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The Impact of Visual Schedules for Students With Disabilities: A Literature Review

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THE IMPACT OF VISUAL SCHEDULES FOR STUDENTS WITH DISABILITIES: A LITERATURE REVIEW

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A REVIEW OF VISUAL SCHEDULES AND ITS EFFECTS ON STUDENTS WITH DISABILITIES

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Abstract

The purpose of this empirical research literature with application emphasis was conducted so I could better understand the effects of visual schedules and video modeling. Visual schedules and video modeling showed an increase of independence with transitions between classroom settings and daily routines had on students with autism. These studies reviewed students from elementary aged to young adults. The majority of students who participated in the reviewed research had no previous exposure to visual schedules. 20 peer reviewed publications were studied and analyzed on these simple interventions and the impacts and success students encountered. The documented success of a simple intervention proved to be effective for students who struggle with change and the uncertainty of what is next.

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CHAPTER 1: INTRODUCTION

Autism is referred to as a spectrum disorder that includes challenges in social interaction, social communication, and repetitive behaviors. Children with autism can struggle making direct eye contact and playing in groups with other children. Sensory systems can be overloaded from noise, sounds, or clothing textures. Some children are rigid with daily schedules while others have food aversions. Signs of autism can be seen in children as young as 18 months. Research discusses several common comorbid conditions such as gastrointestinal disorders, seizures, sleep disorders, and mental health challenges like anxiety, depression, and attention issues (Autism Speaks, 2021). When referring to the "spectrum" of disorders researchers talk about the varying subtypes within autism. According to Autism Speaks, a website dedicated to autism, is influenced by an amalgamation of genetic and environmental factors (Autism Speaks, 2021).

Moore, C. (2008) gathered information about autism and the associated label. In 1994 researchers deemed that one in 1000 children were labeled autistic. In 2008, the number had increased dramatically to one in 100 children. Moore stated that prior to the vast resources available to us now, children in the 1950s and 1960s who displayed atypical characteristics were labeled with schizophrenia. More recent data estimates that 1 in 54 children in the United States and 1 in 42 in Minnesota are diagnosed with autism or autism spectrum disorder (Autism Speaks, 2021).

Many myths have been generated to describe children with autism. To gain a clearer understanding of this neurological disorder, let us debunk some of those myths commonly believed by parents and educators.

Myth: People with autism are intellectually disabled.

Truth: Autism brings an equal number of exceptional abilities and challenges. Some people with autism have higher than normal IQ's and can excel in math, music, or other pursuits.

Myth: Autism is only a brain disorder.

Truth: People with autism can have co-occurring conditions like epilepsy, gastrointestinal disorders, food sensitives, and many allergies.

Myth: Autism is related to intelligence and cognitive skills.

Truth: Autism is defined by repetitive and ritualistic behaviors and deficits in social communication. The CDC notes that 50% of individuals with ASD also have intellectual disability.

Myth: Autism only occurs in boys.

Truth: Autism is more commonly diagnosed in males. Girls tend to slip through the cracks as they learn to mask their symptoms, known as camouflaging. The ratio of boys to girls is 4:1. The ratio may change due to current research focused on girls (Regan, T., July, 2019).

Myth: Autism is caused by vaccines.

Truth: A 1998 study completed by Andrew Wakefield published in the British Medical Journal, the Lancet, was retracted in 2010 after it as discovered that Wakefield fraudulently linked ASD with MMR vaccines. This information caused a decline in childhood vaccines leading to outbreaks of diseases in the US such as whooping cough.

A predictable schedule and daily routine presented through a visual schedule is a key factor for ASD students to achieve classroom success. Students with autism can display rigidity and many desire the need for structure. How do teachers meet those particular needs within a

classroom setting? One solution is to provide explicit expectations and a schedule of activities. A visual schedule with clear and concise expectations for students can alleviate anxiety which leads to dysregulation and behaviors that can include self-injury, shutting down, and work refusal. Dysregulated behaviors include self-harm in the form of head banging, skin picking or pinching; harm to materials: throwing items, tipping over furniture; harm to others: biting, hitting, yelling, crying, and verbal aggression.

Children with autism have challenges processing verbal information but seem to excel when presented with written or pictorial information. The students' age and ability level should be considered to determine if the presented information should be provided via simple written format or presented with pictures. A teacher unfamiliar with students with autism may consider their behaviors as non-compliant. Students may run around, hand-flap, pace in circles, rock, sway, yell, and elope to help process information that has been presented verbally. Depending on the students' cognitive level and ability to process information, it may take a few seconds or minutes to understand and act on the information. If teachers recognize the verbal input is impaired and a student can read, a whiteboard can be used to communicate directions which is considered a visual option. The written form of communication allows the individual to read and process at their own pace.

A schedule provided either through a digital format on an iPad, Chromebook, or in a printed format, helps guide individuals throughout the day, it gives a clear timeline of what is next, and provides a to-do list. In the 21st Century, people rely heavily on personal electronics to navigate. Millions of dollars are spent on devices such as phones, tablets, and computers for schedules, communication, daily reminders, photos, referencing data, and social

communication. Students diagnosed with Autism Spectrum Disorder (ASD) have challenges receiving, processing, and interpretating verbal input. These challenges can significantly impact the ability to function throughout the day, especially during the school day. Increases in unexpected behaviors such as yelling, hitting, swearing, throwing items, or task avoidance are primarily due to information processing differences (Dettmer, Simpson, Brenda & Ganz, 2000).

Teachers want to know how to help students with autism manage daily transitions independently and with minimal interfering behaviors. By the nature of this disorder students with autism interpret information literally and thrive in structured environments. Can students with ASD become more independent and exhibit fewer interfering behaviors if they are provided with visual schedules (paper or electronic) to help them understand what is next especially during transitions between activities? This thesis will specifically review research that considers the impact of visual schedules provided to students compared to students who are not provided guidance via visual supports.

I chose the topic: using visual schedules as a tool to increase independence and reduce behavior dysregulation in students with ASD. As a classroom teacher, the majority of my students at the high school level receive special education services in a resource setting separated from their general education peers as a result of behaviors they exhibited that interfered with their learning or the learning of others. My goal is to promote student independence by reducing the need for constant verbal explanations about what to do next or what to expect. Though many students began their education relying on visual supports, the use of visuals fades by the time students reach high school. A visual schedule is beneficial for students who struggle with transitions because schedules prepare students for what happens

next providing them with the extra processing time needed to mentally prepare for the transition. Visual schedules will help reduce dysregulation due to unexpected and confusing transitions.

Students who are on the autism spectrum are easily influenced both positively and negatively by events that happen throughout the day. Benign events, such as substitute teachers or a change in the lunch menu might, seem minor to the majority, but can be insurmountable for students with ASD resulting in situations where students are non-compliant, hysterical, or unable to move past their current "stuck" position (MacDonald, L. et al., 2018).

Simon Baron-Cohen, (2003), challenges us to remember that "People with AS [Asperger Syndrome] are like saltwater fish who are forced to live in fresh water; We're fine if you just put us into the right environment," (Moore, C., 2003). If students are given the resources needed to be successful, they will be. As teachers, it is our responsibility to provide the right resources to make it possible. We not only help students achieve success, we also promote independence. The goal for most parents and teachers is to help the ASD students thrive independently within a world that does not fully understand Autism.

CHAPTER II: LITERATURE REVIEW

To locate the literature for this thesis, searches of Educator's Reference Complete, ERIC-Education, were conducted for publications from 1995 to 2018. This list was narrowed by reviewing only published empirical studies articles from peer-reviewed journals focused on autism, visual schedules, video modeling, and picture schedules in journals that addressed the guiding questions. The key words used in the searches were "autism spectrum disorder," "autism," "autism picture visual schedule," "autism picture schedule," and "autism visual schedule." The chapter structure reviews the literature focused on visual schedules and increased independence.

