subjects were a 41 year old female, IQ of 47: a 35 year old, IQ 47: a 34 year old female, IQ 70: and a 32 year old male, IQ 53. All IQs were determined from the performance on the Peabody Picture Vocabulary Test. The subjects were tested individually. An investigator entered the room and gave a verbal message to the subject and then left. Another investigator entered and tried to elicit the message from the subject. The results showed all stimulus were reproduced accurately by the subjects. The study suggested nonverbal subjects with quadriplegia retained and relayed verbal material with reasonable accuracy. Also, the accuracy of relayed material diminished when messages could not be expressed concretely and expressive abilities were estimated too low. This data demonstrated the gap between receptive language and expressive language.

At the Assistive Technology Educational Network of Florida, (ATEN) in Orlando, Florida (1993) an evaluation was completed on two students with cerebral palsy who were profoundly physically impaired, non-verbal and severe developmental delays. The students were properly positioned and engaged in a variety of activities. The strengths and weaknesses of each child was evaluated and the most appropriately communication system was selected for each child. The results of the evaluation concluded that each student had a significant discrepancy gap between receptive and expressive language. The ATEN recommended a communication board with pictures and an augumentative device called the "Whisper Wolf" for nonverbal students to use for communicating. It was a portable, battery powered, voice output device. It contained ADAM LAB electronics and produced synthesized speech. The student accessed word, phrases, and functions through touch panel activation or a speech operated auditory scan. That is, the student heard preprogrammed messages through a "private" volume controlled, pillow speaker mounted near the ear. On hearing a desired message, the student activated a single switch to "speak" the selection aloud through the device's built in "public" speaker. Displays, individually designed, might have one to 36 messages. Another augmentative device was the "Wolf" which also produced synthesized speech and was activated through a touch panel. Students who did not have use of their hands would use the "Whisper Wolf."

Research compiled by the State of Florida, Department of

Education (1986:AS#4) listed prerequisite skills for successful use of communication boards and issues related to communication systems. These Cognitive/Social Behaviors were the ability to:

1. maintain eye contact with other individuals
2. maintain eye contact with the referent
3. establish joint focus
4. fixate on an object to which another is pointing or looking at
5. shift gaze between two or more objects or pictures
6. scan an array of three or more objects or pictures
7. attract the attention of another individual
8. direct attention on to a specific referent
9. understand that the objects or pictures represent a general class of experiences, events, objects, and activities
10. store and retrieve meaning associated with objects and pictures
11. indicate when a message has been misinterpreted
12. terminate a communicative exchange

Earliest communication and language training for many mentally handicapped individuals started at the presymbolic or early symbolic stage. Many individuals have been involved in infant stimulation or preschool programs. Frequently profoundly mentally handicapped adults may be schooled at this stage. To establish an overall view of an individuals presymbolic communication attributes it was imperative to collect background data combined with observational and testing data. Bernstein & Tiegerman (1993: 395,396) listed the following questions for speech-language pathologists to answer to obtain data:

1. How does the client communicate primarily?
2. Does the client demonstrate any turn-taking behaviors?
3. What situations seem to be high-communication contexts?
4. What high-interest items does the client have?
5. Do care givers provide enough time for the client to respond? How do care givers cue the client to respond? How do they evaluate responses?
6. Which care givers seem to elicit the most client responses? Why?
7. Does the client seem to enjoy making sounds? Give examples. How often does the client vocalize? Which situations elicit maximum vocalization? Imitated vocalization?
8. Which daily situations result in the most client-caretaker interaction?
   Describe these interactions? When do these occur daily? Are the client's responses consistent?
9. Does the client initiate communication? How? In what situations?
10. Does the client-
    Make wants known? How?
    Request help? How?
    Point to things, name them, or both? Does the client look at objects and / or partner while pointing or naming Ask questions or seek information? How?
    Indicate emotions (pain, happiness, like/dislike)? How?
    Seek attention? How? What happens if attention doesn't follow?

Data needs to be collected for determining rudimental communicative signals in non verbal students. Once the student's initial communicative signals have been recognized the ground work has been laid for the developing of more complex communication. Goossens & Crain (1989) suggested a four-step formula for determining early communicative signals that act as a desire for more pleasurable activities.

The first step was to introduce the student to a variety of pleasurable activities that encouraged vocalizations, increased smiling, and increased motor activity. The activities were categorized by their proprioceptive, tactile, visual, auditory, gustatory, and olfactory primary sensory input . A few of the activities that Goossens' and Crain (1989) considered for proprioceptive primary sensory input were rocking to music, being swung in a bed sheet, pushed in a swing, and bounced on a large ball. Tactile activities included being fanned, placing hands in warm water, having his/her back scratched, and vibrotactile stimulation. Visual activities included watching bubbles being blown, watching a wind-up toy, and playing peek-a-boo. Auditory, gustatory and olfactory activities included listening to music, receiving bites of a favorite food, and smelling a pleasant smell.

The second step was to encourage the child to participate in an enjoyable activity, intentionally pausing from time to time and observing the child's behavior during these pauses. It was noted if the child was aware to the fact that the activity had ceased and displayed anticipation of the activity starting again. If the child was not able to predetermine the reoccurrence of an activity, the child was not ready to indicate a desire for the activity to resume. Frequent repetitive enjoyable activities was suggested for the child not demonstrating anticipation.

For the third step to take place the child had to be able to anticipate the reoccurrence of an activity then, importance turned to establishing a behavior that could provide a communication signal for

more. After a signaling behavior was developed, the pause time was intentionally lengthening to encourage the use of more than one signal used at a time. Signals used in combinations was suggested to be a a higher level behavior.

The fourth step involved verbally stating the child's signaling behavior when reinstating an activity, e.g. "again"...."more" rocking. By using the appropriate word (i.e., "more") with the signal, the child was given verbal language that equivalent to the nonverbal request. Even if the child did not comprehend spoken words at this level of development, the word did obtain meaning after consistent pairing.

In attempting to teach young and severely handicapped to communicate Burkhart (1987) had found using pictures and symbols helped to relate ideas. Difficulty in associating concrete to pictorial was directly related to the similarity of the object to the symbol. Mirenda and Lock (1989) identified a predictable hierarchy of easiest to hardest between various objects, pictures, and symbols.

Mirenda & Locke (1989) conducted a study with 40 subjects ranging in age from 3 years,11 months to 20 years,10 months (average age = 11 years:5 months. All of the students were non-speaking as defined by the American Association of Mental Deficiency (AAMD). An investigation was done to determine if a hierarchy of symbol transparency was predictable for persons with limited language ability. The study used various symbol sets. Based on the mean numbers correct across subjects, the hierarchy was, in order of easiest to hardest:

objects, black-and -white line symbols (including Picsyms, Self-Talk, Picture Communication Symbols, and Rebus, in that order), Blissy mbols, and written words. It should be noted that the procedures used in the Mirenda study were limited to the assessment of object associations. Mizuko (1987) found that normally developing three year old found Picture Communication Symbols and Picsyms to be more clear and easier to lean than Blissymbols.

Glossens & Crain (1989:146) reported selecting pictures that maintain good ground-figure differential was extremely important and suggested ways to maximize the utilization of photographs:

1. Select photographs in which the figure appeared prominent against a neutral uncluttered background.
2. If the background was cluttered : the figure was highlighted by outlining it with darker black lines or the figure was cut out and mounted on a simpler neutral background.
3. If the figure was dark, it was placed on a light background.
4. If the figure was light, it was placed on a dark background.

