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VISUAL SUPPORTS AND AUTISM

A MASTER'S THESIS
SUBMITTED TO THE FACULTY
OF BETHEL UNIVERSITY

BY
DONNA MACOSKEY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF ARTS IN SPECIAL EDUCATION
AUGUST 2023

BETHEL UNIVERSITY

VISUAL SUPPORTS AND AUTISM

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AUGUST 2023

APPROVED

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Acknowledgments

Completing this intense thesis would not have been possible without the love and support of my husband (Jason) and children (Ashlyn & Colby). Thank you for your understanding and support through this process. Time away from family and their special moments was difficult but it was something I needed to do in order to support our family and grow in my career. Thank you so much to my advisor at Bethel University. Without Susan's support and thorough responses, I don't know that I would have been able to complete this thesis. I love you all for having patience and understanding during such an intense time in my college career.

Abstract

Autism Spectrum Disorder (ASD) is a complex developmental condition that involves persistent challenges in social interaction, speech and nonverbal communication, and restricted/repetitive behaviors. Children on the Autism Spectrum thrive on routine, visuals, and calm learning environments. Visual supports are effective tools for students who need additional support to understand and communicate. Visual supports are easily accessible, adapted to skill level, and tailored to specific interests and activities. In this literature review with application, I will explore different types of visual supports and describe situations in which visual supports are used effectively. I will go in-depth about the different types of visual supports, why visual supports are important, and when to use visual supports successfully with students.

Table of Contents

Title Pages	1
Acknowledgments	3
Abstract	4
Table of Contents	5
Chapter 1: Introduction	6
Definition of ASD	6
Definition and Examples of Visual Supports	7
Chapter 2: Literature Review	13
Literature Search Procedures	13
Visual Supports to Assist Communication	14
Visual Supports to Assist Daily Functioning	20
Visual Supports to Assist Social-Emotional Functioning	30
Visual Supports to Assist Student Learning	37
Chapter 3: Application of the Research	45
Chapter 4: Discussion and Conclusion	51
Summary	51
Professional Application	53
Limitations of the Research	54
Implications for Further Research	55
Conclusion	57
Appendix	58
References	67

CHAPTER I: Introduction

Communicating with someone who does not understand can be difficult. Utilizing visual support can help convey the message and clarify the topic or information one is trying to communicate. Visuals, such as images, pictures, drawings, or hand signals can be useful tools to help communicate with someone who cannot communicate verbally for whatever reason. Utilizing visual support when communicating with an individual who has an Autism Spectrum Disorder (ASD) has been used with positive outcomes. In this literature review with application, I will explore different types of visual supports and describe situations that visual supports are used most successfully.

The American Psychiatric Association (2021, June 1) defines ASD as follows, “Autism Spectrum Disorder (ASD) is a complex developmental condition that involves persistent challenges in social interaction, speech and nonverbal communication, and restricted/repetitive behaviors. The effects of ASD and the severity of symptoms are different in each person.”

In 2020, the Center for Disease Control (CDC) reported that approximately 1 in 54 children in the U.S. was diagnosed with ASD, according to 2016 data. When this number was analyzed by gender it is 1 in 34 boys and 1 in 144 girls. The Minnesota-Autism and Developmental Disabilities Monitoring Network (MN-ADDM) is part of the Autism and Developmental Disabilities Monitoring (ADDM) Network, a group of programs funded through the Centers for Disease Control and Prevention (CDC), which estimates the number of children with ASD and other developmental disabilities living in different areas of the United States. MN-ADDM monitors the prevalence of ASD and intellectual disability (ID) in parts of Hennepin and Ramsey counties. Using data from 2016, MN-ADDM researchers found 1 in 44 (2.3%) 8-year-old children were identified with ASD. This is higher than the national average of

8-year-old children identified with ASD (1 in 54 or 1.9%) in the United States. Schools need to implement successful communication systems to ensure that learning is equitable for students. Visual supports help multiple students across all categories and should be considered for use in every classroom.

Visual supports are an important tool for individuals who may need additional support to understand and to communicate. Visual supports can be used in most situations and easily adapted to individual needs and are easily accessible and tailored to specific interests or situations. Visual supports can be modified in size, subject, and quality. Visual support can be photographs, drawings, objects, written words, lists, hand signals, or used on an electronic device.

I became interested in the use of visual supports a few years ago and my interest has only grown. Originally I was interested in understanding the use of visuals versus sign language and exploring the different benefits of each for students with ASD, I have observed many types of visual support throughout my time as an educator. Seeing student reactions and recognizing the level of understanding that some students had in response to a visual symbol versus a real-life photograph, I wanted to explore whether the quality of the visuals mattered. Through my years of substitute teaching and teaching in different settings, I experienced the use of many types of visuals. It was interesting to observe many situations where visuals were used with students. All the benefits, types, and uses of visuals interested me. There were times that I could feel the fear and anxiety in students with ASD as they encountered situations or objects they did not expect. Providing visual instructions or a visual schedule in addition to verbal language helped the students understand where they were going or what was expected next, This piqued my interest

in learning more about visual tools, the different types of visuals, the different situations for their use, and what benefits using visuals has for students with ASD.

Research has shown that visual supports work well to communicate with individuals who have trouble communicating. According to Breitfelder (2008), by placing visual supports in an early childhood classroom setting as part of the instructional program, students who have difficulty with verbal language benefit from eased transitions, feelings of empowerment by having visual choices, clearly defined expectations through the use of pictures, longer attention span, reduced anxiety, concepts become more concrete, and the ability to help express his or her thoughts. There has been ample research to show the positive effects of using visual supports to aid behavior management. Using visuals to communicate has helped students reduce negative behaviors as a way to communicate or express themselves. Visual supports provide structure and routine, encourage independence, build confidence, improve understanding, and provide opportunities to interact with others, which helps reduce frustration and anxiety.

Many types of visual support can be created including visual schedules with or without words, pictures, or symbols that can provide an individual schedule. Visual schedules help individuals understand expectations and prepare for changes. It helps independence, transitions, or reduces anxiety. A student can look at their visual schedule and independently see what will be coming next, helping to reduce anxiety about an unexpected transition. Visual schedules can be big and displayed around the classroom or they can be smaller and displayed on a personal binder for the student, or even as a strip taped to the desk. Visual supports, such as daily schedules and/or social stories are a key component to an accessible classroom for a student with autism. These supports should be tailored for each child by varying their complexity. Visual schedules can be pictures only or can include words, made to match the level or needs of each

student. The pictures on the schedule can be a generic representation of a subject or activity or a real-life picture of the classroom or activity. Visual schedules can include the time to help the student determine the length of a specific activity or to understand how much time is left.

Another type of visual support is called a 'first-then strip'. A first-then strip can be a card with pictures or symbols that can be attached and removed, words that can be written and erased, or an app on an electronic device. The pictures/words depict activities so an individual will understand what needs to be done before they can do something else, typically a preferred activity. First-then strips can help to motivate an individual to complete an activity that they may not enjoy. They see that after completing one task they can choose a high interest or desired activity. This encourages the completion of the first task. According to Breitfelder (2008), it can help if the first-then strip is green on the first side and red on the opposite side with a black line down the middle, the green symbolizes *go* meaning do this first. The red symbolizes that the student is finished and can engage in the preferred activity.

Choice boards are another useful visual support. Individuals can see the choices instead of listening and remembering the choices. Being able to visually see the choices may be less overwhelming to an individual. Teachers can use the choice board to display only the accepted activities for a given time as a way to reinforce making expected choices.

A favorite visual tool for teachers who work with students with ASD is a token strip. This strip of cardboard or plastic has 3-5 squares where check marks or stars are placed to represent on-task or expected behavior. A picture that represents a desired item or privilege that the individual is working towards is also on the strip. This visual gives the individual a concrete representation of rewards for their appropriate behavior, good choices, or on-task actions.

A concept map presents information visually. Concept mapping is a visual tool that benefits all students, especially those who learn better visually. Concept maps can include charts, graphic organizers, tables, flowcharts, Venn diagrams, timelines, or T-charts. According to Roberts & Joiner (2007), concept mapping is based on the premise that learning is an active process and therefore the learner must select, manipulate, and transform information for meaningful learning to occur. A concept map is a way to externalize the process of connecting new information to already known information for the student.

Another visual used is a social narrative. A social narrative is used to help explain a social situation or social expectation that the student struggles to understand. A social narrative can help individuals see what others may be thinking (with thought bubbles) and illustrates an expected response during a social exchange. "Social narratives can be presented using various strategies, including comic strips and cartooning, social scripts, SMARTboard, and power cards." (Coogler et.al. 2017)

Sign language is also considered a visual tool, used not only to communicate with hearing impaired students but also as a visual to remind or reinforce behavior or ideas with any individual. Using a simple sign to communicate instead of verbalizing can help individuals who become overwhelmed with a lot of verbal instructions resulting in a reduced amount of interruption. The ability to use the sign "sit" with a student, silently during circle time as a reminder instead of interrupting the circle to verbalize "please sit" benefits the whole class. I have seen simple signs used successfully as discreet reminders for expected behaviors with individuals across many subjects and activities. Signing can be used anywhere and at any time, it can also be individualized for students when used as gestures to remind or support instead of as a language to communicate.

The Picture Exchange Communication System (PECS) is a communication system that relies on exchanging picture symbols to teach the learner the back and forth process of communication. PECS is used to teach communication skills to students with limited or no verbal communication. The goal is for the student to learn to initiate communication and begins with assistance and support from a teacher, para, or parent. Students with ASD have successfully learned to communicate using PECS in the classroom and at home. There are six stages to the PECS method and facilitator training is available. During phase I the individual will learn to exchange a single picture for an item or activity of high interest. In phase II the individual will still use 1 picture but will learn to generalize this skill by using it in a different place and with different people across the room. Phase III introduces the use of more than one picture, the individual will select from 2 or more pictures to ask for their favorite items or activities. The pictures can be put in a PECS binder with velcro strips to easily store and remove the pictures. During phase IV the individual will begin to learn to construct simple sentence structures with a detachable sentence strip using an "I want" picture followed by the picture of the desired item or activity. The focus in phase V is to have the individual use the PECS to answer the question, "What do you want?" Phase VI will then teach the individual to comment with the sentence strips, to answer questions such as, What do you see?, What do you hear? and What is it? They will make sentences starting with I see, I hear, It is, a, etc. According to Ganz & Simpson (2004), the ease with which most individuals with ASD learn PECS may be explained by several factors: (a) inclusion of individual's preferred items as motivation to initiate communication; (b) use of concrete visuals as opposed to transitory symbols such as manual signs; and (c) initial lessons focusing on requests, which are more motivating and rewarding to individuals with ASD. PECS reportedly does not typically require weeks or months of formal training (Bondy & Frost, 1998).

This working thesis will explore the literature that addresses visual supports for students with autism. The literature review will also seek to understand if the type of visual support makes a difference for students with ASD in a variety of situations.

