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How do Nonverbal, Severely Disabled Students Communicate: Creating Outlets for
Students and Teachers.

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This project is dedicated to all my medically fragile students who inspire me daily to discover the keys that unlock the treasure chests of their minds. My wife Sarah, whose motivation, patience, and love drives me to always do my best. My parents Nestor and Geri, whose extraordinary example of how to live in Christ has shaped my love for people. Leslie Mauerman, Jacqueline Thousand, and Richard Villa who have guided my educational steps and pushed me to jump on tables and teach. My cousin Rick Rodriguez who was the first person to say that I would be a great teacher and encouraged me to teach. And to the greatest teacher of all, our Lord and Savior Jesus Christ, to which all the glory goes, whose example I follow daily so that I may one day be a teacher He may be proud of.

Abstract

Discovering communication outlets for nonverbal, severely disabled students who are medically fragile is crucial for maintaining a “student-centered” academic environment. Nevertheless, to determine a disabled individual’s preferred outlet for communication, via eye-gaze or tactile means, is potentially an enormous task for researchers and educators to accomplish. By piecing together information from multiple bodies of research examining nonverbal communication, assistive technology, and self-determination, this researcher recognized a gap in the standard methodologies, as applied to medically fragile students. The researcher conducted a single subject, qualitative study, using a low-tech communication device. With the device, the researcher identified the subject’s preferred method of nonverbal communication obtained by consistent data resulting from observation and tool facilitation. Current assistive technology utilizes limited outlets for nonverbal communication. The limitations of current assistive technology restrict nonverbal, severely disabled students from being able to freely communicate with others. The researcher’s creation of a simple tool that facilitates more than one outlet for student communication may enable medically fragile students to communicate more effectively with researchers and educators.

KEYWORDS: medically fragile, non verbal communication, severely disabled

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Introduction

Communicating one's opinion is the ultimate form of independence, earned in many cultures only through centuries of feuding. Society has come a long way and expressing one's view is now a constitutional right that each human being possesses here in the United States. However, not every person has the ability to communicate his or her opinion. People with special needs might have the right to express their views to others, but lack the capability to do so.

As a special education teacher, I have witnessed students in social situations yearning to interact with others by expressing their thoughts and opinions. These students, nonetheless, are limited by having to rely on somebody else to do the social interaction for them, or by not interacting with anyone at all. In the classroom, I strive to teach curriculum that is student-centered, yet when I ask for students to express their thoughts on particular curriculum components, there is silence. This has brought me great turmoil as a teacher because my goal as an educator is to create a curriculum that meets students' needs, but I cannot determine my students' needs if they cannot directly communicate their view on any classroom matters. Attempting to create a student-centered environment, which meets the needs of my students, has raised a question I have been asking myself ever since I taught my first day in a special education environment: What outlets do nonverbal, severely disabled individuals have to communicate?

Enabling students to express to their teacher, what they want, need, feel, or to even answer questions in class without any expressive language is a monumental

task. Existing research in the education field focuses on non-verbal communication, assistive technology, and self-determination as keys to effective means of communication. This project sought to build upon the existing studies by creating a device that utilizes all three factors concurrently, in order to effectively help non-verbal, severely disabled students communicate with others.

The research underlying this project was conducted utilizing a single subject, who is considered in the special education field as medically fragile. The term medically fragile means that the individual must fulfill two criteria: a) The individual must fall into accordance with IDEA 2004 Regulations, “Child with a disability means a child evaluated ... as having mental retardation, a hearing impairment (including deafness), a speech or language impairment, a visual impairment (including blindness), a serious emotional disturbance (referred to in this part as “emotional disturbance”), an orthopedic impairment, autism, traumatic brain injury, other health impairments, a specific learning disability, deaf-blindness, or multiple disabilities, and who, by reason thereof, needs special education and related services.” b) The individual requires a nurse to assist with specific needs in and outside their academic environment.

In addition to being medically fragile, the student who is the subject of this study is non-verbal. The term non-verbal is a way to describe an individual’s inability to communicate with others. The individual who is the subject of this study does not speak with words, but can communicate with sounds similar to grunts or by crying.

Key areas of research for this project lie within three areas: (a) Nonverbal Communication, (b) Assistive Technology, and (c) Self-Determination. Research has shown that there is a disadvantage in assessing the self determination skills of nonverbal students with significant impairments due to, "...differing methods of communicating with the child, ranging from a parent or sibling who is almost able to guess a child's response before it is given, to an unfamiliar professional, such as a school psychologist, who looks for responses that fall within a standardized protocol" (Van Tubbergen, Warchausky, Birnholz, & Baker, 2008). People with severe disabilities can make their own decisions, but they frequently need some sort of support, or assistive technology, to help them communicate their decisions. "Thus, people with severe disabilities can be involved in self-determination on both a personal level and a collective level by enabling them to maximally participate in their lives and communities when the necessary supports and accommodations are in place" (Wehmeyer, 1998). The question of how non-verbal, severely disabled students communicate has been explored by existing research, but this project will fuse the separate areas of knowledge by producing a low-tech communication device that provides multiple outlets of communication for people with severe disabilities.