Roberson, Gravel, Valcante, and Maurer (1992) reported on study using picture task analysis. Many teachers and researchers have integrated task analysis and augmentative communication procedures to make up sequences of pictures that represent the steps needed to complete a task. A picture task analysis was used to breakoown the skill into component parts, students were guided forward, backward, or total task chains, and recorded step-by-step progress toward skill acquisition were provided by the teachers of students with moderate and severe disabilities. A picture task analysis was a pictorial representation of the

necessary steps in a task analysis and displayed for the students to follow. The pictures communicated that the task to be performed required a sequence of steps to be carried out in a sequential order with starting and stopping points. The ultimate goal of a picture task analysis was for the student to be able to perform specific tasks independently. Picture task analyses improved receptive communication, acted as a memory aid, and was time and cost effective. The picture task analyses were easy to make, carry and implement.

Roberson et al. (1992:13) listed the following steps to make a picture task analyses :

1. An appropriate skill was chosen from the student's individualized program (IEP) and broken down into a sequence of steps according the student's ability.
2. A symbol system was chosen. The University of Florida used photographs to represent the steps.
3. The appropriate materials were selected.
4. A photograph was taken for each step in the sequence.
5. The photos were placed in sequential order , placed on a backing, and glued.
6. Numbers were written below each picture and arrows pointed to the next picture in the sequence.
7. Written below each picture was a description of desired behavior.
8. To protect the photo, lamination or clear contact paper was applied.

After the picture analyses was completed, the teacher explained it by pointing to each photo and reading the sentence below each picture. The teacher modeled the behavior of each photo while the student watched and looked at the appropriate photo. The teacher performed

the task and asked the student what came next. The student with reading ability read the description below the photo and the nonreaders and nonverbal students pointed to the appropriate next step. The teacher then let the student perform as many of the steps as possible and intervened when necessary. The teacher gradually faded directions so the student was able to perform the task independently using the picture task analysis suggested (Roberson et al. 1992).

Goossens & Crain (1989) recommended an eyegaze communication vest to beworn by the Service Provider. The vest was extremely useful during the beginning stages of intervention with augmentative communication students using eyegaze as a response mode. The vest was always available for communication and allowed the hands of the service provider to be used for possible positioning or manipulating objects.

Siegel-Causey & Guess (1989:5) suggested five goals to consider when using a communicative method with handicapped learners to:

1. Gain attention
2. Elicit desired behaviors
3. Help the learner anticipate coming events or recall past events
4. Share information
5. Engage and maintain the learner in reciprocal interaction

Bernstein & Tiegerman (1993) suggested, some mentally handicapped individuals experienced problems with the use of pictures or symbols and may need to use an augmentative form of

communication. Augmentative systems helped to achieve expanded symbolic communication. Communicative methods included communication boards, and electronic or computer-based communication.

Goossens & Crain (1989) suggested that before initiating symbolic communication, pretest to find the child's communicational stage of development. It could be frustrating for both the child and the service provider if the program implemented is to advanced for the child. The child's cognitive and early social communication skills must be determined before intervention measures are considered. A detailed communicative evaluation was important if an intervention program was to be successful. Individual diagnostic assessments and group observation provide an excellent source of data, yielding developmental levels, communication competence (strengths, weaknesses, ability to adjust communication breakdowns, and adult-peer interaction patterns.

Dattilo and Camarata (1991) stated the need for an intervention plan to self-initiate communication for success in using an augmentative device for communication. Issues related to augmentative communication systems compiled by the State of Florida, Department of Education (1986: 11) listed the following:

1. Use of augmentative systems foster the development of language and speech of the potential exists.
2. Students should be exposed to language systems to broaden their interaction potential.
3. Some means of communication must be provided regardless of whether Piagetian Stage V cognitive skills have been achieved.
4. Piagetian Stage V cognitive skills facilitate functional application of signs and communication boards and booklets.
5. Every student's environment must be prepared to implement augmentative systems on a consistent basis.
6. Augmentative systems must not be withheld in hopes the speech will eventually develop.

Computer technology has opened many possibilities for the nonverbal. Microcomputers have helped special education programs for mentally handicapped, autistic, and physically impaired children achieve success reported Rushakoff & Lombardino (1983). The Speech and Hearing Clinic at the University of Florida had recommended microcomputer systems for many children between the ages 5 and 8 years old.The microcomputer was used according to various needs of the child: as an effective speech output communication aid, for writing and computer assisted instruction.

The necessary basic components of the microcomputer system included a microcomputer (64K RAM), disk drive, and a monitor. A printer was required for writing and a speech synthesizer for speech output as a communication aid suggested Rushakoff & Lombardino (1983). Prescriptions for the microcomputer systems indicated specific consideration of performance and environmental factors to ensure the appropriate needs of the child were being met. Microcomputers provided

the individual with a mode for independent learning as suggested Rushakoff & Lombardino (1983).

The research has shown several ways to develop a communication program for students with severe mental handicaps. One must be knowledgeable in the areas of nonsymbolic behaviors by observing, interpreting responses, and responding appropriately in harmony with the individual's goal in communicating and assist learners to achieve a more active participant in communication interactions. Also, research has shown that a nurturing, trusting, structured environment motivated and increased opportunities for the learner to communicate.

Solution Strategies

Some of Ostrosky & Kaiser (1991) environmental strategies for the purpose of enhancing the event of the child to communicate and to prompt the adult to use language about things that were of interest to the child were implemented into Gloossens & Crain (1989) four-step formula for determining early communicative signals that act as a desire for more pleasurable activities. The students present communicative behaviors and equipment in the classroom were implemented into the communicative program.

The first step of Gloossens & Crain (1989) four-step formula will introduced the student to a variety of pleasurable activities that encouraged vocalizations, and / or increased smiling, and / or increased motor activity. Among the activities Goossens' & Crain mentioned, the following activities were chosen for the targeted group: rocking to music,

being swung in a bed sheet, pushed in a swing, bounced on a large ball, and watching bubbles being blown. In addition those activities the targeted group used a switch to operate a vibrating pillow, a battery operated toy, and tape player. Pictures were taken of the activities mentioned above for use in step three.

The second step was be to encourage the child to participate in an enjoyable activity, intentionally pausing from time to time and observing the child's behavior during these pauses. It was noted if the child was aware to the fact that the activity had ceased and displayed anticipation of the activity starting again. If the child was not able to predetermine the reoccurrence of an activity, the child was not ready to indicate a desire for the activity to resume. Frequent repetitive enjoyable activities were suggested for the child not demonstrating anticipation. The students will used a switch to operate battery operated toys and tape player that ceased to operate when the switch is not depressed.

For the third step to take place the child had to be able to anticipate the reoccurrence of an activity then, importance turned to establishing a behavior that could provide a communication signal for more. The data collected from week one and week two on the students' communicative behavior will be evaluated and determined what behaviors could provide a communicative signal for more.

In addition to these behaviors colored photographs were placed on a communication vest suggested by Gloossens & Crain (1989) and/or a communication board. Based on a study done by Mirenda & Locke

(1989), a hierarchy was established in the order of easiest to hardest: objects, color photographs, black-and-white photographs, miniature objects, and black-and-white line symbols.

Ostrosky & Kaiser (1991) research suggested appealing materials placed within sight but not touch, prompted children to make a request for the item or activity. The effectiveness of this strategy, the materials were made visible, shown and named the item, and then waited for a response from the child to request the item. The child was encouraged to make a choice when more than one item or activity was presented to the child. By saying "Tell me which one you want" or by saying the name of each item a child was promoted to initiate language. The children would be shown a colored photograph and the concrete item and eventually be able to use only the photographs. Colored photographs of the potty chair, food, and drink were shown to the students at least four times a day during the activity.

The fourth step involved verbally stating the child's signaling behavior when reinstating an activity, e.g. "again"...."more" rocking. By using the appropriate word (i.e., "more") with yes/no signal. The behaviors mentioned in step three will be used and the word more will be initiated. Also, Ostrosky & Kaiser (1991) suggested to provide a situation where a child needed assistance, for example being pushed on a swing.