The application for this literature review thesis will provide examples of visual supports presented via a PowerPoint presentation for colleagues to understand the benefits of different types of visuals and their use.

CHAPTER II: LITERATURE REVIEW

Literature Search Procedures

This literature review explores the use of different types of visual support to enhance learning for students who have been diagnosed with an autism spectrum disorder (ASD). The review considers different types of visual support with information including how to create visual supports, opportunities for when to and how to use, and when to use the different types of visuals with students. The literature review will also seek to discover if the type of visual support makes a difference for students with ASD in a variety of situations.

To locate literature for this thesis, searches were conducted in Education Journals, ERIC (EBSCOhost), and SAGE Journals Online. Keywords used in the searches included: “autism spectrum disorder”, “ASD”, “autism”, “PECS”, “Visual schedule”, “Context mapping”, “Graphic organizers”, “First - then”, “Visual supports”, “sign language”, “social emotional visual support”, “zones of regulation”, “electronic visual support”, “social emotional learning”, “picture communication”, “visual communication”, “social stories”, “Social narratives”, and “working towards”. Only peer-reviewed material is included.

This chapter reviews the literature on visual supports and their use with students diagnosed with autism spectrum disorder (ASD) in four sections in this order: Visual supports to assist communication, Visual supports to assist daily functioning, Visual supports to assist social-emotional functioning, and Visual supports to assist student learning.

Visual supports to assist communication

Five articles are reviewed in this section discussing the use of sign language and the Picture Exchange Communication System (PECS), including pros, cons, and the best areas to use these visual supports.

Gillespie-Smith, R., Riby, D. M., Hancock, P. J. B., & Doherty-Sneddon, G. (2014) focused on picture communication visual support systems. Picture communication systems are a nonverbal communication method using pictures or symbols to communicate a want, need, or feeling to another individual. Determining the complexity of the symbol, from line drawings to colored photographs of the child's environment, and the impact on understanding the picture symbol to a student is for educators to understand. Gillespie-Smith et al. (2014) used eye-tracking technology to determine whether a participant with autism spectrum disorder looked at a picture symbol differently than their neuro-typical peers, specifically if using less ecological and realistic images.

They found that children with autism spectrum disorder (ASD) attended typically to faces and objects presented within their picture communication systems and researchers were a little surprised with their results. The study included a total of 84 participants, 21 were between the ages of 9 - 16 years, diagnosed with autism spectrum disorder (ASD), and familiar with the use of Picture Exchange Communication System (PECS) and Board-Maker (BM) images at their school.

The rest of the participants were also familiar with PECS and BM images and included three groups of 21 children matched 1:1 with the ASD children, based on the following: chronological age (CA), verbal ability (VA), and non-verbal ability (NVA). Gillespie-Smith et al.

(2014) used a Tobii 1750 eye-tracker (Tobii Technology, Stockholm, Sweden), using ClearView 1.5.10 (Tobii Technology) for the presentation of stimuli and recording eye movements in this study. This system was portable and was used with all of the participants, who were tested individually. The independent sessions lasted about 10-12 minutes, including the eye-tracking software calibration along with the trial blocks of images.

Researchers predicted that the participants with ASD would look less at the face regions than their comparison participants regardless of the type of picture symbol they viewed. This was proven to be false. There was no significant difference among the gaze behaviors of the participants. More notably there was no significant difference to imply that the level of functioning related to autism. This is important because the sample included a wide range of abilities across the spectrum and there was similar attention and engagement with the picture symbols across the spectrum. The researchers were trying to determine if the use of simpler picture symbols may have impacted the outcome. Did it matter if there was only one person in the picture instead of a social group? Could this have resulted in less discomfort for the participants? Did lack of high-interest objects to distract and steal attention from the face regions in the picture symbols add to this result? Gillespie-Smith et al. (2014) suggested that these questions need to be researched to determine if the images impacted results.

Yoder, L., Lieberman, R. G. (2010) focused on the visual support of Picture Exchange Communication System (PECS) in an attempt to determine if the PECS increased communication skills by using picture exchanges to assist and enhance communication abilities. The subjects for this study included 36 participants between the ages of 18 - 60 months, with fewer than 10 words. 33 participants had a diagnosis of autism spectrum disorder (ASD) and 3 were diagnosed with pervasive developmental disorder—not otherwise specified (PPD-NOS).

The participants were divided into two groups and received one of two treatment conditions: one group used PECS and one group used Responsive Education and Prelinguistic Milieu Teaching (RPMT), yet all participants had access to picture symbols. The treatment sessions were three 20-minute sessions per week for six months. The equality of the two groups was measured on nine variables thought to possibly affect the dependent variable and the examiners were blind to the participant group labels. Yoder and Lieberman (2010) used The Early Social Communication Scales-Abridged (ESCSAbridged; Mundy et al. 1996) to assess the participants at the beginning and the end of the study.

The results showed a significant correlation between the participants in the PECS group and the number of picture exchanges. Yoder and Lieberman (2010) mentioned that the pictures used in the study were very generalized, even more simple than the normal PECS photographs. This was done to determine if the child had learned to generalize the use of the picture exchange system overall. Using similar pictures brought about some additional questions for further research. Can using a generalized picture exchange help a child begin to coordinate attention to object and person for communication? Could eliminating the need to identify and correlate a relationship between the picture and an object and then use the picture exchange to increase communication?

Angermeir, K., Schlosser, R. W., Luiselli, J. K., Harrington, B., & Carter, B. focused on PECS and whether the type of image makes a difference in communication attempts. There were four male participants between the ages of six and nine, all diagnosed with either autism spectrum disorder (ASD) or Pervasive Developmental Disorder (PDD). All participants also met the following criteria: (a) have little to no functional speech (no more than 10 spoken words), (b) rely primarily on pre-linguistic means of communication (i.e. pointing, leading), (c) be

considered candidates for PECS by their clinical team or primary speech-language pathologist and (d) no history of systematic instruction in requesting with graphic symbols (all children had little to no previous exposure to requesting with graphic symbols although some participated in classrooms in which other students used graphic symbols to request) (Angermeir et al., 2008 p.430). During the study, the participants began each phase with hand-over-hand assistance followed by gradual faded assistance. The study followed the phases of the PECS instruction and focused on Phase I and Phase II since time ran out on the study and the participants left for summer break. The sessions occurred for 15-30 minutes, three to five times a week. During Phase I and Phase II, there was no need for the participant to discern between different symbols. In the beginning, instructions for the participants were simple: *point to blank* or *give blank* and the participant should give the symbol in exchange for the target object. Participants advanced to the next phase after 100% mastery.

Angermeir et al. (2008) felt that the results of this study led to the belief that participants did not indicate different responses based on the symbols for the first two phases. Researchers felt that this was an important observation because using a less iconic symbol can help to facilitate generalization for students. Angermeir et al. (2008) mentioned that the results only pertained to the first two phases and the results could not be generalized to include PECS phase III and phase IV where the participants need to identify and choose between symbols. Further research is needed to determine whether the type of picture symbol influences how students communicate using PECS.

Carr & Felce (2007) compared two teaching procedures, an error prevention procedure, and an error correction procedure, to teach the relationship between objects and pictures. A total of 29 children between the ages of four and seven years of age were divided into two groups of

participants. All participants had been diagnosed with Autism Spectrum Disorder (ASD). All participants were also in Phase II of Picture Exchange Communication System (PECS) programming, so all could make independent exchanges of pictures for items. Carr & Felce (2007) explained that there were three stages in the study; Stage 1 included both groups to provide an in-between-groups baseline comparison; Stage 2 was the error correction group that received six teaching sessions delivered at a rate of one per day with no more than two days between sessions. Each session comprised five conditional discrimination teaching trials using the standard error correction procedure; Stage 3 was the exclusion group, Six teaching sessions comprised of five conditional discrimination teaching trials using the exclusion procedure. The sessions took place in an unoccupied room made available for the teaching sessions at each school. The measures for each child were the accuracy of correspondences between the learned picture and object pairs and accuracy of delayed correspondence in learning outcome tests with all combinations of object and picture pairs presented to subjects throughout the study. Researchers thought that students would benefit from teaching procedures that minimize difficulty in learning the relationships among various combinations of stimuli. In the end, a series of 18 learning outcome trials were compiled for each child, with the outcome test immediately following the last teaching session. The results showed that for both the correspondence checks and the learning outcome test, the exclusion group tested higher in both areas. The outcomes support the utility of exclusion-based methods for teaching visual conditional discriminations to children with ASD and severe language disabilities. The exclusion error prevention allows students access to a reinforcement item on every teaching trial, this could increase student's motivation and reduce frustration levels. Carr & Felce (2007) deduced from the results that classroom teachers responsible for teaching basic vocabulary skills in both augmentative and

spoken receptive and expressive forms would benefit from using the exclusion method as it provided a more ecologically valid method for teaching conditional discriminations that provide the basis for developing relationships between nouns and their referents.

Spencer, Petersen, & Gillam (2008) highlighted three case studies and showed the seven-step evidence-based practice (EBP) decision-making process for each. The process could be used by teachers when trying to determine the best EBP to use with a student. Researchers stressed that the practice chosen should be based on research and student variables, not only what the teacher knows or has available. Spencer, et. al. (2008) detailed three case studies to explain the process of how each followed the seven steps; 1. Develop parameters to guide the search for evidence 2. Search for evidence 3. Evaluate each study for quality and summarize findings 4. Consider student and family factors 5. Consider teacher and school factors 6. Integrate the evidence 7. Monitor the outcome. The case studies chosen to demonstrate this process showed how to use the data considering both the child and the school along with the research to determine the best augmentative and alternative communication (AAC) for each situation. Researchers compared an aided system, PECS, which incorporated the use of some type of device (paper, pictures, computers, voice-output devices), and an unaided system sign-language (uses the individual's body). Spencer, et.al. (2008) mentioned that due limited time and resources for teachers, the goal has to gather a few studies that were a good match to the student, the practice of interest, and the desired outcome. The author's findings were to pick the EBP that best matched the student (ability to verbalize, fine motor skills), the school (resources, teacher knowledge), and family comfort level or preference. All three case studies were similar and provided information about why each communication choice was made, In the third example the family preferred an AAC device that the school did not believe fit best with the student, Another

family member used the AAC system with success. There was a stipulation made that after two months if no significant progress then the AAC could be trialed.

The study suggested that teachers stayed current with new technology and research to ensure the best tool is used for the students. The study also highlighted that choosing the best AAC system for the student was the beginning point and that progress monitoring of the student performance is essential so that adjustments or changes can be made when the system is no longer effective for the student. Spencer, et.al. (2008) reiterated often in the study that it was critical to integrate the best available research with the circumstances posed by students, families, and teachers.

Visual supports to assist daily functioning

A review of six articles provides information on the use of visual schedules, first-then, choice board, working towards strips, visual timers, and visual lists; pros, cons, and best areas to use these visual supports.