MacDonald et al. (2018) analyzed the overall effectiveness of visual schedules and work systems with students on the autism spectrum to determine whether these interventions changed overall behavior patterns to increase on-task behavior and decrease off-task behavior.

MacDonald et al. (2018) used quantitative evaluation to determine if implementing visual schedules and work systems in the general education setting decreased overall anxiety, provided direct support to executive function, and resulted in positively dysregulating impacting behaviors among students with ASD.

Students who met four criteria participated in this study. All students had a verified diagnosis of autism, attended mainstream classes in the upper primary years, demonstrated the capability to complete assigned classwork, and had documented difficulty with on-and off-task behaviors and transitions between tasks (p. 256).

Two fifth-grade and one third-grade student who met selection criteria were observed during regular classroom time with their teachers, while another fifth-grade student was

observed during small group instruction in a language other than English (p. 256). The students observed during this study demonstrated difficulty with fine motor and writing tasks including continued writing, overall stamina with a writing assignment, cutting, coloring, and gluing. Baseline data was collected over a minimum of five separate occasions focused on the targeted behaviors. Ten-second interval data collection was recorded for observed behaviors (p. 256). During the intervention phase of the study, teachers were provided both paper and digital materials and a 30-minute face-to-face meeting (p. 257).

The results of the study found that the on-task behaviors significantly increased for work completion and on-task behaviors, with the most significant change noted in the 5th grade student who increased productivity from 20% to 53% on-task when visual supports were provided (p. 259). The off-task behaviors were not as clearly defined. Though the off-task behaviors were not considered significant, each student except the third grader showed a decreased overall rate of off-task behaviors. No significant change was found in levels of teacher prompting (MacDonald et al., 2018).

Cihak et al. (2011) looked at two different types of visual schedules and the correlation with student transitions and levels of independence. Research compared a traditional visual schedule in pictorial form to video-based activity schedules. Previous research showed that visual schedules provided ASD students with greater independence during transitions.

Cihak et al. (2011) sought to compare the differences between picture visual schedules and video modeling for students during various transitions. The study focused on the functional differences between static schedules and video schedules (p. 434).

The study included two special education teachers with more than five years of experience and four students who met specific criteria. Each participant qualified based on a physician's diagnosis of ASD, an IEP objective related to improving social behavioral skills, no documented visual or hearing impairments, and both student and parent agreed to participate (p. 435). The study took place within two different middle schools, with two students in each school. Static pictures that had been taken of the students engaged in five different activities were used as stimulus items. The pictures were placed in sequential order based on activity and were centrally located within the classroom. A digital version of the activities was also captured modeling independent transitions between the five different activities. Sections of the video where students engaged inappropriately, were edited from the clip as only target behaviors were included (p. 435).

Teachers prompted students using either the static pictorial schedule or the video modeling along with the phrase, "check your schedule." When the student correctly met the expectation they were rewarded with verbal praise. If the student did not start the transition within five seconds of the teachers' prompt, it was marked as an incorrect transition. (p. 437). Students on the spectrum struggled with reading non-verbal and social cues such as students packing up towards the end of class and conversations coming to an end which did not allow for the adequate amount of processing time needed for transition (p. 36).

According to Cihak et al. (2011), two students did better with a visual schedule in the form of pictures, while two students did better using the video modeled schedule. All four students demonstrated 100% independence with their transitions and continued using the schedule that was most successful for them.

Cihak et al. (2011), suggested that further research should expand this type of visual modeling in a wider range of settings such as work and leisure type activities.

Does advanced notice reduce the number of class interruptions which would provide more instruction time? Hume et al. (2014) studied whether notifying students about transitions ahead of time would increase predictability and create positive routines for students with autism.

Four students met the criteria for this study. Two co-teachers gathered data for one student who exhibited significant struggles with transitions and displayed the following behaviors: head down on the desk, crying, and being unresponsive to direct questioning (p. 36). The level of anxiety and stress overwhelmed this student and caused him to shutdown during instruction. A 5-minute warning timer was implemented signaling when the end of class was near. Along with a timer, a first/then schedule was put into place for the entire class. Within one week of implementing the new interventions (with tweaks along the way), both teachers noticed significant improvements with the student's willingness to participate in class and transition between activities in locations outside the classroom (p. 43).

Implementing transitional supports, providing upfront expectations, and creating predictability with student schedules helped alleviate anxiety and addressed the delayed processing struggles experienced by students with ASD.

Considering the number of dysregulated behaviors within a self-contained classroom Pierce, et al. (2013) believed that students with moderate autism would display increased independence with transition if a visual activity schedules were utilized.

Four students ranging in age from 9-11 years were chosen for this study. The students had scores above 30 on the Childhood Autism Rating Scale (CARS) and scores on the Psychoeducation Profile Revised that fell 5-8 developmental years below their chronological age (p. 255). Each student struggled with independent transitions and relied heavily on adult prompting and instruction. The students exhibited various levels of communication ability.

Pierce et al. (2013) conducted a quantitative study based on pre- and post-test data. The subjects included students in a self-contained classroom mainstreamed in the general education setting for classes such as gym, art, lunch, and recess. Transitions were noted to be very difficult for the students who required moderate levels of adult interaction and prompting to complete tasks and move about the classroom in a timely manner.

Within the self-contained classroom, staff created four centers. The centers included math, fine motor, literacy, and reading (p. 256). Each student had some type of exposure to the centers daily. Materials utilized at centers included worksheets, sorting pieces, scissors, construction paper, short story books, computers, and puzzles (p. 256).

The study design was constructed as an A-B-A-B style. The study measured the following parameters: visual schedule not present, introducing the visual schedule, removing the visual schedule, and reintroducing the visual schedule. Researchers planned to look at students' reactions to the intervention, determine the overall impact on students' ability to independently transition, and complete the tasks at each center. The study was designed to happen once a day, five days of week.

All four students significantly increased their independent transitions and completed activities when the visual schedule was introduced. When the visual scheduled was removed,

all four students displayed decreased independence and an increased need for adult intervention to complete a task. Though the decreased independence was not as significant as at the beginning of the study, researchers postulated that it might be related to repetition and having an idea of what needed to be done. Independence increased again once the visual schedule was implemented (p. 266). When the visual schedule was placed back into the student's routine, students completed transitions with the visual schedule at rates of 97% to 100% (p. 265).

Schneider et al. (2010) analyzed the data linking visual schedules to improved socially appropriate behaviors within an elementary classroom. Social narratives, another form of visual support, were incorporated in situations where students struggled with dysregulation, behavior management, and off-task behaviors. Researchers used quantitative evaluation to determine whether implementing Social Stories increased students' on-task behaviors. Schneider wanted to see if Social Stories produced increased results or whether additional supports were needed to gain desired results.

Three kindergarten to fifth-grade students participated in the study. Each student was identified with autism and a speech impairment (by the IEP team). Each student demonstrated difficulties with off-task behaviors and impaired verbal and/or social communication (p. 152). At the beginning of the study all three students were taught in a self-contained classroom. Shortly after the study began, two students were placed into mainstream classes. The transition did not negatively impact the study.

As a result of baseline data, Schneider et al. (2010) designed this study so that each participant heard a Social Story immediately before a targeted transition. Participants answered

comprehension questions following the story to confirm their understanding of the tasks. Correct answers were affirmed with, “That’s right.” When a participant answered incorrectly staff reiterated the correct response using the specific examples from the Social Story (p. 153).

The results of this study showed increased on-task behaviors for each student. One participant increased to 50% compliance of the expected task which was viewed by some as significant. When the Social Story accompanied the visual schedule the compliance increased to 72% (p. 156). Two kindergarten participants were observed as ‘being aware’ that an intervention was implemented. Though they did not understand the goals, they were aware of being pulled aside. Schneider et al. (2010) stated that participants knowledge of selection prevented the chance of systematically changing their behavior.

There appears to be a positive correlation between utilizing visual schedules and decreased negative behaviors during difficult transitions. Waters et al. (2009) analyzed visual schedules and a function-based intervention for dysregulated behaviors that tended to happen during students’ transitions.