Rushakoff & Lombardino (1983) stated computers have helped many physically impaired children to achieve success and provided a

mode for independent learning. All four of the target students used the computer. The target students will use computer software Early and Advanced Switch Games by R. J. Cooper that caused visual and auditory effects to increase eye gaze, following one step directions and demonstrate the concept of cause and effect. The target students used the computer to read a story by using auditory and visual scanning skills and depressing the switch at the appropriate time using the computer.

Research by Goossens and Crain (1989) on classroom environment suggested the classroom be centered around language and communication, through the use of integrated communication systems. The use of an assortment of communicative boards that display a specific topic was cost efficient, promoted instant communication, allowed semantic and linguistic expansion, and was easily developed. Equipment placed conveniently through-out the classroom allowed easy access. A list of available classroom equipment that would help the students meet their communication objectives was made.

It would be unrealistic to expect each child to have an individual communicative device such as a "WOLF" (ATEN) (1993) or a "Touch Talker" (Dattilo & Camarata, 1991) because of the high cost and availability of funds. The classroom presently had one "Wolf", one scanning device, one communication board, one communication vest, adequate amount of appropriate pictures, five switches, two tape players, four switch operated toys and two switch accessible computers. The existing equipment was sufficient to meet the objectives.

Chapter 111

Method

During the first week of implementation, the target students were introduced to a variety of pleasurable activities that encouraged communication behaviors. The following activities were introduced: rocking to music, pushed in a swing, bounced on a large ball, watching bubbles being blown, and use a switch to operate a battery operated toy, tape player, and computer. A colored photograph of each activity was shown to each child before and after the activity. Data was collected on the students' communicative behavior during the activities, their ability to alternate eye gaze between the activity or goal and the listener and activating the switch to operate a computer program at the appropriate time. Each student was observed for approximately 20 minutes a day for one week and a present level of functioning was established (Appendix A: 58).

During week two, the target students were encouraged to participate in the same activities as week one: rocking to music, pushed in a swing, bounced on a large ball, watching bubbles being blown, and use a switch to operate a battery operated toy, tape player, and computer. A colored photograph of each activity was shown to each child

before and after the activity. The service provider caused the activity to cease approximately every 1-2 minutes. Data was collected on the students' communicative behavior during the activities, the ability to alternate eye gaze between the activity or goal and the listener and activating the switch to operate a computer program at the appropriate time. Each student was observed for approximately 15 minutes a day three times a week and data was recorded (Appendix B:60).

During week three, data collected from week one and two on the target students' communicative behaviors was evaluated and a communicative behavior was established for each of the students. The target students participated in activities of their choice by using their established communication behavior and eye gaze. Data was collected on the students' communicative behavior during the activities, the ability to alternate eye gaze between the activity or goal and the listener and activating the switch to operate a computer program at the appropriate time (Appendix C:62).

During week four through twelve the target students continued to participate in activities of their choice by using their established communication behavior and eye gaze (Appendices D:64 - L:80). When an activity ceased after 1-2 minutes, the word "more" was introduced to the student and the student needed to use a communicative signal to iniate the activity to start. Data was collected on the students' communicative behavior during the activities, the ability to alternate eye gaze between the activity or goal and the listener and activating the

switch to operate a computer program at the appropriate time. Each student was observed for approximately 15 minutes a day three times a week and data was recorded.

During week five, the author visited classrooms in another county to observe non verbal students and their communication program. The author met with the students' speech pathologist, occupational therapist, physical therapist, and technology technician to discuss the students' progress and program during week six and seven. The students were introduced to two new battery operated toys, a bunny that played a song and moved and a fan in the shape of a bear. The occupational therapist positioned the students for optimum hand control at the computer to activate a switch (Apendices E: 66 - G:70).

During week eight and nine the occupational and physical therapists positioned the students in equipment that facilitated head and trunk control to enhance vocalization and eye gaze. The speech pathologist and author did a whole group language lesson using a communication board that had sequenced pictures of the story and a communication vest with pictures of the students. The students had to look at the picture that pertained to the part in story on the communication board and look at the picture of the child whose turn it was to help turn the page (Appendices H:72 - I:74).

During week ten through twelve the students continued to participate in eye gazing and computer activities, positioned to facilitate head and trunk and hand control. The students participated in reading

stories using a switch activated tape player, picture communication board, and communication vest. The students communicated it was their turn by looking at their picture on the communication vest and responding in a positive way (Apendices J:76 - L: 80).

Chapter IV

Results

The four target students of the physically impaired class were evaluated by teacher observation 15 minutes three times a week over a twelve-week period. The highest score of one day per week was averaged and recorded for each of the three objectives. The score was recorded for each of the twelve weeks (See Table 3:45 and Table 4:46). The students were observed during three activities: eye gazes at pictures, positive responses to continue a highly motivating activity, and switch activation at the appropriate time for computer use. Data was collected and recorded three times a week. The first week's data established each of the student's present level of functioning or baseline. First, one picture of an activity was presented four times during an activity period. The students were evaluated on the number of successful eye gaze attempts. Second, while the students were engaged in a highly motivating activity, the activity ceased every one-two minutes. The students were observed for positive responses for the activity to continue. When given a verbal command to "push the switch," the students activated a switch for computer use. The students rate of performance

was recorded before implementation (See Table 1: 11). The students rate of performance was recorded at the end of implementation (See Table 2:44).

Once a desired activity for each student was discovered the ability to eye gaze was increased. Motivation played an important part in gaining the students attention and listening to one step directions. During the first two weeks the students were observed for positive responses to activities to find an activity that would motivate the students to want to look at the picture of a desired activity and communicate for the activity to begin. Positioning of each student was crucial for increasing motor skills for computer use and effective eye gaze.

Student One responded to a wind up toy merry-go-round. The student was not able to isolate eyes from head movements and tracked the object by turning the head toward the object. The student had eye gazing success when looking at the concrete object rather than the picture, but after five weeks of practice the student began to focus on the picture. The first target student mastered the first objective: to increase eye gaze when looking at a picture or object from one out of four to two out of four. The student communicated the desire for an activity to continue by a smile. The second objective: to increase communicative behavior by a positive response by 25 percent was mastered from zero response to one out of four attempts. The student activated the switch to operate the computer more effectively after being properly positioned to facilitate hand and head control. The student did not meet the third

objective: to increase motor skills for computer use by 100 percent. The student showed approximately 20 percent increase in motor skills (Table 5: 47).

The second student responded highly to a tape player activated by depressing a switch. The student was given a "Wolf" which was programmed to speak the name of the picture or activity when depressed. The student activated the "Wolf" by applying pressure to the picture of an activity and then went to that activity. The student had the most success eye gazing between the picture of a tape player and the tape player. The second student mastered the objective: to increase eye gaze from one out of four to two out of four attempts. The tape player was placed on a chair with wheels and when the tape stopped the student would use the chair for support and wheel the chair to the author to start again. The student mastered the second objective: to increase communicative behavior by a positive response of 25 percent or one out four to two out of four. The student did not master the third objective : to increase motor skills for computer use by 100 percent. The student increased motor skills for computer use by 75 percent (Table 6:48).

The third student was highly motivated to eye gaze when food was involved. The student was given a picture of food and the food item. The first objective was mastered by increasing eye gaze from one out of four to two out of four attempts. The first week the student did not participate in objective two which was to give a positive response because he was able to make yes and no responses and say the word "more." However,

credit was given to the student for objective two when asked to name the picture of food before the student could receive the item of food. When the student attempted to name the food it was considered a positive response. The student did master objective two from zero response to one response. The student had not attempted to name a food before. During the fifth week through the twelfth the student received food as a reinforcement and increased switch activation. The student mastered objective three increasing motor skills for computer use from one out of four to two out of four attempts (Table 7:49).

