AN EXAMINATION OF HOW SIGN LANGUAGE AFFECTS THE BEHAVIORS OF STUDENTS WITH AUTISM IN A VOCATIONAL SETTING

by

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A thesis submitted to

Sonoma State University

in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

in

Education

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By

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ABSTRACT

Purpose of the Study:

Research suggests that students with severe disabilities, particularly autism, learn to use sign language for many reasons. Prior research on using sign language with students with autism suggest that although the participants were responsive to the interventions, they seemed to lack the support needed to generalize skills beyond the classroom where the direct instruction occurred.

The purpose of this study is to determine how the use of sign language affects students with autism in a vocational setting in the areas of behavior and communication.

Procedure:

A single subject research method in which a single researcher may investigate multiple subjects within one study is utilized. It follows a basic AB model in which a baseline data was collected, and then data collected again after the intervention was introduced. In addition to these quantitative methods of data collection, qualitative methods such as structured student observations and field notes were also utilized.

Findings:

It was found that the intervention provided the students with the tools to not only assist them in maintaining appropriate work behavior in a vocational setting, but also allowed for them to be better communicators within that setting.

Conclusions:

By incorporating the use of sign language into an existing verbal prompt system as a way for the students to appropriately access the environment in which they worked. Evidence of this is found in the increase of positive statements and interactions that occurred with both students while in their vocational setting after the intervention was introduced.
It is with immense gratitude that I acknowledge the guidance of my committee members, Jennifer Mahdavi, Cat Ayala, and Mary Dingle. I want to thank them, along with all of the other teachers who have been a part of my public school journey, for their work in education.

This thesis would not have been possible without the love and support of my partner. You are the light of life and the sweetest part of my soul.
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Introduction

“It is almost time for work. When the bell rings at the end of lunch it is time for work with Lee. Every day after lunch, I work dumping trashcans with Lee. [bell rings] Should I go to work now? Ms. Tock, should I go to work now?” –Steve

Background

Every day, lunch was on the student schedule. Whether it was a block period schedule or an all period schedule, every day when lunch ended, it was time for work. Yet, each day in my vocational classes there were students with autism questioning their scheduled activities and how to complete them.

In 2008, I was hired to be a special educator of twelve students with a variety of disabilities placed in a special day classroom at a public high school in Northern California. All of the students in my classes had qualified for special education services due to a severe disability. The students required 100% supervision at all times, as well as the utilization of a variety of teaching strategies in order for them to access their educational programs. A daily schedule was written on the board and was reviewed each morning with the students on my caseload.

The curriculum taught was a functionally-based life skills curriculum. Each day, instruction in functional reading, mathematics, social skills, activities of daily living, and pre-vocational and vocational education were provided. Flexible grouping strategies were used to support the individual education programs of all learners in my classroom. All subject lessons presented were taught with the ultimate goal of generalization and to provide opportunities for the students to increase their levels of independence and obtain a higher quality of life.
At 16 years old, the state of California, under IDEA, requires all students who receive special education services to have a transition plan that guides their involvement in a vocational program. Like many other counties, Sonoma County utilizes a transition plan that not only provides the students with a specific plan toward goal achievement, but also allows them to work, part-time, at a sub-minimum wage.

In the program at the high school where I worked, I taught a vocational skills program during the 3rd, 5th, and 6th periods. In addition, students in my 5th and 6th period vocational classes were working with campus custodians after lunch for a sub-minimum wage. Of the twelve students on my caseload, three of them were diagnosed with autism. Of these three, two were paid custodial workers after lunch.

The students in my class were people of various disabilities with a wide range of ability. However, many of them received special services under the qualifying diagnosis of autism. Very quickly I noticed that several of the students diagnosed with autism had communication difficulties across many domains. As these students with autism struggled to be effective communicators within the class, I began to think about alternative modes of communication that would be beneficial for students with autism.

With sign language identified as one of the instructional methods that may prove beneficial to students with autism, I began to research how I could incorporate its use to assist my students in better communication. I was particularly interested in how my students could utilize it to understand expectations and make choices outside of the classroom, within their work environment, especially since during their vocational period, the participants struggled to complete 3-4 step work jobs without engaging in inappropriate talk.
While working to attain a Master’s degree in education with a concentration in special education, I had conducted many applied field projects (AFPs) relating to the use of sign language as a bi-lingual instructional strategy. As an instructor, I used total communication (TC) in my lessons daily.

During my studies I noticed that many students learn to use signs for many reasons, including identifying, responding, evaluating, and self-reinforcing quality greetings and decisions in the classroom. Within these inquiries, I noticed that although the participants were responsive to the interventions, they seemed to lack the support needed to generalize skills beyond the classroom where the direct instruction occurred. I began to wonder that if given the proper support, would these students be more successful in generalizing skills and becoming better communicators in their communities.

Statement of the Problem

When working with students with severe disabilities, it can be beneficial to use alternate forms of communication. Picture schedules and written schedules have shown to benefit students with autism by preparing them for daily activities and expected behaviors (McClannahnan & Krantz, 1999).

Similarly, signing provides a communication medium for children with various types of language delays or impairments, such as autism, apraxia of speech, aphasia, Down syndrome, and fetal alcohol syndrome (Rush, 2005, as cited in Toth, 2009). Research suggests that the use of sign language when paired with oral language have increased the oral and sight word vocabulary of students with learning disabilities and has
improved vocabulary acquisition of students with more severe disabilities such as Down Syndrome, cerebral palsy, mental retardation and autism (Simpson & Lynch, 2003).

In special education, there are often communication barriers that create a need for an identification of instructional strategies to develop independence. In preparation for employment, the vocational program supports student communication with supervisors to identify strengths and needs for employment. As communities are becoming more accommodating to people with disabilities, more employment opportunities are emerging for adults with disabilities. An identification of instructional strategies will support the job training of students.

With sign language identified as one of the instructional methods that may prove beneficial to students with autism, it is interesting to look at how students can utilize it to understand expectations and make choices in a work environment, especially since during vocational periods, the participants struggled to complete 3-4 step work jobs without engaging in appropriate talk.

The purpose of this study was twofold. The first was to review current and emerging literature on the use of alternate forms of communication in educational settings for students with severe disabilities. Secondly, using these methods of alternative communication, specifically sign language, I designed instruction and modified curriculum that assisted in redefining my students as more involved members in a vocational environment. My research focus was to introduce to students with autism the use of sign language as a cognitive behavioral strategy to monitor expected behaviors during vocational periods, as well as to determine if the use of sign language would increase those students’ ability to be more independent in the vocational setting.
Significance and Purpose of the Study

Upon completion of this project, there will be several individuals who benefit from the information uncovered. As a third year teacher, there was immense benefit in doing this with my own students. Not only was there a strategy that supported a student’s ability to increase their level of independence and gain greater self-monitoring abilities, but there were also opportunities to gain a better understanding among educators of how classroom based research and the ways in which it can improve professional practice.

This project may benefit other teachers by increasing their understanding of how sign language can be used as an instructional strategy to increase independent task completion of students in a non-academic environment. Furthermore, teachers may also see how to use task analysis to monitor student performance and make curricular decisions based on their findings.

In addition, students may benefit from their teachers’ use of sign language as a visual tool. It is a communication skill not regularly taught to enhance skills, but used as an alternative mode of communication when nothing else works. Teachers may find that the use of sign language as a supplemental teaching modality may enhance a student’s ability to focus and self-monitor across many disciplines.

Another beneficiary of this project will be the students involved in the study. By using a method of alternative communication as a teaching strategy, students are given opportunities to increase their social skills in a working environment while becoming more active participants in their education, their possible future employment opportunities, and improving their overall quality of life.
A third group of beneficiaries that may arise from the completion of the project is the vocational staff with whom the students work. By learning different ways in which to communicate with the students, they were not only increasing their knowledge of sign language, but how they can better communicate with people of all abilities. They will be better able to deal with the diversity of the school population and to meet the needs of all the students.

One final group of beneficiaries is the parents and families of children with disabilities. By utilizing various means of communication, parents may find that sign language might prove to assist in communication with their children.

Since the purpose of this study was to examine the use of sign language as an instructional strategy for students with autism in high school vocational training programs during paid work positions, the question that guided this project was: How will students with autism in high school vocational training programs use sign language during paid work positions to increase completion of tasks and communication with co-workers?