Research for this project consisted of gathering information about a single subject. A single subject study was chosen to allow a more detailed examination of how a specific, medically fragile, non verbal individual can communicate. By concentrating efforts upon one individual, the researcher attempted to provide a benchmark, allowing other researchers to expand the data generated to assist other

medically fragile individuals with preferred outlets of communication. This type of project can improve instruction by helping educators involve medically fragile students within the classroom by giving them communication outlets for their active voices. This study is different from most published studies due to the nature of the student studied. The student is classified as severely disabled. However, the student carries the additional designation of being medically fragile. A medically fragile designation can prompt many educators to stifle student activity and involvement. Notwithstanding any particular student's disabling conditions, educators have an obligation to educate all students. The goal of this project is to help enable educators to reach all students, no matter what their disabling condition.

The existing research in this area is limited, in part, because of the difficulty for individuals with special needs in participating with this type of single subject research. Students with severe disabilities commonly need assistance to use technology, due to the severity of their disabilities. Since the subject is non-verbal and has severe cognitive disabilities, determining whether answers chosen by the subject were purposeful or mechanical was difficult. An example of a hypothetical subject's mechanical response could occur if the researcher were to place a low tech device in front of the subject (e.g. a switch) and the subject automatically presses the switch, without a prompt, because the subject has been trained to press the switch whenever it is placed in front of him. An example of a hypothetical subject's meaningful response would occur under these circumstances if the researcher were to

place a switch in front of the subject and following a prompt, the student presses the switch, after completing a task given by the researcher.

The researcher concluded that the best way to conduct the investigation underlying this project was through a single subject study with the goal of identifying the subject's preferred outlet for communication whether the answers were mechanical or not. Discovering the preferred outlet for non-verbal communication and applying general principles which can be practical for other educators to assist all individuals with special needs, this researcher created a low-tech communication device for use in this research. This device could be useful to other educators seeking to create outlets for severely disabled, nonverbal communicators, in order to allow their students to be heard.

Chapter Two: Literature Review

The ability to effectively communicate is an important skill that all individuals must demonstrate to effectively integrate in society. As a special education high school teacher who works with nonverbal, medically fragile students, the researcher has discovered that individuals with special needs, just like their peers, have a need to express themselves to others around them. Although nonverbal individuals with special needs express themselves differently from others (i.e. sounds of pleasure or dislike), they still need to establish a way in which even those unfamiliar with their particular communicative sounds can clearly distinguish what they are trying to communicate.

The job of a special educator is to not only help these specific individuals develop academically, but also help them develop socially. This can be difficult for the population of students that is taught in a severely disabled environment. People who are nonverbal and have severe disabilities may have difficulty expressing themselves due to multiple factors. This project focuses on three of these factors; (a) non-verbal communication, (b) assistive technology commonly used in the special education realm, and (c) self determination skills. These areas are important in the context of this study because research in nonverbal communication can assist in determining what type of communication is best for understanding individuals who are nonverbal. Research in assistive technology for communication purposes may assist educators in helping individuals with special needs develop crucial communicative abilities and determine which communication devices best serve this

population. Furthermore, research in self determination skills of people with special needs may demonstrate the need to support and respect the answers given by these individuals so that their voice is heard, rather than the voice of the care givers who believe they are making the correct assumptions for particular individuals. The existing research demonstrates that nonverbal individuals with severe disabilities can communicate with others in a way that will help them integrate and be a respected member of society. The articles cited in this project describe the distinctive studies done in these three areas, but it also shows how these areas work together as a unit to answer the question of how do nonverbal, severely disabled individuals can effectively communicate.

Nonverbal Communication

For students with special needs, nonverbal communication is an important tool to develop, not only for expressing oneself, but also for learning purposes. Nonverbal individuals use different communication tools, which can produce varying results in measuring the effectiveness of nonverbal communication. Research suggests that nonverbal communication depends on multiple factors, one being the use of assistive technology to facilitate in communication. Use of augmentative and alternate communication devices is a nonverbal technique to communicate; however, the weakness of these augmentative and alternate communication devices is that they are only as effective as the person utilizing them. This can be extremely challenging, and frustrating, for individuals with special needs, and can lead to a total shutdown of communication. Johnston, Reichle, and Evans (2004) argue that in order for

nonverbal individuals, especially ones with severe disabilities, to effectively use augmentative and alternate communication devices, the devices must be efficient for the individual to use, if they are not then success rates will be limited. Furthermore, when communicating with nonverbal individuals, the use of body language should be considered in validation of understanding the message being communicated.

Nonverbal communication can be difficult for people with communication and cognitive disabilities. American Sign Language (ASL) is a tool that can be utilized for individuals with special needs if they are trained in that specific skill and if they have the physical and cognitive abilities to comprehend and use it with others. According to Rudd, Grove & Pring (2007), the use of sign language with individuals with disabilities has the potential to be effective; however, the individual must be properly assessed to determine if this mode of communication is appropriate for that specific individual (Spencer, Petersen, & Gillam, 2008).