Smith, D.L & Gillon, G.T. (2004) focused on various visual supports. They conducted a study by sending surveys to Speech-language Therapists, asking about intervention strategies for students with Autism Spectrum Disorders (ASD). Of the 75 surveys sent, 34 were returned. Respondents provided intervention to children with ASD. According to Smith & Gillon (2004) the survey was in a checklist format where respondents responded to questions concerning caseload characteristics. They also rated a range of interventions based on frequency of personal use and perceived effectiveness. Next was an opportunity to provide any comments concerning intervention for children with ASD. The following 12 strategies were rated on the survey: Social Story Technique, Augmentative Communication (AAC)/Picture Exchange Communication System (PECS), Visual Aides/Strategies, Applied Behavior Analysis (ABA), Discrete Trial

Instruction, Milieu/Incidental Teaching, Greenspan's Developmental Approach, Facilitated Communication, Auditory Training, Functional Communication Training, Sign (paired with speech), and Holding Therapy. An independent examiner coded the survey responses to ensure data reliability. The majority of the respondents had one to five children with ASD on their caseload. Half of the children served were younger than five, with the range of direct therapy contact from more than once per week to less than once per month. The results showed that visual aides were highly favored for regular use and perceived effectiveness, with 94.1% of therapists using them regularly. Visual aides received a 3.7 out of 4 rating for effectiveness. The result could be a little skewed as some therapist's grouped both PECS and Social Stories under visual aides, along with others like a visual schedule, first-then strip, etc. Visually based interventions were three of the four most frequently used interventions, which included visual aides, augmented communication/PECS, and Social Stories. Research has shown that children diagnosed with ASD have an increased ability to comprehend visual information compared to verbal information. Another possible reason for the greater use of visual aides could be due to the ease of use and creation. Smith & Gillon (2004) felt optimistic that from the caseload results one could hypothesize that the interventions provided for children at younger age ranges were effective in reducing the need for intervention when they were older. The researchers also highlighted the long-term difficulties associated with ASD that demonstrated a need for continued support and intervention.

Ganz (2007) reviewed successful visual-based strategies for organizing classrooms that were reviewed by autism experts and individuals with high-functioning autism. Ganz (2007) justified a brief review of research, implementation guidelines, recommendations for effective use, and suggested resources for classroom structuring, visual schedules, and visually based

organizational strategies. Visually based interventions are recommended for individuals diagnosed with autism spectrum disorder (ASD) because visual processing is a strength for many of the individuals. Visuals are believed to decrease anxiety and increase independence; they help a student know what to do, where to be, what steps to take, and what to expect. Research through the years demonstrates success using visually-based programs with ASD individuals. Ganz (2007) highlighted that a visually structured classroom needs to consider every student's needs, have individualized areas for independent work, and should not have any irrelevant visuals that may be distracting. Something as simple as putting tape on the floor to mark a specific area can help a student know where they need to remain during a task. Having only the materials needed in a learning space can help limit distractions and help the student be more productive. Ganz (2007) suggested using barriers to designate learning areas in the classroom, such as an area for group instruction, an area for independent learning, an area for one-on-one instruction, an area for leisure, etc. Individual areas should have barriers such as shelves, bookcases, or tape on the floor so the student recognizes what is expected in each area. Ganz (2007) recommended reorganizing independent work areas to match student capabilities.

Visual schedules capitalize on visual processing strengths. The schedules provide concrete, stationary instructions with illustrations and/or pictures. A visual schedule informs an individual about the activity, when it will occur, and how to complete the steps in the activity. To be sure, visual schedules are a promising practice when used to address time-on-task problems, increase independence, assist learners to understand play sequences, curb disruptive behaviors, and increase communication skills. It was suggested to individualize each activity schedule, either by color coding, using a particular character or symbol, using a name, or using the individual picture. Visual schedules should always be tailored to the individual, considering their learning

level, motivating interests, and the amount of information they can comprehend. A particular student might be able to have all daily activities on one schedule whereas another student might need the day divided into several smaller schedules. One student might have a schedule with time and words, another student might have pictures, and a third student might have objects to represent the activities in their schedule. Research results found that gains from visual schedule use were measured, maintained, and even generalized to other tasks over time. In some instances it could be appropriate, even motivating for students to assist in creating their schedule. Ganz (2007) also noted that the placement of visual schedules should be individualized, accessible, and make sense; for instance, a visual showing the steps of an activity should be placed on the table where the activity is completed whereas a toileting sequence schedule should be displayed in the bathroom area. The advantage of schedules is the flexibility of being portable or permanent; technology-based, paper-based, or object-oriented. It has recommended that the student has a way to mark or check off each step or activity as it is completed. This could be done by using small pictures with Velcro when a student completes a task, the picture is removed and placed in a completed pocket, physically crossing or checking off a box when an activity is completed, or removing an arrow from the schedule as activities are completed. Ganz (2007) provides the following suggestions to remember when using visual activities; initially over-teach the schedule process, use physical prompts and gestures because they are easier to fade than verbal prompts, use a natural signal to indicate when it is time to check the schedule (a timer or certain phrase), make adjustments if the student does not quickly learn to independently use the schedule (shorten the schedule, divide into more steps, use larger images or objects, switch from abstract representation to more concrete) and remember to adjust the schedule when slight

changes occur to help students learn to adjust more easily when spontaneous schedule changes occur.

The final area Ganz (2007) reviewed was the use of individual work tasks. Visually organized tasks contain three components; instruction, organization, and clarity. Instructions provide information on how to complete the task and can include pictures, words, or materials. Organization refers to the simplification of tasks to include only the necessary materials. This may include having several smaller containers for each step within a larger container incorporating everything needed to complete the task. This process can help the individual with reduced distractions. Clarity involves highlighting the important details of the task and having only the necessary materials in the learning area. Ganz (2007) makes the following suggestions for simplifying implementing visually organized tasks; base task objectives on individual Individualized Education Plan (IEP) and include special interests to motivate students. Independent work areas should include only previously mastered skills. Create typed task lists for classroom tasks including the date to be completed with copies for each student. Use masking tape on the back of a task and write the initials of students who have mastered that task. Design matching and sorting tasks to allow for changing placement of pieces to ensure students pay attention to the directions, and design the task with self correction procedures. Ganz (2007) mentioned that much continues to be learned about the best way to utilize these tools since these methods have potential to increase independent functioning and decrease the effects of deficits associated with ASD.

Leisa M. Breitfelder (2008) highlighted several adaptations and accommodations to use with early childhood students with various disabilities. Breitfelder (2008) researched visual supports for students related to autism, behavior disorders, learning disabilities, sensory needs,

communication disorders, developmental disorders, attention deficit disorder (ADD), and attention deficit hyperactivity disorder (ADHD). The research-based visual adaptations and accommodations outlined with instructions on how to make them were: visual supports, picture schedules, work systems, behavior modification charts, and picture exchange communication PECS books. Filled with research-based results and ideas Breitfelder (2008) helped decipher which visual supports to use at which times for students diagnosed with autism spectrum disorder (ASD). According to Breitfelder (2008) one of the most effective ways to get students to process language is through the use of visual supports; a visually perceived stimulus can assist in comprehending instructions or information. In the classroom setting visual supports were used to assist students with following directions, understanding the lesson, and being independent following schedules. The use of visual supports was also proven to assist with improving behavior. Behaviors that accompany frustration, confusion, or anxiety are decreased when visual supports are used. Visual support can benefit all students who have difficulty with reading. By placing visual supports in an early childhood classroom setting as part of the instructional program, students who have difficulty with verbal language (students who have ASD, ADD/ADHD, developmental disabilities, learning disabilities, behavioral disabilities) can experience: eased transitions, feelings of empowerment by having visual choices, clearly defined expectations through the use of pictures, longer attention span, and reduced anxiety. Concepts become more concrete along with improved expressive communication.

Since research has shown that students diagnosed with ASD learn better visually versus verbally, many students prefer picture communication along with oral or written communication. Visual supports allow students more freedom and independence to engage with their classmates. Visual daily schedules can help to ease anxiety and create independence. As always, the visuals

used should be individualized to each student. Visual daily schedules can also present a broad scope of the day and the student could have several smaller work systems for each activity outlined in the larger schedule. A schedule shows the student where to go and the work system shows the student what to do. A work system is a systematic and organized presentation of tasks and materials that the student is expected to complete. The work system should visually communicate the following four pieces of information: the steps needed to take, how much work needs to be done, how the student will know when the task is complete, and what the student is expected to do once the task is complete. Other visual supports highlighted for students diagnosed with ASD were First-Then strips, a behavior modification chart, working towards the strip, and the Picture Exchange Communication System (PECS).

Mahoney (2019) explored the use of activity schedules and peer-mediation groups for secondary students diagnosed with autism spectrum disorder (ASD). An increasing number of secondary students diagnosed with ASD receive lessons in general education classrooms. Mahoney (2019) asserts that given that secondary teachers instruct multiple classes throughout the day it is more likely that they have students diagnosed with ASD in their classes and are responsible for meeting the instructional needs of students with varying abilities. Collaboration and support between the general ed secondary teachers and the special education secondary teachers is needed to determine the level of support and the tools needed to help each student learn best. Secondary classrooms tend to have large class sizes, high student-to-teacher ratios, and limited consistency with lessons and expectations through the different subjects. This can cause anxiety, confusion, and feelings of being overwhelmed for students who have difficulty with executive functioning. Mahoney (2019) explained that individuals diagnosed with ASD often exhibit difficulty managing tasks, planning actions, and controlling impulses. They are also

challenged by working memory, processing information, comprehending auditory stimuli, tolerating novel information, retaining short-term information for processing at a later time, and thinking about and understanding what another person is thinking. All of this contributes to why students diagnosed with ASD experience difficulty remembering and tracking a variety of teacher expectations and course requirements that rely heavily on teacher-initiated verbal instructions, resulting in problems completing work independently.

Because students in secondary grades can be more self-conscious about needing extra support, the use of peer-mediated groups is less obvious and more accepted. Peer-mediated instruction and intervention (PMII) is an evidence-based practice in which peers serve to support both the academic achievement and social-skill development of students with specific learning needs; including students with ASD. There are six steps to implementing PMII and four steps to implement an activity schedule along with the PMII. Mahoney (2019) explained in detail all six steps which are 1) Identify the academic needs 2) Select peer group members 3) Train peers 4) Structure the classroom 5) Check for understanding of classroom assignments within PMII groups and 6) Progress monitoring. Each step is important and all steps should be followed carefully to generate the best outcomes. Once the PMII groups are established, the teacher can begin to implement the activity schedule, which has the following four steps: 1) Select the activity schedule 2) Train the PMII groups on using the activity schedule 3) Check for understanding of using activity schedules in PMII groups and 4) Monitor student progress. The teacher meets with the PMII groups to monitor progress and reestablish goals throughout the sections. Mahoney (2019) predicted that students would likely benefit from structured and predictable class routines, transitions would be eased when the students knew what was expected

and visual activity schedules used with peer support would increase on-task behavior and improve assignment completion for students.