The fourth student responded to the swing and large ball. Two adults were needed to lift the child onto the object due to her size. The student was tube fed twice a day which took one hour per feeding, and nap time was at least one hour daily due to medication and poor sleeping patterns at night. Activities had to be planned around the availability of the student and adult assistance. The student was able to look at picture when presented to the left or right side rather than directly in front of the student. Objective one was mastered from one out of four to two out of four attempts to eyes gaze at a picture.The student was able to look at the authors eyes to express "more" of an activity. The student mastered objective two: to increase communicative behavior by a positive response by 25 percent. Switch responses to operate computer increased even though stability of the hands was not completely attainable. The student did master objective three by increasing motor skills for computer use by 100 percent (Table 8:50).

The students improved in ability to eye gaze, communicate a positive response and increase motor skills for computer use significantly over a twelve week period. During the last three weeks of implementation, the students were assessed by the two classroom teacher assistants and the author. The author was involved in school related activities outside the classroom. The students did not increase or maintain but slightly dropped in all areas of responses. Not only did the students need to be motivated but the provider also needed to be motivated. Student's daily health problems and fatigue influence the students response rate. The students are demonstrating more awareness of their environment, turn taking and the desire to communicate.

Table 2

Performance Objectives Chart

Post-Test Level

	A	B	C	D
1	Target Students'	Looks at Object	Communicates	Activates
2	Present Level		for "More"	Switch
3	May, 1994			
4	Target Student 1	2/4 times	1/4 times	2 times/min.
5				
6	Target Student 2	2/4 times	1/4 times	2 time/min.
7				
8	Target Student 3	2/4 times	1/4 times	2/4 times
9				
10	Target Student 4	2/4 times	1/4 times	2/4 times
11				
12	Target Students'	Looks at Object	Communicates	Activates
13	Goal Level		for "More	Switch
14	May, 1994			
15	Target Student 1	2/4 times	1/4 times	4 times /min.
16				
17	Target Student 2	2/4 times	2/4 times	2 times/min.
18				
19	Target Student 3	2/4 times	3/4 times	1/4 times
20				
21	Target Student 4	2/4 times	3/ 4 times	1/4 times

Table 3

Performance Objective Chart

	A	B	C	D	E	F	G	H
1	Weekly Average	Obj.1	Obj.2	Obj. 3	Weekly Average	Obj. 1	Obj. 2	Obj. 3
2	of Student 1				of Student 2			
3	Week 1	0.75	0	1.5		1.25	0.5	1
4								
5	Week 2	0.25	0	0.75		1.75	0.5	0.5
6								
7	Week 3	0.75	0.25	1.25		2.25	1.25	1.25
8								
9	Week 4	0.75	0.75	1.5		2.75	1.25	1.5
10								
11	Week 5	1.25	1.75	2.25		2.25	2.25	2
12								
13	Week 6	1.75	2	1.75		2.5	2	1.5
14								
15	Week 7	2	1.75	2		2	2	1.5
16								
17	Week 8	1.75	1.75	2.5		2	2.5	2.25
18								
19	Week 9	2.5	2.5	2		2.75	2.25	2
20								
21	Week 10	2.5	1.75	2		2.25	2	2
22								
23	Week 11	2	1.5	1.75		2	1.5	1.75
24								
25	Week 12	2	1.5	1.75		1.75	1	1.75

Table 4

Performance Objective Chart

	A	B	C	D	E	F	G	H
1	Weekly Average	Obj.1	Obj.2	Obj. 3	Weekly Average	Obj. 1	Obj. 2	Obj. 3
2	of Student 3				of Student 4			
3	Week 1	1.25	N/A	1		1.25	0.25	0.75
4								
5	Week 2	1.5	1.25	0.5		1.5	1.25	0.75
6								
7	Week 3	2.25	2	1.25		1.75	1.75	1.25
8								
9	Week 4	2	1.75	1.5		2	1.5	1.5
10								
11	Week 5	2	2.75	2.25		2.25	2	2
12								
13	Week 6	1.75	2.5	2.25		2	2.25	2.25
14								
15	Week 7	2.25	2.25	2		2.5	2.25	2.25
16								
17	Week 8	2	2	2.25		2.75	2.5	2.25
18								
19	Week 9	2.75	2.25	2.25		2.75	2.5	2.25
20								
21	Week 10	2.5	1.75	2.25		2.5	2	2
22								
23	Week 11	2	1.5	1.75		1.75	1.75	1.5
24								
25	Week 12	1.5	1	1.5		1.75	1.25	2