Definition of Terms

American Sign Language (ASL)-

A complete language with all the properties of other languages of the world, existing entirely in a visual-gestural modality and is composed of symbols that can be combined in a specific rule-based manner to express meaning (Daniels, 2001). It involves signals for letters and words or phrases (Westling & Fox, 2004).

Sign Language-

A language which uses visually transmitted signs to convey meaning—simultaneously combining hand shapes, orientation and movement of the hands, arms or body, and facial expressions to fluidly express a speaker's thoughts (Dennis & Azpiri, 2005). A broad category of languages that are not spoken (Daniels, 2001).
Total Communication-

The combined use of oral language, sign language and visual cues (Bogdashina, 2005).

Picture Exchange Communication System (PECS)-

A form augmentative and alternative communication using pictures, symbols and icons. The student is expected to seek out a person to exchange the picture or object for desired item or activity (Heflin, 2007).
Literature Review

Many teachers for students with severe disabilities, including severe autism, have seen the difficulties arise from limited communication skills (Koegel, 2000). When students struggle to communicate unwanted behaviors increase and interfere with life. Without clear methods of communication it is extremely difficult for teachers and students to establish routines and expected behaviors.

The biggest difficulties arise in classrooms when no mode of effective communication is available and unwanted behaviors occur. Difficulties such as maladaptive and non-compliant behaviors have often been overlooked, having not been thought of as having a communicative function (Koegel, 2000). This has led to the promotion of more functional communication interventions in people with autism (Frea, Koegel & Koegel, 1993). Functional communication interventions can be defined as positive behavior supports designed to reduce problem behaviors by replacing them with meaningful and socially appropriate behaviors (Texas Statewide Leadership for Autism, 2009).

Nonverbal communication is a common practice that is used as a classroom management technique in special education classrooms, as well as general education classrooms, to facilitate appropriate behavior by allowing teachers to utilize students' need to learn through movement as well as redirecting unwanted behavior without disrupting the rest of the class (Dennis & Azpiri, 2005). The effectiveness of nonverbal communication strategies used by teachers and students can be assessed by monitoring student progress. Nonverbal commands can be used across multiple settings to manage behavior. This includes the use of sign language and gestures. Both sign language and
gestures provide students with a visual and kinesthetic learning environment. The literature reviewed looks at how teachers and students can access multiple modes of communication to meet individualized needs.

The scope of this literature review is to explore the history and current issues surrounding the use of alternative methods of communication in the classroom, specifically for students with autism on three levels. It will first draw from the history, theory and research in the fields of (1) autism and augmentative communication and (2) communication systems, specifically, sign language, and then discuss the application of that research in (3) intervention techniques to increase an individual's level of independence.

*Autism and Augmentative Communication*

In 1943, Leo Kanner was the first person to use the term autism when describing similarities in the behavior of eleven children in his study “as having marked differences in their ability to socialize with others and extreme rigidity in their behaviors” (Heflin & Alaimo 2007, p. 49). The American Psychiatric Association (APA) provides a classification system for differences in learning and behavior that is a widely accepted device used to diagnose autism. Under the umbrella category of Pervasive Developmental Disorders (PDD), five subtypes of autism are defined. The PDDs described in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR, 2000) are: Autistic disorder, Asperger’s disorder, Rett’s disorder, Childhood Disintegrative Disorder (CDD) and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS). The core deficits of people on the autism spectrum are: 1) social impairment 2) communication
impairment, and 3) compulsivity (Bogdashina, 2005). Compulsivity includes the extreme attention and hyper focus on one’s own interests.

People with autism display a variety of social impairments such as the reluctance to interact with others, make eye contact and maintain attention to social situations. With these impairments it is difficult to develop social relationships. People with autism struggle relating to people and often prefer individual activities over group activities. People with autism who are higher functioning generally interact socially, but struggle to establish friendships (Morris, 2002).

Depending on the intellectual development of individuals with autism, communication impairments vary. It may be difficult for people with autism to understand and use verbal and nonverbal communication. They often choose not to engage in communication not centered on them. Some people with autism use stock phrases and repetitive language, while others are unable to use verbal language. In addition, people with higher functioning autism may have large vocabularies and talk about topics intensively, but are often off topic, or talk about inappropriate subjects or at inappropriate times. Regardless of intellectual abilities, individuals with autism have communication deficits that affect their ability to socialize and effectively communicate (Heflin & Alaimo, 2007).

Characteristics of people with autism may include restricted interests due to preference of objects over people and to parts of objects rather than the whole and repetitive motor movements, such as hand flapping and spinning. Repetitive movements are often self-stimulatory behaviors that serve no obvious purpose. The narrow range of interests seen in people with autism is unusual by development standards (Heflin &
Perseverations on favorite topics or activities restrict the developmental opportunities, both social and communicative, available to individuals with autism.

Autistic disorders are diagnosed based on behavior symptoms within one or more of the core deficit categories. For example, individuals diagnosed with an autistic disorder may have deficits in the social, the communicative, and the interests and compulsivity categories, whereas people diagnosed with Asperger’s generally do not have deficits in their communication development, but have a social impairment. These deficits, as found in individuals diagnosed with an autistic spectrum disorder, result in difficulties processing verbal information and, therefore, may be better equipped to handle the visual better than the auditory modality (Bryen & Joyce, 1986; Toth, 2009).

Another commonly observed characteristic relating to autism is that individuals with autism are often taught to use coping mechanisms to block sensory input (Bogdashina, 2005; Dempsey & Foreman, 2001). Because it is not imperative to understand all the sensory input that is in an environment, it is beneficial to filter out unnecessary information. Individuals with autism find it extraordinarily difficult to filter sensory information. They become overloaded and, as a result, act out (Bogdashina, 2005). However, there are several commonly used strategies that are thought to decrease sensory overload with sight, sound, smells, tastes and touch. One of these strategies is to provide structure and routine to an individual’s everyday activities. Having a structured environment is thought to decrease sensory input and avoid overload by assisting the individual in sorting out the sensory information and providing them with feelings of safety and trust (Bogdashina, 2005).
Another strategy is to provide an alternative communication system that taps into a visual modality, since many individuals with autism have deficits in auditory processing (Heflin & Alaimo, 2007). One such system is sign language. Because sign language is more iconic, the conceptual demands on the learner are not as great, and therefore, easier to understand (Bryen & Joyce, 1986). "Some autistic individuals (with kinesthetic language) use signs as a supportive means for translating verbal words (both receptive and expressive), as they often make better sense of what has been said through movements" (Bogdashina, 2005, p. 232).

Without these coping mechanisms, individuals with autism are unable to filter sensory input and unwanted behaviors may occur. Behaviors noted due to sensory input overload are difficulty understanding cause/effect, distractibility, resistance to change, perseverations, aggression, tantrums, self-injury, and the use of self-stimulatory behaviors to cope are among some of these differences (Bogdashina, 2007; Heflin & Alaimo, 2007; Wilczynski, Menousek, Hunter, & Mudgal, 2007). It is the identification of these behavioral differences in students with autism and the function of those behaviors that is imperative when promoting the use of an alternative communication system (Koegel, 2000).

The ways in which a person communicates must be considered in his or her education in order for them to fully access the world around them. When selecting communication methods to be used with a student with special needs, individual characteristics need to be matched with the options available. Expressive and receptive modes of communication should be looked at to analyze how effectively a student is communicating. Specifically, individuals identified with an Autism Spectrum Disorder
(ASD) can have a variety of language impairments that could affect their ability to communicate effectively with others.

Communication is defined as the transmission and reception of information and concepts through the use of verbal, nonverbal, and graphic symbol systems in an agreed upon way (Bogdashina, 2005; Heflin & Alaimo, 2007). Research examines a range of communication functions and means of communication used to express these functions. There are three major functions, or reasons, as to why individuals communicate. These three communication functions are identified as the instrumental function, the social function, and the expressive function (Bogdashina, 2005). An instrumental communication function occurs when an individual wants to communicate a request or objection. This can be an immediate want or need, an expression of discomfort, frustration, or boredom. A social function of communication occurs when an individual is looking to engage with others. An expressive communication function is used when there is a comment on the emotional or mental state of an individual. Research dictates that all functions should have communicative intent (Bryen & Joyce, 1986; Bogdashina, 2005).