Bateman & Wilson (2021) explained how using visuals such as snack talk cards, could support diverse learning and social engagement for all students, including students diagnosed with autism spectrum disorder (ASD). As classroom diversity expands across the United States, Bateman & Wilson (2021) explained that teachers need to ensure all students have access to appropriate and culturally and linguistically relevant instruction and that all students are meaningfully included. Snack talk cards are visuals that have a broadly written topic question, such as “What do you like to play with?” and includes pictures and/or words that represent student high-interest areas. Topics included could be a craft, a video game, a board game, reading a book, a stuffed animal, or sports. Teachers need to ensure student representation of all students' interests to excite and engage them in participating in discussions. Implementing culturally responsive and relevant interventions is of particular importance when supporting the social development of diverse students with ASD as social skills interventions are particularly susceptible to these risks. Students with ASD often differ in their social development resulting in fewer friends, higher anxiety, and lower self-esteem. Using visuals to promote topics for the students to discuss and share with peers during a social time can positively influence student acceptance and social well-being.

Martin & Wilkins (2022) discussed several areas to focus on to enhance learning for students with Autism Spectrum Disorder (ASD). According to Martin and Wilkins. (2022) findings from studies indicate that individuals with ASD rely on vision to gather information more than any other sense. Based on these findings, Martin & Wilkins (2022) outlined several, simple physical adjustments teachers can make to the visual displays, physical layout, and

lighting in the classroom. Simple physical adjustments include turning chairs to face just the teacher for circle time, creating distinct learning areas, and limiting the amount of visuals in the room. These modifications can help students from becoming visually overstimulated.

Adjustments to lighting to reduce brightness or glare significantly reduces over-stimulating effects of light. This environmental change may benefit every student in the classroom, especially those with light sensitivity. Drapes or coverings on a window, fabric over lights, or turning on only part of the classroom lights can enhance the learning environment. According to Martin & Wilkins (2022), too much light causes distracting glare on surfaces with high levels of reflection, such as vinyl and linoleum. Researchers suggested that learning areas on carpet and rugs is the best choice for classroom floors and learning spaces because they absorb and diffuse light. Along with lighting, teachers need to be aware and conscious of not using an excessive number of decorations or colors in the classrooms. If there is an overabundance of visuals throughout the room, students may be distracted and lose focus on work or listening to instruction. While many students thrive in an information-rich visual environment, students with autism spectrum disorder (ASD) can be overstimulated by excessive decorations and color (Martin & Wilkins, 2022). Making sure to only display relevant displays in the classroom can help students. Martin & Wilkins, (2022) suggest making sure that the visual stimuli in the classroom are related to what the students are learning about so that if a student becomes distracted by a visual, it will be relevant to what the student is supposed to learn. Martin & Wilkins (2022) share in the findings that students with ASD are likely to have difficulty focusing on the teacher if there are competing visuals, especially if the visuals have an object of high interest for that student. Another reason students with ASD have trouble focusing on the teacher is due to the tendency to avoid looking at adult faces, particularly when the adult begins to speak.

In addition to a possible avoidance of looking at the teacher, students with ASD have particular difficulty integrating auditory-visual stimuli (Poole et al., 2018); therefore, teachers should avoid presenting visual information while simultaneously providing verbal explanations (Martin & Wilkins, 2022). With a few changes, a classroom can be easily adjusted to be more learner-friendly for a student with ASD.

Visual supports to assist social-emotional functioning

In this section, four articles discuss the use of social narratives, Zones or Regulation, and handheld electronic visuals; pros, cons, and best areas to use this visual support.

Coogle, Ahmed, Aljaffal, Alsheef, Hamdi (2018) reviewed a variety of social narrative strategies. Their study focused on four different social narrative strategies used with four different early childhood students in four different classes with four different teachers. Each student had 17 peers in their class and the teachers were concerned about meeting the needs of the students along with the needs of the other 17 students in their classroom. The purpose of this study was aimed to identify social narrative strategies that could be used to enhance the social skills of young children identified with autism spectrum disorder.

This was a qualitative study and the researchers used participant observation to gather data. The four types of social narratives used were Comic Strips, Social Script, SMART Board, and Power Cards. Coogle, et.al. (2018) implied that social narratives increased the understanding of social situations resulting in more appropriate behaviors. They also stressed that to most successfully utilize social narratives, the team working with an ASD child should be identified (i.e, parents, caregivers, teachers, and related service personnel) and work collaboratively to identify the target skills important for the child to gain, agree on each individuals role, and how the data is going to be collected.

Comic strips provide a visual representation of a social situation and include symbols with a brief narrative; therefore they are appropriate to use with students who have limited verbal skills. Comic strips can be inexpensive, easily implemented, and personalized to the student and specific situation or emotion. In this study, the team identified that the student using the comic strip would work on initiating play with others. The teacher talked with the student and asked him to be involved with the creation of the comic strip. He explained what he was drawing as he drew it. The comic consisted of four frames. In the first frame, the teacher drew a picture of peers playing in the students' favorite play area. In the second frame, he drew a picture of the student walking over to his peers playing in the area. In the third frame, the student was drawn along with a communicative bubble that said, "Play please". And in the last frame, he drew the student receiving the desired plaything with the peer saying "sure" in a talking bubble. This comic was used and read with the student during free choice time and outside play. According to Coogle et.al. (2018), this tool, along with modeling and repetition was successful. Over time the student mastered the target skill.

The social script tool was chosen for the second student because she was beginning to read and verbalized many words. Responding to peers was the target skill for this student. Social scripts are similar to comic strips but contain more words and fewer pictures. The script was written in language familiar to the student and read to her before choice time every day. "Sometimes friends might ask me to play by saying, Sally, do you want to play with us? I will respond by looking at them and saying yes please or no thank you" The student listened to the script every day before free choice time. The student began to respond to peers after hearing the script along with verbal prompting and modeling. According to Coogle et.al. (2018), this tool,

along with modeling and repetition was successful, and over time the student mastered the target skill.

When utilizing a SMART Board to present a social narrative, the educator creates a PowerPoint, which includes descriptive sentences and photographs of an appropriate expected behavior. This technique was chosen with the third student as he was more interested in technology-enhanced instruction. With a Smart Board the student can be involved and touch, move, or circle the responses in the narrative. The target skill chosen for the third student was to greet a peer using a button on a communication device, programmed to say “hello”. The teacher wrote the social narrative and included descriptive sentences noting that when arriving at school, a teacher or friend would say “Hello”, and Juan would use his communication button to say “Hello”. This narrative was practiced with the student. When the narrative ended, the teacher modeled hand-over-hand, helping Juan use his button to respond when someone said “Hello”. The teacher observed that over time Juan spontaneously used his communication button when peers greeted him upon arrival at school. Following each interaction, his teacher and/or grandma completed a progress monitoring form. According to Coogler et.al. (2018), this tool, along with modeling and repetition was successful, and over time the student mastered the target skill.

Power Cards incorporate a written narrative that prescribes appropriate behavior in a situation that is problematic for the child. Power Cards are unique as they include a special interest character or hero printed on one side of the card to motivate the prescribed behavior. Power Cards are typically used before a problematic social situation occurs but can also be used during the situation as a visual reminder for the student. Power Cards are beneficial because typically they are small in size, have a shorter social narrative, can be used discreetly, and are individualized to the student's special interest character or hero. Mickey Mouse was used for the

Power Cards for this student to address the skill ‘initiating play with peers’. The target student was verbal and quickly made progress using the Power Card and reminders. As stated by Coogle et.al. (2018), the student no longer needed his Power Cards to complete this skill and began to use similar Power Cards for different skills. According to Coogle et.al.(2018), Power Cards, along with modeling and repetition was successful, and over time the student mastered the targeted skills.

Jennifer Ganz, Margot Boles, Fara Goodwyn, and Margaret Flores used electronic devices with students diagnosed with Autism Spectrum Disorder (ASD). The purpose of this study was to investigate the effects of visual scripts delivered via iPad ® on the use of verbs or nouns for three 8 - 14-year-old children with autism. Each child had a primary diagnosis of autism and a secondary diagnosis of speech impediment. According to Ganz et.al. (2013), studies have shown that approximately 90% of children with ASD have delays in expressive language. Some children are nonverbal and those who do speak often have deficits in the use of a broad vocabulary, complexity of sentence structure, responsiveness to social stimuli, flexibility in conversation, and use of descriptive language when compared to typically developing peers. The authors theorized that with the known success of a variety of visual scripts for students diagnosed with ASD, they wanted to explore the use of visual scripts using an iPad ®. Ganz et.al. (2013), noted that with the increased use of technology in schools, it may be beneficial to incorporate portable technology and provide visual scripts in such a flexible format. Electronic visual supports are more discrete and age appropriate for the students in the age of technology. Research questions included (a) whether the use of the iPad ®-based visual scripts result in increased use of verbs or nouns to describe current events when asked for information, (b) whether the participants required less invasive prompts during the intervention, and (c) whether

the implementation of iPad ®-based visual scripts resulted in increased spontaneous use of nouns. Also highlighted were the ability to easily and quickly adapt the visual support using technology versus hard copy support, the visual supports with technology were less conspicuous, and the technology allowed for more individualized and in-depth instruction when the teacher was not available. The study took place in a quiet classroom in the school for two of the student participants and in the home of the third participant. On each day of treatment one to two data points were collected for each condition, and the researchers determined a baseline. The intervention procedure followed least-to-most prompting when the student did not correctly answer the question within 10 seconds. Between each prompt, there was a 10-second pause. Ganz et.al. (2013), used a prompt sequence including an unprompted response, point prompt, verbal model, and direct demand, and the researcher reported which level of prompt was used. Two researchers collected the data independently either live or via video. Treatment integrity measured the correct or incorrect implementation of the procedures by the researchers for each of the phases. All sessions observed were implemented at 100% accuracy, except for one of Morgan's sessions, which was implemented with 83% accuracy. Researchers determined that the effects of visual scripts used on an iPad ® were successful, although it was not determined if the iPad ® was more or less effective than paper scripts. That would be something that would need to be researched further. The authors noted several reasons why using an iPad ® might be advantageous. According to Ganz et.al. (2013), an iPad ® would be less conspicuous; a collection of scripts could be kept together; the iPad ® is easily carried versus cards; sentence strips or a choice board is less convenient & easily lost and iPads ® are commonly used so a student carrying one would not look out of place.