The participants in the study included two 6-year-old boys medically diagnosed with autism who displayed problem behaviors during transitions across multiple setting such as the special education classroom, home, and, inclusion classrooms. Both participants were not new to using visual schedules. They were previously taught how to navigate transitions and schedules based on the visuals that were provided (p. 310).

The study was completed over two to three sessions that occurred three to four days per week. This study took place in controlled environment with the two subjects. The two participants were expected to transition between a desk and a small table. The students were

provided with a visual schedule that included a picture for each expected activity (p. 301). Waters et al. (2009) studied transitions between preferred and non-preferred activities. To aide with transitions, the boys were provided with visual schedules. Food was used as an additional incentive to help curb behaviors such as throwing objects, pushing over furniture, kicking or hitting objects, or falling to the floor (p. 310). Depending on the behavior displayed when asked to transition, participants were either allowed to continue with the preferred activity for reinforcement or the non-preferred task was terminated to avoid reinforcing negative behaviors.

Both participants displayed high levels of problem behaviors noted in baseline data. Since students were familiar with visual schedules, introducing them had no impact on the negative behaviors. Extinction and differential reinforcement of other behaviors along with visual schedules and preferred food as a reward yielded a significant decrease in the students' undesirable behaviors. Waters et al. (2009) stated that further research should be conducted that analyzes the benefits of antecedent-based interventions such as a visual schedule combined with extinction to treat problem behaviors during transitional times.

When reviewing research on visual schedules, more research was found for young children with little research found for adults with autism. Tustin et al. (1995) analyzed the data from a 28-year-old autistic male who worked in a manufacturing plant; packing boxes. When he was prompted to change from one task to another without an advanced warning, he displayed stereotypical autism behaviors that included hand flapping and body rocking.

The workplace environment was set up so that the employee worked on a given task for 30-minutes. At the end of 30-minutes, the supervisor asked in a friendly tone if the employee

was ready to transition to the new task. The supervisor placed the new task in front of him, removed the current task, and walked away. With no advanced warning of the upcoming change, the stereotypical tantrums presented when the supervisor removed the work. Researchers wanted to know if adding an advanced warning, would decrease the negative behaviors. The supervisor gave advanced notice of the change by approaching the participant, setting the new materials near, asking the participant if he was ready to make a change, and waiting for two minutes. If the participant did not start the new task within two minutes, the supervisor approached again, removed the current task and walked away. The study took place over five different activity changes and each condition was present for five sessions (p. 91).

The results of this study showed that when the participant was given advanced notice of a change he independently began the new task within the 2-minute requirement 90% of the time. When the advanced warning was not present, the participant followed the change request 60% of the time (p. 92). Tustin et al. (1995), stated that providing the participant a choice of when he wanted to transition to the next task could have been critical to the success of the advanced notice that a change imminent. People with autism struggle with not finishing a task before transitioning onto a new task. The study could have further clarified whether the supervisor allowed participants an opportunity to finish the task before removing the task with an expectation to start a new task.

Video modeling (VM) is being tested and tried more often than in the past as teachers routinely utilize visual schedules for students with disabilities. McCoy et al. (2010) considered whether pairing video modeling with visual schedules would reduce the transition time between classes would provide increased instruction time.

McCoy et al. (2010) chose a special education teacher who had challenging time when her students transitioned from a general education class into the resource room. Students took an average of 10-minutes to settle into the new environment and begin their work. Even when they started their work, they demonstrated difficulties staying on task to complete the assignments. Six students took part in this study; four had a learning disability (LD), one had an emotional disability (ED), and one had another health impairment (OHI). Each student previously worked with a visual schedule. A typical visual used had a picture accompanied with words which explained a sequence of events that students were required to complete. Compared to same-aged non-disabled peers, the students with disabilities had a difficult time reading social cues and embedded transitions expectations which made it difficult for them to transition from one thing to the next in a timely manner (McCoy et al., 2010).

Video modeling (VM) is a technique used to display a desired outcome. In this study the teacher asked two 5th grade students to model the resource room teacher's transition expectations at the beginning of class. Students were shown the video on Mondays and Wednesdays and provided a cue card which illustrated the steps needed to begin their work. On Tuesday, Thursday, and Friday students were given only the cue card with the steps listed. The teacher implemented the VM technique paired with the cue cards with two students at a time. Two of the six students were exposed to the visual rotation for six weeks, two of the six students were exposed for four weeks, and two of the six students only two weeks. The study ended prematurely due to the absence of a consistent schedule because of pre-planned year-end activities.

The two students who demonstrated the biggest improvement with classroom transitions were the students who completed six weeks of interventions that included both the video modeling and the cue cards. The students who completed four weeks of interventions also improved from baseline data. The remaining students, who only had two weeks of interventions, did not improve from baseline when the VM was used. The study suggested that the students were not given enough time to assimilate the practice.

Giving visual cue cards to students with disabilities appeared to help with transitions that were easier for the non-disabled peers. The results of this study indicated that video modeling did not need to be presented daily but could be used as an additional technique to visually display expectations and appropriate preferred behavior.

Grenier, M., and Yeaton, P., (2011) completed a single case study using David, a third grader with autism, who struggled with transitioning into the general education physical education classroom. Students with autism struggle with verbal processing. When instructions are presented verbally, students tend to disengage.

David entered the general education class when the teacher prompted the students to begin warm-ups. If other students passed David while he was jogging or if he had to share equipment with classmates, he became frustrated and laid on the gym floor curled in a ball and cried.

Ms. Easton had been David's gym teacher for the last four years and had experience working with students with autism. She also had experience writing Social Stories for activities and delineating the orders of operation that occurred within her class. Due to the significant dysregulated behaviors David presented the gym teacher created two different Social Stories:

what to expect when he came to class; and it was ok for other students to pass him while he was jogging. Initially, when the stories were present to David a slight decrease in dysregulated behaviors was noted during gym class. Ms. Easton knew she needed to do more for David so she collaborated with his teacher and they designed a plan where the gym teacher attended class during morning meeting and gave a preview of what would be happening in gym class. Not only did this arrangement provide David with a preview of what to expect, it also allowed other students to mentally prepare for class. The PE teacher discovered that the extra five minutes during the regular education class morning meeting decreased the time during gym that students needed redirection or explanation of the daily lesson.

Once the new routine was established students, including David, previewed the information and expectations before heading to class. David arrived to class relaxed and ready to participate in all the activities. Not only did the new routine help David, but his peers were also more willing to help him because he was not on the floor curled up crying (Grenier, M., and Yeaton, P., 2011).

Watson, K., and DiCarlo, C., (2015) analyzed the use of picture activity schedules and their effect on classroom routines. Past studies have shown that routines displayed in a picture format reduced the students' levels of adult dependence. An established routine accompanied by a visual provides forewarning. The term 'picture schedule' is typically associated with special education students, especially to aid with transitions or when students with autism are dysregulated.

Watson, K., and DiCarlo, C., (2015) looked at a black male kindergarten student named Alexander who did not receive targeted special education services. The study was conducted

over five days. The classroom teacher was also the researcher for this study. Alexander struggled to follow multi-step directions during his daily routine. The study criteria indicated that the student must function within the expectations of a typical kindergarten class and struggle to follow multi-step directions. The study took place seven months into the school year. The daily routine had been taught from the beginning of the year and remained consistent throughout. Alexander continued to struggle following the typical expectations and classroom routines. What his peers completed in 2.5 minutes Alexander took five minutes to complete.

The three transitions areas observed were morning routine, mealtime routine, and afternoon dismissal. Data was collected over a three-week period, occurring once a day for each activity. Alexander was observed over a five-minute period that documented how many tasks he independently completed. After the five-minute observation period, the teacher recorded how many additional prompts Alexander needed to complete the task.