Schiff, Bauminger, & Toledo (2009) showed that individuals with special needs may have “a deficit in creative thinking abilities such as abstract thinking, idea generation, and elaborate reasoning” (p.5); these abilities are important when generating and communicating an opinion. Expressing an opinion can go beyond the scope of just saying “yes” or “no”, yet, it may be a difficult process for individuals who suffer from severe disabilities and who have a lack of nonverbal communication skills. In addition, nonverbal communication could be difficult to interpret for the person receiving the signals, but some nonverbal communication techniques are universally understood. Bryan (1977) states, “...nonverbal behavior does not have

well defined rules or syntax; yet there is a consensus about the enactment (encoding) and Interpretation (decoding) of human states, relations, and attitudes” (p.37). The problem is that people who are nonverbal and have severe disabilities- whether mental, physical, or both- may not be able to accurately portray their emotions or behaviors in a way that most people are accustomed to interpreting. In fact, some individuals with severe disabilities may not be able to accurately communicate their thoughts or opinions at all. According to Shevin and Klein (1984) research on nonverbal, severely disabled individuals, “One potential difficulty to which teachers must be attuned is that gestures and facial expressions, which have commonly interpreted meaning in society at large, may be used inadvertently in non-standard ways by students (p.165)”. Therefore, researchers and educators must be careful in the assessment of nonverbal communication and make sure to use every tool available to accurately assess each idea.

Assistive Technology

Assistive technology can have a profound effect upon the severely disabled population when it comes to communication. Communication technology such as switching mechanisms or switches, computers, and communication boards, are great tools that help nonverbal individuals with severe disabilities correspond. These communication devices are some of the keys to helping severely disabled individuals express their opinions. Dyches (1998) suggested in her research that, “...switch training was an effective strategy for helping students with autism and severe disabilities to communicate a simple message... (and) that incidental teaching

methods are effective in teaching students to initiate communication and develop greater complexity within their communicative repertoires” (p.160). Dyches research implies that switches are effective tools to use for individuals with special needs because of the efficiency and usability of the device. The research of Dyches, Davis, Lucido, & Young (2002) document remarkable independence of individuals with special needs who use assistive technology to communicate with others. Not only did the individuals communicate their opinions and desires, the interaction between the user of the device and the responder increased dramatically. This level of individuality and independence, utilizing assistive technology, should be the goal for all individuals with special needs who are medically fragile. Other technological advances such as that used in the case study Bache and Derwent (2008) conducted with an individual with “profound disabilities” using an eye gaze system to interact with her computer at home to open a range of possibilities that were previously unthinkable. Even though this individual only had physical limitations, not cognitive, she was still able to communicate with her environment via the computer. Being able to communicate using this software could be possible, but like Bache and Derwent (2008) affirm in their study, cognitive abilities, such as the ability to learn new information, recall information, and remain focused on a task, were required to effectively use this software. This could pose a problem for individuals who have severe cognitive and physical disabilities, like many of those classified as medically fragile. Individuals who cannot control their physical movements or who have significant cognitive limitations would have an extremely difficult time utilizing this

technology and must be fully assessed to see which technology works specifically for them. Assistive technology for individuals with special needs is crucial in promoting independence and expressing one's voice. Assistive technology has the potential to facilitate positive growth within the confines of the applicable disability, facilitate typical development within the individual with special needs, and augment the individual's skills to promote higher level functioning within the individual's environment (Wisniewski and Sedlak, 1992 p. 309).

Self Determination

Self determination is the key to helping nonverbal, severely disabled individuals communicate. "Learning to make choices can extend to areas of major life concerns such as vocation, residence, and consent to medical treatment, as well as to relatively minor, but cumulatively significant day-to-day decisions such as choice of recreational activities, partners for social activities, food, clothing, music, seating, and scheduling" (Shevin and Klein, 1984 p.161). Shevin and Klein's research showed not only the importance of making choices, but the importance of teaching individuals with disabilities the skill of communicating self determined, choice making, so that the individual may independently grow. "Choosing" is a broad term. However, this project utilizes the same definition that Shevin and Klein used in their study: "choosing", "...the act of an individual's selection of a preferred alternative from among several familiar options (p.162)". The Shevin and Klein study demonstrated how teaching individuals with disabilities the power of self determination within their own lives is the first step in producing independence, which is every educator's job.

Research by Van Tubbergen, Warschausky, Birnholz, & Baker (2008) showed that the skills for self determination can be shown through a number of outlets, including eye gaze and switch interface systems, two models that flourish among the medically fragile. Van Tubbergen et.al. produced a fantastic, progressive, choice making model which not only gives individuals with special needs multiple choice presentations, but confirmation of the answers selected with yes/no responses, thus validating the individuals' choices (p.96). With this model, students with disabilities can make their own choices in and outside the classroom and determine their own future's path with the self determination skills that they developed. Research conducted by Martin, Woods, Sylvester, & Gardner (2005) in regards to vocational choices for individuals with severe disabilities showed that, "...vocational planning typically does not reflect students' interests, but rather reflects caregivers' ideas of what they believe are students' post school visions and preferences" (p.147). With the proper teaching of self determination skills, and a functional model, students may choose vocational jobs for themselves and validate their opinions about where they want their future to go.

Conclusion

The topic chosen for this project presents many challenges. There are many variables to consider, depending upon the individual subjects participating in each case study. Most of the research suggests that people in the medically fragile population will need to be evaluated to see if they are physically capable of responding with assistive technology used in the study. This will be an important factor because assistive technology can be extremely expensive. The researcher

determined that if this project were to make this communication option available to everyone, common and inexpensive devices would need to be utilized for the study. Furthermore, the research reviewed involving assistive technology was done with subjects who have more typical cognitive abilities, compared to individuals who are medically fragile. The Subject in this study was an individual with severe cognitive and physical disabilities, so results were difficult to obtain.