It is commonly agreed upon that many individuals with autism often have great difficulty with the expressive aspect of communication. However, it is not uncommon for individuals with autism to lack communicative intent because they may be unaware or unable (lacking the required skills) to use communication as a means to get something, express how they feel, or ask somebody to do something for them (Wilczynski et al., 2007).

In addition, Bogdashina (2005) lists the different means of communication and their sophistication. From simple to complex they are listed as: behavioral, gestural,
vocal, verbal, sign language, using objects, using pictures, using written language, and combinations of the above. She further explains how the means of communication, the way in which the individual expresses and receives messages, is highly dependent upon the person and their current competence and ability.

Additionally, it is not just the communication functions and means of communication that need to be considered when designing an educational program for students with autistic-like behaviors, but the individual differences need to be considered as well. In their study in 2001, Dempsey and Foreman discuss the difficulties in developing programs and treatment approaches for children with autism. Similarly to Bogdashina, Dempsey and Foreman found in their research that individuals with autism lack the ability to spontaneously communicate. They discovered that although some students with autism have shown communicative progress using traditional techniques, such as applied behavior analysis, many have not. Those individuals who did not succeed with applied behavior analysis techniques were exposed to other expressive forms of augmentative communication, such as sign language.

Both Bogdashina and Dempsey and Foreman agree that the functions of behaviors, no matter what they are, are individualized to each person, their current levels of cognition and competence, and cannot be generalized across a large population of students with autism.

Communication Systems

In order for a classroom environment to be conducive to communication, students and staff must have an agreed upon system with which to communicate (Bryen & Joyce, 1986). What this means is that language contexts must be created for instruction to have
meaning, as well as to set up classroom standards and behavioral expectations. Students with autism often require direct instruction and training to acquire these skills. Because of the commonality of auditory processing difficulties in these students, visual cues can be beneficial in connecting activities and ideas.

There are a variety of instructional and intervention strategies used in classrooms to offer opportunities for students with autism, among others, to use multiple learning modalities. “One of the characteristics of autism is the remarkable ability of many (maybe the majority of) autistic people to excel at visual-spatial skills while performing very poorly at verbal skills” (Bogdashina, 2005, p.106).

Instructional strategies and interventions used with students displaying autistic-like behaviors should be selected based on individual characteristics and needs in order to achieve an effective communication environment. For example, if a student is poor at visualizing, movements can be connected to images and signs to connect experiences with language (Daniels, 2001). In addition, students with autism often demonstrate a need for social intervention regardless of their language and cognition (Heflin & Alaimo, 2007; Bogdashina, 2005; Koegel, 2000; Morris, 2002). One of the most common interventions for students with autism used today that combines the utilization of multiple modalities and social skills is sign language (Toth, 2009; Plumley, 2009).

Sign language in special education. There are developmental stages required for participants to be successful in nonverbal communication systems, such as sign language. Research indicates that students must have the physical modality required to form the signs in order to achieve success using sign language (Bryen & Joyce, 1986). They must
also have the cognitive ability to reproduce signs shown to them (Kriegsmann, Gallaher, & Myers, 1982).

It is emerging thought that students benefit from the combination of speech, movement, and visual cues as a communication enhancement (Simpson & Lynch, 2007). It is natural for children to learn through movement and interaction (Dennis & Azpiri, 2005). The use of sign systems in a general educational setting provides access for all students to engage in the use of multiple learning modalities to increase expressive and receptive communication skills. With multiple modalities, students have more opportunities to make meaning of language (Charlop-Christy, Carpenter, Le, Leblanc & Kellet, 2002).

Using sign language adds a kinesthetic modality to the classroom. Increasing the expressive modalities of learning allows individuals more opportunities to make meaning of and acquire language and communication skills. For individuals with disabilities, the use of sign as a receptive modality allows them to focus on the visual cue and not get distracted by unnecessary conversation (Lawrence, 2001).

Sign language combined with pictures or pictographs make language more accessible to students with autism (Daniels, 2001; Toth 2009). In one study conducted with non-deaf young children diagnosed with a disability there was an increase in use of language development with nonverbal communication and verbal language (Daniels, 2001). This is significant because it shows that sign language can help facilitate overall language development.

Sign language is often offered as a last resort as an intervention strategy for nonverbal students with autism (Plumley, 2009). Plumley discusses how the use of sign
language can give students with autism an increased understanding of spoken words, ways to express feelings and create meaningful relationships, and to improve their behavior. For individuals with autism sign language can provide a link from the visual and kinesthetic input to what was being said.

Many educators often use total communication (sign language and verbal language) in addition to picture communication to support the learning environment of their students. It has been found that students with autism have been receptive to visual communication due to difficulties processing verbal language (Heflin & Alaimo, 2007). Sign language, combined with pictures or pictographs, makes it even easier to develop language skills than with words alone (Daniels, 2001).

For individuals with autism, using sign language as a communicative tool has been found to enhance verbal language in education settings (Dennis & Azpiri, 2005). The physical movement of signing can engage kinesthetic learners to focus on learning and remembering the information being communicated (Bogdashina, 2007). This is important because individuals with autism often have auditory processing issues. The kinesthetic and visual modality provided by signing helps to make connections between spoken words and body reactions (Williams, 1996).

It is specifically noted that for students with disabilities the use of sign language can bridge communication gaps (Dennis & Azpiri, 2005). Sign language can be used in the general education classroom to visually cue students with autism through instruction without increasing auditory input (Toth, 2009).

In addition, sign language adds a visual stimulus to auditory input. Simpson and Lynch (2007) discuss how using sign language, as a communication enhancement, can be
successful for students with autism. Whereas much research focuses on the use of sign language as an instrument to increase accessibility of language and communication skills, Simpson and Lynch focus on the use of sign language and socialization. They found that sign language could be a benefit to the expressive communication skills of children with autism by increasing oral and sight word vocabulary providing more opportunities to share new skills with others.

In 2001, Marilyn Daniels wrote a book that examined her research on how various communication styles benefit children. ASL became the primary language used in the classrooms, where the teachers were all hearing and experienced in ASL. In essence, Daniels studied how the use of sign language is used across all educational settings to facilitate communication. She found that sign language initiates both communication and literacy. In the time during her study, the sign language program had a positive response with the teachers and the students. Both teachers and students reported an increase in self-esteem. She reported that because of the benefit in language development, all subjects gained respect and appreciation for each other’s language and culture.

With the use of sign language, individuals are given an additional tool with which to communicate. Although it is difficult to measure, individuals with autism tend to show more pride, stand up taller, and greater interpersonal skills (Daniels, 2001). As students use nonverbal communication methods they increase their understanding of language. This increased understanding of language can help social skill deficits of students with autism by promoting a positive self-image (Simpson & Lynch, 2007).

Since many individuals with disabilities have difficulties with spoken language, sign language has become a popular and valuable tool in special education for improving
social and communication problems (Toth, 2009). This is especially true for individuals with autism who have deficits in both social and communication skills (Toth, 2009).

**Instructional Interventions**

Communication difficulties in students with autism often result in problem behaviors. Research has shown that unwanted behaviors in students with autism are maintained because they serve a purpose and will remain present unless an intervention is applied (Hines & Simonsen, 2008). Due to language deficits in students with autism, they often expressively communicate with the use of inappropriate behaviors instead of speech, which also impair their ability to use appropriate social skills. It is speculated that the reasons for inappropriate behavior are cognitive delays and inability to notice social cues due to language deficits. Interventions should teach students replacement behaviors to achieve the same function as the inappropriate behavior. In addition to sign language, other frequently used instructional interventions for increased social, communicative, and behavioral differences in individuals with autism are visual schedules, activity logs, and other forms of graphic systems (Heflin & Alaimo, 2007).

Visual schedules, activity logs, and graphic systems are among the most popular alternative instructional strategies used with students with autism. Because students with autism tend to have auditory processing and receptive language deficits, tools such as schedules, logs, and graphic systems help to support the visual aspect of learning, but do not require the need for highly developed fine motor skills. This is an important difference from sign language because in order for sign language to be effective, students must not only have the cognitive ability to remember and imitate signs, but they must also have the fine motor development to produce the signs (Bryen & Joyce, 1986). It has
been noted that the use of visual schedules, logs, and graphic systems are far less
demanding on students' fine motor development and therefore more accessible than sign
language (Westling & Fox, 1999).

