The Impact of Using Visual Supports to Increase Independence for Students with Autism That Require Very Substantial Support in a Vocational Classroom

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**Abstract**

The purpose of this study was to examine the impact of visual supports on increasing the independence of a student that has Autism and requires substantial support. Research demonstrates that students diagnosed with Autism often have difficulty achieving task independence via verbal instruction as used in a typical classroom setting. They often understand visual cuing more easily, so visual supports may be implemented to encourage independence. In this study, a five-week case study was completed to determine the influence of visual supports on task independence with a student with Autism attending non-public high school specializing in students with intellectual and behavior disabilities. Visual supports included Visual Activity Schedules, Visual Job Skill Checklists, and Work Systems and were compared with weekly baseline assessment in which visual cues were not offered. Using the null hypothesis, it was hypothesized that the use of visual supports would have no influence upon the measured independence of an individual student with Autism who requires substantial support. Findings revealed that the student reached significant levels of independence with the use of the three different types of visual supports. With each type of the support, the student was better able to complete typical classroom tasks without intervening prompts of teachers or support staff.

**CHAPTER I**

**INTRODUCTION**

**Overview**

Many individuals with Autism have strengths in visual processing. They learn from what they see by thinking in pictures. Visual supports provide the ability to use language to communicate, socially interact, and know how to respond to expectations placed on them. Visual supports create structure by providing organization of their space, helping them to learn routines. Visual supports promote independence as students build confidence in themseleves and improve their understanding of expectations placed on them. When these students know how to respond, problem behaviors decrease and their willingness to work increases. Visual supports increase oppurtunity for students to respond to and engage in learning oppurtunities (Kliemann, 2014). Being that they can be used in a variety of settings, visual supports provide the ability to increase generalizing of skills in a variety of different learning contexts. For educators, using visual supports provides meaningful data by better helping them understand what students can do independently and areas where they need additional support. They provide valuable data for the classroom, which drives instruction and helps to target specific student learning goals. The teacher and the student both benefit from this intervention, as students are able to process language in a way that provides meaning and context and teachers are able to use data to shape their teaching to create and enhance visuals that further develop independence while building on their strengths and interests and reducing their anxiety and frustration.

**Statement of Problem**

 The purpose of this study was to determine the impact of using visual supports to increase student independence of a high school student who requires substantial supports in a special education vocational setting. This study is a case-study of a single subject.

**Hypothesis**

 The researcher proposed a null hypothesis, in which the use of three different types of visual supports will have no impact on increasing independence of the student with ASD.

**Operational Definitions**

***Visual Supports*** (independent variable) can be pictures, video-modeling or text embedded with pictures that help students with ASD to understand language and be able to communicate. They help students to anticipate what will be happening, to organize themselves and their materials, to help them develop understanding about a concept, to complete tasks with increasing independence, and to be able to make decisions based on their preferences and how they may feel.

***Increasing Student Independence***(dependent variable) means that students would be able to perform a set of skills even after prompting has been faded. The student would not need to rely on the presence of an adult staff to provide support of scaffold steps within instruction. The student would be able to perform a set of target skills and be able to generalize them over a variety of different settings by themselves.

***Autsim Spectrum Disorder (ASD)*** a disorder where students have difficulty interacting socially, that affects their ability to communicate and develop relationships and have restricted and repetitive interests in which they have difficulty learning and may engage in problem behaviors.

***Prompt*** is a cue given to a student who is completing a task or following a set of directions. The type of prompt given depends upon the student’s level of independence. Prompts increase the chance for a student to complete a task accurately and completely.

***Prompting Hierarchy*** is the organization of prompts to determine the amount of assistance that each prompt requires from the staff requesting.

***Level of Prompting (Least to Most Restrictive)*** promotes independence for a student with ASD. Several prompts are used to help a student with ASD acquire a new skill. The requesting staff starts with the least restrictive prompt and slowly moves to the next restrictive. The staff will continue to move through each prompt until the student has successfully completed the required task, transition, or skill. Least to most prompts start with (1) Independent, (2) Gesture, (3) Verbal, (4) Model, (5) Partial Physical and (6) Physical.

**CHAPTER II**

**REVIEW OF THE LITERATURE**

 This literature review examines the independence of students with Autism Spectrum Disorder (ASD) that require very substantial support and the interventions used to increase independence. Section one defines ASD and discusses how it affects learning. Section two identifies why visual supports are used to teach students with ASD. Section three explains what visual supports are, provides examples of different types, and discusses how to develop them. Section four depicts the difficulties that occur for students that have ASD. Section five discusses the outcome of the intervention visual supports.

**WHAT IS AUTISM?**

 The world of ASD is continuously evolving. New research is being conducted to better understand ASD and identify resources used to support people with ASD. According to the Diagnostic Statistical Manual of Mental Disorders (DSM-5), individuals diagnosed with ASD have impairments in social communication and restricted repetitive behavior. Symptoms of impaired social communication must include deficits in social engagement and emotional exchange, deficits in verbal and nonverbal communication, and deficits in developing relationships. Individuals must also have two out of the four symptoms in restricted and repetitive behavior in order to receive the diagnosis of ASD. These include repetitive movements, rigidity in completing routines and having structure to complete routines, restricted areas of interest, and hypersensitivity or hyposensitivity to sensory input (Daily, 2016). Restrictive and repetitive behaviors also include challenging behaviors. These behaviors can include head banging, self-injurious behavior (SIB), and getting out of their seats to jump up multiple times. As these behaviors occur, and at times escalate, students become increasingly dependent upon surrounding adults for supports in daily function. (Lequia, Machalicek, & Rispoli, 2012).