Following baseline data collection, a picture schedule intervention was put into place that consisted of three labeled picture activities for each routine laid out in a story strip format. When the intervention started data collection mirrored the baseline recording. The subject was observed for five-minutes and teacher prompts were tallied. When Alexander followed the picture activity story strip researchers noted a significant level of independence and reduced amount of teacher prompts during each activity. Mealtime was the most successful routine. The subject completed this routine independently (Watson, K., and DiCarlo, C., 2015).

Watson, K., and DiCarlo, C., (2015) stated that further research is needed to see if this type of layout would apply across all routines within typical school day.

Dettmer, R. et al. (2000) analyzed two different visual schedules for two boys diagnosed with an autism spectrum disorder (ASD). One schedule had three distinct parts and the other was a story strip visual. The younger boy, Josh, was seen in a school setting and struggled with transitioning from a preferred activity to a work task. The other student, Jeff, had difficulty with transitioning within a community setting. Both boys had minimal experience with visual schedules.

The experimental design approach used an A-B-A-B style to evaluate the effectiveness of the visual supports to determine the time spent transitioning and the level of adult prompting needed between activities. While the baseline data was collected, previously implemented interventions continued such as verbal prompts, physical prompts, and proximity control. A one-minute transition time was allowed between activities. If transition was not started within one-minute, a verbal prompt was provided. After another minute, the researcher gave a verbal prompt paired with a visual of the expected activity. If students did not transition within ten-minutes, the adult physically guided the participants to the desired activity (Dettmer, R. et al., 2000).

Jeff was estimated to be functioning at 32 months intellectually while his actual age was seven-years-old. Jeff struggled transitioning within his community and often displayed tantrums when he was asked to transition. Jeff struggled with expressive communication presenting with immediate echolalia (repeating things said to him). Two different schedules were created for Jeff. One was a car schedule and the other was a portable schedule. The car schedule was designed with pictures of Jeff's daily schedule, in order. The portable schedule was created with

a photo album using the same pictures. The theory behind the portable schedule was that it could be taken to various locations to show Jeff what would happen next.

Josh, a five-year-old by date of birth, functioned at a 4.2 year level. Speech was limited to three to five words sentences. He was observed within a classroom setting and struggled transitioning from a preferred task to a work task.

Dettmer, R. et al. (2000), studied the use of three different types of visual schedules: a visual schedule which consisted of a strip of pictures, a sub-schedule/finished box, and a Time Timer. Josh was given a notecard with a task to complete. When he was finished he put the card into the sub-schedule/finished box to show completion. Following work completion Josh was allowed choice-time for 10-minutes. He preferred computer time. A Time Timer was visually located within Josh's sight and set for 10-minutes. He was told that when the red color was gone his time was up and it was time to work again.

Baseline data was gathered and the interventions were started. The boys reverted to baseline work and then changed to interventions. In both situations the boys showed improvement with expectations with the interventions. When the interventions were removed and baseline observations re-occurred, both Jeff and Josh requested the schedules asking or pointing to the schedules they used during the intervention. Jeff, who displayed echolalia, was not speaking in full sentences. He demanded the picture book so he could see what was next and his level of public tantrums became non-existent. Even though Josh's speech was limited to a few words, he knew where his visual schedule was, located up high on a shelf. Josh led the adults by the hand and pointed towards the shelf where his schedule was located indicating that he wanted to use the visual schedule.

Dettmer, R. et al. (2000) suggested that continued research should assess the effectiveness of visual schedules across multiple settings, caregivers, children, and adults. It has been documented with a degree of certainty that using visual schedules with students and children with autism help reduce stereotypical behaviors when the uncertainty of what happens next is looming.

Mortada, A. M. A. J. (2017), analyzed the Picture Exchange Communication System (PECS) to consider the impact of increased communication vocabulary for students with autism. Struggles with communication, speaking, understanding, and responding appropriately are hallmark characteristics of autism spectrum disorders (ASD). Some people with ASD use echolalia, the immediate or delayed repetition of another's words or phases.

Mortada, A. M. A. J. (2017), studied whether using PECS increased the communication of 10 seven-year-old children. To participate in the study, children provided parental permission and evidence of an ASD diagnosis. The study was conducted over a period of 15 trials which took place two to five times per week.

The PECS program consists of six phases, learning to give a picture to a communication partner, distance and persistence, picture discrimination, sentence structure, responding, and commenting. Each phase builds on the earlier stage with the goal to increase communication from one-word to full sentences. Autistic individuals tend to respond better to visual cues than verbal communication.

When the pictorial system was used, the participants showed increased communication. When given the opportunity to use a visual picture to request what they wanted versus speaking, the participants began to construct full sentences using the PECS system. The

expressive language of the individuals grew more robust after using the PECS system (Mortada, A. M. A. J., 2017).

Hume, K., Plavnick, J., Odom, S. (2012) analyzed three first-grade students programmed in both resource and general education settings who required a significant amount of adult prompting to accurately complete a task. This study was designed to create work systems that visually supplied step-by-step instructions to complete specific tasks.

Multiple studies show that students with autism are likely to be in a special education classroom due to their lack of communication, social interaction with others, and the presence of repetitive behaviors. The goal of special education is to provide services in least restrictive environment (LRE) to promote time learning with same-aged non-disabled peers. Students with autism face challenges that restricts their participation in the least restrictive environment. Stereotypical behaviors include: difficulty following verbal directions, becoming overwhelmed due to sensory overload, and dysregulation. Providing visual models for the steps needed to complete tasks gives students opportunities to participate and complete work alongside with their non-disabled peers (Hume, K., Plavnick, J., Odom, S., 2012).

Individuals reliance on adult prompting to engage creates a significant level of prompt dependency which contributes to learned helplessness. Learned helplessness occurs when students become paralyzed at becoming independent. Students appear to lack understanding and appear passive. They rarely initiate or complete tasks (Hume, et al., 2012).

This study used organized work systems, individualized spaces where students completed tasks that included: visuals depicting four steps to follow: (the expected task to complete, information showing the length of the tasks, information that showed students when

the task was complete, and instructions for what to do next). The purpose of the individual work system was to visually outline a structured set of steps for students to follow to complete their work independently.

All three students practiced with visuals in the classroom throughout the year. The special education classrooms incorporated the visual pictures which helped the students navigate independently. Visual representations were not present when Casey, Matthew, and Seth participated in the general education classroom (Hume, et al., 2012).

Hume, et al. (2012), asked teachers to identify the most important IEP goal to address. The study created a work flow system that had a table for the student with the target activity placed to the left with a box for finished working to the right. Students were given a four-step process which outlined each step. When the task was completed and placed in the finished box, the participant was provided a visual cue for the next activity.

Students levels of independence for task completion more than doubled from the baseline data. When students transitioned into the maintenance phase, two of the three students continued to demonstrate increased independent task completion. Prior to the interventions all students needed adult prompting from 72%-92% of the time. Prompt dependence decreased to an average of 18% to 48% with the work systems (Hume, et al., 2012).

Hall, L., McClannahan, L. E., & Krantz, P. J., (1995) analyzed dependence on teacher's aides for students with disabilities. The research studied three students, Mike, Sam, and Larry along with three aides. The goal of the study was to introduce a picture schedule into the students routine to allow for decreased verbal or physical prompting from the adults who were

present each day. Each aide picked one area they identified as prompt dependent. The tasks varied from bathroom needs to completing work after morning meeting. Each aide agreed that they gave a significant number of student prompts during assigned tasks.

Prior to the study each aide watched a video about ways to work with students with disabilities followed by an hour-long meeting. They were asked to decrease the number of prompts (both physical and verbal) given to students while they were working. Students were given the same activities they had done in the past with the addition of a picture book that showed step-by-step directions.

During baseline collection each aide was observed giving verbal, physical, and gestural prompts. As the intervention phase was implemented, all aides decreased the number of prompts given. At the end of the study, two of the three students reached 90%-100% independent engagement while the third student who consistently showed 0% during baseline showed 75% independence during the intervention (Hall, L., et al., 1995).