With nonverbal communication, the research suggests that individuals with this disability can still communicate within their environment, but technology will play a significant role within this communication realm. For example, a nonverbal individual's specific sound can communicate a need which only a few people have the ability to interpret. However with the proper technology, a greater number of people will be able to correctly interpret the nonverbal individual's need information, as distributed by the augmentative device being used. Moreover, research suggests that the technology used by nonverbal individuals must be customized to fit the individual's needs and that these nonverbal individuals must hold the cognitive capacity to use that technological device effectively and efficiently. Even though the GoTalk One or the iTalk2 can be utilized in a medically fragile classroom, devices like the GoTalk4+, GoTalk9+, GoTalk32+ are too advance for students to utilize due to their inability to cognitively process more than two options or they cannot physically utilize the devices. Other devices such as the Headmouse Extreme and the SeeTech Pro Eye Tracker, that are intended to be used with individuals with severe disabilities, cannot be utilized in the medically fragile classroom because the majority

of the students cannot control their eye movements or head movements in order to effectively use the device. The technology is vast in the special education field, but the effective utilization of the devices is quite small among the medically fragile population.

Existing research suggests that the self determination skills of the subject chosen for this project play a significant part in whether the subject can successfully communicate with the researcher. The researcher considered nonverbal communication skills, assistive technology, and self determination skills specifically for individuals with severe disabilities in trying to determine the best means of communicating with the subject in this project. As a result, the researcher created a model, which he believes has the potential to help nonverbal, severely disabled individuals successfully determine preferred outlets for communicating with others.

Methodology

The research conducted in this study and many others has shown that (a) establishing a method for nonverbal communication, (b) utilizing assistive technology, and (c) promoting self-determination are all essential in aiding individuals with special needs to communicate. The purpose of this study is to provide people with special needs an opportunity to integrate themselves into society by supporting them in communicating with individuals around them. People with multiple and severe disabilities often communicate needs through grunts, hand clapping or highly individualized facial expressions, techniques which require a pre-existing relationship with another individual to succeed. Individuals with special needs must have the opportunity to communicate in a more socially accessible way, one to which their typical developing peers can understand and respond. In answering the question, "How do non verbal, severely disabled individuals communicate?," the researcher designed an alternative assistive communication strategy. The goal in developing this strategy was to assure it was simple enough for the person with disabilities to utilize, but also allow the recipient or responder a means by which to understand what the person with disabilities is trying to communicate when asked a question.

This chapter is presented in five distinct components, which consist of; (a) the design of the qualitative study conducted, (b) the demographics of the participant selected for the sample, (c) the setting in which the study was delivered, (d) the

instrument developed and distributed by the researcher, and (e) the procedure and the analysis of the data presented in the study.

Design

The design of the qualitative research was to implement a single-subject case study. A single-subject case study design was most appropriate because the researcher was able to conduct and perform an in-depth analysis of the student being studied. Furthermore, a single subject study was the logical starting point for research upon the medically fragile because (a) the medically fragile require highly individualized systems of communication and (b) the lack of existing research on the medically fragile population means that a single subject would establish a benchmark from which subsequent studies could build.

This study falls under the qualitative realm for a number of reasons. Mertler and Charles (2008) define qualitative research as data that generates insight and elucidates the quality of a particular phenomenon of interest. Knowing how, and if, people who are nonverbal with severe disabilities are able to communicate to others is challenging in a classroom where all of the students are nonverbal and live with severe disabilities. For a student with these types of disabilities, the opportunity to communicate in an academic environment will not only make the student's educational experience richer, but will also help the educator shape the academic environment for that student. The case study provides a student the opportunity to help his or her educator shape the teaching environment through the data collected

from that student in that specific environment. The student can participate with providing data in choosing the preferred outlet of communication with their teacher.

Participant

The criteria for individuals in this study includes persons who must have (a) experience using communication devices, since the time limit of this study requires this skill to be in place. (b) A participant diagnosis of severely disabled and nonverbal combined; (c) the student ability to participate in activities with other individuals for approximately ten minutes; and (d) parental permission for participation in the study. The exclusion of samples in this observation were due to (i) lack of individual physical ability or experience to activate a communication device; (ii) low tolerance of social interaction by individuals who regularly refuse to participate in activities in the classroom; and (iii) the parental refusal of participation by their child in this study.

The individual sample chosen for the case study was a seventeen-year-old African-American male; who is diagnosed with severe cognitive and physical disabilities, is nonverbal, and is considered medically fragile. For the purpose of this study, he is referred to as X. This intentional study and sampling was conducted specifically because the participant met all the criteria. He possessed the ability and experience to use low-tech assistive technology, such as switch devices to activate cause and effect computer programs and communication boards. Overall, X fit all of the criteria for the research project, and he could participate in activities for approximately thirty minutes. Furthermore, the researcher obtained parental

permission. After thoughtful consideration about the population in his environment, the researcher concluded that this student best represented the population of the researcher's classroom and is a fair representation of individuals who are considered medically fragile.