 ASD is broken up into three severity levels beginning with the most and ending with the least required amount of supports. Level 3 identifies the students that “require very substantial support”, Level 2, “requiring substantial support”, and Level 1 “requiring support” (Daily, 2016, p.11). Level 3 identifies the type of student who will be discussed in this research. Individuals at Level three have severe impairments in their verbal and nonverbal communication which significantly affects their ability to function. They are unable to initiate social interactions and respond appropriately. Their behavior can be very challenging. They can only see the environment through their eyes and have extreme difficulty with attention, processing change, and engaging in intensified behaviors that disrupt their day to day activities.

 Individuals with ASD have difficulty interacting socially, restricted areas of interest, and stereotypic behavior. Stereotypic behavior is repetitive body movements. These can include rocking back and forth, clapping hands, mouthing objects, flapping hands, moving hands or fingers in abnormal patterns, and repeated vocalizations. All of these characteristics drastically affect how these individuals perform at school and interact with others and their environment (Fleury et al., 2014). Individuals with ASD struggle with the ability to focus, resulting in a short attention span. This makes it challenging for them to attend to academic instruction (Hume, Plavnick & Odom, 2012). It is important to note across the literature that individuals with ASD have great strengths in processing information visually and being able to pay close attention to detail as well (Kliemann, 2014). A study showed that many students with ASD in public school systems are unable to actively participate in general education settings alongside their typically developing peers. This has much to do with their difficulty with communicating and interacting with others. It is extremely challenging for students with ASD to follow directions in a classroom, as they are unable to process information verbally. They struggle to understand language and interpret it very literally. Deficits in communication also make it challenging to receive and interpret language from students with autism. It is difficult for educators to identify what these students are comprehending. As for educators, there is little guidance provided concerning how to teach, create, implement, and modify instruction to teach these students in a general education setting. This lack of professional support affects student learning as a result (Fleury et al., 2014).

 Many students with autism struggle greatly with the transition from high school to postsecondary goals. Some students with autism pursue higher education and gainful employment, but for students with autism that require very substantial support this can be a great challenge. A study showed that only thirty-seven percent of individuals with ASD are able to obtain and keep jobs, and of those jobs many are only part-time work (Fleury et al., 2014). The amount of support and supervision that these individuals need is quite high which makes it difficult to find placement that will provide necessary assistance. The hope and goal is for individuals with autism to be fully independent. The level of support needed at a job placement might look different than the level of support in school. This affects student learning and ultimately their independence (Kliemann, 2014).

**WHY ARE VISUAL SUPPORTS USED FOR STUDENTS WITH AUTISM?**

 Visual supports provide structure and allow for increased social interaction skill development (Kidder & McDonnell, 2017). Students with autism have difficulty understanding social cues. They struggle to initiate conversations, respond to questions, and understand expectations in language. As mentioned earlier, a strength for students with ASD is that they are visual thinkers. They think in pictures. Seeing information helps them to process, retain, and respond (Fleury et al., 2014). Receiving information visually allows them to respond more quickly to lists of steps for tasks they are expected to complete. The pictures clearly communicate what they need to do, which decreases the amount of verbal exchange, and therefore auditory processing, needed between students and adults. This is important for students who struggle with processing auditory information. (Watson & DiCarlo, 2016). Visual supports can help reduce challenging behaviors before they begin. They provide students an advance warning of what will be happening and give them the time to process on their own time (Kidder and McDonnell, 2017). All of the studies addressed use Visual Activity Schedules (VAS) as a means to support communication, promote increased social interaction, and facilitate instruction. VAS are designed specifically for students with autism who require very substantial support (Knight, Sartini, & Spriggs, 2015). The Individuals with Disabilities Education Act (IDEA) (2004) and No Child Left Behind (2001) mandated that educators use evidence-based practices in their classrooms, and VAS are considered an evidence-based practice, which have been found to be consistent, reliable and effective (Knight et al., 2015). Visual supports provide individuals with autism the opportunity to communicate, as well as provide structure, teach routine, and support transition.

 Visual schedules are a component of the TEACCH model (Treatment and Education of Autistic and Communication Handicapped Children). It is the only component of TEACCH that is considered to be an evidence-based practice and has several controlled studies that clearly explain the intervention and its effectiveness (Kliemann, 2014). The other components include the physical organization of a space, the use of structured work systems, and the organization of tasks. The TEACCH model focuses on the student as a whole. It focuses on the student’s strength in the area of visual processing and on the things the student prefers and is of interest to them to increase motivation. The model encourages the use of data to shape instruction and identify student needs. TEACCH wants the students to be able to independently retrieve meaning from the environments in which they live, learn, and work. The model provides tools, namely visual supports, to equip an individual with autism with the ability to find possible solutions to problems and to prevent challenging behavior from occurring. The use of visual schedules within the TEACCH model, increases student independence, task completion, on task behaviors, communication and ability to follow directions (Kliemann, 2014).

Communication with individuals with autism is different; using words to verbally talk is not automatically tied to communication. Students with autism can engage in challenging behaviors such as tantrums because they are unable to communicate their needs. Students with autism need access to a wide range of materials in order to be successful at communicating. Visual schedules, video modeling, and hands on learning with physical objects allow the student to interact in a way that is meaningful and that makes sense to them specifically (Fraser, 2013). Creating and using visual supports promotes growth in independent learning opportunities. They provide a means for students to know when they have completed a task or when an event or activity is finished. Visual supports are implemented to communicate to students the number of tasks or jobs they will need to complete, what those tasks will be, what will happen next, and the order in which they will occur. Visual supports naturally cue the student by providing picture images of what is to come, which lessens the amount of prompting that adult staff needs to give a student to complete a given task (Kliemann, 2014). They also communicate when a transition will occur, particularly when something that is unexpected will happen in their day to day routine. The visuals prepare the students without overwhelming them or causing them to feel out of control. They help them to prepare by acknowledging a change before a non-preferred activity or task occurs. Visual supports communicate verbal directions in a way these students are able to comprehend. In return, this supports their expressive communication. Communicating does not come naturally to them. Arranging classroom furniture, materials, and peers can encourage increased opportunities to build functional communication. Visual supports can help students engage in conversations at appropriate times and provide them choices of topics to talk about to increase opportunities for social interaction. Pairing visual supports and choice making is a great strategy to allow students to practice positive social interactions, turn taking, and initiating conversations (Butler & Dykstra, 2014). Visual supports address communicational challenges by teaching students how to process expectations and develop social skills (Cohen & Demchak, 2018).