In essence, visual schedules and activity logs use a set of known pictures or words
that visually cues someone to engage in a sequence of activities (McClannahan & Krantz,
1999). These visual cuing systems can take many forms, but are usually placed in a book
and through direct instruction, a student is directly taught how to use the book to engage
in activities, ask for items, perform tasks, and enjoy rewards (McClannahan & Krantz,
1999). A popular graphic system of communication is the Picture Exchange
Communication System (PECS). PECS is a frequently used set of pictures and symbols
that teaches students to request and label items, among other functions (Tincani, 2004).

Research has shown the compared effects of the Picture Exchange
Communication System (PECS) and sign language on the acquisition of requests for
preferred items of two students with autism (Tincani, 2004). It showed that in one
instance, independent demands, and the percentage of vocalizations increased with the
use of sign language over the other expressive communication system across the board.
The results of the study illustrate that the mode of communication that produces
acquisition of requests for preferred items varies based on individual characteristics and
pre-existing skills. Spencer, Petersen, and Gillam (2008) also found that one benefit of
using sign language over PECS is that sign language is an unaided communication
system making it more readily accessible, than PECS, which is an aided communication
system requiring the use of some type of device. Though both positives and negatives
were found with the use of both sign language and PECS as communication systems, it
was found that the one advantage of sign language over PECS as an expressive communication mode was increased vocalizations. This research provides evidence that the use of sign language, when used as an instructional intervention, can produce increased communication for individuals with autism.

Summary

Educational research is needed to implement teaching and learning strategies used in public schools today. As American Sign Language (ASL) is becoming more commonly accepted as a language, educators and researchers have been looking at the functionality for students with disabilities, specifically those with autism, as a means to augment language learning and development, social interaction, and overall communication.

Developmental stages required for successful participants need to be looked at when considering nonverbal communication systems. Research indicates that students must have both the physical modality required to form signs to be successful with the use of sign language as well as the cognitive ability to mime gestures (Bryen & Joyce, 1986).

With sign language as an enhancement to verbal language, students with autism are given the tools they need to tap into multiple modalities of learning. Due to the difficulties that individuals with autism have in responding to auditory stimulus, they are often unable to understand the meaning of the language around them. As noted by several researchers throughout this review, sign language can provide the kinesthetic and visual modality to verbal language that many individuals with autism need. (Toth, 2009)

Due to social impairments, people with autism have benefited from the use of sign language due to difficulties processing verbal information. It may be easier for a person
with autism to use a visual modality rather than an auditory modality. In addition, not only has the use of sign language been used as an intervention for increased language development for individuals with autism, but there has also been evidence as to how it assists those individuals with social interaction by creating opportunities to engage with peers by using their skills and making them aware of responses from others.

Finally, it is important to note that the use of sign language as an instructional intervention for individuals with autism has been reported to help decrease unwanted behaviors by giving individuals with autism a way to communicate with others positively and increase their overall self-esteem and way of being (Daniels, 2001).

With the use of sign language as a strategy that supports a student’s ability to increase independence and self-monitoring skills, it can be used in many educational settings. This project may benefit teachers by increasing their understanding of classroom based research, therefore improving professional practice. This project can be used to increase the understanding of how sign language can be used as an instructional strategy to support independent task completion of students in a non-academic environment.
Methodology

In this chapter the methodology of developing and completing this project is reviewed. This chapter is divided into sections describing how the project examined the use of sign language as an instructional strategy. The five sections are: research design, description of sample, curriculum, procedures, and data analysis.

Participants

This inquiry was conducted on a public high school campus in Northern California. The participants were two male high school students during vocational work periods. Both students were 16 years old and juniors in high school. The criteria used to participate were based on their school enrollment and qualifications for special education. They were participants in a vocational training program where they were paid a sub-minimum wage to work with campus custodians as part of their Individualized Education Programs (IEPs).

The individuals were chosen for this project due to their participation in the work program, their history of good attendance, and their primary disability diagnosis of autism. They both had the level of cognition and motoric control necessary to use sign language as a mode of communication. Confidentiality was maintained for the students by using fictional names (Nick and Steve) and refraining from using distinguishing factors of either student.

The participants and their parents were given information on how the use of sign language provides the students with images to use as an enhancement to verbal instructions. Informed consent for the study was obtained via a written consent form (Appendix A) signed by the parent/guardian of each student participating in the study, as
well as the student. The form details the nature of the study and the student’s potential role.

_Nick._ Born in Northern California, Nick has been receiving special education services in Sonoma County since he was 3 years old. This year he is a junior and will return for one more year, participating in the vocational education program to prepare him for a transition program. Nick receives special education services under the qualifying disability of autism. He is a fluent English speaker in an Eritrean family, using Tigrinya as their primary language at home. Nick is the oldest of three siblings, who travels with between their divorced parents every week. He can follow two to three step directives. He communicates verbally, but has difficulties having conversations and participating in appropriate social interactions. Due to Nick’s disabilities he is always supervised and cared for by his family.

_Steve._ As a Santa Rosa native, Steve has been receiving services in Sonoma County since elementary school. He lives with his mother in Santa Rosa. Steve is the youngest in his family. He was adopted into his family at the age of six as the youngest child, and the only one living in the home. Steve is Caucasian. His adopted family is also Caucasian. Steve receives special education services under the qualifying disability of autism. Prior to his attendance at the public high school that he currently attends, Steve attended an all boys residential school that focused on behavior. Although Steve can function without close supervision now, he receives care from his family and respite care workers. His respite care workers support him in leisure activities, such as going to the gym, market, and movies.
Research Design

The project on which this thesis was based follows a research model in which the teacher is also the researcher. The project can be generalized in similar learning environments. A single subject research design was used in which the researcher uses the participant as his/her own control group, comparing each participant to himself. This project followed what is known as the AB research design. Within this single-subject research, the AB design was conducted when a baseline was tracked (A), and then the intervention was implemented (B). In classic single-subject research, if there is change in the behavior after the treatment or intervention is in place, then it is said to have had an effect (Johnson & Christensen, 2008). In this project, data were collected on target behaviors during paid vocational work for two students with autism.

The vocational training program was intended to prepare students with special needs for vocational environments after high school. For the students examined, participation in this program was not new. Both students had been participating in the program for one year prior to this project.

During vocational work periods, students worked with custodial staff to empty trashcans across the campus courtyard. Their goal was to independently complete the 3-4 step task of dumping a trashcan. There are often general education students, staff and visitors in the courtyard distracting students in the vocational class. On occasion there are students serving detentions by working with the custodians and students in the vocational class.

During the vocational program instruction, it was noted that the students displayed unwanted and/or inappropriate behaviors for a work environment. For the
purpose of this project, the researcher focused on the unwanted behaviors of non-work related talk and repetitive questioning. Non-work related talk consisted of topics from video games to dating and prom. Repetitive questioning was often student centered, such as “Are you my friend?” and “Am I a hardworker?”.

Data collection took place over a period of four days to establish baseline. Once baseline was established, the intervention, three 20 minute sign language lessons pertinent to the desired outcome of the target behaviors and two 10 minute review lessons, were taught over the course a week. Data on target behaviors were collected for ten days after the intervention was implemented. The data collected in this AB format were then used to determine if the intervention had any affect on the students’ target behaviors.

While the AB single-subject research design provided quantitative data results, other qualitative measures were utilized to provide a more detailed, well rounded picture of what was occurring during the time of the project. Teacher observational notes were recorded and conducted as follows: during the time in which the student was participating in the project, field notes were taken recording the verbal and nonverbal behaviors of students, what was happening in the environment around them, what they were physically doing during the vocational period, and what they did after the job was complete. Observations were recorded during the vocational period.
Curriculum

The curriculum used in this study is a teacher-made curriculum that incorporates sign language and common vocational words. A lesson plan was designed to help the students make connections between vocational words and their corresponding signs. A list of twelve words were compiled that were in direct relation to the vocational job of the students.

Procedures

The data were collected during the vocational period for the students. This period occurs daily from 1:10 pm-2:00 pm. During this time, the students participate in various custodial tasks that are driven by their IEP transition plan objectives. During the vocational period the students work separately in the same area of the campus.

