
2022

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Research Presented at National Association for Professional Development Schools (NAPDS) Conference

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Recommended Citation

Sein, Naomi A. (2022) "Enhancing the Educational Environment: Improving Student Outcome Using Visual Supports," *PANDION: The Osprey Journal of Research and Ideas*: Vol. 3: No. 1, Article 7.

Available at: https://digitalcommons.unf.edu/pandion_unf/vol3/iss1/7

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Enhancing the Educational Environment: Improving Student Outcome Using Visual Supports

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Abstract

Students in varying educational settings are supplied with varying levels of academic support. While it is well known that academic supports assist students in learning academic content, visual supports are proven to improve and develop academic language and improve academic proficiency. Visual supports assist students in becoming more knowledgeable of academic content by increasing student engagement and the implementation of classroom structure. The overall focus of this research project was to determine the effectiveness of visual academic supports within primary education, specifically the behavioral and academic impacts of visual aids in a Communication and Social Skills (CSS) classroom at Willow Grove Elementary School within the Duval County School District. The preliminary conclusions of the study are that the visual supports made more consistent academic impacts than behavioral impacts on the students observed.

School Background Information

My internship was at Willow Grove an Elementary School located in Jacksonville, Florida. At the time of the internship, this Title I elementary school consisted of 993 students and 60 teachers/ support staff (National Center for Education Statistics, 2021). The student body was a diverse group of students, consisting of 54% Caucasian and 46% minority students (National Center for Education Statistics, 2021). At the time of the internship, all students were eligible for free breakfast and 43% of the student body was eligible for or received free or reduced lunch. The ratio of student to teacher averaged 16:1, however, some classes received extra support, including those in the Communication and Social Skills (CSS) Program offered at the school. The CSS program consists of 72 students with a diverse range of exceptionalities. In addition to the CSS program, the school also has a Voluntary Pre-Kindergarten

(VPK) Program, which is not offered in all schools throughout the district.

Classroom Background

In my internship, I conducted observations, instructional assistance, and one-on-one small groups with students in a third-grade self-contained CSS classroom. This classroom consisted of nine students with varying exceptionalities, including Autism Spectrum Disorder (ASD), Intellectual Disability (ID), and Specific Learning Disabilities (SLD). All students have an Individualized Education Program (IEP). The classroom has varying decorations hanging from the ceiling, decorations on all the walls, and at the front of the room, student work can be located. On the board at the front of the classroom is a visual schedule and the Florida State Standards with the students' learning objectives. The room has three rows

of student desks with three students in each row. In addition to the student-arranged rows, there are two work areas that have crescent moon-shaped tables, one located in the back of the classroom, and the other located at the front corner of the classroom. Both work areas were utilized for instructor and student-led centers. Lastly, in the front of the classroom is a desk utilized to project information on the board at the front of the classroom. A graphical depiction of the classroom layout is shown in Figure 1.

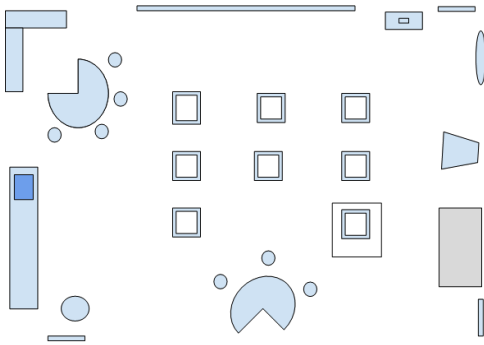


Figure 1. Classroom graphic layout. The room has three rows of student desks with three students in each row. In addition to the student-arranged rows, there are two work areas that have crescent moon-shaped tables, one located in the back of the classroom, and the other located at the front corner of the classroom.

Teaching Responsibilities

As a student intern in a third-grade self-contained CSS Classroom, teaching responsibilities vary. When starting my internship, I assisted with check-in by ensuring that students walk to the correct classroom and had their temperatures checked upon entering the building. In this classroom, I aided the students in their breakfast clean-up and morning work before conducting their math lessons. During the math lessons, I utilized guided practice, explicit instruction, and modeling to ensure students' understanding of the math content. I usually provided students with a worksheet which served as an informal formative

assessment. This worksheet was utilized during the lesson as group work and independent work, depending on the lesson for the day. Once the students had completed their math work, they were asked to read independently before transitioning to their lesson in language arts. As a student intern, I typically led the lesson for math. During the other lessons conducted throughout the day, I provided students with one-on-one instruction when they needed extra instruction on the course content.