Once the study was completed, each participating aide was surveyed about their overall opinion of the study. All aides agreed the introduction of photo sequences or picture prompt cues was the main reason that students demonstrated success with independently completing the assigned tasks.

The acronym TEACCH (Treatment and Education of Autistic and Communication related handicapped Children) is associated with students who have autism, as the science behind the method provides structured step-by-step direction for activities or schedules. Taylor, K., & Preece, D. (2010), used the same framework with students who had multiple disabilities and visual impairments. Reducing signs of severe dysregulation in the attempt to reach each

student in their own unique way to create school success with task completion led to this study. The lack of structure and predictability for these students caused dysregulated behaviors.

Three individuals in this study ranged from 13-17 years old, did not have an autism diagnosis but had visual and physical disabilities, and displayed behaviors with similar patterns as those with autism. The program provided the struggling students with predictable structure and routine and addressed sensory sensitives. The overall design of TEACCH was altered to meet the unique needs of the three students. One student had a visual impairment so the visual part of TEACCH was replaced with tactical objects to simulate the same outcome.

The data was favorable for using the TEACCH method with students who have disabilities other than autism. The end goal of the TEACCH method was not independent work completion but to follow a sequence of steps. Due to the students' unique disabilities independence was not an option. The TEACCH program has limitations as it is not universally designed for cross-categorial disabilities. Limitations of the TEACCH method included the amount of training needed for staff, the time it takes to create the schedules, and the space required to provide the work.

Hume, K. & Odom, S., (2007) examined the effectiveness of individual work systems for three individuals with autism who demonstrated lack of task completion and independence. The students relied on significant levels of adult prompting which gravely affected their independent functioning both in and out of the classroom. To increase independence, work systems were created that provided step-by-step guidance for task completion and engagement.

Two elementary-aged students participated in the study. The task was observed during students' free choice time. The third participant was a 20-year-old male who was part of a transition program and had a job with a local library. The study required participants to have an autism diagnosis, demonstrate difficulty in completing tasks independently, and familiarity with visual schedules.

Mark's job was to scan library books and pages. He relied heavily on adult prompting to stay on-task to compete the work. Mark was a non-verbal individual who used a Dynavox to communicate.

An A-B-A-B design tracked the results of the study. Baseline information was gathered with no changes to either the work schedule or the classroom schedule, and no changes in level of adult prompting. Intervention included the individual work system consisting of four separate parts; the task, the amount of work to be completed, a sign that the work was completed, and directions for the next task (Hume, K. & Odom, S., 2007).

Three individuals showed significant improvements all with task completion, and a significant decrease in need for adult prompting with the intervention. All three participants reverted back to the original baseline data when the intervention of the work systems was removed. When the interventions were reintroduced for the second interaction all three subjects increased work levels greater than the initial trial. After a month of implementing the interventions Mark no longer required adult supervision to complete his work (Hume, K. & Odom, S., 2007).

Considering the future research for work systems to increase independent work completion, studies should include larger sample sizes and incorporate a variety of competencies such as: self-care, academics, job, and leisure skills.

Bryan, L. C. & Gast, D. L., (2000) analyzed whether a picture-activity schedule increased engaged on-task and on-schedule behaviors. The four participants in this study had a diagnosis of autism and functioned at grade level or one level below. The four students were selected due to the need for extra adult support to stay on task and follow the same schedule as their classmates.

The study took place during the 45-minute language arts time block. A single picture of the expected activity was placed at the top of the student's table before class. Data was collected five days per week within the 45-minute class period. Observations occurred during an A-B-A-B withdrawal design. The difference compared to other studies was that no verbal prompting was allowed if a task was not initiated within a 10 second period. Adults provided a physical prompt: tap on the shoulder to reinforce no verbal interactions. Students were expected to complete an activity from start to finish including putting their supplies away before they transitioned to the next activity. If a student finished the work prior to the end of the 45-minute observation, they were given a "finished work" activity until the class period was over (Bryan, L. C. & Gast, D. L., 2000).

Baseline data showed that students correctly completed tasks from 3.25% to 21% of the time. Intervention data with the picture activity book for all four students showed 90% to 100% on-task, on-schedule behavior. When the picture book was removed, all the students reverted to near baseline data. When schedules were reintroduced all students significantly increased to

previous or higher levels than the initial picture book intervention. Two students independently prompted a classmate who was off task to follow the picture schedule. The student responded, “oh yeah.”

Students showed large gains in completing on-task, on-schedule behaviors when verbal communication about schedule expectations was removed and replaced with visual representations.

Mechling, L. C., & Gast, D. L. (1997), analyzed the use of a self-operated, combination audio and picture prompting system. The system measured whether individuals with disabilities completed tasks without the presence of an adult. During the study, researchers evaluated four areas: sorting groceries, making a peanut butter and jelly sandwich, loading the dishwasher, and making microwave popcorn.

A Digivox was used to provide audio and visual prompts. A Digivox is speech generating device that includes pictures lined in rows. It is constructed using right sequencing with the sequence beginning in the upper left-hand corner. The student finds the visual pushes the picture with a pre-recorded audio instruction and completes the step.

Four students (two males and two females) took part in this study. All four individuals had Down-syndrome, and demonstrated difficulty completing tasks independently, and had a need for daily living and vocation skills development. Prior to this study, none of the four students had prior experience using a self-prompting device. Each student received training on how to use the device from the Director of Education. The study format used an A-B-A-B withdrawal setup. Baseline data consisted of the teacher giving a verbal prompt to begin work and complete the task. None of participants were successful with only the verbal prompt.

During baseline data collection, all four-students completed 0-2 steps out of 12. When the prompt device was placed, each student followed the picture sequence, pushed for the verbal prompt, and followed the directions. Students immediately showed gains in correct task completion when the device was present. Data showed that when the device was removed students performed back at baseline levels; all returned to 90%-100% accuracy when the Digivox was presented again.

Zimmerman, K. N., Ledford, J. R., & Barton, E. E., (2017) analyzed the use of visual activity schedule for students who had challenging behaviors such as screaming, throwing of objects, elopement, biting, and work refusal. Three preschool students chosen by their teacher met the requirements for: challenging behaviors that interfered with classroom tasks, low levels of engagement, consistent school attendance, and could match 2-D pictures. Students not diagnosed with autism were selected for this study.

The study was conducted in a preschool setting where observations took place over a 10-minute period during morning free-play centers. The three students had not had prior exposure to visual schedules. The study outline was an A-B-A-B withdrawal design. The targeted students were not isolated from other classmates during data collection. During the baseline data collection, morning free play continued as normal with typical interaction between teachers and students. If an observer was asked to play, they responded, “I am working for the teacher.” No verbal or physical prompts were given to any of the students (during morning free play started). Baseline data was collected with no visual activity schedule present. All three students displayed little to no engagement in the activity and showed significant levels of challenging behavior. When the visual schedules were used, immediate changes in engagement

and the absence of challenging behaviors occurred for all three students. The visual schedules consisted of four pictures attached with Velcro to laminated card stock. When the visual schedule was removed all three subjects returned almost to baseline data. Students quickly improved skills once the schedule was returned (Zimmerman, K. M., et al., 2017).

Future research should consider the presence of providing a preferred activity after the non-preferred task is complete. Would students be more willing to engage in an activity if there was a preferred choice next or was the success in completing a non-preferred task due to the presence of a visual schedule (Zimmerman, K. M., et al., 2017)?

Duttlinger, C., et al. (2013), analyzed whether using picture-based supports improved completion of multi-step directions. Four 11-15 years-old students took part in the study. Each student had a cognitive level in the mild-moderate range and had the ability to complete tasks without adult supervision. All four students had experience using picture schedules to follow the daily schedule.