Diamond (2018) discussed, very specifically, using a visual poster with students during problem-solving lessons and situations. Diamond (2018) highlighted research through the years that showed that children, specifically those with ASD have deficits in the areas of interpersonal skills such as problem-solving. Diamond (2018) explained the poster, in detail including each step, the importance of placing the same poster throughout the learning environment where it is accessible for students, and the importance of modeling using the poster to enhance student learning. The study highlighted the importance of following a process that includes an introductory lesson, modeling, the use of visuals, and revisiting the lesson multiple times to reinforce the message with students. Supporting the development of problem-solving through the use of embedded visual instruction using a problem-solving poster will contribute to the reduction of stress associated with not knowing how to handle difficult situations and, in turn, increase appropriate behavior during problem situations (Diamond, 2018; Rao & Gagie, 2006.) The visual poster placed throughout the classroom helps reinforce student accessibility in situations unseen by the teacher and increases student independence and confidence. Visual supports such as graphic organizers, flashcards, and worksheets are incorporated during direct and independent practice within these intervention programs. The visuals include pictures and words and represent the foundational steps needed to solve a problem. The steps include the ability to (a) recognize a problem, (b) determine and apply the most appropriate solution to the problem, and (c) evaluate the effectiveness of the applied solution. Diamond (2018) determined that the poster supported the students ability to identify problems and generate simple solutions to problems. Using the visuals students began to use problem-solving vocabulary during daily interactions. The use of visual support should always be paired with teacher support, especially in the beginning so that the students learn how to properly use the visual supports and can

generalize this knowledge to use visual supports across categories. When implementing visual supports, such as posters, Diamond (2018) makes sure it is large enough to see across the area of use, and also suggests putting additional smaller versions around the classroom. Diamond (2018) determined using visual supports has proven successful and encourages the use of visual supports during the daily routines and planned activities.

Augmentative and alternative communication (AAC) is a form of communication utilized to assist individuals with severe speech or language problems including those with ASD to express their thoughts, needs, and ideas using symbols, pictures, or text. According to Zimmerman and Ledford (2015), there are two main types of AAC: unaided and aided. Unaided AAC depends on the user's body to convey messages including natural gestures, body language, body movement, facial expressions, speech, and/or sign language, which does not require any support from external devices or procedures to operate. Aided AAC requires external equipment either electronic (e.g., computerized speech-generating devices) or nonelectric devices (e.g., pictures, symbols, words placed on a sheet of paper, written output, and communication books). The use of AAC can impact a student and their learning capabilities. This article focused on the aided AAC called the Picture Exchange Communication System (PECS), which is a pictorial communication strategy. According to Zimmerman and Ledford (2015), PECS is an approach that teaches children with ASD to exchange a symbol/picture, to procure the desired items instead of pointing to the symbol/picture. There are six phases in PECS that increase as the individual has mastered the previous phase. Zimmerman and Ledford (2015) determined that when parents and practitioners learn to implement PECS efficiently and the result is positive outcomes for the students involved. Furthermore, results demonstrated that PECS was an effective intervention to teach individuals with ASD functional communication skills. The PECS

system was successfully learned by parents and practitioners through training and they were able to use it with their children and students with positive results.

Visual supports to assist student learning

This section reviews five articles discussing the use of concept maps, Visual Activity Schedules (VAS), and graphic organizers; pros, cons, and best areas to use this visual support.

The Veronica Roberts and Richard Joiner study (2007) used 10 participants ranging between 11 - 14 years old, all diagnosed with ASD from the same school and the same study group. The participants were separated into two groups based on their level of need. One of the researchers was a tutor who had previously worked with the participants so there was a familiarity for the participants. Additionally the content was able to be created at an appropriate level for both groups of participants. All participants were involved in two one-hour sessions about how to create a concept map. The first focused on creating maps manually and the second introduced a computer software program designed for making concept maps. Group A received concept mapping with words while group B received concept mapping with pictures. The study involved teaching two separate science lessons. One group received a lesson using concept mapping while the other group received a conventional lesson. The groups switched their learning for the second lesson. Both groups completed pre-and post-tests. Roberts & Joiner (2007) hoped to prove that concept mapping could work with the cognitive predispositions of individuals with ASD and provide a versatile method to support curriculum delivery as well as independent study skills for participants. This study provides a preliminary investigation into the efficacy of concept mapping as a learning strategy for pupils with ASD. Many studies have shown that students diagnosed with ASD benefit educationally with the use of visual strategies because they process and retain information delivered visually better than auditorily. Roberts &

Joiner (2007) explained that cognitive load theory suggests that by using visual processing strengths, concept mapping may reduce the cognitive load of a learning task for pupils with ASD. Concept mapping allows a schematic network to be formed externally on paper, rather than within the mind. As a result, concept mapping may overcome deficits in the structural organization of the autistic brain (Roberts & Joiner, 2007.)

Roberts & Joiner (2007) had success in their study, the findings supported the use of concept mapping. The pupils retained and recalled information after the concept mapping intervention. The children's academic improvement was nearly four times greater following the concept mapping intervention than after the conventional teaching practice. Interestingly, the most significant effect was on pupil performance in the more traditional question/answer tests. The positive findings in this study are consistent with previous studies, according to Roberts & Joiner (2007) and highlights suitability for use within existing lesson plans. Concept mapping is a useful tool to support effective educational accommodations for pupils with ASD. Another finding in this study was that when provided with a starting point the participants were able to begin a task and continue to work independently. From this, Roberts & Joiner (2007) suggested enhancing the use of content mapping with starting points to provide a structural foundation for the pupil to build from. Starting points remove the initial uncertainty about how to begin a lesson or task. One limitation of this study was the small participant sample size. for the sample.

Maria Lemler Hugh, Carlin Conner, and Jennifer Stewart (2018); focused on evidence-based visual support that provided a visual sequential organization of the steps for an activity or skill. For students with ASD, Visual Activity Schedules (VAS) can be an effective method to support student understanding of, and participation in, multistep activities that pose difficulty. The VAS support can be effectively used across a wide array of activities in a

classroom. According to Hugh et.al. (2018), VAS can be individualized for students and aligned to the specific needs, including behavioral support. VAS can be used with all students who can benefit from visual organization of multi-step activities. VAS can be adjusted to meet the needs and abilities of students and displayed for long periods so students can repeatedly reference, if needed, unlike verbal directions. Hugh et.al. (2018) described implementing VAS through the data-based individualization (DBI) process that included the following five steps: (a) determining the activity, (b) developing the VAS, (c) making the data collection plan, (d) teaching the use of the VAS, and (e) evaluating student progress through the data that was collected during the whole process. Hugh et.al. (2018) suggested that when selecting an activity, the student should have the desired skills to perform the activity but unable to remember the correct order of completion or unable to perform the skills independently. Once an activity is chosen by the team and the student's level of performance is determined, the team can identify the target skills to highlight and identify the students motivating variables, such as time of day, etc. Following DBI guidance, the VAS is individualized to each student, so the number of steps for one student may differ from the number of steps identified for another student. Along with determining the activity the team needs to determine how to present the VAS, considering the student's receptive language skills. Once the sequence and mode have been developed, the team determines how the student will physically manipulate the visual steps of the VAS. Hugh, et.al. (2018) stressed to consider how the student will physically manipulate the visual steps, using data about the student's fine and gross motor skills. The VAS should make it apparent when a step has been completed to help the student with executive functioning and progression through the steps.. The third critical step is to develop a data collection plan to record student development. According to Hugh et.al. (2018), the team should make a progress-monitoring

plan, consider which data should be collected, by whom, when the data will be collected, and to ensure the data did not include any inferences. The team will use the data to determine if VAS is successful for the student. Next, the team will teach the student to use the VAS for the activity with prompting. Eventually the student will independently use the VAS. Systematic prompting should be used to cue the student to attend to the VAS, manipulate the visual steps, and perform each step within the activity. The final step is to evaluate progress using the collected data and determine if any adaptations should be implemented for the student. According to Hugh et.al. (2018), the team should look for frequent errors, levels of prompting, and then modify the VAS. The VAS may be adapted by reducing one step into multiple steps or using a more concrete visual in a step. The efficacy and effectiveness of VAS has been well-documented and its use has been identified as an evidence-based practice (EBP) for children with ASD by the National Professional Development Center (NPDC) on ASD and the National Autism Center (NAC). Hugh et.al. (2018) mentioned that though there is much evidence supporting the effectiveness of VAS, there are gaps in the research and more research is needed to determine the frequency and duration of teaching sessions for the VAS. The use of VAS by teachers is a practical option as the development can be done by the teacher, whether hand drawn or using the computer. The VAS steps can be made of only images, images and text, comic strips, or text alone. The current body of research surrounding VAS is geared towards addressing behaviors that support self-regulation, self-care, transition, and play for individuals with ASD. Given the effectiveness of VAS in these areas, it would be beneficial to further extend the research into to completing academic activities within the classroom.

Jackson & Hanline (2019) wanted to explore the results of combining Reading to Engage Children with Autism in Language and Literacy (RECALL) with the graphic organizer concept

map to enhance the science learning by young children with ASD. RECALL is an approach to shared reading designed specifically for children with ASD. During RECALL, the adult asks completion, recall, open-ended, wh-, and distancing questions based on dialogic reading. RECALL adds wh-inference and emotion identification questions, as these questions are difficult for students with ASD. As Jackson & Hanline (2019) explained there is a least-to-most prompting hierarchy using visual supports to help the student find an answer. There have been several studies completed that research ways to improve general reading comprehension for students diagnosed with ASD, including the use of graphic organizers, and using graphic organizers to improve comprehension in science texts for older students diagnosed with ASD. Two caucasian five year old male children participated in the study. Both participants had adequate vision and hearing, the ability to answer questions verbally, were available for the study, and diagnosed with ASD. Interventions were completed in different locations and for different amounts of time. For this study, Jackson & Hanline (2019) combined RECALL with a concept map to determine the outcome when using both interventions with young students with ASD to answer fact-based and inference questions related to science texts. Jackson & Hanline (2019) had two research questions: 1. What is the effectiveness of RECALL combined with a concept map on answering comprehension questions from science text? and 2. What are the perceptions of the participants and their mothers about using RECALL combined with a concept map? This study used videos to collect data that was analyzed visually to determine the relationship between the dependent and independent variables. Jackson & Hanline (2019) established a baseline using a science book read aloud that included stopping to ask each of the five predetermined questions at appropriate times based on the content of each page. During the intervention the purpose of the concept map was explained. The concept map provided pictures

that the participant could use to answer questions about the book. The concept map was available to the participant at all times and if a participant did not answer the question within five seconds, the interventionist began the prompt hierarchy. Following reading the interventionist reviewed five questions and answers. The study results indicated that concept maps used to teach science content were effective. The intervention package used in this study incorporated systematic instruction in the form of RECALL prompts and the use of visuals in the form of concept maps along with RECALL visual response options to increase responses to comprehension questions related to science text for children with ASD. Using two techniques to teach students diagnosed with ASD proved successful and even helped the students retain the information. This may indicate that the concept map not only supported the initial science learning but also helped students retain the information as evidenced by the ability for participants to answer questions without using the concept map in the oral comprehension assessment. Another important step that Jackson & Hanline (2019) mentioned was that even though visual supports are a tool that helps a majority of students diagnosed with ASD, visual supports need to incorporate individual considerations when they are constructed. This study provided evidence that adapted shared reading combined with concept mapping holds promise as an effective intervention for young children diagnosed with ASD (Jackson & Hanline, 2019.)