COVID's Impact

Over the past few years, education and other public entities have been faced with many challenges related to the worldwide pandemic, COVID. Also known as Coronavirus, COVID is an infectious disease caused by the SARS-CoV-2 virus (World Health Organization, 2020). This disease spreads rapidly and causes respiratory illness and in serious instances can be fatal. When beginning my internship experience, I witnessed first-hand the extent to which this virus is contiguous to individuals. Within my internship, in the Exceptional Students Education (ESE) Department, 14 of 21 adults had been absent from their classrooms due to COVID. Therefore, there had been a serve shortage of individuals to sustain the students within the classes. The impact of the virus had not only impacted the adults within these ESE classrooms, but there were also several classes in which over half of the students had tested positive for the coronavirus as well. This impact led to inconsistencies with instruction, inconsistencies in students' behavior, and the remaining staff to feel overworked with limited resources.

Context of Inquiry

Within education, there are many challenges. As an intern within ESE Program, I had the opportunity to see the high demand for intervention for students with exceptionalities. Through observations within Physical Impaired (PI), Emotional Behavioral Disorder (EBD), and Communication and Social

Skills (CSS) classrooms, I had the opportunity to learn in and explore different educational settings, which refers to “the diverse physical locations, contexts, and cultures in which students learn” (Great Schools Partnership, 2013). Every educational setting in which students with exceptionalities learn has its own unique characteristics. As a teacher candidate observing a PI classroom, I determined that the classroom is characterized as a learning environment that provides an accessible space for students that utilize wheelchairs, students that utilize walkers, and students with other functional limitations to allow for proper intervention to improve these students’ learning outcomes (Great Schools Partnership, 2018). I was also placed as an intern was an EBD classroom, which is characterized by the adaptations made for students who have pervasive and/or emotional behaviors that adversely impact their learning outcomes (Great Schools Partnership, 2018). Lastly, I had the opportunity to intern in a CSS classroom. This educational setting is uniquely characterized by its ability to provide intervention and supports for students with communication and social limitations to make the learning environment more accessible (Great Schools Partnership, 2018). Across each of these educational settings, different academic supports were utilized. Academic supports *“entails a variety of instructional methods, educational services, and school resources that help students accelerate skill acquisition and learning progress, meet expected school requirements and competencies, and succeed in their education”* (Great Schools Partnership, 2018). However, in each of these settings, instructors utilized visual supports to enhance their instruction. This led me to wonder about the overall effectiveness of visual supports as a strategy to enhance outcomes for students with disabilities.

As a teacher candidate, over the different semesters and these experiences, I had the opportunity to provide intervention support, which is defined as actions taken to improve the students’ learning outcomes (Great Schools Partnership, 2018). In

providing intervention support, I determined that some actions taken were not effective at improving student learning. This determination was made based on students’ formative classroom assessments and informal assessments including classwork and other daily tasks. After making this determination, I asked what form of visual supports had the greatest impact on students’ learning outcomes.

Instructional Tools and Supports

Within education, there are many tools used to improve students’ learning outcomes, especially for kinesthetic, visual, auditory, and other learners. Which type of instructional tools and supports will best benefit a classroom with a variety of learning needs has been called into question. For example, for kinesthetic learners, learning needs include physical movement integrated into instruction (Wiley Educational Resources, 2021). In lesson instruction this can include activities that keep students from remaining stagnant during the instructional time and allows the students to utilize hands-on activities to be more involved in the instruction occurring. For visual learners, learning needs include visuals, images, and graphics to support instruction (Wiley Educational Resources, 2021). In lesson instruction, this can include the use of graphics, charts, and other visual aids that support the information provided in the instruction. Auditory learners, prefer “instructional discussion, the use of audio, and other auditory forms of instruction” (Wiley Educational Resources, 2021). Specifically, this includes classroom discussion, lecture, and Socratic seminars that add audio components/ inclusions to the instruction occurring. All these students’ learning needs differ, therefore, multiform instructional tools and supports provide the ability for learners’ needs to be met. This has led many to question which instructional tools and supports have the largest benefit for student outcomes.

For this inquiry, I chose visual aids as an instructional tool of interest. The instructional

implementation of visual supports should increase students' outcomes on classroom formal assessments, classroom tasks, and end-of-unit summative assessments. Therefore, the purpose of this inquiry was to ascertain the evidence pertaining to the overall benefits of the implementation of visual supports in the classroom setting.

Academic Support vs. Visual Supports

In understanding the ways to improve students' learning outcomes, an instructor needs to understand the instructional strategies that support students. Academic support includes a variety of "instructional methods, educational services, and school resources available to accelerate skills acquisition" (Great Schools Partnership, 2018). Because it is proposed that the instructional methods, educational services, and school resources all have a role in students' outcome, this review is limited to the academic supports that examine the instructional methods teachers use to increase students' learning outcomes.