Setting

The setting for this case study was a school that primarily educates individuals with moderate to severe special needs. The classroom population consisted of fourteen individuals who are nonverbal, severely disabled, and are considered medically fragile. Twelve students were in wheelchairs and two students were ambulatory. The ages of the individuals were between eleven and twenty-one years. There were four paraprofessionals in the classroom and two one-on-one nurses. X's IEP calls for a one-on-one nurse who was present during all observations. The researcher administered the questionnaire and the instrument to the participant in a room separated from other students, located next door to the researcher's classroom.

This project remains crucial for the specific environment and population described above, since the specific outlets available for students to express their opinions have historically been so limited. For example, a binary switch provides the student only two options to express his or her choice. On the other hand, the instrument created for this project utilizes three options for expression, which enhances the opportunities for the student to convey his or her opinion.

Instrument

The instrument designed and used was a low-tech communication device created by the researcher, which was designed specifically for the students to be equipped to give answers and to fully participate in the classroom. The device offers multiple opportunities for the student to give and validate answers. The instrument offers three distinct ways of eliciting responses from students: (a) students may use eye-gaze to answer questions or make choices, (b) students may point or touch options to make their choices, and/or (c) students may use a lever to indicate choices. The structure of the instrument was constructed out of a shoebox top, lined with construction paper. A 12-inch long slit was cut from the shoebox top for the answer lever to move to different positions. The lever was made out of a circular, wooden knob, which was screwed and glued to a wooden backing. The differentiating responses were attached with Velcro for multiple communication options (e.g., picture symbols).

The instrument matches the project well in that the subject has multiple outlets through which to give answers to the researcher. Many assistive devices have only one means of communication, but this instrument utilizes multiple forms of nonverbal communication through visual and tactile means.

Procedure

Parental consent was obtained for the subject of this study, prior to commencing research. This consent was obtained by means of a letter and sent to the guardian of the participating students. The permission slip informed the guardians

that the researcher was looking to create a low-tech device to help the subjects communicate responses in the classroom in order to produce a richer academic experience. The letter also outlined the procedure for conducting the case study. It explained that the researcher would ask a series of questions with multiple-choice answers to the subject and that the subject would answer each question by choosing their answer with one of the three nonverbal options that the instrument utilizes.

Once the guardian's consent form was obtained, the researcher prepared the room in which the questioning would take place. The room contained a chair for the researcher and for the subject's nurse (who must be present for medical reasons). The researcher laid the instrument on the table alongside the multiple picture symbols that related to questions being asked by the researcher. The symbols were placed on the sample's left side (the researcher's right side) and vertically separated (9 inches apart). The instrument was also prepared so if the symbols were placed horizontally the participant would still be able to participate.

The researcher took the subject and the subject's one-on-one nurse to the designated room and introduced both the participant and his nurse to the instrument. The researcher explained that the subject would hear a series of questions in which the subject would choose his answer with his preferred outlet of communication via the device. The participant and his nurse were informed that the subject would be taking the same test Tuesday and/or Thursday for the next three weeks (five sessions total). If the subject were absent on either day, then the questionnaire would be postponed until the following day.

Before conducting each session with the subject, the researcher introduced the instrument and explained the multiple options that the subject could utilize with the tool. The researcher would ask three practice questions to the subject so that he could practice using the instrument before the data was collected. Once the warm-up questions were completed, the researcher conducted the original test.

The researcher would first read a question and give two answer choices to the subject. The researcher would wait for the subject's response via the instrument. The subject would answer (via picture symbols) by selecting his choice (by eye gaze, hand selection, and/or lever). The same procedure was followed with all the questions given. After the first test was conducted, the subject and his nurse were thanked and released.

The same procedure was conducted for the second, third, fourth, and fifth sessions. The subject came in the testing room; the researcher introduced the instrument, gave the subject his warm-up questions, conducted the test, and collected the data. The researcher designed the steps of this case study for simplicity so that the subject could comprehend and follow them. If the steps were too difficult for the subject, the subject did not cooperate with the procedures. One way the researcher simplified the procedure was by asking the subject to come into the room with his nurse, practice using the instrument and answering practice questions (familiarizing himself with the instrument). After practicing, the researcher read and solicited answers to five questions, and the subject then left the room, completing the procedure. The process took less than twenty minutes to complete. The researcher is a

special education teacher and had worked with the subject extensively for over two years, prior to conducting the study. Based on his experience with the subject, the researcher felt that twenty minutes was a reasonable amount of time for the subject to participate and comprehend the work, considering the extent of his cognitive and physical abilities.

Analysis

Data analysis began with tracking the subject's preferred method of answering the questions and if the subject answered the question correctly. The researcher tracked the preferred outlet for communication, analyzed the data for consistency (if he answered the same method for each question), which determined the preferred method of answering (eye gaze, touch, or lever). If the answers were consistent, then the researcher concluded that the subject had been successful in choosing their preferred outlet for communication. As a result of this procedure, preferred answering methods could be established for the subject via the instrument. With these methods established, any special education teacher could use this instrument and establish better and more consistent outlets of communication with nonverbal students.