Knight et.al. (2014) researched articles to determine if Visual Activity Schedules (VAS) should be considered an Evidence-Based Practice (EBP) for teachers. VAS is a series of images, pictures, photographs, or line drawings used to depict a series of events. According to Knight et.al. (2014), VAS is used with individuals and students with ASD to visually prepare to complete the next step or activity. There were 16 studies used in the research review. Subjects in the 16 studies included a total of 56 participants aged 3-21 years, all with a diagnosis of ASD;

though the severity ranged. Knight et.al. (2014) determined that VAS fits the standard to be considered an EBP for use. Throughout the study, there was evidence shared that VAS positively affected individuals and students with ASD. Knight et.al. (2014) suggested that VAS was a fairly easy way to provide consistent cues about daily activities; was widely applicable throughout the lifespan of individuals; and could also increase the range of individual skills. VAS can be used in an educational setting, in the community, in the home, etc. VAS is a non-invasive tool that a student or individual could have at their disposal or displayed in a specific area to be used discreetly. Systematic instructional approaches are often combined with VAS and may include graduated guidance and variable interval schedules of reinforcement. Systematic instruction is a teaching method that breaks a skill down into individual components in a planned way to help students learn a skill more easily. Pairing systematic instruction with VAS can be easily done and presented to the whole class, benefitting all learners. Students who have deficits in auditory processing, including students with ASD, are at a disadvantage in the classroom since the majority of information is communicated verbally. According to Knight et.al.(2014), visual supports are beneficial because those diagnosed with ASD process visual information more easily. Teachers can use VAS with confidence knowing that there has been much research done that has proven beneficial for a majority of students with ASD, as well as others. Stakeholders reported that the VAS (a) were engaging and age-appropriate, and that the students attended, (b) was effective and practical, and (c) promoted student independence after using.

Trembath, Vivanti, & Iacono (2015) conducted research to determine if children with ASD were truly visual learners as often described. The authors tested their assumption that not all children with ASD were visual learners by experimenting with 25 children with ASD, 19 children with global developmental delay (GDD), and 17 typically developing (TD) children.

The subjects were presented with a series of videos via an eye tracker in which an actor instructed the children to manipulate objects in speech-only and speech and pictures conditions. No difference in visual attention to stimuli was found in this experiment. It has been widely believed that children with ASD are not auditory learners but visual learners. Trembath et.al. (2015) found proposed evidence for a visual learning style in children with ASD from the following three sources; (1) adults with ASD who have provided qualitative accounts of their experiences living and learning with ASD, (2) the outcomes of studies involving the use of picture-based augmentative and alternative communication (AAC) systems to support the communication and learning of children with ASD, and (3) studies that show improved performance tasks requiring the processing of visual, as opposed to auditory information. The findings call into question the assertion that children with ASD have a propensity for visual learning over auditory learning and point to the need for caution in the prescription of picture-based AAC systems based on this assertion until further research is conducted. Trembath et.al.(2015) suggested some children benefit from the use of AAC, but they suggest that the benefits are more likely from the capacity of the systems to provide an efficient and recognizable mode and support the development of a systematic communication along with the visual learning style.

CHAPTER III: APPLICATION OF THE RESEARCH

The evidence-based practice application materials were created for student use and then individualized for each student. The PowerPoint presentation information is intended for general education teachers from Pre-Kindergarten through grade 12. Information about visual supports such as what they are and when to use visuals has become more important for teachers as more and more increasing numbers of students are diagnosed with ASD. According to Breitfelder (2008), one of the most effective ways to help students process language is through the use of visual supports. A visually perceived stimulus can assist in comprehending instructions or information. The presentation slides were broken down into different types of visuals and briefly explained a little about each. An example of each visual was included in the slides. The PowerPoint presentation for colleagues covers the following: explaining and highlighting the benefits of different types of visuals, how to create visuals, and how and when to use visuals effectively. Visuals can help students focus on the important details. As discussed in the literature review some of the many types of visuals are: social narratives, visual schedules, first-then strips, choice boards, working towards strips, concept maps, visual timers, sign-language, visual lists, Visual Activity Schedules (VAS), as well as an augmentative communication system, Picture Exchange Communication System (PECS).

Visual supports are nonverbal intervention tools composed of pictures, drawings, or symbols to support following routines, expectations, academic concepts, and to communicate a want, need, or feeling to another individual. Visual supports such as graphic organizers, flashcards, and worksheets are incorporated during direct and independent practice within these intervention programs (Diamond, 2018.) Visuals include pictures and words and represent the foundational steps needed to solve a problem. The supports can be used in addition to verbal

instructions. As classroom diversity expands across the United States, Bateman & Wilson (2021) explained that teachers need to ensure all students have access to appropriate and culturally and linguistically relevant instruction and that all students are meaningfully included. Visuals should be made with the least amount of visual clutter possible. While many students thrive in an information-rich visual environment, students with ASD can be overstimulated by excessive decorations and color (Martin & Wilkins, 2022). Making sure to only display relevant displays in the classroom can help students. Students need to be able to understand quickly what the visual is showing. Ganz (2007) highlighted that a visually structured classroom needs to consider every student's needs, have individualized areas for independent work, and should not have any irrelevant visuals that may be distracting. When creating visuals be conscious to not overstimulate the user. Use simplicity for visuals, not what looks good. Visuals are a tool, not a decoration. Visuals should have relevance and created with a purpose in mind, not just for show. A visual should support or enhance the idea being explained to the students. A visual should be easy to read at first glance. Visuals are more successful when there is a bold contrast between the background and foreground. It is also important to keep the visual simple to make sure they are not visually overstimulating. Research has shown that children diagnosed with ASD have an increased ability to comprehend visual information compared to verbal information. Smith & Gillon (2004) posit that another possible reason for the greater use of visual supports could be due to the ease of use and creation.

Be aware that many think it would be helpful to include a student's high-interest area or object on the visual to hook or engage the student but using this may backfire and distract the student into thinking about that high interest area or upset them if they can't access preferred

items immediately. Using a high-interest area picture on visual supports (other than the reward) can become a hindrance and void the effectiveness of the visual.

The benefits of visuals are; giving students independence, informing students what to expect next, decreasing student anxiety about the unknown, supporting learning, informing students what steps to take, giving students information on how much longer until the next activity, and motivating students. Visuals are effective and low in cost.

Examples of when to use visuals are: During initial instructions (visuals enhance the content speaking about), independent work time (activity list on board), arrival & dismissal times (a visual put in a locker to show steps to be taken at arrival/dismissal), small group work, posted in students desk area, and posted on the front board to show daily schedule & morning routine. Visuals are a sustainable resource because they are inexpensive to make, are easily adjustable to individual needs, and can be consistent throughout the learning areas for the student throughout the day.

A social narrative can help individuals see what others may be thinking (with thought bubbles) and illustrates an expected response during a social exchange. Social narratives describe a social situation, concept, or skill in a story form. A social narrative can cover a wide range of situations. The purpose is to share accurate social information in a way that is meaningful to the student. A social narrative can be very specific to the student or generic to an idea. Pictures or illustrations help the student to understand the purpose of the story. A social narrative can be as short as one picture or it can be many pages long. Different types of social narratives are social scripts, comic strips/cartooning, Power Cards, and social stories. Social narratives are commonly used for social situations like; hitting, big emotions, going on a field trip, toileting, or to expose a student to a new situation and what might be expected. Social narratives are most successful

when used repeatedly with a student throughout a day or month. Coogleet.al. (2018), implied that social narratives increased the understanding of social situations resulting in increased appropriate behaviors. They also stressed that to most successfully utilize social narratives, the team working with a child with ASD should be identified (i.e, parents, caregivers, teachers, and related service personnel), should work together to identify the target skills important for the child to gain, agree on each individuals role, and how the data will be collected.

A visual schedule can include calendars, timelines, and timetables. A visual schedule increases student independence and reduces anxiety as students can visualize what event is next and how long it will last. A visual schedule empowers students to be independent and responsible. A visual schedule can reflect the whole day or be divided into smaller sections, depending on the needs of the student. Research results found that gains from visual schedule use were measured, maintained, and even generalized to other tasks over time. In some instances it could be appropriate, even motivating for students to assist in creating their schedule. Ganz (2007) also noted that the placement of visual schedules should be individualized, accessible, and make sense.

A first-then strip helps students learn to follow directions. First-then strips can lay the foundation to learn multi-step directions. First on the strip is a picture of the activity to be completed, then is a picture of the motivating activity the student will get to do immediately following the task.

A choice board gives the student a visual menu of activities that are allowed and expected at a given time. The board is set up by the teacher with the appropriate choices for the scheduled time. The student can independently choose an activity. A choice board can be used to increase independence during centers/station time. Students use the choice board to understand what is

expected or allowed. A choice board can also be used to show activities that are allowed during free-choice time.

A ‘working toward’ strip is a motivator that helps a student remain on task or maintain expected behavior to earn a desired break, choice, or reward. A ‘working toward’ strip can be used for short periods of time or a whole day. It is easily adjustable for a student's needs.

Concept maps are used to display ideas to support student learning. Concept maps are used across all subject areas. A concept map is a diagram that illustrates the connection between different words, concepts, or ideas. Roberts & Joiner (2007) noted that Cognitive Load Theory suggests that by working with students and visual processing strengths, concept mapping may reduce the cognitive load of a learning task for pupils with ASD. Concept mapping allows a schematic network to be formed externally on paper, rather than just within the mind. As a result, concept mapping may help overcome deficits in the structural organization of the autistic brain. Roberts & Joiner (2007) suggested enhancing the use of content mapping with starting points, to provide a structural foundation for the pupil to build from and can remove the initial uncertainty about how to begin.

Visual timers can help ease the anxiety of students who wonder how much longer they have to work on a task or how long it is until the next activity. Visual timers give the students control and responsibility as they can determine independently how much time is left.

American Sign Language (ASL) can be easily incorporated into your daily routine. ASL can be used to silently signal a student or allow a student to signal you without interrupting the whole group. The ASL letter “T” shaken stands for toilet, all of my students know that they can signal that to an adult in my room and then go to use the bathroom. Sign language can be used to remind students to “stop”, that they are “too loud”, or to “work”.

The Picture Exchange Communication System (PECS) is a research-based method used to teach nonverbal students to communicate. The system begins with exchanging pictures for objects. This gives the student the ability to make choices and express needs or wants. PECS can be simple or complex depending on the student's level. Picture symbols are created, laminated, and attached with Velcro so the picture symbols do not get lost. Spencer et.al. (2008), highlighted three case studies and showed the seven-step evidence-based practice (EBP) for using PECS and the decision-making process for each step. The process could be used by teachers when trying to determine the best EBP to use with a student, under the direction of a speech language pathologist.