 Visual supports are important for students with autism because they provide and create structure by defining activities and sequencing them to help students identify the order they will occur (Knight et al., 2015). VAS eliminate or lessen the confusion that students with autism encounter. By reading pictures in a sequential order, in a concise and clear, format, they are better able to identify what is expected of them. They also communicate a clear beginning and ending that helps them to predict what will happen (Watson & DiCarlo, 2016). Supports in the classroom that provide structure also increase students comfort and trust. Visual parameters are set to help students to acknowledge the boundaries concerning materials and tasks (Hume et al., 2012). This type of organization creates a space in which students are able to predict what will happen which in return keeps them motivated and on-task. Visually defining spaces clearly communicates when it is time to work and where the student will complete specific work, such as independent tasks, whole group instruction, one to one (1:1) work and break areas. Labeling classroom materials with pictures and words provide understanding of their space which adds structure to their learning environment. Using visual supports to physically organize a space reduces and controls distractions specific to student learning styles and allows for greater independence with clear structure of rules and expectations (Kliemann, 2014).

 Visual supports can be used to establish routines. Routines foster predictability which builds confidence for students with ASD while reducing anxiety and rigidity. When a student knows what will happen next, it frees up the rest of their cognitive processing to engage in more meaningful instruction (Watson & DiCarlo, 2016). By supplementing verbal instruction, students are able to use visual supports as natural cues to increase comprehension and task completion. They also allow for differentiation of specific learning needs. Visual supports can be completed with individual student routines in mind. Establishing routines is preferred for students with autism and creates stability. Once they learn them, they are motivated to complete them regularly.

 Visual supports are used to facilitate transitions. Transitions are part of everyday life, occurring multiple times throughout a day. They require students to complete an activity and move onto the next, to initiate new tasks, and to change locations. Transitions can be extremely challenging events for students with ASD to process. Using visual supports and cues in transition provide understanding of where the student will be going. A teacher can cue a student with a picture of a cafeteria to provide time for the student to process where they will be headed next. They can support transitions prior to a transition, during a transition, and following a transition (Hume, Srekovic, Snyder, & Carnahan, 2014b). In a study in 2015, Knight et al. used VAS in both general education and self-contained classrooms. Within those school environments, visual supports were also used for specific student activities and classes in which the student changed locations within their day (cooking and related therapies). They were used in student home, community and workplace settings to demonstrate how VAS could be generalized to skills in multiple areas of life. This practice was reported to be successful in all of the observed locations. All students indicated positive results with using VAS. Prompting was faded and behavior within transitions improved. All the students participating in the study were able to increase the number of steps in their schedules. Visual supports assist transitions by decreasing the time it takes to complete them, increasing appropriate and positive behavior, and decreasing prompting and support needed from adults (Hume et al., 2014b).

**HOW TO DEVELOP AND PROVIDE VISUAL SUPPORTS**

 Visual supports are evidence-based practice that use pictures, visual schedules, and physical items to help individuals with autism receive and express communication. In the research, VAS are a method to teach students skills that increase on-task learning, increase positive social behaviors and reduce maladaptive behaviors (Knight et al., 2015). Video modeling is another visual support that students can use, as they imitate adults by observing them complete a task which decreases the amount of verbal interaction with the student. This increases focus and prevents distractions from the task at hand (Fleury et al., 2014). Using manipulatives is another example of a visual support. They are able to increase student engagement by giving a hands-on task to provide the desired instruction (Fraser, 2013). For students with ASD who require very substantial support, using physical objects provides a more concrete and literal example of what is expected of them. A teacher might hand a student a lunch tray to prompt the student that it is time for lunch. This also promotes independent transitions (Hume et al., 2014b). Visuals supports are not just laminated symbol icons. They are purposeful to motivate and provide direction in learning skills and following a schedule. Student cognitive ability should be considered when designing these supports.

 Direct and systematic instruction is necessary when teaching students with ASD how to use visual supports. Thinking is scaffolded to ensure that students achieve skill mastery through modeling, guided practice and independent practice. It evaluates a student’s need and provides insight where deficits may lie (Fleury et al., 2014). Visual task organization is created to reflect specific learning needs and styles. Instructions are structured to clearly and concisely communicate how to complete a task (Kliemann, 2014). All instruction should facilitate generalization across settings and individuals. Once a skill is mastered visual supports should be generalized so the student can perform it in different settings, with different people and different materials (Fleury et al., 2014). When developing visual supports teachers need to keep in mind individual learning styles, because while visual processing is a strength in students with ASD not all will process visuals the same way. Some may only be able to process one picture at a time, while another may handle multiple pictures. The created visual supports must make sense to each of the students utilizing them (Cohen & Demchak, 2018). It is highly unlikely that one support will work for all students. Each student has different strengths and needs, so collecting data is a resourceful tool to identify how the student is performing, their level of independence, and what additional supports they may need to improve accuracy (Hume et al., 2014b). Teachers implement visual supports in the classroom by providing the student with the visual support, standing or sitting in close proximity to the student, and prompting them. Prompting involves shaping the student behavior by, in most cases, following a hierarchy of least to most prompts that allows the student to continue making progress toward the end goal without having to stop and restart (Hume et al., 2012).