Visual supports are a variety of "images, pictures, and visual items which give students access to their learning content/learning environment" (Rao & Gagie, 2006, pg. 27). While examining the overall usefulness of visual supports, there was a high prevalence of research surrounding the implementation of visual supports in Exceptional Students Education (ESE) classrooms.

Inquiry Question

For this project, my inquiry question was: *"How do students with exceptionalities within a CSS classroom benefit academically from the use of visual supports in the educational environment?"* This inquiry stems from the growing population of students with exceptionalities within the public school system and the different means of academic intervention the public school system provides for students with exceptionalities.

Selection of Participants

During my internship, I conducted observations and provided instructional assistance, and one-on-one small groups with students in a third-grade self-contained CSS classroom. The classroom consisted of nine students with varying exceptionalities, all of whom had an IEP. The demographics of the nine students consisted of 22 percent (2 students) non-verbal students and 55 percent (5 students) on Florida's Alternate Curriculum standards also known as Assess Points. When determining which participants to include in my inquiry project, I determined that the students that would benefit from visual supports intervention were the students on Access-Points. These students on Access Points consisted of five third grade students, all of whom have an IEP on file. These students were chosen because they are in third grade performing academically between a kindergarten to first grade level in reading curriculum and math curriculum. In addition to performing at similar levels academically, these students also have similar accommodations and related services included on the IEPs, including directions read aloud and extended time on classroom tasks, as well as bi-weekly meetings with the Speech-Language Pathologist (SLP), respectively. The accommodations and related special education services are appropriate for the inquiry question and reflects accurate intervention implementation.

Data Collection Procedures

To answer the question, *"How do students with exceptionalities within a CSS classroom benefit academically from the use of visual supports in the educational environment?"* The pre-intervention data collected were students' scores on Performance Measures Assessments (PMA) and students' average performance level on classroom tasks. Classroom tasks assessed included classwork, formative/summative classroom assessments, and homework accuracy/completion. These pre-intervention data

determined the student's starting academic level of performance and hence provided a baseline of students' performance prior to intervention provided through visual supports. Additionally, by determining the baseline for students' academic performance, the post-intervention data should reflect the areas in academic content that made improvement after the intervention was provided.

The intervention that was provided to students was three forms of visual supports, including visual schedules, behavior flip-cards, and first/then cards (Figure 2). These three forms of visual support were implemented within the classroom to support smoother transitions from one academic content to another and eliminated behaviors that prevent academic instruction. The intervention spanned over an eight-week time frame. Week one was strictly initial data collection and classroom observation. In weeks two through week seven, the implementation of visual supports took place. The students were taught the meaning of symbols/images on visual support, how to use the visual supports, and a gradual release of responsibility of the visual support to the students utilizing the visual support. In week eight, the post-intervention data was collected and analyzed to reflect the overall benefits academically of the implementation of visual supports in an ESE program.

the overall effects of visual supports on students learning and on students' behaviors to answer the question *"How do students with exceptionalities within a CSS classroom benefit academically from the use of visual supports in the educational environment?"* The data collected were both quantitative and qualitative, which allowed a variety of analyses. The wide range of data included notes students' behaviors and the duration/times of behavioral incidents because students' behavioral incidents impact the educational environment which could impact students' outcomes. The students' pre-performance data was collected to reflect students' outcomes prior to intervention and the post-performance data to reflect students' outcomes after intervention.

For the quantitative and qualitative data collection, a chart was constructed with five-minute increments throughout the school day, from 8:00 a.m. to 2:45 p.m., to track behavioral incidents and duration (Figure 3). The chart was marked when an incident occurred and again if the incident continued through the five-minute increment. As a continuation of data collection on behaviors occurring in the educational space, an Antecedent, Behavior, and Consequence (ABC) chart was completed with details regarding the behaviors that were noted on the time chart. These two forms of behavioral data collection served to help in understanding the behaviors and the student's educational environment during instructional execution. Behaviors throughout the internship experience were recorded for five students. The initial observations served as a baseline to which behaviors after implementation of the visual supports could be compared. Other forms of data collected during this process included quantitative data on students' weekly assessments. Like for the behavioral data, the performance of students on course materials before, during and after this process was implemented was compared.

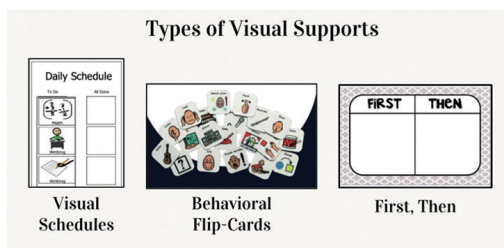


Figure 2. Types of visual supports. The three types of visual supports used in this study are shown.