The teacher created a picture schedule that included five to eight pictures on the left side of a laminated sheet under the title *tasks* with a row of Velcro dots on the right side labeled *to-do*. The images used to create the picture schedule were gathered from the Boardmaker program. The student tasks fell in the categories of hygiene, independent living skills, and general tasks within a classroom. The layout of the study was an A-B-A-B withdrawal design. All four students showed low percentages of correct responses when the picture activity schedule was not present. With the picture activity schedule intervention, the percentage of correct responses increased to 65%-96.25% accuracy. It was noted the students demonstrated changes when the picture activity schedule was present. It is also worth

mentioning that not only did the students show increased accuracy of the tasks but also accuracy in the order of task completion (Duttlinger, C., et al., 2013).

The use of a picture schedules clearly shows a significant increases in work completion with students who struggle to follow multi-step instruction; with a bonus of completing the steps in the correct order. Taking these schedules to another level and including them in vocational, community, and home settings could be further researched (Duttlinger, C., et al., 2013).

CHAPTER III: APPLICATION OF THE RESEARCH

Ever since I can remember, I always wanted to be an elementary school teacher. One reason was because I wanted to decorate my classroom with cute things. Life took me down a different path and immediately out of college I worked in the insurance industry. When I received a life changing diagnosis, I reevaluated what I wanted to do with my life, and I became a special education teacher working with students who have autism.

In the few short years, I have been a teacher I have watched my students struggle within the classroom. Students exhibit various levels of anxiety due to being unprepared for changes in routine and not knowing what is expected of them within the classroom, and even what is next on their schedule. Students' anxiety levels can make the difference between having a great day or having a day with severe levels of dysregulation and difficulties.

Many of my students attend general education classes with their same-aged non-disabled peers but find themselves struggling to keep up or rely heavily on the adult support in the classroom. The ultimate goal for the students is to navigate independently, reducing the amount of dependence on others. However, this task seems almost impossible at times due to the different environments students encounter. With the overwhelming pressure teachers face related to meeting state and school guidelines, the need to verbally expel information to students is just too much for them to handle. The stress is felt cross-categorical, across all classrooms and students. Many students in our classroom process information visually, while auditory information is lost. If teachers only present information verbally, students who learn visually are left behind. Teachers are overwhelmed with making modifications and adaptations. What if this *just one more thing* could make life easier, would teachers be willing to do it?

This school year presented itself with a lot of challenges due to the worldwide pandemic from COVID-19 which resulted in students at home in distance learning using virtual interaction via online platforms. The pandemic provided an opportunity to apply the knowledge and research about using visual schedules not only for students in special education but for students within the general education population as well.

All students struggled with the change from attending school five days a week in a classroom with their teachers to learning virtually or in hybrid learning. Independent learning at home and understanding and following new expectations was challenging. I believe many teachers thrown into this situation suddenly had an overwhelming feeling that they needed to disseminate as much information as possible with limited resources and capabilities. Upon reflection, teachers learned that the most important thing students wanted to know was: What do I have to do and where can I find it?

I used knowledge from working with my students on a daily basis and presented to the entire staff strategies about how we can better reach not only students within the special education program, but general education students as well. It was clear that level of stress and confusion students were experiencing was making it nearly impossible for them to complete assignments. Suddenly, we saw A students become F students; teachers felt the need to teach all information as quickly as possible. Following my presentation, staff adapted the motto, “less is more.” This new presentation model not only benefitted learning in a pandemic but served as a paradigm shift in how we present information to students. I provided real-life examples to clarify my points. I asked them, What happens when you receive an email that is paragraphs

long? What is the first thing you normally do? You open it to see how long it is and instantly become overwhelmed with how much information there is to process.

When creating visual schedules, it is important to consider how the schedule is presented. What are you trying to say? What can be condensed in your presentation to fewer words? Removing the extra wording helps reduce being overwhelmed about reading everything at once. Most people primarily want to know: what do I have to do and where/how do I do it?

The words visual schedule are synonymously associated with special education. However, considering every aspects of our lives, we rely on visual schedules on a daily basis. Our phones, desk or digital calendars, text messages, and email, are all examples of daily visual schedules. Figure 1 shows an example of a visual schedule that I use in my classroom. It is a layout for my students of the tasks they are to complete for class. This example schedule relies on students reading words. If I had a student who struggled with reading, I would add pictures into the schedule. Can you think of something that this generation of students sees daily? Something that has to do with digital electronics. Icons, and emoji's! If the Facebook icon was flashed in front of our faces most people would instantly register it as Facebook. In the Snapchat icon was shown to us or our students, they would instantly associate that icon with Snapchat. Remember, you do not always need words when creating a

Wednesday, October 28th **Assignments**

No due date	3	2
1. Watch CNN10	Turned	Assigned
2. Complete CNN10 form	in	
3. Budgeting for Savings		
4. Practice writing your address		
5. Counting bills		
6. Grocery Shopping		
7. Reading Recipes		

Figure 1

Educational Toolbox

Apps	Resources	Codes
	Zoom link	Password:
	Blstudent resources	School email password
	Online textbook	School email login info
	Edpuzzle	Click on your hour
	commonlit	Click on class code
	essaypop	9th grade: 10th grade:
		Join code:

Figure 2

visual schedule. You can reduce the level of structural stress placed on students by inserting pictures and removing words.

Figure 2 is an example of a visual schedule that includes both pictures and words. This schedule is called the education toolbox. This was a one-stop for students to access their teachers digital class board. All the links they needed for each specific class are in one place. We found when students had to click on multiple links, sometimes several weeks back, to find Zoom and classroom links they spent more time trying to find what they needed rather that working on what was important. In educational terms this is called structrual stress.

Sometimes students see or hear what teachers say such that their brains are filled with so much information they struggle to decipher what is important that needs to be done. As teachers, we want to alleviate the stress we put on students and guide them through the weeds to be as successful as they can. We do not want them to see scrambed information. We want them to see it clearly and to understand.

I continued to explain to our staff that their teaching was not wrong, but there was another way to look at the information they provided. Remembering again, “less is more.” One of the biggest questions I asked the staff was, “Are you sick of getting emails or students raising

their hands to ask where to find the information they are supposed to be reading?" As adults with busy schedules the last thing, we want to do is spend the extra time reading information. Adults prefer information presented in a concise, organized manner. Students do, too.

Figure 3 is a typical example of a visual schedule. Created for students using Otus. Daily required assignments are listed in one written paragraph. This was the very first thing they would see! Students were instantly overwhelmed with the information presented in Figure 3 and in trying to determine where to begin. We organized and condensed the information so the first thing they saw was *click on the attachment*.

Tuesday 10/27 Time to make this Tuesday grrrrreat!!!! If you are distance learning (Group b), you will be required to ZOOM into class during normal hour. CLICK HERE to join our Zoom session. Be ON TIME to our Zoom class (1:26). NO ZOOM = NO ATTENDANCE. **Agenda for today:** 15 mins indep. reading.
VS
Tuesday 10/27 Oct. 2&: Click on Attachment 10/28/2020 12:54 PM 1

Figure 3

See Figure 4. This layout provided a weekly "to the point" expectation of tasks to be accomplished. Teachers can add interactive links for students to join Zoom meetings in one click versus searching through previous materials to find the links. Another benefit of this visual schedule is that students can print the weekly plan and check the boxes to track completed assignments. This layout not only provided visual expectaions, but a

DATE CLASS NAME	
Date	Topic & To-Do's
Mon: 10/26	❑ Zoom at 1:26 pm ❑ 15 mins independent reading ❑
Tues: 10/27	❑ Zoom at 1:26 pm ❑ 15 mins independent reading ❑ Review participle phrases
Wed: 10/28	❑ ❑ ❑
Thurs: 10/29	❑ ❑ ❑
Fri: 10/30	❑ ❑ ❑

Figure 4

visual of the work they already completed and work they still needed to complete.

The overwhelming response I received from staff was positive and encouraging. I was able to collaborate with the teachers in the school to help them build visual schedules for their classrooms. Most of the teachers never even considered the students' perspective. I explained that teachers can use this schedule example as a template to make their own. What might work for one may not work for another.

