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Visual Activity Schedules and Students with Autism Spectrum Disorder: A Review of the Literature

By Luis Figueroa

This issue of **NASET's Autism Spectrum Disorder Series** was written by Luis Figueroa from Florida International University. The article is a review of the literature focusing on visual activity schedules and students with ASD. Students with disabilities, including those with ASD, are now expected to meet all academic demands in all content areas. Students with disabilities are also expected to participate in all high-stakes testing mandated by the state. Schools throughout the nation are being held accountable for each of their students' academic performance, including students with ASD. According to researchers, about 36% of students with ASD are participating in general education classrooms for more than 80% of their school day (Hart Barnett & Cleary, 2015). It is important to keep in mind that many instructional programs provided to students with ASD focus on communication, social, functional, and life skills (Hart Barnett & Cleary, 2015). Content area skills may not be thoroughly instructed or taught. Mathematics is one of the content areas that the nation considers to be of high priority for all students. However, there are fewer evidence-based interventions known for math that may help increase mathematical fluency. Researchers have extensively analyzed the effects of Visual Activity Schedules (VAS) and determined that the evidence-based practice has helped students with ASD reduce off-task, behaviors, dependency on adults, and facilitates smooth transitional times (Spencer, Evmenova, & Boon, 2014).

Abstract

Students with disabilities, including those with ASD, are now expected to meet all academic demands in all content areas. Students with disabilities are also expected to participate in all high-stakes testing mandated by the state. Schools throughout the nation are being held accountable for each of their students' academic performance, including students with ASD. According to researchers, about 36% of students with ASD are participating in general education classrooms for more than 80% of their school day (Hart Barnett & Cleary, 2015). It is important to keep in mind that many instructional programs provided to students with ASD focus on communication, social, functional, and life skills (Hart Barnett & Cleary, 2015). Content area skills may not be thoroughly instructed or taught. Mathematics is one of the content areas that the nation considers to be of high priority for all students. However, there are fewer evidence-based interventions known for math that may help increase mathematical fluency. Researchers have extensively analyzed the effects of Visual Activity Schedules (VAS) and determined that the evidence-based practice has helped students with ASD reduce off-task, behaviors, dependency on adults, and facilitates smooth transitional times (Spencer, Evmenova, & Boon, 2014).

As the country enters a period of high accountability for teachers and students and the continued push to mandate full access of curriculum instruction for students with autism spectrum disorder (ASD) through federal laws such as the No Child Left Behind (NCLB) and the Individuals with Disabilities Education Improvement Act (IDEA 2004) (Spencer, Evmenova, & Boon, & Harris, 2014).

Students with disabilities, including those with ASD, are now expected to meet all academic demands in all content areas. Students with disabilities are also expected to participate in all high-stakes testing mandated by the state. Schools throughout the nation are being held accountable for each of their students' academic performance, including students with ASD.

As the inclusion model of instruction becomes increasingly common in our nation, many students with ASD are being exposed to general education classrooms. According to researchers, about 36% of students with ASD are participating in general education classrooms for more than 80% of their school day (Hart Barnett & Cleary, 2015). This number has increased drastically during the recent years due to the rising numbers of advocates promoting full inclusion for students with disabilities and recently updated federal laws. Even though many of these students' needs and services are determined by their Individualized Educational Plan (IEP) the national/federal expectation is that they will access and learn the same curricular content as their general education peers. It is important to keep in mind that many instructional programs provided to students with ASD focus on communication, social, functional, and life skills (Hart Barnett & Cleary, 2015). Content area skills may not be thoroughly instructed or taught.

Mathematics is one of the content areas that the nation considers to be of high priority for all students. However, there are fewer evidence-based interventions known for math that may help increase mathematical fluency. Much of the emphasis of evidence-based practices has been placed on reading. Many students with ASD lack the skills necessary to master mathematical understanding. Math is an area of concern for the nation because about 25% of students with ASD deal with some type of mathematical disability (Hart Barnett & Cleary, 2015). Recent research indicated a much slower growth rates in calculation skills as likened to students with disabilities.

Even though many of the students are able to maintain adequate mathematics performance abilities while in the primary grades, many of them will struggle once they enter the intermediate and middle school grades. The content in these grades is believed to be more abstract, cognitively complex, and focuses on high order/ problem solving skills (Hart Barnett & Cleary, 2015). Such skills may be extremely difficult for students with ASD due to their poor ability to think abstractly and to truly breakdown a complex mathematical problem. According to researchers, many of the difficulties students with ASD face in mathematics are due to the lack of planning, organization, attention, self-monitoring, and off-task behaviors (Hart Barnett & Cleary, 2015). In many occasions teachers' instruction is affected by the off-task behaviors and transitional problems. Therefore, they spend most of their instructional time focusing on correcting the students behaviors and helping them transition from one activity to the next.