Table 5

Implementation Graph

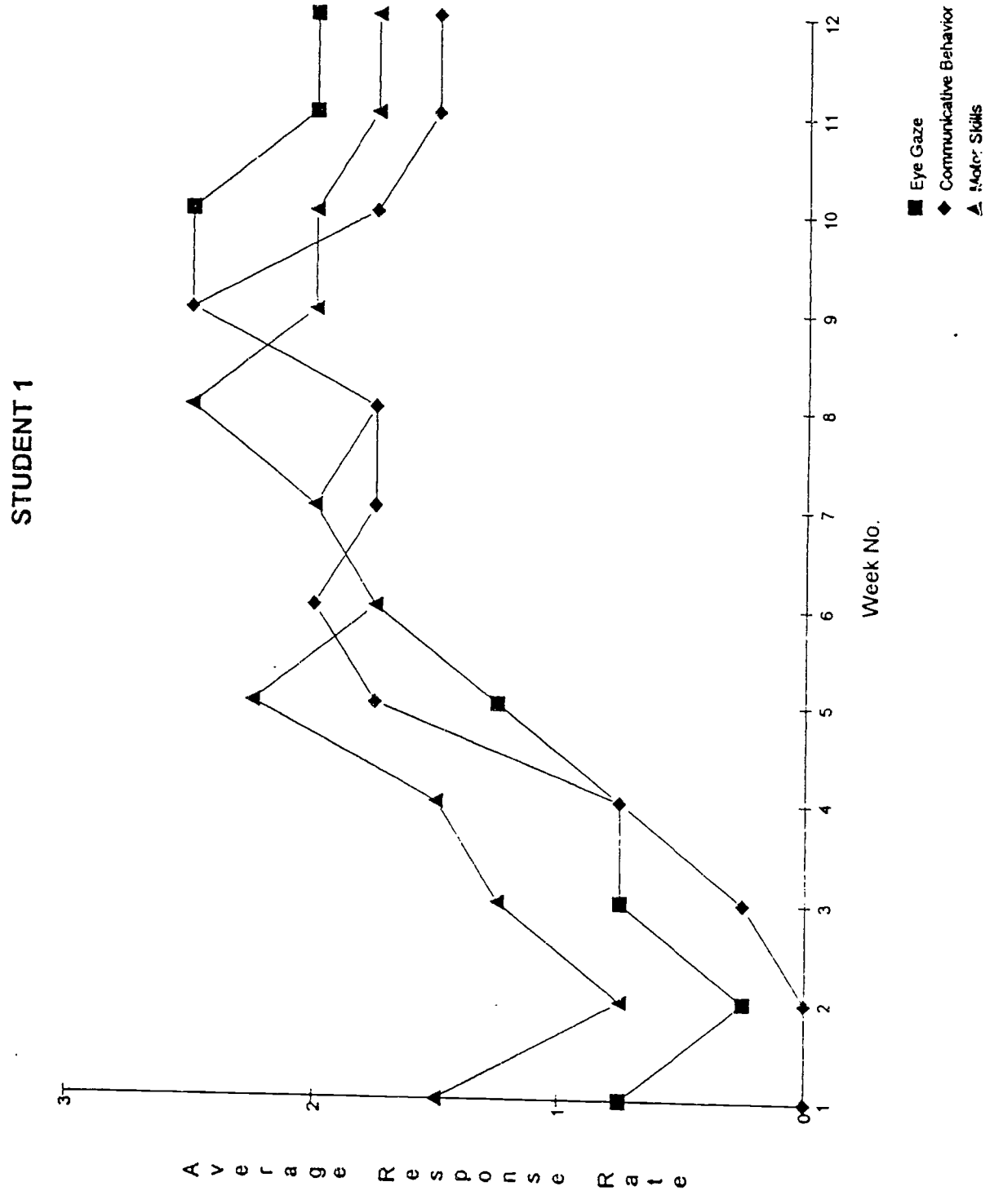


Table 6

Implementation Graph

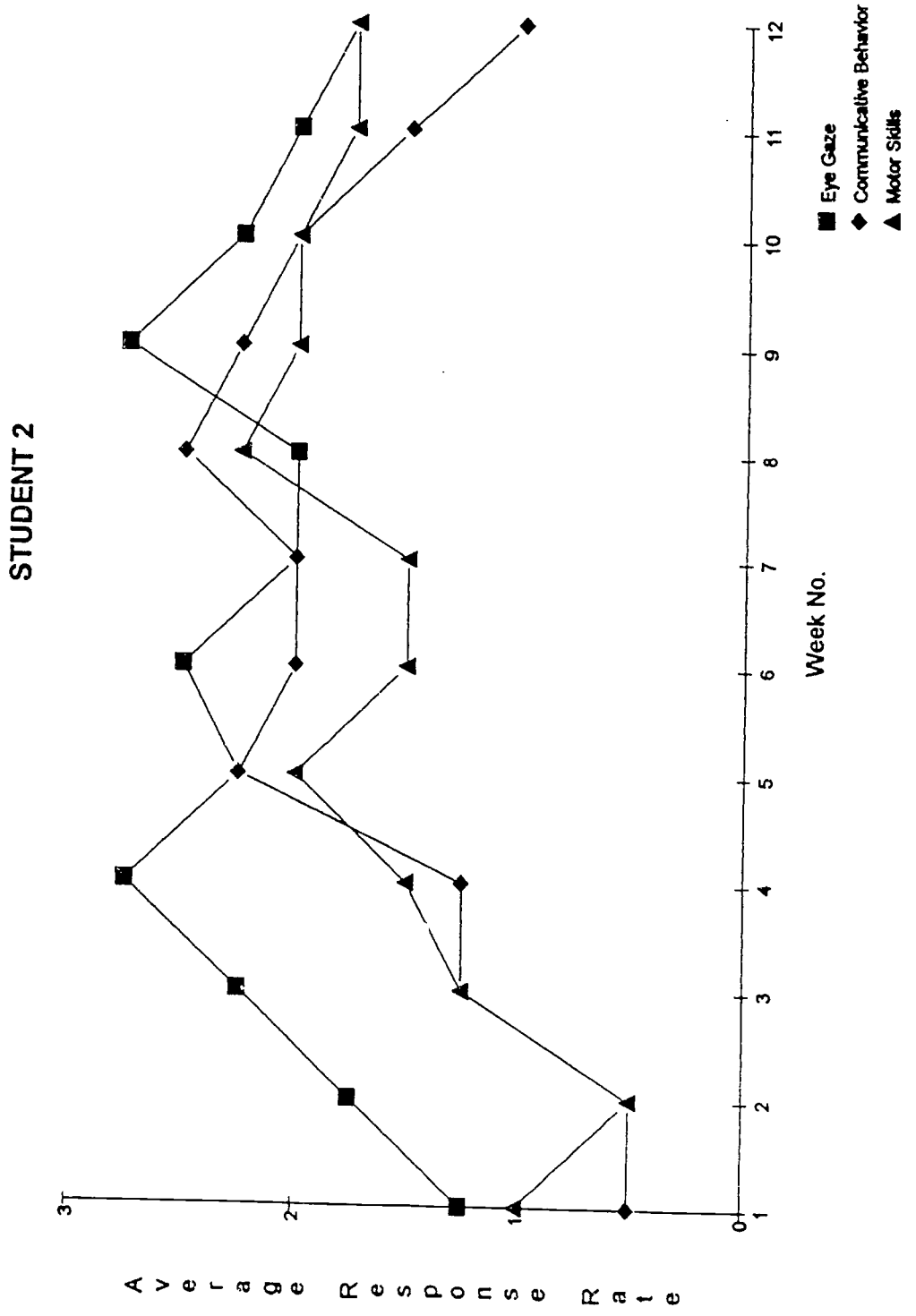


Table 7

Implementation Graph

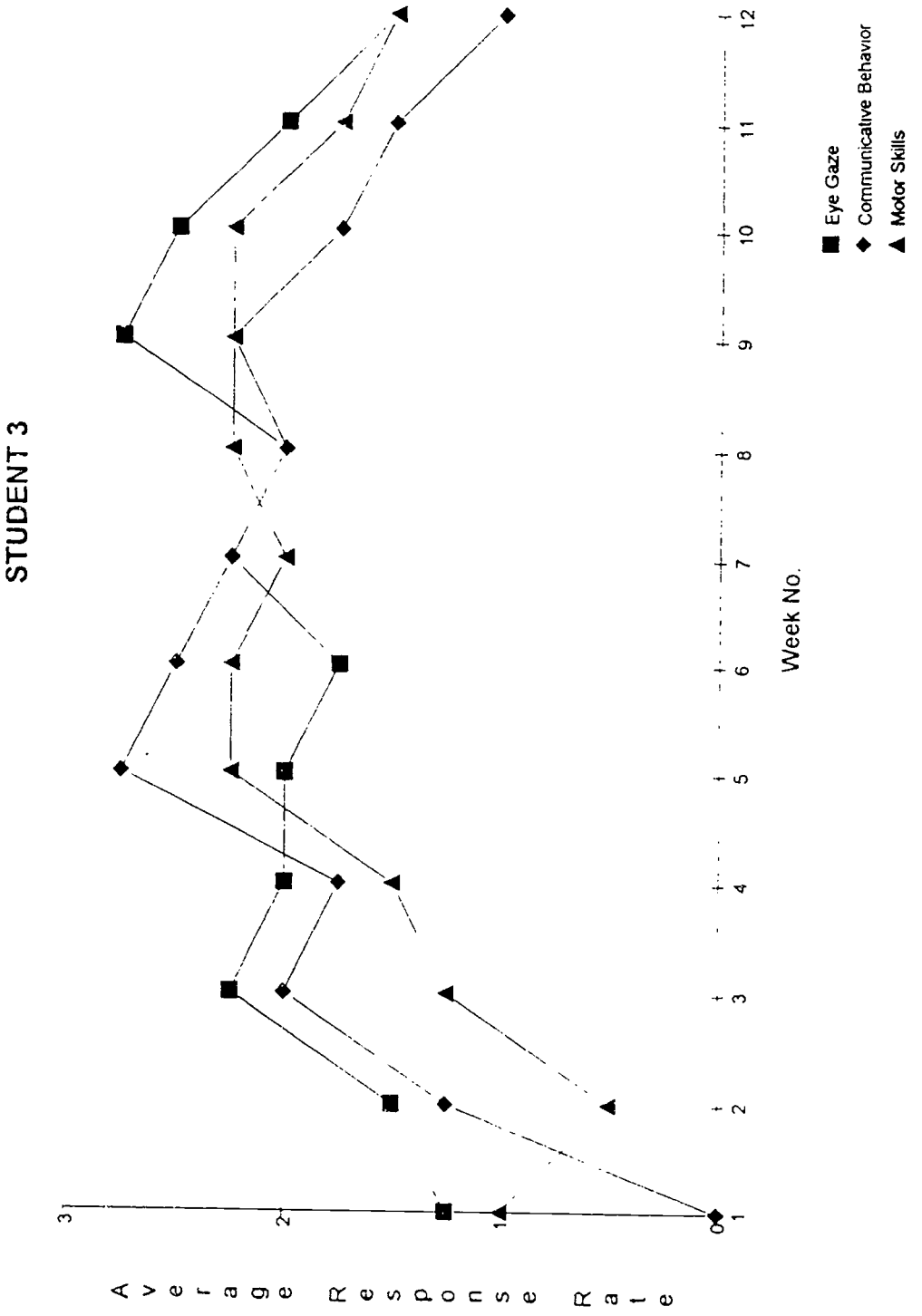
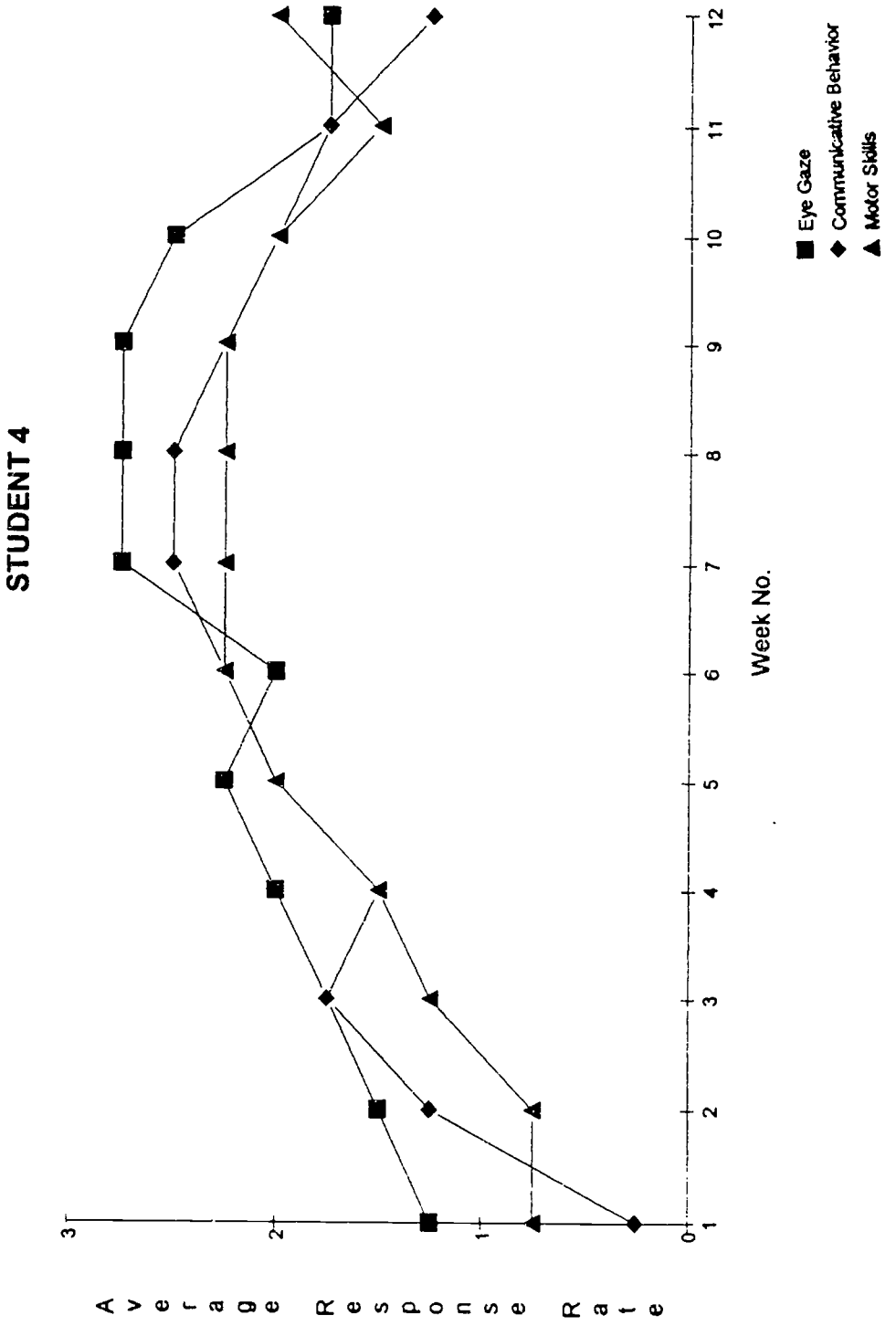


Table 8

Implementation Graph



Chapter V

Recommendations

Once an augmentative communication system had been established, communication needed to take place in their natural environment and promote interaction. The student's preferred communication system should be used through out the day in all locations of the room. It was not appropriate to use a communication system only during language. A communication system should be portable, uncomplicated and effective.

For a student to use an augmentative system effectively, potential communication partners needed training to interpret the encoding method. The most important aspect of implementation was for communication partners to be knowledgeable with the student's system and encourage its use. It was essential that the students realized that their communication partners value their communication system. The success of the program depended on communication participants ability to use the system when interacting with the student.

The correct positioning of the students can greatly enhanced the student's ability to succeed in communication. The target students had cerebral palsy which caused physically immature balance and equilibrium reactions and prevented them from automatically knowing

how to hold their head and trunk against gravity. In addition, their motor performance was strongly affected by persisting primitive reflex patterns which interfered with their ability to use their eyes and arms effectively. The students had difficulty separating the movement of their head, shoulders, elbows and legs from each other. The student's muscle tone was increased significantly when excited. Controlling the accuracy and speed of the muscles was very difficult for the students.