By taking a few extra seconds to write class expectations on the board, or noting the schedule or plan, teachers help increase student independence. In classroom settings schedules help students navigate a day without having to ask, what comes next?

CHAPTER IV: DISCUSSION AND CONCLUSION

Discussion

Implementing visual schedules and work systems that outline a predictable pattern for student on the autism spectrum are easy to create teaching modifications. The student accommodations can be implemented in the mainstream classroom to address student anxiety and off-task behaviors. MacDonald et al. (2018) determined that additional research is needed in to develop effective tools that inform and instruct mainstream classroom teachers about strategies that increase on-task behaviors (p. 264).

Recognizing each student's learning strengths and challenges, Cihak, D., (2010) discovered that some students learn better with video modeling while other students learned better with the static-picture schedules. Making sure to address individual students levels of understanding is important. Cihak discovered that students who struggled with distractions performed better from video modeling examples versus the static picture schedule. The video modeling eliminated manipulating small pictures from the task to the finished column, which reduced the number of steps that must occur to complete a task.

Though visual schedules may be the missing link for student success in transitioning from one activity to the next, visual schedules need to be consistently monitored. If a student is showing great progress with the schedule, the teacher should recognize it is a good fit for the student. If after the visual schedule is presented and there is not much of a change, the schedule may need to be adapted to better fit the needs of the student. Some things to consider if students do not improve with a schedule are: what was the student engaged in before the requested transition? Circumstances of what is happening before, or the task the

student is working on could play a significant role to determine if the visual schedule is effective. (Hume, K., et. al., 2014).

Pierce, J., et. al. (2013) looked at the behaviors of students with moderate autism and how they transitioned from one activity to the next using a visual activity schedule. The visual activity schedule increased independent transitions for students from one activity to the next.

Schneider, N., and Goldstein, H., (2010), determined that classroom behavior could improve for students by adding a Social Story about the expectations. A Social Story may incorporate pictures, words, or both to help students understand the expected behavior.

Waters et. al., (2009) noticed a significant reduction in unwanted behaviors during transitions after implementing visual schedules. Providing students a schedule of expectations or upcoming events reduces anxiety and allows for more seamless transition from one activity to the next.

One way to increase production and productivity is to give students advanced notice of work that needs to be completed and show what comes next. Some autistic students have difficulty moving to a new task if the first is incomplete. Tustin, R., (1995), found that allowing the task to be finished by giving an advanced warning prevented the breakdown of the current task from being completed and not starting the following task.

McCoy et. al. (2010) conducted a study using video modeling to display appropriate behavior by modeling the expectation of how to enter a classroom and initiate a task. The use of video modeling proved successful for students who struggled with Gestalt thinking. Students could watch the video and refer to the schedule of expected steps. The process resulted in

quicker transitions along with quicker task initiation which resulted in increased work completion compared to prior data.

Grenier, M., and Yeaton, P., (2011) described that students in classrooms today are not the same students teachers had years ago. Teachers need to capitalize on available technology which gives the students access to resources that best meet their needs. They studied a student who struggled with transitioning to gym from class. Researchers realized that incorporating an additional step, giving a preview of what happens next, alleviated students' observable anxiety. A few extra minutes in the morning supplied many minutes of success for the student in the classroom.

Students diagnosed with autism may have a difficult time following multiple-step instruction. Student's reliance on adult support reduces their overall instruction time. Alexander, showed improvement in task completion after only to introductions to the picture activity schedule.

Having a student complete tasks without adult support is important. Teachers must analyze each transition scene and determine individual steps. When Dettmer, R. et. al. (2000) introduced a visual schedule, one student progressed from needed physical assistance to transition to a new activity to independently transitioning using a visual schedule. Replacing verbal prompting with visuals proved to be a successful intervention.

Social communication challenges are is a hallmark characteristic of autism. Mortada, A. M. A. J. (2017), analyzed the effectiveness of introducing the Picture Exchange Communicate System (PECS) a communication intervention. Students who used PECS improved

communication from a level of using a limited number of words to communication in full sentences using a visual communication system.

Adult prompt dependency is an issue found with disabled students including those with autism. Hume, K., Plavnick, J., Odom, S. (2012), provided a group of students with four distinct steps of how to complete a task. The intervention decreased the level of adult dependence and learned helplessness that students developed. Providing students a visual illustrating the four steps of instruction, decreased the level of adult prompting which increased students' independence.

Treatment and Education of Autistic and Communication related handicapped Children (TEACCH) is a successful intervention for students with autism. TEACCH is a structured method that incorporates visuals for students. The process includes individual work stations, visual schedules, and timelines of what to do when a task is finished. Teachers need to consider a students' level of physical impairment and fine motor skills before introducing students to the TEACCH method. Students are required to move Velcro pieces from one spot to another. TEACCH has proven successful with autistic students but would be somewhat challenging to incorporate into a general education classroom due to the time commitment for the teacher and the training of the staff to ensure correct execution.

Limitations

Most classroom teachers and students face challenges on a daily basis. Mainstream classrooms pose challenges with demanding high levels of control. In the MacDonald et. al. (2018) study, time constraints were problematic which ultimately affected the number of baseline observations obtained. Sam, the third-grade student, joined the study later than other

participants. Lastly, overall classroom distractions such as noise, interruptions, schedule changes, and unpredictable student behavior were noted (p. 264).

The limitation within the Cihak, D. (2010), study was the carryover from one phase of the intervention to the next. Incorporating two different methods simultaneously, video modeling and static picture schedule, made it difficult to determine the effectiveness of one intervention over the other. To gain a clear understanding of which options was more successful researchers should have implemented a third phase of the study measuring one method at a time. The results would provide a clear understanding of efficacy.

When developing a visual schedule for students, the goal is to increase independence. Hume, K., et. al. (2014) discussed student limitations and challenge to develop the correct schedule format for each student. It is important to be aware there is a difference between visual and auditory schedules and the manner of implementing and monitoring the success of each schedule. The primary goal is to develop a tool that can generalize to settings outside of school giving students access to new environments and experiences.

Pierce, J., et. al. (2013) noted limitations within their study. They felt that research should have been expanded to gather more baseline information such as standardized test scores, language levels, and the opportunity to re-evaluate the interventions given to the students. Having a baseline understanding of intellectual levels would give some guidance to how basic or elaborate the visual schedules should be. Since some students could read and some did not, having baseline data for reading levels could be crucial to the success of the study related to using a picture visual schedule versus written visual schedule.

Schneider, N., and Goldstein, H., (2010), understood that the data gathered in their study implementing Social Stories and visual schedules was limited because they used students who were blind. Monitoring teacher behavior when presenting the material to the students could have impacted results as their students could have affected the study outcomes. Student behavior could have been swayed by the observations of others within the room.

Some limitations of Waters et. al. (2009), study were the absence of separating location and activity during the assessment. No data was collected on the accuracy of using the visual schedules. Lacking this additional information may have skewed the results dramatically.

Tustin, R. (1995), stated more research should be conducted on why giving students notice reduced behaviors and increased task completion.

A limitation in the study McCoy, et. al. (2010) faced was the teacher had small sample size of only six students within the study; each group of students worked in two-week increments. By the time, the third set of students participated in the interventions, they only received two weeks of the interventions versus the first group who had six weeks. The last group did not see as much of a positive impact from video modeling as the two other groups, likely due to the limited intervention time.

Students with autism struggle with understanding or predicting what is next, what is expected, and what to do. Watson, K., and DiCarlo, C., (2015) studied how students complete implementing a picture activity schedule for each of the students. A limitation that affected the overall results was the amount of time it took a student to transitions from one activity to the next. The time piece of the study was not documented or the duration of each step. As

teachers, we can provide interventions frequently as deemed necessary but if there is no documentation, how do we know if it is an effective strategy?

Mortada, A. M. A. J. (2017), faced limitations as the study sample was small and lacked data which should have been collected during the generalization phase. Without information, the study lacked in robustness of its findings.