Due to the lack of academic instruction, students with ASD may not be mastering mathematical skills. Students with disabilities tend to be at the lowest levels academically then their general education peers, however, in some occasions the disability may not be the only cause. Many school districts also lack the funds necessary to provide teachers and students with additional support in their classrooms. Many of the educational organizations such as the National Council of Teachers of Mathematics (NCTM), the National Mathematics Advisory Panel (NMAP), and the Common Core Standards for academics, are asking for in-depth instruction of whole numbers for all elementary aged students (Stroizer, Hinton, Flores, & Terry, 2015). The same organizations are also suggesting that all students in the elementary level should develop an understanding of the basic operations of addition, subtraction, multiplication, and division. In addition, these organizations believe that students should be fluent with all standard algorithms for addition, subtraction, multiplication, and division (Stroizer, et al., 2015). According to the NMAP, practicing and building fluency of conceptual whole numbers will allow students to build and achieve automaticity of all the basic skills. Students will be able to say answers fast, accurately, and effortlessly. Building and mastering these skills will allow the student more space in the working memory to process more complex mathematical problems (Stroizer, et al., 2015).

Researchers have extensively analyzed the effects of Visual Activity Schedules (VAS) and determined that the evidence-based practice has helped students with ASD reduce off-task, behaviors, dependency on adults, and facilitates smooth transitional times (Spencer, Evmenova, & Boon, 2014).A VAS is set of pictures or words that provide students with cues of activities that need to be completed for the week. Students can learn how to use a VAS by being introduced to one activity at a time, allowing the students to get familiar with the picture cue and how to transition to the next activity. Teachers must also be consistent and remind students to check their schedules every day.

A VAS can be presented to the student in multiple including, paper-based, computer-based, or through video modeling. A teacher can create a binder with a picture of a single activity or step, each on a different page (Meddan, Ostrosky, Tripplett, Michna, & Fettig, 2011). A teacher can also use a power point presentation where each slide presents a new activity or step (Meddan, Ostrosky, Tripplett, Michna, & Fettig, 2011).

The VAS approach provides students with a foreseeable routine allowing them to know what to expect, inevitably lowering anxiety levels (Banda, Grimmertt, & Hart, 2009). VAS can help promote on-task behaviors, which may lead to helping students with ASD manage activities in an inclusive setting (Pierce, Spriggs, Gast, & Luscre, 2013). Many experts believe that visual supports are extremely beneficial for children and adults with ASD because they are able to process visual information much better than auditory information. Studies have shown that the implementation of a VAS results in decreased prompting by adults, making the students more independent (Schneider & Goldstein, 2010). Visual schedules are beneficial and used by everyone in their daily lives. It's what keeps people on time for meetings, doctor appointments, and family functions. The implementation of a VAS can be viewed as an antecedent strategy to help reduce adult dependency and increase independent behaviors (Pierce, Spriggs, Gast, & Luscre, 2013).

The VAS can also help students with problem solving skills. Researchers believe that many students who are diagnosed with ASD lack problem solving skills because they highly depend on adults to solve the situation (Cote, Jones, Barnett, Pavelek, & Ngugen, 2014). Even though research has shown that problem solving skills are essential for students with ASD to function in the real world, many teachers still question the benefits of teaching such skills. Problem-Solving skill can help provide any students with disabilities with the appropriate tools to handle a problem with the correct solutions (Cote, Jones, Barnett, Pavelek, & Ngugen, 2014). Problem solving abilities will help students with ASD solve basic and more complex problems that may arise throughout their day during interactions with teachers, peers, and other adults in their lives.

In a study conducted by Cote, Barnett, Pavelek, and Ngugen, three elementary aged students were selected to participate. All three participants were diagnosed with autism and two of the students participated fully in an inclusion classroom setting. One student received instruction in a special education classroom. The students were exposed to several problem-solving interventions and they were all able to successfully achieve their goals. Researchers believe the study is useful for teacher when planning instruction. The study was able to demonstrate a functional relationship between the intervention provided and students achieving the desire problem-solving skills (Cote, Jones, Barnett, Pavelek, & Ngugen, 2014).