Daily, after the lunch bell, student workers gathered with the head campus custodian to report for their assignments. Before starting their task, students put on gloves given to them by the head custodian (5 minutes). The head custodian then instructed the participants to their assigned area to dump trashcans (15 minutes). During this instruction time students were instructed to clean sections of the courtyard by dumping trashcans into rolling trashcans and then return to a meeting spot. They were reminded to use appropriate work behaviors, such as using their gloves while working, how to dump the trashcans, and on topic talk. When directing the students to their section to clean, where to meet after work, and to use acceptable conversation topics they were asked to repeat the instructions or indicate their understanding by responding to questions.
Data collection took place on the presence of appropriate work behaviors. The participants were observed for these target behaviors when they were completing the vocational task of dumping trashcans independently. The task required four steps:

1. Check for full trashcan (If there is nothing inside of it, then move on to the next can).
2. Move rolling trashcan near full trashcan.
3. Dump full trashcans into rolling trashcan.
4. Move on to the next trashcan.

Before the intervention was introduced, data was collected noting how often the participant exhibited the unwanted target behaviors. A baseline was established during a typical week when the average number of off task behaviors was exhibited. Data was collected over the course of four days to determine baseline. When baseline data was established the participants completed the task with below basic skills, requiring modeling and constant direction to complete the task.

For the purpose of this study American Sign Language was used, along with spoken English, to communicate the steps needed to complete the task of dumping trashcans. Once baseline was established, a vocabulary list was generated based on the participants' required tasks at the jobsite. The jobsite vocabulary was taught using verbal and nonverbal language. The participants received 20 minutes of sign language training for five days and 10 minute trainings 2-3 days per week thereon for review of the skills.

While the participants became familiar with the sign language program, the teacher also taught and trained the custodial staff participating in the study. The custodians received 30 minutes of training on signs that were used to augment verbal instructions of dumping trashcans during this project. They were given sheets with photos of students signing vocational vocabulary with the vocabulary word labeling the sign in English. Visual aids with written English and pictures of people using ASL to identify
The custodial staff became familiar with the sign language signs as well and were directly instructed on how and when to use them with the participants.

During the lessons, the jobsite vocabulary signs were used along with spoken English vocabulary and grammar structure. Students were taught signs that correlated with their vocational tasks. The vocabulary focused on in this project was: finished, dump, nothing/empty, full, move, next, near/against, other/another, large/big, trashcan [trash], rolling trashcan [push holding handle], and courtyard [area]. Iconic signs were chosen as an option to provide a visual of abstract concepts (words). Some phrases used were, “This trashcan is full/empty”, “Move the rolling trashcan to the next trashcan” and “Dump this full trashcan”. The signs were used by both the researcher and the custodians to instruct the participants during the vocational period.

After the intervention was introduced and taught the participants were again observed by the researcher completing their task of emptying trashcans during the vocational period.

The data collected for this study was collected by the researcher. A task completion log was used to collect data on the dumping of a trashcan and observation logs were kept to collect data on appropriateness of work behavior. A 4-step task completion log was used to track the independence level of each step completed within each task attempted. Seven codes were used as a rubric to mark the level of independence during the completion of each step on the data collection form. The codes for each level were: full physical prompt, partial physical prompt, modeling, direct verbal prompt, gestural prompt, indirect verbal prompt and independent. The codes are posted on the
task analysis data collection form used and can be found in Appendix C. The rubric was modified for this project. During the 4 steps analyzed, full physical and indirect verbal prompts were not used. Full physical prompting is not used in this jobsite environment, and indirect verbal prompts are not appropriate for the environment. Partial physical prompts were used such as hand over hand guidance and tapping of a hand.

Students used direct verbal and gestural prompts, as well as models, to become independent in dumping large trashcans into rolling trashcans. The observation log used to take anecdotal notes divided the work hour into 10 minute increments. Notes were taken on repetitive behaviors and talk during work time. The observation log had ten minute increments vertically on the left side of the page, 4-5 trial days listed across the top, and a grid in the middle where notes were taken incrementally per work period. A data recording log was used to track the presence of inappropriate work behaviors, such as repetitive behavior and non work-related talk. It was also used to track the presence of appropriate work behaviors, such as on topic talk. Non-work related talk varied from video game or television to personal life, such as prom and dating. On-topic talk consisted of work related activities and feelings. The data recording log had ten minute increments vertically on the left side of the page, thirty-one trials listed across the top and a large grid in the center to record codes incrementally per trial. The data recording codes can be found on the task analysis data collection form in Appendix C, as well as its 4-step adaptation for this project. The data recording and observation log used can also be found in Appendix C.

The data were collected during the ten vocational periods following the intervention to monitor and assess student work behaviors.
Data Analysis

Single-subject AB research design was used to analyze the information and display the results in graphs. The single-subject research model is prevalent in special education research today. It is common practice for special education researchers to analyze behaviors if they can be defined in observable and measurable terms in order to assess changes over time. In order to link student outcomes to instruction and interventions requires that the data collected on behaviors must be observable and measurable, and that in order for the evaluation of the instruction and the interventions to be useful the data must be collected frequently (Heflin & Alaimo, 2007). One of the most common research methods found in special education is Applied Behavior Analysis.

Applied Behavior Analysis is the science of controlling and predicting human behavior. There are several different single-subject research designs that are used within Applied Behavior Analysis. Literature shows the use of Applied Behavior Analysis to facilitate educational techniques used with students with autism to be effective. Current research dictates that because there is not enough evidence to show the cause of autism, there can be no generalized recommendations for specific cases (Dempsey & Foreman, 2001).

Applied Behavior Analysis studies allow for a control of environmental factors and use of a wide range of experimental designs to measure research techniques. Applied Behavior Analysis looks at behaviors that may have a neurological base, but may change with carefully controlled environments (Dempsey & Foreman, 2001). With an Applied Behavior Analysis design, behaviors are analyzed within controlled environments to determine what factors have an influence.
There are four principal methods in this type of research: AB research design, reversal ("ABA"), alternating treatments, and multiple baselines. Within special education, teachers often take on the role of researcher to assess instructional strategies used in their classroom. Most often, the “teacher researcher” will use the AB or the ABA design.

This single-subject AB research design was used for this project to analyze the information obtained and display the results in graphs. This typical AB design is the simplest single-subject research design and is quite common among special education researchers.

Once data were collected and the results organized, connections could be made between the target behavior and intervention, specifically, how the use of sign language during instructional work time affected the participants’ ability to not display the target behaviors during the vocational period.

The data collected using anecdotal notes from observations of the participants was more complex. Using a notebook and a pencil, anecdotal notes of participant behavior were taken during vocational work periods. The notes systematically collected the social interactions of the participants to track the presence of inappropriate behaviors, such as non-work related talk, repetitive behaviors, on topic talk, and work related talk. The notes are organized in a matrix by common themes to try to determine similarities and differences between the participants.
Results

In this chapter, the data collected during a nineteen-day period in April 2010 through May 2010 are discussed. The data were collected daily during the pre-vocational work period. This study examined the impact of using sign language with students diagnosed with autism as a way to decrease unwanted or “target” behaviors. The data collected were presented for each of the two students beginning with the results of the baseline data collected, followed by emerging themes from the direct observations, journal reflections, and field notes. The information was then summarized into the specific findings for each student. The chapter is concluded by a discussion of the similarities and common themes discovered through this project.

Steve

The baseline data set (A) was collected over the course of four days during the fifty-minute vocational period on each day. Data were collected on types of talk and work behaviors every ten minutes throughout the vocational period. Over the course of the baseline collection period, Steve had instances of off-task talk 80% of the time during three of the four vocational periods. It is important to note that during the instances in which Steve did not demonstrate off-task talk, he did not participate in any talk at all. For the baseline data, it was observed that Steve was either talking off-task or not talking at all. There were not instances of Steve participating in appropriate on-task talk during this collection period. Table 1 below shows the average instances of Steve’s off-task talk during each vocational work period as well as the average percentage of the time spent on off-task talk during the data collection period.
The use of sign language was introduced as an intervention, in conjunction with the existing behavioral management system of verbal prompting that is used with Steve during the fifty-minute vocational period. Data set (B) was collected, as post intervention data to monitor the progress of decreasing the unwanted behaviors. In order to make sure that Steve understood the sign language that was being used, Steve was involved in five 20-minute lessons over the course of one week. Steve was also given photos of the signs that were to be used as part of the intervention. Steve was instructed that he would then continue his vocational period as normal, but would see both the teachers and custodial staff using the sign language that he had been introduced to in addition to the verbal prompting.