 Visual supports can foster independence in structured work systems. Structured work systems sequence directions or information and answer four questions: (1) What is the amount of work I need to complete? (2) What is the work I need to do? (3) What will let me know when I am finished my work? (4) What do I do when I am finished? (Fraser, 2013). Structured work systems are a component of TEACCH developed at the University of North Carolina at Chapel Hill. Structured work systems can be used on their own as an intervention to promote independence and decrease target behaviors, which are behaviors that we want students to decrease and replace with more appropriate behaviors. Visual supports found within structured work systems help students to organize material. They also help students learn and practice using sequencing skills. Structured work systems have students working in the direction from left to right. Students take a task that is positioned to the left of their work location, follow the four visual directions to answer the questions above and then move the task to their right to signify that they are finished. This creates structure and builds independence. The difference between visual schedules and structured work systems is that visual schedules communicate where the student will transition…n or what event is next. Structured work systems organize a task in a way that engages the student in a meaningful way by answering the four questions above (Kliemann, 2014). The organization of tasks breaks down a task into simple to understand, smaller steps while emphasizing the important details for the student to complete within a task. Work systems help students to generalize skills learned in one location to a different location without needing the support of the work system. The idea is that the student has practiced the work system enough to master the skills that they would then be able to transfer to a new setting when provided with visual supports (Hume et al., 2012). Work systems can be used across contexts to promote independence not only in schools but on job sites, in the home, and in the community (Hume, Boyd, Hamm, & Kucharczyk, 2014a). The result of using work systems is increased student engagement and task completion. Studies have shown that students were able to focus on tasks for longer periods of time. The essential outcome for all the studies was increased independence with reduced number of prompts (Kliemann, 2014).

 Challenging behaviors affect the daily lives of students with ASD, as they can interfere with their learning, cause harm to themselves and others, create stress for teachers and caregivers, and create isolation and seclusion (Hume, et al, 2014a). Examples of challenging behaviors include self-injury, property destruction, aggression, and non-compliant behaviors. Visual supports are created with the target behavior in mind and should always implement pictures that are of interest and are motivating for the student. This helps by providing necessary reinforcement. A wide range of visual supports can be created to handle challenging behaviors. These include social stories and first-then boards. Social stories help individuals with autism develop social understanding of a specific task, event, location or person. They prepare students by giving relevant description of these things and setting concrete expectations of their behaviors when encountering them (Kidder & McDonnell, 2017). Prompting in the form of pictures provides positive replacement behaviors for target behaviors. If a student is yelling out answers during class, the teacher can point to a picture on the board of a student raising their hand to prompt the student to gain attention appropriately. First-then boards are used to teach students how to follow directions appropriately. Accuracy in completing targeted behaviors can then be rewarded with a preferred activity. Reinforcers are introduced prior to the task or behavior that students might be further motivated to comply (Hume et al., 2014a).

 Creating and using visual supports has resulted in increased engagement and decreased target behaviors. In studies, students spent more time engaged in task. The amount of prompts needed significantly decreased with the use of visual supports (Kliemann, 2014). The use of VAS taught and naturally cued students to switch their attention from the adult prompting to the visual supports provided in schedules, prompts, and work systems. Students used the VAS as a resource to shape their independence and behavior without realizing it. It also decreased the amount of 1:1 instruction provided (Hume et al., 2012). It is important to remember that visual supports and schedules need to be explicitly taught before students use them. Modeling how to follow a checklist, complete a sequence, or transition from one location to the next is a skill that needs to be taught. Keeping language short and to the point is critical for understanding when using visuals. Finally, staying consistent and presenting visual supports in the same way each time is important when a child is being asked to demonstrate a specific skill (Hume et al., 2014a).

**HOW DOES AUTISM CREATE DIFFICULTIES FOR STUDENTS DEVELOPING INDEPENDENCE?**

Independence builds confidence and self-determination. It builds a future that is less dependent on the support of others. However, individuals with autism have difficulty with executive functioning, information processing, understanding expectations, completing work independently, and interacting socially. These difficulties make it challenging for students to achieve independence. Students with ASD struggle with executive functioning skills. They have troubleconcentrating, making it challenging to execute a plan and keep their materials organized. They tend to be impulsive and act before thinking. They also have difficulty accessing their working memory. This leads to hardship in following multi-step directions (Fleury et al., 2014). Shifting their attention back and forth between tasks is incredibly difficult. New situations typically present a challenge for them when they are expected to respond in predictable ways (Hume et al., 2014a).

 As mentioned earlier, processing information auditorily or verbally is often a struggle. It is often extremely frustrating to students with ASD as they recognize that processing takes them more time compared to their typically developing peers. They can hear someone talking to them but have trouble identifying the meaning of what is said. From an outside perspective, it may look like the student is unable to follow directions or is refusing to follow them, yet this is not the case (Fleury et al., 2014). Research shows that students with ASD who are included in the general education setting have great difficulty processing information auditorily, so they tend to be at a disadvantage as most information in this setting is presented verbally. The results of the data collected showed that the information presented verbally led students to act out and engage in maladaptive behaviors due to their inability to focus their attention to verbal directions (Knight et al., 2015). Poor processing also leads to poor generalization of skills. Teaching skills that are functional, significant, and specific to student needs is the goal for teachers. In order to gauge desired behaviors and skills, students need to be able to demonstrate them across a variety of settings, with different people and materials (Hume et al., 2012). For most of these students, additional processing time is needed. Many times they feel like they are being bombarded with too much at once and are unable to express their needs (Butler & Dykstra, 2014).