In supported sitting head control was adequate for short periods as long as correct position was maintained and extension behaviors controlled. It is important to adjust the computer screen or display pictures at a eye level to increase their visual field. With the assistance of the occupational therapist and physical therapist, the students could be properly positioned to allow optimum success using their eyes and hands to communicate.

Activities needed to be highly motivating for the students to desire to participate. For the student to perform a simple task as eye gazing or slightly depressing a switch many elements were involved. It was physically exhausting for the students to maintain proper positioning for long periods of time. The speech therapist and computer technician offered a variety of activities to motivate the student and hold their interest. Activities that provided music background, visual stimulation, and manipulation were highly motivating for the the auditory, visual, and kinetic learner.

During the past four weeks, the students had been participating in

a language program daily for 30 minutes. The program involved using a tape and book. A picture of each student is displayed on a communication board and the author introduced the students to turn taking by pointing to the child's picture. As the students anticipated their turn, positive body responses and eye gazing were increasing. With assistance the students took turns activating the switch to operate the computer and turn pages of the book.

As a result of this project, the author will be part of a team consisting of a speech, occupational, and physical therapist, computer technician, and teacher. The team will evaluate students in need of an augmentative communication program. This team will provide ongoing evaluations of the students, so that the parents, and the classroom teacher will receive feedback on the students progress on a regular basis.