Table 1: Instances of Off-Task Talk During the Vocational Period

<table>
<thead>
<tr>
<th>Data Set</th>
<th>Average Instances of Off-Task Talk Out of 5 Trials Each Vocational Period</th>
<th>Average % of Off-Task Talk During the Collection Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: baseline</td>
<td>4.25</td>
<td>85</td>
</tr>
<tr>
<td>B: post intervention</td>
<td>1.50</td>
<td>38</td>
</tr>
</tbody>
</table>

The post intervention data showed instances of Steve’s off-task talk during the vocational period and were collected over a period of ten days. Like the data collected during the baseline, instances of off-task talk were recorded every 10 minutes throughout the vocational period. In addition to off-task talk, instances of no talk, and on-task talk were recorded. However, during this post intervention data collection period, Steve’s instances of off-task talk dramatically decreased. Data collected during the intervention period was collected but is not shown. The graph below compares the presence of Steve’s off-task talk, no talk, and on-task talk collected over the data collection periods. The
dotted line in the graph below represents the intervention period. The graph shows how the presence of the target behavior decreased and the presence of the replacement behavior increased during the post intervention data collection period.

Figure 1

![Graph showing baseline and post intervention data collection periods with three lines representing target behavior, no behavior, and replacement behavior across 14 days.]  

The graphs show that after the introduction of sign language during the vocational period, Steve's total instances of off-task talk decreased significantly. In addition, after the sign language was introduced and integrated into the pre-existing behavior management technique of verbal prompting, Steve began to display the behavior of on-task talk, something that there was no evidence of during the baseline data collection period.

Steve was chosen to participate in this project due to his overall cooperative behavior. After reviewing both the journal entries and structured student observation notes, a few themes emerged. In all notes taken, it was observed that Steve had a very positive outlook about his vocational period altogether. He was always willing to go to work and maintained a positive attitude throughout the vocational period. It was noted
that he appears to like being social, but it was often one sided; he did not appear to be interested in the other person's interest in his choice of topic. During the post intervention it was noted that he showed occurrences of connecting work topics with life outside of work. His use of sign language with his co-workers also increased. While collecting baseline data it was observed that Steve’s work ability did not seem to be bothered or upset by the presence of an observer. Table 2 below shows some of the characteristics of Steve’s pre and post intervention attitudes.

Table 2: Themes from Journal Entries & Student Observation Notes about Steve

<table>
<thead>
<tr>
<th>Without Sign Language</th>
<th>With Sign Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>o slow to start work</td>
<td>o promptly went to work with one sign or gesture</td>
</tr>
<tr>
<td>o asked random questions</td>
<td>o random questions decreased</td>
</tr>
<tr>
<td>o continually asked repetitive questions</td>
<td>o repetitive questions decreased</td>
</tr>
<tr>
<td>o made repetitive statements</td>
<td>o repetitive statements decreased</td>
</tr>
<tr>
<td>o made comments or tried to initiate conversations with random people walking by</td>
<td>o connected work statements with personal life</td>
</tr>
<tr>
<td></td>
<td>o comments and or attempts to initiate conversations with random people decreased</td>
</tr>
</tbody>
</table>

Prior to the intervention it was noted that Steve was constantly talking during work. His conversation topics were often repetitive and non productive. The field notes showed repetitive work statements such as, “Is that the bell?”. There were also many conversation topic perseverations, such as “the boy who is bi-polar” or his “pay check”. He often discussed his work hours, anticipation of his paycheck, family finances, new Xbox game, TV, or grounding from the use of electronics.

During the post-intervention data collection period there were non-talk periods, more work statements connected to personal life goals, and less off topic talk. On day
three of post data collection Steve stated, “I’ll take care of them. At home I take out the trash. The trashcans fill up quicker here than the daycare.” Before this statement he was talking about being the boss of the worksite. He was feeling proud of the work he does. At home his mom runs a daycare he helps out with, and he made connections between his work in a daycare facility with less than a dozen students and the high school with hundreds. His hyper focused thoughts were on how many cans he could dump, which led to how many people he served and then to how much of campus he could clean before the next bell.

In conclusion, the data collected appears to show that the introduction and use of sign language in conjunction with the existing behavioral management techniques used with Steve had a positive effect on his instances of participating in off-task talk during the vocational period. The sign language became a visual cueing system that assisted Steve in maintaining appropriate behavior and making appropriate choices during work.

Nick

Like the data collected from Steve, the baseline data set (A) was collected over the course of four days for Nick. The baseline data set was also collected on types of talk and work behaviors during the fifty-minute vocational period every ten minutes each day. Over the course of the baseline collection period, Nick had instances of off-task talk 100% of the time four of the four vocational periods. For the baseline data, it was observed that Nick was talking off task at least once, every 10 minute interval of the vocational period. There were not instances of Nick participating in appropriate on-task talk or no talk during this collection period. Table 1 below shows the average instances of
Nick's off-task talk during each vocational work period as well as the average percentage of the time spent on off-task talk during the data collection period.

Again after the baseline data was collected, sign language was introduced as an intervention, in conjunction with the existing behavioral management system of verbal prompting that is used with Nick during the fifty-minute vocational period. A second data set (B) was then collected to monitor the progress of decreasing the unwanted behaviors in Nick. In order to make sure that Nick understood the sign language that was being used, Nick was involved in five 20-minute lessons over the course of one week. Nick was also given photos of the signs that were to be used as part of the intervention. Nick was instructed that he would then continue his vocational period as normal, but would see both the teachers and custodial staff using the sign language that he had been introduced to in addition to the verbal prompting.

In the post intervention, data set (B), instances of Nick's off-task talk during the vocational period were collected over a period of ten days. Like the data collected in set (A), instances of off-task talk were recorded every 10 minutes throughout the vocational period. In addition to off-task talk, instances of no talk, and on-task talk were also recorded. It is important to note that during data set (B), Nick demonstrated times in which he chose not to talk at all. This is different from his baseline data in which shows that Nick was talking off-task 100% of the time.
Table 3: Instances of Off-Task Talk During the Vocational Period

<table>
<thead>
<tr>
<th>Data Set</th>
<th>Average Instances of Off-Task Talk Out of 5 Trials Each Vocational Period</th>
<th>Average % of Off-Task Talk During the Collection Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: baseline</td>
<td>5.0</td>
<td>100</td>
</tr>
<tr>
<td>B: post intervention</td>
<td>3.0</td>
<td>60</td>
</tr>
</tbody>
</table>

During this data collection period, not only did Nick’s instances of off-task talk dramatically decrease from 100% to 60%, he used on-task talk 28% of the time and worked not talking 12% of the time. The graphs below compare the presence of Nick’s off-task talk, no talk, and on-task talk collected over the data collection periods. A dotted line in the graph below represents the intervention period. The graph shows how the presence of the target behavior decreased and the presence of the replacement behavior increased during the post intervention data collection period.

Figure 2

The graphs show that after the introduction of sign language during the vocational period, Nick’s total instances of off-task talk decreased significantly. In addition, after
the sign language was introduced and integrated into the pre-existing behavior management technique of verbal prompting, Nick began to display the behavior of on-task talk and choosing not to engage in talk at all; something that there was no evidence of during the baseline data collection period.

Overall, Nick was chosen to participate in this project due to his generally cooperative behavior. After reviewing both the journal entries and structured student observation notes, a few themes emerged. In all notes taken, it was observed that Nick had a very positive outlook about his vocational period. He was always willing to go to work and maintained a positive attitude throughout the vocational period. It was noted that he appeared to like being social, but he was unable to maintain appropriate talk with his co-workers. While taking the baseline data set it was observed that Nick’s work ability did not seem to be bothered or upset by the presence of an observer. In fact, it should be noted that after the introduction of sign language, Nick appeared to have more self-confidence while in his work environment. Table 4 below shows some of the characteristics of Nick’s pre and post intervention attitudes.