 Understanding expectations and being able to complete work accurately and independently can be a challenge for students with ASD. Individuals with ASD rely heavily on the support of adults to care for their daily needs, complete work, follow routines, obtain a job, and build positive relationships (Hume et al., 2014a). They become easily heightened and anxious when they are unable to process expectations and are unsure what will happen next. These challenges for students with autism who require very substantial support cause them to become prompt dependent, meaning that they rely on adults to provide a prompt before they initiate an activity. This continues to be a struggle even after they have mastered skill or content. Independence and participation decreases as a result (Hume et al., 2012).

The ability to use oral language is a significant predictor for independence and success in achieving post-secondary goals such as employment, living independently, having relationships, and managing daily needs (Hume et al., 2014a). Communication difficulties affect how students with autism interact socially with others. Initiating conversations, unless they are making requests for a preferred item, is a great challenge. Answering questions and taking turns are of great difficulty as well. Reading the nonverbal body language of others and labeling how others may feel is challenging when they are unable to do so for themselves (Butler & Dykstra, 2014). They tend to have limited expressive and receptive language skills. They may script speech or repeat words or phrases over and over, while being unable to talk with an appropriate tone of voice. They might talk in a sing-song manner or a monotone voice. They struggle with regulating themselves when they are upset. Receptively, individuals with ASD struggle with processing verbal directions or understanding multi-step directions. They have a tendency to take the communication of others very literally (Fleury et al., 2014). Imitating behaviors can affect their skill development. Social communication impairments can cause issues with perspective taking, comprehension, and a disconnect from others and their own environment, resulting in limited social exchanges as they are only able to think about themselves. Most people with ASD do not have the inclination to either make friends or then socialize with them. They live in their own world and do not seem to care what others are doing around them unless it directly affects them. They prefer to do most activities alone. All these difficulties affect their ability to build positive relationships, work with other students, and to learn from others (Fleury et al., 2014).

**THE OUTCOME OF VISUAL SUPPORTS FOR STUDENTS WITH AUTISM**

Increase in independent behavior is something that is expected as adolescents mature and transition into post-secondary goals; however, this is not the case for individuals with ASD. Many of their transitions after high school are difficult because they do not receive the same degree or types of supports they had in school. Not having the supports to which they had grown accustomed may stagnate or even stunt their functional independence (Hume et al., 2014a). For an individual with autism, independence is the ability to function in life without the presence of an adult. This individual must be able to respond to their own environment without prompting and make choices based on their own needs. Visual supports are a positive evidence-based intervention that meets the needs of students and aligns with their strengths. They address behavior problems without being intrusive, equip students to make choices, increase communication skills, provide structure to their environments, and support students in becoming more independent individuals (Kidder & McDonnell, 2017).

Visual supports are easy to create, adapt, and use. They can be used anywhere and implemented in a variety of contexts. If they are lost, they can also be quickly replaced (Kidder & McDonnell, 2017). VAS support students with all levels of severity. They provide extensive detail for larger more complex tasks (Cohen & Demchak, 2018). Visuals supports are developed with student’s individual needs in mind (Fraser, 2013). Student independence is fostered as they are able to comprehend visual supports on their own. This lessens the need for support, redirection and modeling for the desired expectation. They provide order, routine, engagement, and predictability (Watson & DiCarlo, 2016). The amount of prompting significantly decreases and student’s accuracy for task completion increases because the necessary supports are provided to support lifelong learning, motivate, and build independent behavior (Hume et al., 2012).

**CHAPTER III**

**METHODS**

 This study used three different types of visual supports to determine the impact on independence for one high school aged student with ASD who requires substantial support in a vocational self-contained special education classroom. The visual supports included a VAS, a visual checklist and a work system. The student used each type of visual supports daily.

**Design**

The designed used in this study was a single-subject design with one student with ASD that requires substantial support. This student used three different samples of visual supports for this study: a VAS, Visual Job Skill Checklist, and Visual Work System. Written directions were provided before the start of each type of visual support to establish a baseline before the visual supports were presented. Written directions were used to gauge baseline, as they are a normal form of instruction to a typically developing student population. Written instructions were favored over verbal instruction as they were more consistent and easier to track in this study. Also, it is more difficult to differentiate verbal instructions from verbal prompts for the sake of data collection. Progress of student independence was monitored weekly. An initial baseline was re-established at the start, then reassessed at the start of each week.

The independent variable was the implementation of the visual supports, and the dependent variable was the student’s independence increasing after the presentation and student response to visual supports.

**Participants**

The participant in this study was a single student with ASD requiring substantial supports. The student is a nineteen-year old male who is a junior in a certificate track program at a special education high school. He academically functions at a first-grade level for all functional academic classes: reading, mathematics and writing. The term “academically functions” in this context refers to a comparison between a student’s actual academic performance and the expected performance of a student at their grade level. This deviation in academic function further describes students receiving special education services. The student’s primary diagnosis of ASD significantly affects his ability to maintain focus, process written and auditory input, and self-regulate. These difficulties make it challenging for him to complete academic and functional tasks and transition without significant accommodations and staff assistance. The student requires a classroom which can provide a low staff to student ratio in order to demonstrate and generalize his knowledge of concepts across settings. The student attends a non-public school located in an urban environment in Baltimore City.

**Instrument**

The instrument used in this study was three different visual prompting systems including: a VAS, a Visual Job Skill Checklist, and a Visual Work System. The VAS provided icons with pictures and words set up in systematic order to communicate the next transition or task the student needed to complete. The VAS was portable so the student could take it with him during all transitions. The visual schedule was in a laminated file folder, from which the student could take an icon, for example “clocking-in,” and match it to the same larger icon where the clock-in cards were kept. The student would take the Velcro icon off of the folder and match it to a larger icon, take time card and clock-in. When it was time to move to the next transition or activity, teaching staff would provide a verbal prompt to student to “check your schedule”. This helped the student move on to the visual transition or task in his schedule while following a sequential order. The transitions and tasks used in the VAS remained the same for the purpose of this study.