Summary

To provide a proper analysis measuring how nonverbal, severely disabled individuals communicate to others, the researcher considered key concepts for nonverbal communication needs. Qualifying the design of the study was important because the design shaped the way that the researcher conducted the research. The

subject of the study was chosen because he fit the researcher's criteria for the case study. Furthermore, the subject was a good representation of this population. The setting was essential because it provided a work environment that kept the subject from being distracted by outside influences. The instrument for this case study was simplistic, yet effective, because of the nonverbal options it gave the participant to express himself. The instrument provided a way for the procedure of the case study and the analysis of the data to be conducive for the researcher to administer and for the participant to understand. With these components in mind, there is no reason why additional research could not be readily undertaken with the goal of assisting the special needs community. In addition, adoption of the instrument and procedures used in the study by special education teachers could increase the level of participation and interaction in the classroom between student and teacher.

Project Presentation

The ability to nonverbally express oneself is a skill that takes time and great effort to acquire. Consequently, teachers must discover and utilize multiple communication outlets for students with disabilities in order for the students to fully participate in classroom curriculum. Knowing that nonverbal expression occurs through multiple outlets, the researcher created a questionnaire (in addition to using picture symbols for answering) for the subject to respond to by using the project's instrument. After collecting data based upon the subject's preferred method of communicating responses, the researcher could anticipate the manner (visual or tactile) through which the subject preferred to express his or herself. The primary components of the project include the questionnaire, instrument, step-by-step questioning procedure, and recorded data, all of which are explored in more depth below.

Questionnaire

The questionnaire created (see Figure A) included five questions that the subject had to answer, using the instrument. The questionnaire was read to the student by the researcher and the subject could respond using the instrument. The questionnaire contained five questions in which the subject could respond from two potential answers. The questions had to do with familiar objects that were seen in the subject's classroom. Question one focused upon the identification of a specific gender (Boy/Girl). Question two focused upon the identification of a specific animal (Dog/Bird). Question three focused upon identification of a familiar object

(Maraca/House). Question four asked for the identification of a specific color (Yellow/Green). Question five asked for the identification of a specific shape (Triangle/Circle). The questions were specifically tailored for the subject to elicit the best responses from the subject, based on the researcher's prior working history with the subject.

Questionnaire

Instructions: Given the model with two picture options, the student will answer the following questions:

1. Can you show me the boy?
2. Can you show me the color yellow?
3. Can you show me the circle?
4. Can you show me the maraca?
5. Can you show me the dog?

Figure A: Questionnaire- Questions asked to the student during the study

Instrument

The instrument created (see figure B) was a low tech device created at home by the researcher using a shoe box top, construction paper, clear packaging tape, a 3"x 1½" wooden block, a wooden ball, a 2" screw, two medium size washers, and Velcro. The shoebox was covered with two pieces of construction paper and secured with clear packaging tape. A 12"x ½" slit was cut on the left side of the shoebox where the lever is. Clear packaging tape was placed along the slit creating a glossy surface against which the lever would move. The lever was created placing the 2"

screw within the wooden block's flat back side. Once the screw was pushed through the board as far as it would go, a washer was placed on top of the screw to create a bigger surface area by which the subject could move the instrument. The bottom of the lever was then pushed through the slit in the shoebox, exposing only the screw. A washer was then placed on top of the exposed screw (creating more surface area) and the wooden ball was screwed on top of the screw bit, creating the lever. On the opposite side of the shoebox, two 1" Velcro pieces were placed on the shoebox vertically, 12" apart. With the Velcro intact, picture symbols may be placed on the instrument.