A visual list is a way to help students remember the steps to complete the task. A visual list can be placed in the area the list is referring to; steps to wash hands next to a sink, steps to put on/take off winter gear in a locker, steps to empty a backpack on the inside of the locker door, and steps to use the bathroom next to a toilet.

Visual Activity Schedules (VAS) can be used to help students gain independence. Hugh et.al. (2018), suggested to determine whether to use VAS, the student should have the desired skills to perform the activity but is unable to remember the correct order of completion or is unable to perform the skills independently. VAS can be placed discreetly on a desk or table spot for the students to view. VAS can be displayed on the board in front of the classroom and referred to as instruction is given and remains displayed as students work. Mahoney (2019) using VAS, predicted that students would likely benefit from structured and predictable class routines, transitions would be eased when the students knew what was expected, and visual activity schedules used with peer support would increase on-task behavior and improve assignment completion for students.

CHAPTER IV: DISCUSSION AND CONCLUSION

Summary

This working thesis explores different types of visual support to use with students who have autism along with information about when to use the different types of visuals with students. The literature review sought to understand if the type of visual support made a difference for the ASD students in a variety of situations. Research and application, has shown that visual support benefits the majority of autistic students. Visual supports are an important tool for individuals who need additional support or modifications to understand and communicate. Diamond (2018) determined that the use of visual supports proved to be successful and encouraged the use of visual supports during daily routines and planned activities. Visual supports can be used in most situations and easily adapted to individual needs, and are easily accessible and tailored to specific interests, or situations. Visual supports can be modified in size, subject, and quality. Visual support includes the use of photographs, drawings, objects, written words, lists, or hand signals. The type of visual support utilized depends on the individual more than the subject or situation. Some students were successful using a visual schedule to guide their day while others needed a shorter First-Then strip as a guide. The ease of adjusting and modifying the visual supports to meet specific student needs has made visual supports a preferred adaptive tool.

Visual support can reduce anxiety and increase student independence and confidence. According to Breitfelder (2008), by placing visual supports in an early childhood classroom setting as part of the instructional program, students who had difficulty with verbal language benefitted from eased transitions, feelings of empowerment by having choices, clearly defined expectations through the use of pictures. Additionally students were observed to demonstrate a

longer attention span and reduced anxiety. Concepts became more concrete, and there was an increase in the student's ability to express thoughts. The ability to self-navigate and follow a schedule independently increases self-esteem and self-worth. Visual supports provide structure and routine, encourage independence, build confidence, improve understanding, and provide opportunities to interact with others, which reduces frustration and anxiety.

Visual supports can include words and pictures, pictures, or only words. The ease of modifying visual supports helps teachers scaffold the learning of students. As the level of reading increases, adding words or using only words might make sense for the student. Having a discreet sheet with a schedule of times for a student can relieve the stress and anxiety of the unknown and can be available for them to rely on as needed.

Visual supports should always be paired with teacher support, especially in the beginning so that the students learn how to properly use the visual tools and eventually generalize this knowledge across categories. Martin & Wilkins, (2022) suggest making sure that the visual stimuli in the classroom are related to what the students are learning about so that if a student does get distracted by a visual, it will still be relevant to what the student is supposed to be learning about. Teachers can help students with ASD thrive in general education classrooms by paying attention to their visual displays, furniture arrangements, and lighting; reducing distracting visual stimuli is one of the easiest and most beneficial changes teachers can make to their classrooms (Martin & Wilkins, 2022).

Coogie et.al. (2018) found that social narratives increase the understanding of social situations resulting in more appropriate behaviors. They also stressed, that to most successfully utilize social narratives, the team working with a child with ASD should be clearly identified (i.e, parents, caregivers, teachers, and related service personnel) and should work together to define

their roles, the target skills important for the child to gain, and determine how the data will be collected. This study helped to demonstrate how different forms of visual communication make a difference for students and help them experience success. If a student cannot yet read, the Power Card or comic strip would be useful and less stressful than using a full social narrative.

Personalizing the social narrative type to each student based on skill levels, and interests proved to be successful in this study. The Social Narrative study informed and provided helpful information for teachers, families, and others who work with ASD students. The Coogle et.al. (2018) study was done in a way to ensure fidelity by using fidelity implication forms in each section of the study. This step was included in the plan the team developed for each student. Each member understood and followed through with their portion of the plan, helping to ensure consistency for the students and also fidelity for the study. The results demonstrated how different forms of visual communication made a difference for the student and helped them to be successful.

Professional Application

Visual supports are used throughout the country to help students to learn and communicate. There are several different types of visual supports accepted and used within classrooms that meet the evidence-based practice (EBP) based on research. In Minnesota, as educators learn more about ASD, more teachers use visual supports. Most people are used to visuals, as simple as pictures on a menu at restaurants. Children's menus include pictures along with the description of the choice. Adults rely on lists, calendars, planners, signs (his, hers, exit, etc), menus, pamphlets, etc. We should not be surprised that the acceptance and even encouragement of increased use within the classroom environment is expected. To increase the

consistency and familiarity of the visuals families of the students I work with will use the same visual support at home that we are using in the classroom.

Knight, Sartini, & Spriggs (2014) suggest that Visual Activity Schedules (VAS) are a fairly easy way to provide students with ASD consistent cues about daily activities, are widely applicable throughout the lifespan and also can increase a range of skills. VAS can be used in educational settings, in the community, in the home, etc. VAS are non-invasive tools that students or individuals can have at their disposal or displayed in a certain area to be used discreetly. VAS could be introduced and used discreetly in the classroom and throughout the day across all aspects of the daily routine at school and home.

Limitations of the Research

The articles used for this research were limited to peer-reviewed published articles available in English only. Related peer-reviewed articles not available on the electronic databases used may have been missed. Keywords used in the searches may have different variations or other terms used in other regions. The use of visual support with all children was not explored, the focus included those with ASD only.

This research was focused on elementary and preschool children. Using visual support with secondary students was not explored. The use of visual supports with children at home was not fully explored to determine if it would affect school success.

No thorough research was found considering the effectiveness of a specific type of visual used in certain situations. It was determined that visual support was effective when used with students but there were not intricate details about which visual type was used per situation. Literature focused on the positive aspect and results of using visuals..

Implications for Further Research

There are several areas that further research should be done concerning visual supports. With visual support used by an increasing number of students, research should be done to ensure that visuals are created and used in the most beneficial way for all children.

In the future, research should consider the impact of training and/or educating the staff using visual supports. More research should be done focused on the benefits and results of education and training staff and parents using visual supports with students. Does a thorough understanding help one create more effective visual supports for student use? Does consistency with visual supports across daily routines, at school and home, increase the effectiveness of the visual support?

The current body of research surrounding Visual Activity Schedules (VAS) is geared toward addressing behaviors that support self-regulation, self-care, transition, and play for individuals with ASD. Given the effectiveness of VAS in these areas, it would be beneficial to further extend the research into the completion of academic activities within the classroom (Hugh, Conner, & Stewart 2018.)

It was determined that the effects of visual scripts used on an iPad ® were successful, although it was not determined if the iPad ® was more or less effective than paper scripts. That would be something to be researched further: Would the use of an iPad ® be advantageous for students? According to Ganz et.al. (2013) an iPad ® is less conspicuous; a collection of scripts can be kept together; the iPad ® is easily carried versus cards, sentence strips or a choice board that are less convenient & easily lost; and iPads ® are commonly used so a student carrying one would not look out of place. Does the use of an iPad ® increase confidence and open students to using electronic visual supports discreetly through an iPad ®? More research should be done to

determine if an iPad ® and electronic visuals are even more beneficial than paper visual supports.

Environmental research should be done to determine if individual learning areas should be considered with barriers such as shelves, bookcases, or tape on the floor so the student recognizes expectations in each area. Does visible designation throughout the classroom help students understand what is expected? Does this reduce anxiety as students know what they are expected to do in each area?

Regarding the use of PECS, researchers should continue to study what effect the type of picture symbol may have on the attention and engagement of students; and determine if simplicity might help to promote engagement and understanding for all students when picture symbols are used in classroom settings. The researchers tried to determine if using simpler picture symbols may have impacted the outcome. Did it matter if there was only one person in the picture instead of a social group? Could limiting characters have resulted in less discomfort for the participants? Did the lack of high-interest objects distract and steal attention from the face regions in the picture symbols add to this result? Gillespie-Smith et al. (2014) suggested that these questions need to be researched to determine if the images impacted results. Yoder and Lieberman (2010) mentioned that the pictures used in the study were very well generalized, even more simple than the normal PECS photographs. This was done to determine if the child learned to generalize the use of the picture exchange system. Using similar pictures brought about some additional questions for further research. Could using a generalized picture exchange help a child begin to coordinate attention to an object and person to elicit communication? Could eliminating the need to identify and correlate a relationship between the picture and an object and then use

the picture exchange increase communication? Does the type of picture on the picture symbol matter?

Conclusion

The use of visual support for students with ASD has been explored and discussed throughout the literature review. Researchers consistently concluded that the use of visual support is an effective strategy for use with ASD students. Using approved procedures the research supports the idea that using visual supports is successful. Using visual support is like most other strategies, the effectiveness of the visual support is most beneficial when it is created with a specific student in mind.

In conclusion, teachers can be confident with the implementation and use of visual support in their classroom. Visual supports are easily modified and can be scaffolded to meet the specific needs of each student. As mentioned earlier, visual supports can be used in most situations, and are easily adapted to individual needs, are easily accessible and tailored to specific interests, or situations. Visual supports should be used in addition to verbal lessons and other teaching strategies. The ease of being able to adjust and modify the visual supports to specifically focus for individual student needs has made visual supports a preferred and easy tool to use.

Visual Supports

Types of visual support,
when. and how to use them
to support students with
ASD

Basic overview of visuals

- **Watch for overstimulation**
 - Visuals should be made with the least amount of visual clutter as able. Students need to be able to quickly understand what the visual represents.
- **Relevance**
 - Visuals should be made with a purpose in mind, not just for show. A visual should support or enhance the idea being explained to the students.
- **Bold contrast & Simple images**
 - A visual should be easy to recognize at first glance. Visuals are more successful when there is a bold contrast between the background and foreground. It is also important to keep the visuals simple to make sure they are not visually overstimulating.
- **Avoid high interest areas or objects**
 - Many think that it would be helpful to include a students high interest area or object to hook or engage a students interest. But using this may actually backfire and distract the student into thinking about that area or upset them if they can't now access that object.