It is important to know that the numbers of students with ASD participating in a general education classroom has drastically increased, therefore, it is beneficial for students with this disability to have the ability to problem solve. Researchers consider problem-solving crucial for students participating in inclusion classroom because it will increase the student's acquisition of self-determination skills and teaches them how to self-regulate their own behaviors (Cote et al., 2014). It is important for teachers to understand how important problem-solving instruction is at an elementary level, research has shown that students with ASD will be able to better generalize and maintain these skills throughout their lives.

Problems behaviors during transitions can greatly impact the student's academic progress, social skills, and independence. It may also impact the teacher's effectiveness of instruction and disrupt other students' academic environment. Based on a study conducted by Schneider and Goldstein (2010), the implementation of this strategy showed that many of the students were able to complete the correct task and transition to a new activity with appropriate behaviors (Schneider & Goldstein, 2010).

The participants in the study were three kindergarten students who were diagnosed with autism. These students demonstrated off-task problem behaviors and had impaired verbal and social communication. It should be noted, however, that some studies have determined that the implementation of a VAS is not enough to eliminate problem behaviors immediately. Researchers also determined that preschoolers required additional time and training, in order to understand how to use a VAS accurately. After proper training the preschoolers were able to accurately follow the VAS (Meddan, Ostrosky, Tripplett, Michna, & Fettig, 2011).

Activity schedules can easily be incorporated in multiple settings, such as general education classrooms, resource rooms, and home settings (Pierce, Spriggs, Gast, & Luscre, 2013). A VAS can be widely used across the entire autism spectrum and in any school setting from preschool to high school (Meddan, Ostrosky, Tripplett, Michna, & Fettig, 2011). Researchers found that when implementing a VAS with systematic instruction, many of the students made huge progress.

The use of a VAS, which has proven to reduce off-task behaviors and aid during transitional times, allows students to more actively engage in what they are learning during each activity. The classroom teacher can focus more on teaching new academic skills and less on behaviors. Based on a study conducted on the effectiveness of a VAS in a physical education class, some of the biggest challenges students with ASD face when attempting to appropriately learn exercises being taught consist of minimal awareness of their surroundings and difficulties engaging in cooperative play (Fittipaldi-Wert & Mowling, 2009).

When a VAS was implemented students were able to learn the correct exercises and collaboratively interact with other peers in the class (Fittipaldi-Wert & Mowling, 2009). Students were able to learn the skills being taught much quicker and effectively than when a VAS was not being used (Fittipaldi-Wert & Mowling, 2009). The implementation of a VAS may help students with ASD with academic progress, making it more likely that they will acquire new skills successfully.

Educators across the nation understand the importance of providing students with autism with an appropriate and adequate education. They believe that the strategies being implemented at the school must be e evidence-based in order to ensure that such interventions will work for all students. According to the NCLB Act and IDEA 2004, teachers are only allowed to implement interventions that are considered to be evidence-based practice (EBP). Researchers consider an intervention evidence-based, when it is implemented consistently and reliably and provides positive results across multiple research studies (Spencer, Evmenova, & Boon, 2014). Researchers also believe that the rigor of the study design, the methodological quality, the amount of impact the study has on society, and the overall quality of the study are all key indicators for a good Evidence-based practice. The VAS has been identified to meet the requirements to be considered an evidence-based intervention that is extremely beneficial for students with ASD. Researchers used a series of guidelines to help determine if a VAS can be considered an EBP. They used single-subject research methods for special education indicators and also used Horner et al's. (2005) guidelines for evaluating research to determine EBP (Knight, Sartini, & Spriggs, 2015).

The literature review supports the proposed action research that will explore whether using a visual activity schedule will increase multiplication fluency. Much of the research conducted supports the use of VAS to help reduce off-task behaviors, help with transitional times, and reduce adult dependency. However, there is a lack of research on how a VAS may help improve conceptual understanding in all content areas. Further research to explore the effects of VAS on academic achievement in content areas such as math, will greatly benefit many students with ASD.

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About the Author

My name is Luis Figueroa I am a recent Graduate student from Florida International University. I was able to attain my Master's Degree in Special Education with a Specification in Autism. I am currently working at an Inner City in school in Broward County as an Exceptional Education Teacher. My job is truly my passion, I enjoy working with students with disabilities and providing them with an opportunity to be successful. I am a strong believer that every child can learn no matter what disability they may have, it is all about accommodating their educational needs. I was very excited when I conducted this study and glad with the outcome."