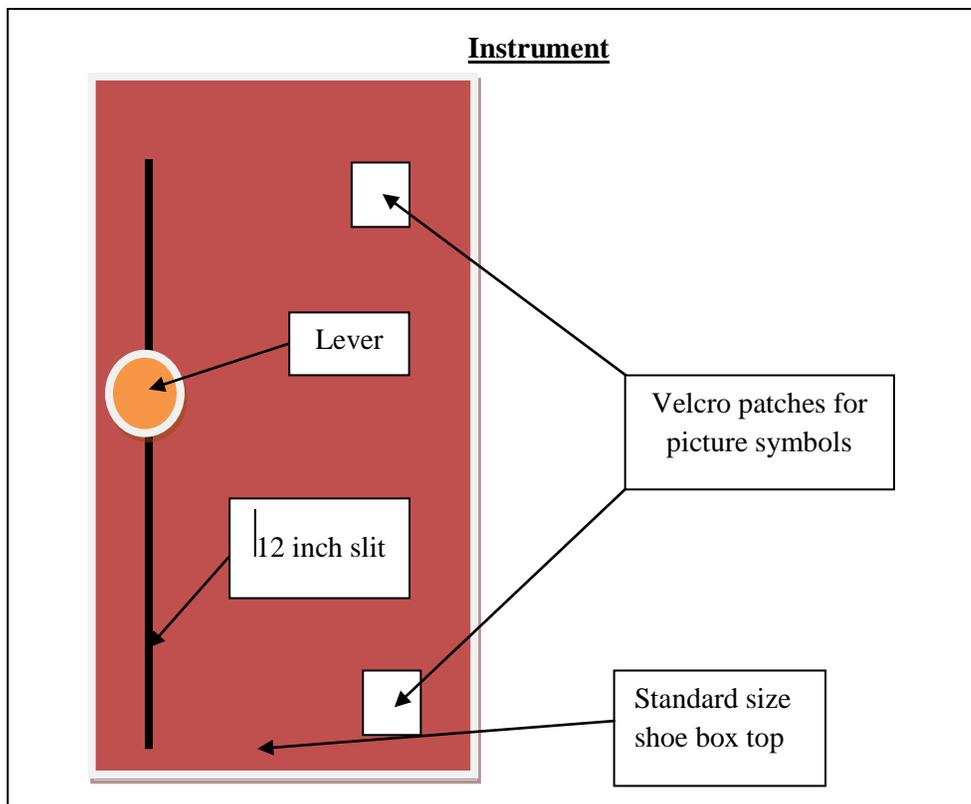


Figure B: Instrument- Device used in the study

Questioning Procedure

(The questioning procedure was performed exactly the same all five meetings with the participant.)The participant was taken by his nurse every morning to the established room in which the questioning would take place and be greeted by the researcher. The researcher would sit approximately 3' away from the subject when conducting the questioning (the nurse would be sitting alongside the subject approximately 3' apart). The researcher would then introduce the instrument to the subject, explaining the three ways by which the subject could record his answer (eye gaze, touch, or lever). After explaining and showing the subject ways to utilize the instrument, the researcher would then ask three warm-up questions in order for the student to practice using the instrument. After the three warm-up questions, the researcher began reading the questionnaire, asking five questions to the subject. For each question asked, the subject would use one of the three methods of responding (eye-gaze, touch, or lever) to answer the question asked. After the questioning was completed and data was taken, the student was released to go back to his classroom.

Recommendations

One of the keys for success in examining communication outlets for non verbal, severely disabled students is to provide multiple means for that student to communicate. Examining success that this research has made will require that multiple topics be examined, such as the summarization of the project, future use for the project, and the highly focused place that this project carries in an educational setting. Further implications of this study include a more global application of the device as in the usefulness that the project may have, plus the limitations of the project, and future research with numerous subjects, given the supplied data.

Summary

Results for this study were based upon two factors 1), that the subject chose his/her preferred method of communication using the device, which was the most important results, and 2), that the student answered the questions correctly, which necessarily examined the cognitive processing capability of answering questions by the student. Outlets for communication were marked when the subject used eye-gaze, indicating his answer by looking at the response card for three seconds or more, by touch, indicating his answer by touching or grabbing the response card, and/or the use of the lever device, indicating the answer by shifting the lever towards the response card, thus ascertaining the cognitive process occurrence, as well. As a result, out of the 25 questions posed throughout the five trial sessions, X answered questions by utilizing the lever 22 separate times, and answered questions utilizing the lever coupled with touching the response card on two separate occasions, and finally,

answered a question by touching only the response card once. The subject did not use eye-gaze to answer any questions. For correct responses, X responded correctly 15 out of 25 attempts (60%), which is considerably high, accounting for the subject's cognitive abilities. As a result, the researcher found that the device utilized did indeed stimulate a greater number of responses and created outlets for the subject and researcher to communicate. This supported the researcher's hypothesis that students with severe communication limitations need more outlets for communicating with others. In addition, these findings unequivocally support the research question of how nonverbal, severely disabled students communicate.

Future plans

The intention for this project was to create a low-tech device for teachers to utilize in the classroom to elicit communication opportunities for nonverbal, severely disabled individuals. By creating different outlets for medically fragile, cognitively impaired individuals to communicate with, the opportunity for discovery of preferred communication means is provided. The key element of success lies in the fact that many existing conventional assistive technology devices do not offer this opportunity to students. This device can be used in the classroom on a daily basis for every communication opportunity available with a medically fragile individual.

Opportunities for use are limitless given the activities for which the student needs to provide a response. Examples include matching colors for Mathematics, choosing literature to be read in the class, or indicating preferred food items for lunch as applicable. Utilization of this tool can really open the doors of communication in the

classroom for nonverbal, severely disabled students. The measure of success for this device is dependent on two factors: 1) the consistent utilization by the teacher and 2) the utilization by the student. The teacher must, as with all assistive technology, conduct a “testing” period with the device and the student. The teacher may need to assist the student in using the device for a period of time before the student becomes comfortable with the tool, which brings to rise the second point, student utilization. If the student indicates that the outlets are not preferred methods of communication, then the teacher must respect his/her choice, and consider other methods to elicit communication opportunities. If the teacher is able to utilize the device to elicit preferred communication opportunities for the student, then the device can be considered a success. Further, if the student rejects the device, it can also be considered a success; since the student is communicating that they are still searching for a preferred outlet for communication opportunities. The only way this device could not be a success is if the teacher did not provide the student an ample “testing” period, during which the student could determine if the device was sufficient enough to provide a preferred outlet for communicating.