Analyzing the effectiveness of a visual schedule versus verbal prompting by an adult is important. Hume, K., Plavnick, J., Odom, S. (2012), faced several limitations with the study. There were no guidelines for the frequency and type of adult prompting that was present and once the interventions were in place, the prompting continued the same during baseline. Researchers should have considered whether adult or less adult prompting with the interventions. Students were not used to the tools they were given. Was that the reason for interactions from adults?

The TEACCH method was limited by design to students with autism. Expanding the method to reach more students with disabilities could be beneficial, with some simple tweaks to the program.

Upon review of all the articles about visual schedules, it was determined that the implementation of visual schedules into the daily routines of students with Autism is a necessary component in order for students to reach higher levels of personal independence. The term visual schedule is a broad term that allows the flexibility to create something that works for students. The evidence further supports the statement that visual schedules are an intricate, effective, and integral component that can be easily incorporated into a daily teaching routine.

References

Autism Speaks (April 10, 2021). *What is Autism.* Retrieved from URL: https://www.autismspeaks.org/what-autism

Bryan, L. C., & Gast, D. L. (2000). Teaching on-task and on-schedule behaviors to high-functioning children with autism via picture activity schedules. *Journal of autism and developmental disorders*, *30*(6), 553-567. Retrieved from https://web-a-ebscohost-com.ezproxy.bethel.edu/ehost/pdfviewer/pdfviewer?vid=6&sid=5bafd525-a414-4785-9106-92254ce64177%40sessionmgr4008

Cihak, D. F. (2011). Comparing pictorial and video modeling activity schedules during transitions for students with autism spectrum disorders. *Research in Autism Spectrum Disorders*, *5*(1), 433-441. http://dx.doi.org.ezproxy.bethel.edu/10.1016/j.rasd.2010.06.006

Dettmer, S., Simpson, R. L., Myles, B. S., & Ganz, J. B. (2000). The use of visual supports to facilitate transitions of students with autism. *Focus on autism and other developmental disabilities*, *15*(3), 163-169. Retrieved from https://journalssagepubcom.ezproxy.bethel.edu/doi/abs/10.1177/108835760001500307

Duttinger, C., Ayres, K. M., Bevill-Davis, A., & Douglas, K. H. (2013). The effects of a picture activity schedule for students with intellectual disability to complete a sequence of tasks following verbal directions. *Focus on Autism and Other Developmental Disabilities*, 28(1), 32-43. http://dx.doi.org.ezproxy.bethel.edu/10.1177/1088357612460572

Grenier, M., & Yeaton, P. (2011). Previewing: A successful strategy for students with autism. *Journal of Physical Education, Recreation & Dance*, 82(1), 28-43. Retrieved from http://www.aahperd.org/publications/journals/joperd/a_successful_strategy_for_students_with_autism.cfm

Hall, L. J., McClannahan, L. E., & Krantz, P. J. (1995). Promoting independence in integrated classrooms by teaching aides to use activity schedules and decreased prompts. *Education and Training in Mental Retardation and Developmental Disabilities,* 208-217. Retrieved from https://www-jstor-org.ezproxy.bethel.edu/stable/23889172?seq=1#metadata_info_tab_contents

Hume, K., & Odom, S. (2007). Effects of an individual work system on the independent functioning of students with autism. *Journal of autism and developmental disorders,* 37(6), 1166-1180. http://dx.doi.org.ezproxy.bethel.edu/10.1007/s10803-006-0260-5

Hume, K., Plavnick, J., & Odom, S. L. (2012). Promoting task accuracy and independence in students with autism across educational setting through the use of individual work systems. *Journal of autism and developmental disorders,* 42(10), 2084-2099. http://dx.doi.org.ezproxy.bethel.edu/10.1007/s10803-012-1457-4

Hume, K., Sreckovic, M., Snyder, K., & Carnahan, C. R. (2014). Smooth transitions: Helping students with autism spectrum disorder navigate the school day. *Teaching Exceptional Children,* 47(1), 35-45. http://dx.doi.org.ezproxy.bethel.edu/10.1177/0040059914542794

Kennedy Krieger Institute (2020). Myths & Facts about Autism Spectrum Disorder. Retrieved from URL: https://www.kennedykrieger.org/stories/myths-facts-about-autism-spectrum-disorder

Macdonald, L., Trembath, D., Ashburner, J., Costley, D., & Keen, D. (2018). The use of visual schedules and work systems to increase the on-task behaviour of students on the autism spectrum in mainstream classrooms. *Journal of Research in Special Education Needs,* 18(4), 254-266. http://dx.doi.org.ezproxy.bethel.edu/10.1111/1471-3802.12409

McCoy, K. M., Mathur, S. R., & Czoka, A. (2010). Guidelines for creating a transition routine: Changing from one room to another. *Beyond Behavior,* 19(3), 22-30. Retrieved from https://web-a-ebscohost-com.ezproxy.bethel.edu/ehost/pdfviewer/pdfviewer?vid=28&sid=5bafd525-a414-4785-9106-92254ce64177%40sessionmgr4008

Mechling, L. C., & Gast, D. L. (1997). Combination audio/visual self-prompting system for teaching chained tasks to students with intellectual disabilities. *Education and Training in Mental Retardation and Developmental Disabilities*, 138-153. Retrieved from https://www-jstor-org.ezproxy.bethel.edu/stable/23879033?seq=1#metadata_info_tab_contents

Moore, C. (2008). Thoughts about the autism label: A parental view. *Journal of Philosophy of Education*, 42(3-4), 493-498. http://dx.doi.org.ezproxy.bethel.edu/10.1111/j.1467-9752.2008.00652.x

Mortada, A. M. A. J. (2017). The Effect of Peer-Mediated Picture Exchange Communication System Intervention in Improving Vocabulary Knowledge in Children with Autism

Spectrum Disorders. *Psycho-Educational Research Reviews,* 23-29. Retrieved from https://files.eric.ed.gov/fulltext/EJ1254854.pdf

Pierce, J. M., Spriggs, A. D., Gast, D. L. & Luscre, D. (2013). Effects of visual activity schedules on independent classroom transitions for students with autism. *International Journal of Disability, Development and Education*, 60(3), 253-269. http://dx.doi.org/10.1080/1034912X.2013.812191

Regan, T. (July 10, 2019). *4 Autism Myths – Dispelled*. Retrieved from URL https://www.additudemag.com/autism-myths-dispelled/

Schneider, N., & Goldstein, H. (2010). Using social stories and visual schedules to improve socially appropriate behaviors in children with autism. *Journal of positive behavior interventions*, 12(3), 149-160. http://dx.doi.org.ezproxy.bethel.edu/10.1177/1098300709334198

Taylor, K., & Preece, D. (2010). Using aspects of the TEACCH structured teaching approach with students with multiple disabilities and visual impairment: Reflections on practice. *British Journal of Visual Impairment,* 28(3), 244-259. http://dx.doi.org.ezproxy.bethel.edu/10.1177/0264619610374682

Tustin, R. D. (1995). The effects of advance notice of activity transitions on stereotypic behavior. *Journal of Applied Behavior Analysis*. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1279793/

Waters, M. B., Lerman, D. C., & Hovanetz, A. N. (2009). Separate and combined effects of visual schedules and extinction plus differential reinforcement on problem behavior

occasioned by transitions. *Journal of Applied Behavior Analysis*, 42(2), 309-313. Retrieved from https://files.eric.ed.gov/fulltext/EJ853176.pdf

Watson, K. J., & DiCarlo, C. F. (2016). Increasing completion of classroom routines through the use of picture activity schedules. *Early Childhood Education Journal*, 44(2), 89-96. http://dx.doi.org.ezproxy.bethel.edu/10.1007/s10643-015-0697-2

Zimmerman, K. N., Ledford, J. R., & Barton, E. E. (2017). Using visual activity schedules for young children with challenging behavior. *Journal of Early Intervention,* 39(4), 339-358. http://dx.doi.org.ezproxy.bethel.edu/10.1177/1053815117725693