Table 4: Themes from Journal Entries & Student Observation Notes about Nick

<table>
<thead>
<tr>
<th>Without Sign Language</th>
<th>With Sign Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>o slow to start work</td>
<td>o promptly went to work with one sign or gesture</td>
</tr>
<tr>
<td>o required lots of prompting to start task</td>
<td>o became responsive to nonverbal prompts</td>
</tr>
<tr>
<td>o continually asked repetitive questions</td>
<td>o repetitive questions decreased</td>
</tr>
<tr>
<td>o made repetitive statements</td>
<td>o repetitive statements decreased</td>
</tr>
<tr>
<td>o made off-task or strange comments in attempts to initiate conversations with his co-workers</td>
<td>o appropriate/on-task comments to initiate conversations with co-workers increased</td>
</tr>
</tbody>
</table>
Prior to the intervention it was noted that Nick was constantly talking off-topic during work. His conversation topics were often repetitive and awkward. The field notes showed repetitive work statements such as, “I’m working,” and “Dump it”. He also had repetitive non-work related statements such as, “Are you my friend?” and brief moments of silence before vocalizing unexpected laughter. There were also many conversation topic perseverations on food, his schedule and his paycheck such as “Am I going to go to KFC?,” “Am I earning money for KFC?” and “Will I eat chicken there?” He often discussed his ability to do good work with repetitive questions like “Am I working?,” Am I doing good work?,” and “I’m a hard worker?”

During the post-intervention data collection period there were non-talk periods, as well as more on topic talk. Specifically, there was an increase of occurrences of work statements connected to goal of the work job and its steps. For example, as recorded in field notes, Nick stated, “The trashcan is full. I can empty it,” and “I’ll go to the next can. Is it empty? I will dump it.” In both of these examples, Nick shows the ability to keep his talk to appropriate work related conversation. These instances are only recorded after the intervention was put in place. He also began making references to the paycheck he was earning, how rich he felt, and how he would go with his dad to put it in the bank. His discussions on paychecks and monetary earnings supported him staying focusing on his job. He also showed an increase in his use of gestures and signs when talking himself through his work.

In conclusion, the data collected appears to show that the introduction and use of sign language in conjunction with the existing behavioral management techniques used with Nick had a direct effect on his instances of participating in off-task talk during the
vocational period. Before the sign language was in place, Nick was unable to control his instances of off-task talk during his vocational period, being recorded as having off-task talk 100% of the time. However, after the introduction of sign language, Nick was not only able to decrease his off-task talk, he also demonstrated the ability to exercise no talk and on-task talk abilities. Nick was not only decreasing an unwanted behavior, but it was also noted in observation notes that he was also becoming more socially acceptable to his co-workers during that time. The sign language appeared to provide Nick with the visual prompt that assisted him in making more appropriate and acceptable behavior choices.

Common Themes, Similarities, and Specifics

Looking back on the process of this research and reviewing the quantitative and qualitative data collected, common themes and similarities between the two students involved in this sample emerged. The first similarity was how the use of sign language in conjunction with the verbal prompting resulted in a decrease of the unwanted target behavior of off-task talk. When given an additional modality to receive information, both students were able to focus on the task at hand and, as a result, showed an increase of on-task talk.

Another similarity uncovered through the duration of this project was the students’ overall attitude. When looking back at journal notes, it was observed that both students had a more positive and confident outlook about what they were doing during the vocational period. This was demonstrated by Steve’s decrease in random commenting to strangers walking by and an increased focus on his work. It was also demonstrated by Nick’s attempts at more appropriate on-task talk with his co-workers.
One final common theme found was that, after the introduction of sign language, both Steve and Nick began their work more quickly and demonstrated the ability to be more independent at their job. These facts suggest that the use of sign language as a prompting method visually assisted them to be more focused and engaged in on task behaviors throughout the duration of their job.
Discussion

Throughout this project, the intention was to better define the students with autism as workers within a pre-vocational and vocational environment as well as to utilize alternative forms of communication to assist the students to be better communicators. The purpose of this project was to focus on the effect of using sign language in addition to verbal prompting on the specific unwanted student behavior of off-task talk. My research focus was on determining how the use of sign language in conjunction with direct verbal instruction would impact a student with autism's ability to not only remain on-task during a vocational work period, but to also maintain appropriate work behaviors.

Interpretation of Findings

There were three main findings of this study. The first finding is that with the use of sign language in addition to verbal prompting, both students demonstrated a decrease in the unwanted target behavior of off-task talk. With the use of sign language in addition to verbal prompting as an instructional strategy, students showed more interest in their vocational tasks by stopping, looking, and listening to directions. Because students received directions in sign language, they were visually engaged in the actual physical movement of the given direction as well as auditorily engaged by the verbal direction. This means that the students were able to draw connections and make conclusions from the iconic sign language signs as the directions were given. The students were able to utilize their visual processing tools as well as their auditory tools to make sense of the verbal directions. Due to the increase of desired behaviors and the decrease of undesirable behaviors it could be interpreted that the use of sign language tapped into
their kinesthetic learning, providing them with opportunities to use an additional modality from which to pull information (Dennis & Azpiri, 2005).

The second finding was that there appeared to be a general increase in positive attitude from both students during the work period. After the intervention, the students showed an increased interest in their work. Their discussion of work job responsibilities with co-workers and peers increased. Both participants made statements that they felt good about doing their job during the vocational period, and had fun doing it. It was noted during one vocational period that Steve proudly stated, “All the trashcans are empty. I like getting my work done.” This statement, though seemingly simple, was a type of statement that Steve had never before uttered during a vocational period. It was the first time that a statement of job satisfaction was recorded for Steve.

In fact, the students appeared to enjoy the success of being more independent at their work job so much that it could be concluded from the anecdotal information collected in the field notes that there may have been an overall increased sense of self-esteem as their understanding of directions increased. Verbal expressions of satisfaction such as, “I did a good job today,” “I really like to do my work,” and “Today I was a hard worker” were all documented throughout the field notes after the intervention was introduced.

Finally, the third finding was that both students demonstrated more focused and independent work behaviors during the vocational period. After the intervention, both students required fewer prompts to begin work; they started work more quickly and independently. The level of prompting students required to complete their work decreased as their off task behavior decreased. Students used sign language, along with
spoken language, to discuss their work expectations. Through instruction and discussion with the students, it was noted that they showed an increase in understanding the steps necessary to effectively complete work during vocational periods. This may be due to auditory processing and verbal comprehension issues people with autism have. With a decreased focus on verbal instruction and an increase in visual instruction, the students had less auditory stimuli to overload their processing, and therefore showed fewer instances of the target behavior.

Conclusions and Literature Connections

The research conducted supports the assertion that people with autism, due to difficulties with auditory processing and verbal comprehension, find success when using visual cueing systems. Although the students in this sample have had some success communicating using more traditional verbal prompting systems, they appeared much less prompt dependent when a visual cueing system was introduced and used in conjunction with verbal prompting.

In terms of sign language and communication in individuals with autism, Daniels (2001) asserts that sign and sign language serve as gestural cues for language concepts. This ensures that students who have difficulty with auditory processing and verbal comprehension will be able to tap into the visual motor properties of language.

In terms of cognition and sign language, this project supports some of the basic tenets discussed in the literature. Bryen and Joyce (1986) discuss the rationale that because many sign language symbols are iconic, they are easier for students with severe disabilities to understand. However, students must have the motoric control necessary to make the signs (Daniels, 2001; Bryen & Joyce, 1986; Westling & Fox, 1999).
students in this study showed the level of cognition and motoric control necessary to participate. Both students were familiar with the iconic symbols of the sign language used by the teacher and work staff and had the cognitive ability to understand each sign. Further, both students found success with sign language by being physically able to form the signs well enough to effectively communicate with teachers and co-workers.

Another connection found was in relation to sign language as a system of communication. It is recorded throughout the research that an increased self-awareness and an improvement in behavior is an indicator that a communication system is successful (Jordan, 2009). For both the participants in this study, the use of sign language provided each student with a communication method that met their receptive and expressive needs. When this additional system of communication was in place, the target behavior decreased.

Limitations

The limitations of this project are as follows. It takes place on a public high school campus and is limited in the school schedule. It uses a sample of convenience, limited by the number of students on campus with autism and at least sixteen years old. Because this project takes place in a vocational setting, the vocational staff involved in the presentation of the curriculum is limited in their knowledge of the use of sign language. The campus environment also provides a variety of situations where general education students influence the instructional strategies being used in this project. During the vocational period general education students can be found in the quad unsupervised, or outside of their classrooms working. These students are a distraction to the student workers. Furthermore, the students in this project were placed in this work setting with
other students serving detention time, and are therefore subject to the social dynamics of
the vocational environment.