The next type of Visual Support used was a visual checklist to complete job skills. The student would read each of the visual steps in the checklist and complete each step. Additional visual supports were provided with the visual checklist, in regards to the specific job the student was completing. This included an “Inventory Sheet,” in which the student would circle the item for which he was taking inventory and write the total amount in the visual box at the bottom of the page.

The last type of Visual Support used was a work system. A work system is designed to communicate the steps a student needs to complete, how many steps or tasks they need to do, how the student knows they are finished, and what to do when they are finished. The visual work system that the student completed explained how to package a job item. The work system provided all the necessary information to the student without the need of additional prompting from staff working with the student. The work system moved in a left-to-right systematic fashion, so the task was structured and predictable.

During a five-week period, at the start of each week, the student was given a set of written directions for each sample to determine a baseline. On the remaining days, the visual supports were implemented to the students increase in independence. When the student used the VAS, he matched icons to corresponding icons around the room to increase his independence in transitions and completion of tasks. When using the visual job skill checklist, the student read, completed, and checked off steps before moving to the next. He was provided an Inventory Sheet, where he would circle the pre-selected item he was counting and write the amount of items in the box at the bottom of the sheet. When the student was completing the visual work system he looked at icons that moved from a left to right sequence communicating how to complete the task and what to do when he was finished. The performance baseline and increased independence using visual supports was collected using three different data tracking forms included below. Baseline measured how the student performed when presented with written directions. Teaching staff recorded data by highlighting a plus for accurately and independently completing the step or task, a minus sign for not completing the task or needing additional prompting provided by adult staff, or no response (NR) if the student did not respond or was engaging in a challenging behavior during which the task had to be removed. For the visual job skill checklist, data was collected by filling out a task analysis, while the student was completing the same steps. Staff identified the student’s level of independence by writing a number that corresponded with the prompting hierarchy. Data was collected for five weeks, and within each week, staff collected data for four days.

(1)VAS BASELINE DATA

|  |  |  |
| --- | --- | --- |
| Target  | Response | Notes  |
| Go Clock-In | + / - /NR |  |
| Get IPad | + / - /NR |  |
| Log into Nearpod | + / - /NR |  |
| Break at Desk or Walk | + / - /NR |  |
| Get checklist for Inside Job | + / - /NR |  |
| Choice Time - “Earning Time” | + / - /NR |  |
| Go Back to Mrs. Wilson’s Class | + / - /NR |  |
| Number Correct |  /7 |  |
| Percentage Correct | % |  |
| Mastery Achieved | Y/N | Initials:  |

(1)VAS PERFORMANCE OF INDEPENDENCE DATA

|  |  |  |
| --- | --- | --- |
| Target  | Response | Notes  |
|  | + / - /NR |  |
|  | + / - /NR |  |
|  | + / - /NR |  |
|  | + / - /NR |  |
|  “Earning Time” | + / - /NR |  |
|  | + / - /NR |  |
| Number Correct |  /6 |  |
| Percentage Correct | %  |  |
| Mastery Achieved | Y/N | Initials:  |

(2)VISUAL JOB SKILL CHECKLIST BASELINE AND PERFORMACE OF INDEPENDENT DATA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Date |  |  |  |  |  |  |  |  |  |
| Take Garden inventory sheet |  |  |  |  |  |  |  |  |  |
| Circle what you are counting |  |  |  |  |  |  |  |  |  |
| Count how many and write in box |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Total Independence |  |  |  |  |  |  |  |  |  |
| Total # of steps | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Percent: |  |  |  |  |  |  |  |  |  |
| Not making Progress |  |  |  |  |  |  |  |  |  |
| Working toward target |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Achieved Target |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

(3) VISUAL WORK SYSTEM BASELINE DATA

|  |  |  |
| --- | --- | --- |
| Target  | Response | Notes  |
| Take Lid off Container | + / - /NR |  |
| Measure 6 Tablespoons of Body Scrub in Each Container | + / - /NR |  |
| Put Lid on Container | + / - /NR |  |
| Put finished Scrub Container in Finished Bin | + / - /NR |  |
| Number Correct |  /4 |  |
| Percentage Correct | %  |  |
| Mastery Achieved | Y/N | Initials:  |

(3) VISUAL WORK SYSTEM PERFORMANCE OF INDEPENDENCE DATA

|  |  |  |
| --- | --- | --- |
| Target  | Response | Notes  |
|  | + / - /NR |  |
|  | + / - /NR |  |
|  | + / - /NR |  |
|  | + / - /NR |  |
|  | + / - /NR |  |
|  | + / - /NR |  |
| Number Correct |  /6 |  |
| Percentage Correct | %  |  |
| Mastery Achieved | Y/N | Initials:  |

**Procedure**

In the implementation of VAS, the student had a laminated, colored-coded file folder matching all of his other student materials. Inside was a strip of Velcro and visual icons that were adhered to the Velcro in the order that the student completed each transition or task. The student was prompted to “check your schedule”, which prompted him to open and look at the first thing. He then took off the first icon and matched it to the same corresponding icon that was much bigger and located where the student needed to transition or where the task or activity to be completed was. After the transition, task, or activity was completed, staff verbally prompted student to “check your schedule” again. Student continued until there were no more icons.

In the implementation of the visual job skill checklist for “Counting Garden Items,” the student completed steps numbered one through three in order. The student read the visual steps one at a time and upon completion checked the box, communicating that they were finished with that step. This visual checklist also included a visual inventory sheet, where the student had to physically identify what they were counting, circle the picture of the item they were counting, and record the total amount at the bottom of the page.