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Appendices

APPENDIX A

BEHAVIORAL CHART OF WEEK ONE

Behavioral Chart

	A	B	C	D	E
1	Target	Obj. 1 amount	Obj. 2 amount	Obj. 3 amount	
2	Students	of eye gaze	of + response	of switch use	
3					
4	Student 1	0,0,0,0	0,0,0,0	0,1,0,0	
5	Student 2	0,0,1,0	0,0,0,1	0,0,0,1	
6	Student 3	0001	N/A	0,0,0,1	
7	Student 4	absent			
8					
9	Student 1				
10	Student 2				
11	Student 3				
12	Student 4				
13					
14	Student 1	0.1.0.1	0,0,0,0	0,0,1,3	
15	Student 2	1,2,0,1	0,0,0,0	1,1,1,1	
16	Student 3	1,0,1,0	N/A	1,0,1,0	
17	Student 4	absent			
18					
19	Student 1				
20	Student 2				
21	Student 3				
22	Student 4	absent			
23					
24	Student 1	1,0,1,1	0,0,0,0	0,1,2,3	
25	Student 2	2,1,2,0	0,0,1,1	1,0,0,0	
26	Student 3	1,2,0,2	N/A	0.0.0.1	
27	Student 4	2,1,1,1	0,0,1,0	0,1,2,0	

Week One

APPENDIX B

BEHAVIORAL CHART OF WEEK TWO

Behavior Chart

	A	B	C	D	E
1	Target	Obj. 1 amount	Obj. 2 amount	Obj. 3 amount	
2	Students	of eye gaze	of + response	of switch use	
3					
4	Student 1	Day Off			
5	Student 2				
6	Student 3				
7	Student 4				
8					
9	Student 1	absent			
10	Student 2	2,2,2,2	1,0,0,1	0,0,0,1	
11	Student 3	1,2,1,1	0,1,1,0	0,1,0,0	
12	Student 4	1,2,1,2	1,2,1,1	1,0,1,0	
13					
14	Student 1	0,0,0,0	0,0,0,0	2,1,0,0	
15	Student 2	absent			
16	Student 3	1,2,1,2	1,1,1,1	0,1,0,1	
17	Student 4	1,1,1,2	1,0,1,2	1,1,0,1	
18					
19	Student 1				
20	Student 2	absent			
21	Student 3				
22	Student 4				
23					
24	Student 1	1,0,0,0	0,0,0,0	1,0,1,1	
25	Student 2	2,1,3,1	0,1,1,0	0,0,1,1	
26	Student 3	1,0,2,1	1,2,1,1	0,1,1,1	
27	Student 4	absent			

Week Two

APPENDIX C

BEHAVIORAL CHART OF WEEK THREE

Behavioral Chart

	A	B	C	D	E
1	Target	Obj. 1 amount	Obj. 2 amount	Obj. 3 amount	
2	Students	of eye gaze	of + response	of switch use	
3					
4	Student 1	0,0,0,0	0,0,0,0	2,1,2,0	
5	Student 2	absent			
6	Student 3	1,2,1,2	1,2,2,3	0,1,1,1	
7	Student 4	1, 3, 1,2	2,1,1,2	1,2,1,1	
8					
9	Student 1				
10	Student 2				
11	Student 3				
12	Student 4				
13					
14	Student 1	0,0,1,0	0,0,0,1	2,1,0.1	
15	Student 2	3,3,2,1	1,1,2,1	0,1,1,1	
16	Student 3	1,2,1,2	2,1,0,2	1,0,1,2	
17	Student 4	absent			
18					
19	Student 1				
20	Student 2	2,3,2,2	1,1,1,1,	2,1,0,2	
21	Student 3				
22	Student 4	2,1,3,1	2,1,2,2	1,1,2,2	
23					
24	Student 1	1,1,0,1	0,0,1,0	1,2,1,0	
25	Student 2	1,2,2,2	1,1,1,0	1,1,2,1	
26	Student 3	absent			
27	Student 4	2,2,1,1	1,2,1,1	1,0,1,2	

Week Three

APPENDIX D

BEHAVIORAL CHART OF WEEK FOUR

Behavioral Chart

	A	B	C	D	E
1	Target	Obj. 1 amount	Obj. 2 amount	Obj. 3 amount	
2	Students	of eye gaze	of + response	of switch use	
3					
4	Student 1	0,0,1,1	0,0,1,1	1,3,0,1	
5	Student 2	3,3,3,2	1,2,1,1	0,1,1,1	
6	Student 3	2,2,1,2	1,0,3,1	1,1,1,2	
7	Student 4	2,2,2,2	2,1,1,2	2,1,1,2	
8					
9	Student 1				
10	Student 2				
11	Student 3				
12	Student 4				
13					
14	Student 1	0,1,1,1	1,1,0,1	2,1,2,1	
15	Student 2	3,3,2,2	0,1,1,1"	2,1,2,1	
16	Student 3	2,2,2,2	2,1,2,2	1,2,2,0	
17	Student 4	2,1,2,2	2,1,2,2	1,3,1,2	
18					
19	Student 1				
20	Student 2				
21	Student 3				
22	Student 4				
23					
24	Student 1	1,0,1,1	0,1,1,1	2,0,3,1	
25	Student 2	2,3,3,3"	1,1,1,1	2,1,3,0	
26	Student 3	absent			
27	Student 4	absent			

Week Four

APPENDIX E

BEHAVIORAL CHART OF WEEK FIVE

Behavioral Chart

	A	B	C	D	E
1	Target	Obj. 1 amount	Obj. 2 amount	Obj. 3 amount	
2	Students	of eye gaze	of + response	of switch use	
3					
4	Student 1	1,0,1,1	1,2,1,2	2,2,1,3	
5	Student 2	2,1,3,3	2,2,1,1	1,1,1,1	
6	Student 3	1,2,1,2	2,2,2,2	2,3,2,1"	
7	Student 4	2,2,2,1	2,2,2,1	2,2,2,2	
8					
9	Student 1				
10	Student 2				
11	Student 3				
12	Student 4				
13					
14	Student 1	absent			
15	Student 2	2,3,3,1	2,2,1,2	1,3,3,2	
16	Student 3	2,1,3,1	1,2,2,2	1,1,2,0	
17	Student 4	1,2,2,2	1,2,2,2	1,2,2,3"	
18					
19	Student 1	absent			
20	Student 2	2,3,3,2	2,0,2,2	2,1,3,2	
21	Student 3	1,2,2,3	2,2,3,2	3,1,2,1	
22	Student 4	2,2,2,2	2,2,2,2	2,1,3,2	
23					
24	Student 1	1,2,1,1	1,1,2,1	2,2,2,2	
25	Student 2	2,2,3,3	2,2,2,2	1,2,2,0	
26	Student 3	1,2,3,2	3,3,2,3	3,2,3,1	
27	Student 4	2,2,1,2	2,2,1,3	1,3,2,2	

Week Five

APPENDIX F

BEHAVIORAL CHART OF WEEK SIX

Behavioral Chart

	A	B	C	D	E
1	Target	Obj. 1 amount	Obj. 2 amount	Obj. 3 amount	
2	Students	of eye gaze	of + response	of switch use	
3					
4	Student 1	1,212	1,2,2,2	1,2,3,2	
5	Student 2	2,2,2,2	1,2,3,2	"1,1,2,0"	
6	Student 3	1,3,1,2	2,1,3,1	3,2,2,2	
7	Student 4	1,2,2,2	2,2,2,1	2,1,2,3	
8					
9	Student 1				
10	Student 2				
11	Student 3				
12	Student 4				
13					
14	Student 1	2,2,1,2	2,1,3,1	1,2,1,3	
15	Student 2	1,2,0,3	2,1,2,2	2,1,1,2	
16	Student 3	2,2,1,2	3,2,2,1	2,2,2,3	
17	Student 4	absent			
18					
19	Student 1				
20	Student 2				
21	Student 3				
22	Student 4	absent			
23					
24	Student 1	2,2,1,1	2,2,1,1	1,2,2,2	
25	Student 2	2,3,1,4	2,2,1,3	1,1,1,2	
26	Student 3	"1,2,2,2"	3,2,3,2	2,2,1,2	
27	Student 4	2,2,2,2	2,3,3,1	2,2,3,1	