*Future Directions*

The results of this project have shown that the use of sign language in conjunction
with verbal prompting had a positive effect on the students' target behaviors by giving
them a visual form of language to gather information in addition to verbal prompting. In
the future, I would like to take an in depth look at how sign language increases students
with autism overall literacy. I would also like to explore the impact of sign language has
as an academic intervention with a student with autism and to what effect it may have on
their learning in relation to their cognitive development.

*Implications*

Upon the completion of this project, one must think about what all this means to
professional practice and the teacher's role. In special education there are many factors
that can be examined at throughout each day, such as the academic, social, and
behavioral elements within the learning environment. With data being collected daily on
social skills, behavior, and academics in the classroom, interventions can be implemented
as needed. Behavior charts are used in the classroom every 30 minutes as a positive
behavioral support, and as a place where data is collected on social skills. Data collection
is also used to monitor curriculum and progress on individual goals. This project has
shown how research can be used to support individual needs and curriculum development
by finding the strengths of the students and developing curriculum based on those
strengths. In this project both participants were students with auditory processing and
verbal comprehension difficulties due to autism. By understanding their individual
strengths an appropriate intervention was chosen and developed in order to allow each student the best possible chance at success toward independence.

This project has taught me how action research benefits teaching and learning. Data collection was used to continuously monitor the decrease of unwanted behavior. As a researcher in my classroom I am able to monitor all teaching and learning strategies. With the development of this project I can share it with my colleagues to develop a more cohesive form of data collection on our campus while sharing the goal for all of our students to increase independence and obtain a higher quality of life.

Next Steps and Reflections

When reflecting upon this inquiry, one must ask what is next. With the collection of data in the classroom, information is used to develop teaching and learning strategies. I learned that as a teacher, I am able to use action research to collect information to adapt curriculum and meet the needs of all learners. By systematically collecting data in all learning environments I can better develop curriculum to support the generalization skills of my students.

Also, as students transition into adulthood they can use sign language as a communication mode to guide their involvement in vocational programs. With clear communication students can independently manage their work. The use of sign language as an instructional strategy provides students with a visual guide to stay on task. On task behavior provides students with more opportunities for success, therefore a higher rate of performance. When sign language is found to be a successful mode of learning for a student it can be written in their transition plan as an instructional strategy to be used in the work environment.
However, it is important to note that not many people know sign language, and because of this, sign language instruction and its use is often very limited and underused. It is important to think about the need for more training in how to provide supports to students with disabilities. And as research continues to indicate the use sign language as a successful intervention for students with autism, perhaps it will be more widely taught among educators and used within a broader range of educational settings.

As I continue to look for ways to help students access their environments, I still wonder about the supports available. Will students be more successful in transitioning to adulthood as educators and families continue improving transition plans? I can support students by teaching them to become better communicators in their communities and by using curriculum that supports generalization skills. Non-verbal gestures can be used by students at school, in their home, at work and in the community.

I strive to find new ways to bridge communication barriers in school and community. At my worksite I collaborate with general education teachers, special education teachers, para-educators, administrators, campus supervisors, bus drivers, custodians and food service workers to support my students with their communication needs. It is my hope that as students transition into adulthood they have supports in school as well as in their community that meet their diverse communication needs. With the use of alternative forms of communication, such as ASL, communication barriers can be bridged to establish more cohesive forms of communication and accessibility across all environments.
Appendix A
GUARDIAN AUTHORIZATION:

Your child is invited to participate in a research study conducted by Rebecca Tock from the department of Education at Sonoma State University. Rebecca Tock would like to examine how students with autism in high school vocational training programs use sign language during paid work positions to self-monitor completion of tasks and communicate with co-workers.

Your child was selected as a possible participant in this study because of their diagnosis of autism and participation in a sheltered work environment.

If you decide to allow your child to participate, data will be collected using anecdotal notes from observations of social interactions during vocational periods, as well as an analysis of completed tasks.

If permission is granted, Rebecca Tock will conduct this inquiry on campus with your child during vocational work periods where he/she is paid a sub-minimum wage. The student will receive this intervention as part of his/her instruction during vocational work periods with Rebecca Tock and campus custodians. Your child will be told how the use of sign language can provide him/her with images to complement verbal instructions. However, there is no guarantee that your child will personally receive any benefits from this research.

Any information that is obtained in connection with this study and that can be identified with your child will remain confidential and will be disclosed only with your permission or as required by law. Subject identity will be kept confidential by using a fictitious name throughout the data.

Your child’s participation is voluntary. Your decision whether or not to allow your child to participate will not affect you or your child’s relationship with his/her participation in the vocational program. If you decide to allow your child to participate, you and/or your child are free to withdraw your consent and discontinue participation at any time without penalty.

If you have any questions regarding the study, please feel free to contact Rebecca Tock at 707-535-7693. If you have questions regarding your rights as a research participant, please contact the IRB (irb@up.edu). You will be offered a copy of this form to keep.

Your signature below indicates that you have read and understand the information provided above and that you willingly agree to allow your child to participate in the study. You will receive a copy of this form, and you are not waiving any legal claims.

Parent Guardian: ___________________________ Date: ______________
Student: ________________________________ Date: ______________
Protocol Summary Sheet

If requesting Exemption or Expedited Review, specify category (see http://www.sonomac.edu/aa/orhp/human_subjects.shtml for Appendix B: Research Activities Eligible for Exemption or Expedited Review): Expedited Review B-9

Title of Project: An examination of how the use of sign language effects the self-monitoring skills of students with autism.

Brief description of purpose of project:
Listed on studying how sign language can impact the work skills of students with autism in a high school special day class vocational program. Signs will be used to facilitate learning experiences that improve communications skills of students with autism. The purpose of this project is to examine how students with autism in high school vocational training programs use sign language during paid work positions to self-monitor completion of tasks and communication with co-workers.

Date Starting Interaction with Human Subjects: 2/1/10
End Date: 6/1/10
Funding Source (if any):

Subjects

Number: 2 Population: Students with autism in a high school vocational training program

Source/How contacted: The participants are students at least 16 years old and currently participating in vocational training with campus custodians as part of their Individualized Education Programs (IEP). The vocational training program prepares students with special needs for vocational environments after high school. As the case carrier of these students' IEP's, I facilitate their participation in vocational programs. The students will receive this intervention as part of their instruction during vocational work periods with campus custodians and myself.

Instruments

Check all that apply: [ ] Tests [ ] Questionnaires [ ] Interview guides [ ] Other: observation
Attach one copy of each instrument used. If not yet developed, provide drafts, samples, and/or outlines

How administered:
[ ] Telephone [ ] Mail or email [ ] In person Length and frequency of procedure: 20-30 minutes 4-5 days/week

Setting: High school campus courtyard

Data

Check all that apply. Data will be recorded by:
[ ] written notes [ ] audio tape [ ] video tape [ ] photography [ ] film [ ] other:

[ ] information which can identify the subject (e.g., name, social security number, other unique identifiers) specify:
[ ] codes linked to subjects names by separate code key
[ ] codes not linked to subjects names

For items checked above, circle box of those related to data that will be reported:

Data will be used for:
[ ] publication [ ] evaluation [ ] needs assessment [ ] thesis [ ] other:

Informed Consent

☑ written (attach copy of consent form; see http://www.sonomac.edu/aa/orhp/human_subjects.shtml for Appendix A: Informed Consent Guidance)
[ ] oral (attach text of statement and request for waiver of written informed consent; see http://www.sonomac.edu/aa/orhp/human_subjects.shtml for Appendix A: Informed Consent Guidance)

This project:
[ ] is exempt under category A-
[ ] is eligible for expedited review under category B-
[ ] requires IRB review

Human Subjects Administrator Date
Chair, IRB Date

Comments:

Prepared: Dec 9, 2009
Appendix B
Next

Other / Another
FULL

DUMP
Large / Big

Push trashcan
Appendix C
Object: 

Teaching Procedure: 

Assessment:

PP = Full physical; PPc = partial physical; NE = no exposure; D = direct; DI = direct indirect; E = indirect; EI = indirect indirect

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References