In the implementation of the visual work system, the student system began with work bins that were set up with a schedule that told the student what to do first, next, and what to do when they were finished. This schedule had numbered icons (1, 2, 3, teacher check, and choice icons), in which each number corresponded to a label on the outside of each bin. The student began by matching number one and taking the bin with the matched numbered icon back to his desk to complete the work system inside the bin. He took out the work system visual directions to know what to do first, next and so forth until the visuals communicated the task was done, where the tasks went when it was finished and what to do next. In this specific work system bin, he was filling lip scrub containers by measuring a fake lip scrub mixture with a measuring spoon six times per one container. He completed 6 containers.

**CHAPTER IV**

**RESULTS**

 This study examines the effects of visual supports on increasing independence of a student with autism that requires substantial support in a special education setting. In this case study, data was gathered on three major variables, using a VAS, a visual job skill checklist, and a work system. The study established baseline by implementing written directions to the students and monitored progress of the student’s independence using the three types of visual support samples. Data was gathered over a period of several weeks and each of the variables is shown with data on a table and it is charted below.

VAS

Table 1

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date** | **2-Jan** | **3-Jan** | **4-Jan** | **7-Jan** | **8-Jan** | **10-Jan** | **11-Jan** | **14-Jan** | **15-Jan** | **17-Jan** | **18-Jan** |
| **Percent** | 0% | 33% | 66% | 0% | 83% | 66% | 83% | 14% | 83% | 83% | 100% |
| **Date** | **21-Jan** | **22-Jan** | **24-Jan** | **25-Jan** | **28-Jan** | **29-Jan** | **31-Jan** | **1-Feb** |   |   |   |
| Percent | 14% | 100% | 100% | 100% | 14% | 100% | 83% | 100% |   |   |   |

Chart 1



Visual Job Skill Checklists

Table 2

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date** | **2-Jan** | **3-Jan** | **4-Jan** | **7-Jan** | **8-Jan** | **10-Jan** | **11-Jan** | **14-Jan** | **15-Jan** | **17-Jan** | **18-Jan** |
| **Percent** | 0% | 0% | 33% | 0% | 66% | 100% | 100% | 0% | 66% | 66% | 100% |
| **Date** | **21-Jan** | **22-Jan** | **24-Jan** | **25-Jan** | **28-Jan** | **29-Jan** | **31-Jan** | **1-Feb** |   |   |   |
| **Percent** | 0% | 100% | 100% | 100% | 0% | 100% | 100% | 100% |   |   |   |

Chart 2



Work Systems

Table 3

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date** | **2-Jan** | **3-Jan** | **4-Jan** | **7-Jan** | **8-Jan** | **10-Jan** | **11-Jan** | **14-Jan** | **15-Jan** | **17-Jan** | **18-Jan** |
| **Percent** | 0% | 33% | 50% | 0% | 50% | 66% | 83% | 0% | 100% | 83% | 100% |
| **Date** | **21-Jan** | **22-Jan** | **24-Jan** | **25-Jan** | **28-Jan** | **29-Jan** | **31-Jan** | **1-Feb** |  |  |  |
| **Percent** | 0% | 100% | 100% | 83% | 0% | 100% | 100% | 100% |   |   |   |

Chart 3



*Note that in the three charts, the peaks correspond to when visual supports were offered and the valleys correspond to baseline days when only written instructions were offered.*

In the study, each variable evaluated the effectiveness of visual supports to decrease the amount of other supports and prompting provided while simultaneously promoting the student’s independence. Over the course of data collection, the student reached anticipated levels of independence with the use of each of the three visual supports types. It may be noted that the initial high points, or peaks, were initially only moderately elevated but steadily improved and remained consistent by the end of data collection. This indicated that his skill in using visual supports improved and was maintained over time. When the visual supports were not available, the student’s performance remained unchanged. The results show that the student increased his skill acquisition and on-task behaviors when visual supports were provided. His challenging behaviors also decreased when the visual supports were in place.

**CHAPTER V**

**DISCUSSION**

This study examines the effects of visual supports on increasing independence of a student with autism who requires substantial support in a special education setting. The null hypothesis states that there will be no effect in using visual supports to increase student independence for a high school student with ASD that requires substantial support. A review of the findings reveals that the use of VASs, visual job skill checklists, and work systems is quite effective in increasing student independence and decreasing levels of adult prompting. Data analyzed in Chapter IV indicates that significant improvement in the student’s performance occurred over time. The data reveals that gains in independence are not perfectly consistent. Despite the minor variations in student performance, the hypothesis, that improvement would not occur, should be rejected.

**Threats to the Validity**

No research is perfect. Studies often suffer from threats to validity, and this study is no different. In terms of external validity, a major threat of this study pertains to the sample. This study is an example of a purposive study, in which the researcher relied on her own judgment in choosing a specific student population to participate in this study. The researcher’s main goal was to focus on specific characteristics of only students with ASD that require substantial to very substantial support. In this study, only one such student was selected, so it can be challenging to make generalizations to a larger population of students. This selection of a specific student with ASD was created on the judgment of the researcher, which could open up issues related to bias.

Another threat to external validity was that in order for the student to use the visual supports, he needed to be systematically taught how to use them. This included modeling by the support of teacher or 1:1. Only presenting the visual supports was not enough for the student to be able to perform the given tasks. Initial modeling and instruction on how to use the visual supports was needed in order for the supports to be an effective intervention.

Internal validity deals with the design of the study; in this case, it was a multiple times series case study design, where one student with ASD is measured repeatedly at regular interval over a period of time on whether his independence changes as visual supports are implemented. A disadvantage of this type of design is that data collection methods may change over time or in different instances. While data collection remained consistent in this study, such dramatic improvement may not be recognized with other students based upon how the specific data is collected and analyzed. If the student becomes aware that he is being observed multiple times, then this could influence his responses, which leads to concerns in internal validity. This design also lacks quality control, which could become an issue if graph results are open to more than one interpretation. In addition, this student needed additional prompting in order to reach mastery of independence. Within this procedure a hierarchy of prompts was used, sequenced from the least to most amount of help to support the student and shape the student’s behavior to increase his independence during the next timed interval. The prompting hierarchy refers to different levels of support organized in a systematic fashion which moves from the least to most amount of supports. The hierarchy begins with independence, moves to gestural, verbal, model, partial prompt, and ends with full physical.