Benefits of visuals

- Allow students independence
- Give a student the ability to know what to expect next
- Decrease student anxiety of the unknown
- Support learning
- Motivate students
- Effective and low in cost

When to use visuals

- Instructions (Visuals enhance the of content speaking about)
- Independent work time (activity list on board)
- Arrival & dismissal
 - In a locker to show steps to be taken at arrival/dismissal
 - Posted on the front board to show daily schedule & morning routine
- Desk area
- Small group work

Types of visuals

- Social Narrative
- Visual Schedule
- First - Then Strip
- Choice Board
- Working Towards strip
- Concept Maps
- Visual Timers
- Sign-Language
- Picture Exchange Communication System (PECS)
- Visual List
- Visual Activity Schedule (VAS)






Social Narratives

- Social narratives describe a social situation, concept, or skill in a story form. A social narrative can cover a wide range of situations. The purpose is to share accurate social information in a way that is meaningful to the student. A social narrative can be very specific to the student or generic to an idea. Pictures or illustrations help the student to understand the purpose of the story.
- A social narrative can be as short as one picture or it can be many pages long. Different types of social narratives are social scripts, comic strips/cartooning, Power Cards, and social stories.
- Social narratives can be used for hitting, big emotions, a field trip, toileting, or to help expose a student to a new situation and what might be expected.
- Social narratives are most successful when used repeatedly with a student throughout a day or month.



Visual Schedule

- Visual schedules include calendars, timelines, and timetables.
- A visual schedule increases student independence and reduces anxiety as students can visualize what event is next and how long it will last.
- A visual schedule empowers students to be independent and responsible.
- A visual schedule can reflect the whole day or divided into smaller sections, depending on the needs of the student.

Time	Activity	✓
10:55-11:25	Centers/Drawers in Launch 	
11:25-11:40	Bathroom & break in Launch 3 	
11:40-12:15	SEL with Mrs. M 	
12:20-12:45	Lunch 	
12:50-1:20	Recess 	

First - Then Strip

- First - then strips are used to help a student to understand what is expected before a reward or desired activity will happen.
- First - then strips can be a motivator for students that may tend to avoid work.

First



Math

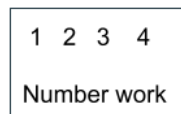
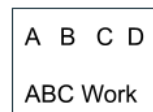
Then



iPad

Choice Board

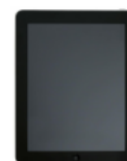
- A choice board gives the student a visual menu of activities that are allowed and expected at a given time. The board is set up by the teacher with the appropriate choices for the scheduled time. The student can independently choose an activity.
- A choice board can be used to increase independence during centers/station time. Students use the choice board to understand what is expected or allowed.
- A choice board can also be used to show activities that are allowed during free-choice time.



Working Towards Strip

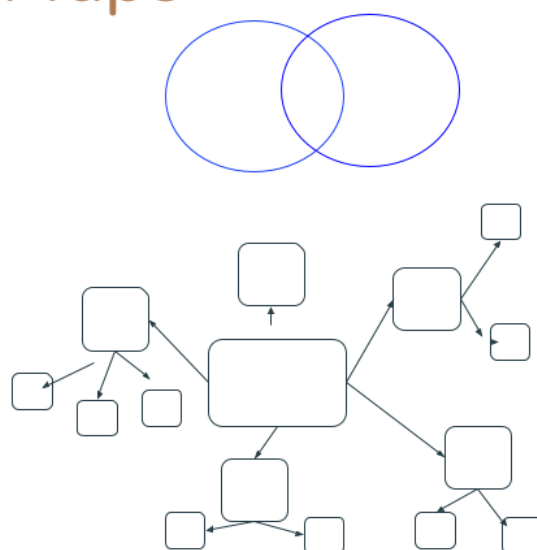
- A 'working toward' strip is a motivator that helps a student remain on task or maintain expected behavior to earn a desired break, choice, or reward.
- A 'working toward' strip can be used for short periods of time or a whole day. It is easily adjustable for a student's needs.

Working towards **iPad break**



Concept Maps

- Concept maps are used to display ideas to support student learning.
- Concept maps are used across all subject areas.
- A concept map is a diagram that illustrates the connection between different words, concepts, or ideas.



Visual Timer

- Visual timers can help ease anxiety of students wondering how much longer they have to work or how long until the next activity.
- Visual timers give the students some power and responsibility back as they can determine independently how much time is left.



Sign Language

- American Sign Language (ASL) can be easily incorporated into your daily routine.
- ASL can be used to silently signal a student or allow a student to signal you without interrupting the whole group.
- The ASL letter "T" shaken means toilet, all of my students know that they can signal that to an adult in my room and then go use the bathroom.
- Sign language can be used to remind students to "stop", that they are "too loud", or to "work".



AMERICAN SIGN LANGUAGE



Picture Exchange Communication System PECS

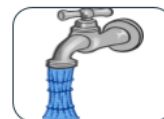
- The Picture Exchange Communication System (PECS) is a research-based method used to teach nonverbal students to communicate. The system begins with exchanging pictures for objects. This gives the student the ability to make choices and express needs or wants.
- PECS can be simple or complex depending on the student's level. Picture symbols are created, laminated, and attached with Velcro so the picture symbols do not get lost.



Visual List

- A visual list is a way to help students remember the steps to complete the task.
- A visual list can be placed in the area the list is referring to; steps to wash hands next to a sink, steps to put on/take off winter gear in a locker, steps to empty a backpack on the inside of the locker door, and steps to use the bathroom next to a toilet.

Water on



Soap, rub hands



Rinse hands



Water off &
Dry hands



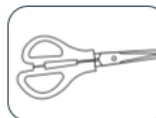
Visual Activity Schedule

- Visual Activity Schedules (VAS) can be used to help students gain independence.
- VAS can be placed discreetly on a desk or table spot for the students to view.
- VAS can be displayed on the board in front of the classroom and referred to as instruction is given and remains displayed as students work.

Step 1: Write name
Color shapes



Step 2: Cut shapes



Step 3: Glue shapes to
match



Step 4: Put in basket



Social story visual

<http://blogs.sd41.bc.ca/lss/resource-centre/visual-supports/social-stories/>

References

- Angermeier, K., Schlosser, R.W., Luiselli, J.K., Harrington, C., & Carter, B. (2008), Effects of iconicity on requesting with the picture exchange communication system in children with autism spectrum disorder. *Research in Autism Spectrum Disorders* Volume 2, Issue 3, July–September 2008, Pages 430-446. <https://doi.org/10.1016/j.rasd.2007.09.004>
- Bateman, K. J., & Wilson, S. E. (2021). Supporting diverse learners with autism through a culturally responsive visual communication intervention. *Intervention in School and Clinic*, 56(5), 301–307. <https://doi.org/10.1177/1053451220963090>
- Breitfelder, L.M. (2008). Quick and easy adaptations and accommodations for early childhood students. *Teaching Exceptional Children-Plus*, 4. [Quick and Easy Adaptations and Accommodations for Early Childhood Students \(ed.gov\)](https://www.ed.gov/teaching-exceptional-children-plus/4/quick-and-easy-adaptations-and-accommodations-for-early-childhood-students)
- Carr, D. & Felce, J. (2008), Teaching picture-to-object relations in picture-based requesting by children with autism: A comparison between error prevention and error correction teaching procedures. *Journal of Intellectual Disability Research*, v52 n4 p309-317 Apr 2008. <http://dx.doi.org/10.1111/j.1365-2788.2007.01021.x>
- Coogle, C.G., Ahmed, S., Aljaffal, M.A., Alsheef, M. & Hamdi. H. (2018) Social narrative strategies to support children with autism spectrum disorder. *Early Childhood Educ J* 46, 445–450 (2018). <https://doi.org/10.1007/s10643-017-0873-7>
- Diamond, L. L. (2018). Problem solving using visual support for young children with autism. *Intervention in School and Clinic*, 54(2), 106–110. <https://doi.org/10.1177/1053451218765234>
- Ganz, J.. (2007). Classroom structuring methods and strategies for children and youth with autism spectrum disorders. *Exceptionality*. 15. 249-260. 10.1080/09362830701655816.

- Ganz, J. B., Boles, M. B., Goodwyn, F. D., & Flores, M. M. (2014). Efficacy of handheld electronic visual supports to enhance vocabulary in children with ASD. *Focus on Autism and Other Developmental Disabilities*, 29(1), 3–12.
<https://doi.org/10.1177/1088357613504991>
- Gillespie-Smith, K., Riby, D.M., Hancock, P.J.B. and Doherty-Sneddon, G. (2014), Attention, communication and autism spectrum disorder. *J Intellect Disabil Res*, 58: 459-470.
<https://doi.org/10.1111/jir.12043>
- Hugh, M., Conner, C., & Stewart, J. (2018). Intensive intervention practice guide: Using visual activity schedules to intensify academic interventions for young children with autism spectrum disorder. 10.13140/RG.2.2.16021.83681.
- Jackson, E. M., & Hanline, M. F. (2020). Using a concept map with RECALL to increase the comprehension of science texts for children with autism. *Focus on Autism and Other Developmental Disabilities*, 35(2), 90–100. <https://doi.org/10.1177/1088357619889933>
- Knight, V., Sartini, E. & Spriggs, A.D. Evaluating visual activity schedules as evidence-based practice for individuals with autism spectrum disorders. *J Autism Dev Disord* 45, 157–178 (2015). <https://doi.org/10.1007/s10803-014-2201-z>
- Mahoney, M. W. M. (2019). Peer-mediated instruction and activity schedules: Tools for providing academic support for students with ASD. *TEACHING Exceptional Children*, 51(5), 350–360. <https://doi.org/10.1177/0040059919835816>
- Martin, R., & Wilkins, J. (2022). Creating visually appropriate classroom environments for students with autism spectrum disorder. *Intervention in School and Clinic*, 57(3), 176–181. <https://doi.org/10.1177/10534512211014882>

- Roberts, V. & Joiner, R. (2007). Investigating the efficacy of concept mapping with pupils with autistic spectrum disorder. *British Journal of Special Education*. 34. 127 - 135.
10.1111/j.1467-8578.2007.00468.x.
- Smith, D.L. & Gillon, G.T. (2004). Autistic spectrum disorder: Caseload characteristics, and interventions implemented by speech-language therapists. *Kairaranga*, v5 n2 p46-54.
<https://doi.org/10.54322/kairaranga.v5i2.271>
- Spencer, T. D., Petersen, D. B., & Gillam, S. L. (2008). Picture exchange communication system (PECS) or sign language: An evidence-based decision-making example. *TEACHING Exceptional Children*, 41(2), 40–47. <https://doi.org/10.1177/004005990804100205>
- Trembath D, Vivanti G, Iacono T, Dissanayake C. Accurate or assumed: visual learning in children with ASD. *J Autism Dev Disord*. 2015 Oct;45(10):3276-87. doi: 10.1007/s10803-015-2488-4. PMID: 26070275.
- Yoder, P.J., Lieberman, R.G. Brief Report: Randomized test of the efficacy of picture exchange communication system on highly generalized picture exchanges in children with ASD. *J Autism Dev Disord* 40, 629–632 (2010). <https://doi.org/10.1007/s10803-009-0897-y>
- Zimmerman, K. N., & Ledford, J. R. (2017). Beyond ASD: Evidence for the effectiveness of social narratives. *Journal of Early Intervention*, 39(3), 199–217.
<https://doi.org/10.1177/1053815117709000>