Week Six

APPENDIX G

BEHAVIORAL CHART OF WEEK SEVEN

Behavioral Chart

	A	B	C	D	E
1	Target	Obj. 1 amount	Obj. 2 amount	Obj. 3 amount	
2	Students	of eye gaze	of + response	of switch use	
3					
4	Student 1	2,1,2,2	1,2,2,1	2,1,3,1	
5	Student 2	1,3,3,1	2,2,2,1	0,2,1,1	
6	Student 3	2,1,1,3	2,2,2,3	2,3,0,1	
7	Student 4	3,2,1,4	3,1,3,2	2,3,2,2	
8					
9	Student 1				
10	Student 2				
11	Student 3				
12	Student 4				
13					
14	Student 1	1,3,2,2	2,1,3,1	2,1,3,2	
15	Student 2	2,2,1,3	2,2,1,2	1,2,2,1	
16	Student 3	1,3,2,1	3,1,2,2	2,1,3,0	
17	Student 4	2,2,3,3	2,3,2,1	0,3,1,2	
18					
19	Student 1				
20	Student 2				
21	Student 3				
22	Student 4				
23					
24	Student 1	2,2,2,1	2,2,2,1	2,1,3,1	
25	Student 2	3,2,1,1	1,2,3,2	2,1,2,1	
26	Student 3	2,2,1,3	3,1,2,1	3,1,2,2	
27	Student 4	3,3,2,3	1,3,2,2"	1,2,2,3	

Week Seven

APPENDIX H

BEHAVIORAL CHART OF WEEK EIGHT

Behavioral Chart

	A	B	C	D	E
1	Target	Obj. 1 amount	Obj. 2 amount	Obj. 3 amount	
2	Students	of eye gaze	of + response	of switch use	
3					
4	Student 1	2,1,2,2	1,2,2,2	3,3,2,2	
5	Student 2	absent	2,2,3,2	2,3,2,2	
6	Student 3	3,1,2,1	1,3,2,2	2,1,4,0	
7	Student 4	2,3,2,2	1,3,0,2	0,1,2,3	
8					
9	Student 1				
10	Student 2	2,3,3,1	2,2,3,1	2,0,1,2	
11	Student 3				
12	Student 4				
13					
14	Student 1	absent			
15	Student 2	absent			
16	Student 3	2,2,1,4	1,2,1,1	3,1,2,1	
17	Student 4	3,2,1,3	3,2,2,2	3,2,2,1	
18					
19	Student 1				
20	Student 2				
21	Student 3				
22	Student 4				
23					
24	Student 1	1,2,3,1	3,2,2,1	2,2,3,1	
25	Student 2	1,3,1,3	2,3,2,3	1,2,2,3	
26	Student 3	3,1,2,2	1,3,2,2	2,2,2,3	
27	Student 4	2,3,3,3	3,2,2,3	2,2,3,2	

Week Eight

APPENDIX I

BEHAVIORAL CHART OF WEEK NINE

Behavioral Chart

	A	B	C	D	E
1	Target	Obj. 1 amount	Obj. 2 amount	Obj. 3 amount	
2	Students	of eye gaze	of + response	of switch use	
3					
4	Student 1	absent			
5	Student 2	2,1,3,3	3,2,2,2	1,2,3,0	
6	Student 3	absent			
7	Student 4	2,3,3,2	2,3,3,1	2,1,3,1	
8					
9	Student 1	3,3,2,2	2,3,3,2	2,1,1,3	
10	Student 2	2,3,4,2	2,3,1,2	2,3,1,2	
11	Student 3	2,4,3,2	1,3,3,2	2,3,2,2	
12	Student 4	3,2,3,3	2,2,4,2	2,3,1,3	
13					
14	Student 1	field trip			
15	Student 2				
16	Student 3				
17	Student 4				
18					
19	Student 1				
20	Student 2				
21	Student 3				
22	Student 4				
23					
24	Student 1	2,3,3,2	2,2,3,2	2,2,3,1	
25	Student 2	1,2,4,2	1,2,3,1	2,2,1,3	
26	Student 3	2,3,2,3	2,2,2,3	2,2,2,3	
27	Student 4	absent			

Week Nine

APPENDIX J

BEHAVIORAL CHART OF WEEK TEN

Behavioral Chart

	A	B	C	D	E
1	Target	Obj. 1 amount	Obj. 2 amount	Obj. 3 amount	
2	Students	of eye gaze	of + response	of switch use	
3					
4	Student 1	1,3,2,1	0,1,3,2	3,1,2,1	
5	Student 2	2,1,4,2	2,2,1,3	2,2,2,1	
6	Student 3	1,3,2,0	2,3,1,1	2,3,1,3"	
7	Student 4	2,4,2,1	1,3,2,2	2,3,1,2	
8					
9	Student 1				
10	Student 2				
11	Student 3				
12	Student 4				
13					
14	Student 1	2,3,2,2	2,3,1,1	1,3,2,1	
15	Student 2	1,4,2,1	1,1,2,1	3,1,1,2	
16	Student 3	0,3,2,2	0,1,2,1	2,2,2,1	
17	Student 4	2,4,1,3	2,1,1,2	2,2,0,1	
18					
19	Student 1				
20	Student 2				
21	Student 3				
22	Student 4				
23					
24	Student 1	2,1,2,3	1,2,2,1	4,1,3,0	
25	Student 2	2,1,2,2,	2,1,1,3	2,4,0,1	
26	Student 3	3,1,2,3	1,2.1,1	1,3,2,2	
27	Student 4	2,1,4,1	1,1,3,1	2,2,1,2	

Week Ten

APPENDIX K

BEHAVIORAL CHART OF WEEK ELEVEN

Behavioral Chart

	A	B	C	D	E
1	Target	Obj. 1 amount	Obj. 2 amount	Obj. 3 amount	
2	Students	of eye gaze	of + response	of switch use	
3					
4	Student 1	2,1,3,2	2,1,0,1	0,3,1,1	
5	Student 2	2,3,1,1	1,0,2,1	2,1,0,3	
6	Student 3	3,2,1,2	3,1,0,2	2,2,3,0	
7	Student 4	3,1,2,1	2,2,1,1	0,2,1,1	
8					
9	Student 1				
10	Student 2				
11	Student 3				
12	Student 4				
13					
14	Student 1	absent			
15	Student 2	2,4,0,1	2,1,2,1	2,3,0,2	
16	Student 3	2,2,2,1	1,1,3,1	2,3,1,0	
17	Student 4	3,1,2,2	0,2,1,3	2,1,2,1	
18					
19	Student 1				
20	Student 2				
21	Student 3				
22	Student 4				
23					
24	Student 1	2,1,3,1	2,1,1,1	2,3,1,0	
25	Student 2	2,3,0,1	0,1,0,2	2,2,0,3	
26	Student 3	absent			
27	Student 4	1,3,2,2	4,1,0,2	2,0,3,1	

Week Eleven

APPENDIX L

BEHAVIORAL CHART OF WEEK TWELVE

Behavioral Chart

	A	B	C	D	E
1	Target	Obj. 1 amount	Obj. 2 amount	Obj. 3 amount	
2	Students	of eye gaze	of + response	of switch use	
3					
4	Student 1	2,1,1,3	1,0,1,2	1,4,0,2	
5	Student 2	absent			
6	Student 3	1,3,1,1	0,1,3,1	3,0,1,1	
7	Student 4	2,1,1,2	1,2,1,1	0,2,11	
8					
9	Student 1				
10	Student 2				
11	Student 3				
12	Student 4				
13					
14	Student 1	2,1,0,3	2,1,0,1	2,2,3,0	
15	Student 2	1,2,1,3	1,0,0,2	2,2,2,1	
16	Student 3	1,3,0,2	2,1,0,1	3,0,2,1"	
17	Student 4	2,2,2,1	1,1,1,2	1,3,2,2	
18					
19	Student 1				
20	Student 2				
21	Student 3				
22	Student 4				
23					
24	Student 1	1,3,0,2	2,1,3,0	2,4,0,1	
25	Student 2	1,3,2,1	1,0,0,3	0,1,1,3	
26	Student 3	absent			
27	Student 4	absent			

Week Twelve