**Comparison of the Findings of This Study to Previous Research**

Previous studies in the area regarding the use of visual supports in increasing independence for students with ASD show that once the visual supports intervention was implemented, students increased their independence and increased their task completion due to the use of visuals for activities, transitions, and tasks, while also decreasing leveled adult prompting. In a study completed by Watson and DiCarlo (2016), a kindergarten student independence increased each of the three times a VAS was implemented to target routines at specific times of the day. When the intervention was presented, the teacher provided less prompting in the completion of all routines. During baseline, the teacher had to provide verbal and physical prompting, with physical being the most intrusive of prompts. This study demonstrated a steady climb in the effectiveness of VASs as an intervention in teaching students with ASD how to follow and learn routines.

Another study by Hume et al., (2012) showed that the performance and independence of three first grade students increased with the implementation of work systems in an educational setting. Staff prompting decreased each time with the implementation of the systems. Independence in this study was measured by the type and amount of prompts the students received. Not only did the data reflect that student independence increased, but teaching staff in both settings noticed increased task completion, accuracy and the ability to generalize skills in each of the three participants. Independence increased as students were able to identify “what’s next,” which is a component of a work system, through the use of visual supports. The evidence from this study showed that generalization and task completion improved as students were naturally reinforced through the implementation of work systems.

In another study, Lequia et al., (2012) showed overall effectiveness of using VAS to decrease challenging behaviors and increase on-task learning behaviors, independence, engagement, and improved transitions. As target behaviors reduced, students were able to replace challenging behaviors with appropriate replacement behaviors with the use of VAS. VAS intervention was provided to students with ASD requiring varied level of supports, some needing low-level supports and others requiring more significant supports due to having had severe deficits in verbal and nonverbal social communication. For all, VAS resulted in decreased challenging behaviors and increased independence. VAS were reported to be less effective in a general education setting versus self-contained classrooms or a special education school setting because of the reduced distractions.

**Further Discussion**

 In further research, one could explore the effect of using visual supports to increase independence with more than one student. This would increase the validity and provide additional data points to demonstrate how the intervention helps more of the students in a classroom. The researcher could also create new and different types of VAS, visual job skill checklists, and work systems to be implemented. This would provide more detailed information and target a variety of skills, instead of just the presented here. Although the student in this study did transition to and from different places using his VAS, more research could still be done in generalizing these type of visual supports outside of a vocational classroom and into other classrooms and even the student’s home and community. This also could provide further research on the type of person giving the instruction and how the student or child responds to different people. Further research could also be done concerning how students respond to visual supports in a general education setting, such as an inclusive public school setting. Visual supports in this study were all designed on paper and the student manipulated each visual with their hands, by removing icons and matching, and crossing off when they completed each step. The researcher would have liked to see how the student would do at using visual supports on the IPad and if they would have responded the same or differently. Since the IPad is a highly preferred item for this student and many students in this population, the researcher would like to know if it could provide support and structure for increasing independence or act as more of a distraction.

Finally, the researcher would like to know why more teachers in both the general and special education setting do not use visual supports to drive their instruction. Research suggests that students with ASD have strengths in visually processing information, as they think in pictures (Hume et al, 2014a). If this is the case, why are more educators not using their students’ strengths to promote independence in their classrooms?

**Conclusions**

This study concluded that the use of visual supports for a student with ASD that requires substantial support is an effective intervention in increasing independence. Visual supports are a strength based intervention that meets the student at the level where they process information, while still addressing problem behavior. The use of VAS, visual job skill checklist, and works systems can be used as an effective tool to help students with ASD learn expectations, routines, and increased independence. VAS, visual job skill checklists, and work systems facilitate understanding as the student is able to look at them to know what they need to do, how they need to do it, and what comes next. Visual supports provide structure and place emphasis on positive communication skills. The use of visual supports builds confidence and self-determination in students with ASD, as they feel empowered to make choices and increase their engagement in work demands and activities in their educational setting.

It was observed that low performance points in data improved slowly and plateaued. An interpretation of this could be that a baseline was collected at the start of each week and the use of the intervention was implemented three of the remaining four days in the week. One explanation for why the baseline measures were so low is that there was a break in instruction due to the student not being in school over the weekend. The low baseline performance, could also be affected by classroom 1:1’s rotating to a different student each day which, depending on the student’s preferences and how that student responds to instruction provided by that staff member, could have an effect on how the student responds to instruction. It is also important to note, that sometimes students just have challenging days, when they do not necessarily feel well but are unable to communicate it or may be having difficulties with self-regulating and managing their behaviors. These are all possible contributing factors as to why the low performance points in data improved minimally.

The researcher also noted that the student’s interest increased as they were consistently provided with specific and positive praise after correctly completing each step, transition, or retrieving expected materials using the visual supports. Specific praise in this regard, helps to shape their behavior to respond appropriately each time. When high exaggerated praise is delivered, the student is able to identify what they did correctly, with hopes of reinforcing the same behavior again in the future. This was true with the student in this study, he was able to discriminate correct versus incorrect responses due to the praise delivered or withheld and corrected by teaching staff.

This study was very beneficial in continuing the process of identifying the use of visual supports on increasing independence for students with ASD that require substantial support. Based on this synthesis, it is evident that further research is necessary on improving independence for varied levels of students with ASD. It will be fascinating to see the results of future studies designed to help this student population toward functional independence with more and more tasks in their lives.

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