Educational Setting

While reviewing educational research for this project, three crucial elements were examined by the researcher, in which the researcher concluded these must be in place in order for communication to be effectively demonstrated. Those elements were nonverbal communication, assistive technology, and self determination. This project was successful in demonstrating the validity of Johnston, Reichle, and Evans’

(2004) research in nonverbal communication, through again proving the fact that augmentative and alternative devices must be effective for the individual with disabilities to use in order for the device to have any success. This project also confirmed the research that Dyches, Davis, Lucido, & Young (2002) presented regarding assistive technology. Their assertion that the operation of any type of technology, whether low or high tech, does increase the ability to communicate with others and promote independence; something that this researcher was able to establish with the preferred communication outlets that X produced using the researcher's device. Furthermore, this project was successful in adding to Van Tubbergen, Warschausky, Birnholz, & Baker (2008) research, which focused on the success that eye-gaze and switch interface systems had in promoting skills for self determination by showing that a device with a lever is another way for tactile learners to demonstrate self determination skills. With these three fields of study in mind, nonverbal communication, assistive technology, and self determination, the distinct success in the medically fragile setting is possible with the use of this researcher's invented device, based upon past and present research.

Global Implications

This project can be considered another successful stepping stone in developing successful research in the field of special education. As previously shown, this project converges and supports much of the research in this specific education field in addition to developing research to show that other communication outlets must also be further examined, so that there exist more viable options for students

with special needs to communicate. The fact that something as simple as this project's lever device helped a medically fragile student to obtain an outlet for communication, which would never be considered with the use of conventional assistive technology devices, shows that there are multiple pathways for nonverbal, severely disabled individuals to communicate in the classroom. It is incumbent upon teachers and researchers to tap into these unconventional ways to fit the student's needs.

Limitations

Like all research, there are multiple limitations for this study. Each medically fragile student is different and their use of technology can be extremely limited at various times. The subject for this study was in good health at the time of the study, and was already familiar with some communication devices, so the results of this study were more accessible for the researcher than with other more seriously disabled, medically fragile students. Furthermore, this device is not a one-size-fits-all type of assistive technology. This device may only be successful for this one individual and no other, however, this is considered a success by this researcher who has worked with this subject for numerous years, so the device can or cannot be effective with other students in a special needs classroom. Moreover, the low-tech nature of the device in this project could pose a potential safety hazard for students if they are not monitored using the device. Given the materials used, the safety precautions cannot be overstated. For example, if the wooden knob were to become loose on the device, the screw could potentially be exposed. Even with these limitations, the researcher feels that this project was a big accomplishment in

developing further outlets for communication in support of students with special needs.

Future Research

Reference to future research has been made multiple times in previous sections of this chapter. The most important investigation that the researcher would like to see made are different types of effective, low tech devices which provide further outlets for the students with special needs to utilize effectively in the classroom. The device in this project has added only one additional outlet which has seen fairly immediate and promising results. If future research continues, exploring multiple outlets for communication in the medically fragile field, the once uninvolved individual now has an opportunity to develop a vital role in the classroom setting. Additionally, research regarding communication opportunities in the medically fragile field in general need development. This researcher found that this is a limited field in terms of overall research and is rarely discussed or even known or understood in the education realm. With the development of research in this field, students who have been virtually ignored in educational research may be brought more dignity and respect by taking their needs into consideration through continued research and development.

Conclusion

Developing communication outlets for nonverbal, severely disabled students to utilize with people in their environment is critical in establishing a student-centered teaching climate. Focusing upon the summarization, future use, educational setting,

global implications, limitations, and future research that this project encompassed has shown the difference this device can potentially make in the special education field. Nevertheless, it is not the success of the device which really makes this project meaningful, but the success of the medically fragile student. Developing these new and different methods to support the student to become independently triumphant in the classroom is where the truer and deepest success lies.

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Appendix A

| Question # | Answered Correctly? | | Method Used? | | |
|---------------|---------------------|----|--------------|-------|-------|
| | Yes | No | Eye-gaze | Touch | Lever |
| 1 | X | | | X | X |
| 2 | X | | | | X |
| 3 | | X | | X | |
| 4 | X | | | | X |
| 5 | X | | | | X |

| Question # | Answered Correctly? | | Method Used? | | |
|---------------|---------------------|----|--------------|-------|-------|
| | Yes | No | Eye-gaze | Touch | Lever |
| 1 | | X | | | X |
| 2 | | X | | X | X |
| 3 | X | | | | X |
| 4 | X | | | | X |
| 5 | X | | | | X |

| Question # | Answered Correctly? | | Method Used? | | |
|---------------|---------------------|----|--------------|-------|-------|
| | Yes | No | Eye-gaze | Touch | Lever |
| 1 | X | | | | X |
| 2 | X | | | | X |
| 3 | X | | | | X |
| 4 | | X | | | X |
| 5 | | X | | | X |

| Question # | Answered Correctly? | | Method Used? | | |
|---------------|---------------------|----|--------------|-------|-------|
| | Yes | No | Eye-gaze | Touch | Lever |
| 1 | X | | | | X |
| 2 | X | | | | X |
| 3 | | X | | | X |
| 4 | | X | | | X |
| 5 | | X | | | X |

| Question # | Answered Correctly? | | Method Used? | | |
|---------------|---------------------|----|--------------|-------|-------|
| | Yes | No | Eye-gaze | Touch | Lever |
| 1 | X | | | | X |
| 2 | X | | | | X |
| 3 | X | | | | X |
| 4 | | X | | | X |
| 5 | | X | | | X |

Data Sheet: Data taken for X's preferred means of communication outlets.