Establishing that visual supports could influence students' outcomes led to initial data collection of students' behaviors, the duration/times of behavioral incidents, and pre/post student performance data. The data were collected with the intention of determining

| Antecedent | Behavior | Consequence |
|--|---|---|
| Student was asked to sit down and complete morning work. | Student continued to walk around the classroom and began huffing/breathing heavy throwing small items (Pens/eraser/poppers) | Teacher redirect task Postponed, Students laugh, and students watch |
| Student was asked to sit down and complete morning work. | Student continued to walk around the classroom and began huffing/breathing heavy throwing small items (Pens/eraser/poppers) | Teacher redirect task Postponed, Students laugh, and students watch |
| Student was asked to switch from one rotation in stations to another | Student began to walk around the classroom and began talking louder/refusal of assigned tasks | Teacher redirect task Postponed, Students laugh, and students watch |
| Student was asked to sit down and complete work. | Student continued to walk around the classroom and began huffing/breathing heavy throwing small items (Pens/eraser/poppers) | Teacher redirect task Postponed, Students laugh, and students watch |
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| Time | Behaviors | | | |
|----------|-----------|---|---|---|
| 8:45 AM | X | | | X |
| 9:00 AM | X | | X | X |
| 9:15 AM | X | | X | X |
| 9:30 AM | X | X | X | X |
| 9:45 AM | | X | X | |
| 10:00 AM | | X | | |
| 11:45 AM | | | | X |
| 12:00 PM | | | X | X |
| 12:15 PM | | | X | X |
| 12:30 PM | | X | X | X |
| 12:45 PM | | X | X | |
| 1:00 PM | X | | | |
| 1:15 PM | X | | | |

Other Notes:

Behaviors typically occur upon arrival and reoccur upon afternoon transition

Function of Behavior: Task Avoidance, Attention Seeking (Behavior does not continue if classroom is evacuated), and to see peers' reaction

Figure 3. ABC data table and time chart. Example antecedent, behavior, and consequence for each incident observed. The time chart was used to log the time and duration of the behaviors logged in the ABC chart.

Behavioral Results

Figure 4 displays the average duration of behaviors for the student J.A. per week over the course of the six weeks of intervention. As compared to baseline (1/31-02/04), the durations of behaviors during the study showed little to no variation. This implies that the visual supports had little impact on student J.A.'s behavior. Also, these results imply that the short-term effect of the visual supports varied per week. JA data showed variations in the average of each week's weekly behavioral average duration. It is not known if there were external factors that were impacting the results for J.A.

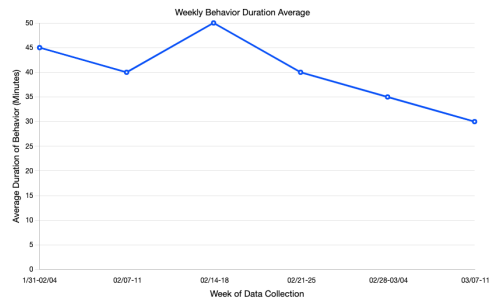


Figure 4. Weekly behavior duration average for student J.A. The average duration (in minutes) was plotted for each week of the study, which was conducted from January 31 to March 11, 2022.

Figure 5 displays the average duration of behaviors for the student E.H. over the course of the six weeks of intervention. As compared to baseline, the durations of behaviors showed a decrease after the start of implementation of visual supports within the classroom. This implies that the visual supports impacted E.H.'s duration of behaviors. Also, these results imply that the short-term effect of the visual supports helped E.H to make slight decreases in the duration of behavior. Based on these key findings for student E.H. further studies will need to be conducted to determine which visual support could have a greater impact on the student's behavior within the learning environment.

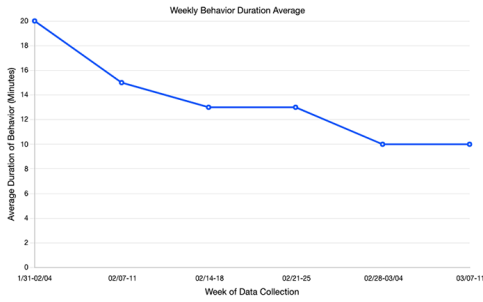


Figure 5. Weekly behavior duration average for student E.H. The average duration (in minutes) was plotted for each week of the study, which was conducted from January 31 to March 11, 2022.

Figure 6 displays the average duration of behaviors for the student J.K. over the course of the six weeks of intervention. As compared to baseline, the durations of behaviors had significant variations. These results imply that the visual supports impacted J.K. behaviors both positively and negatively. These inconsistent results led to conversations with the guardians of J.K. and the Applied Behavioral Analyst (ABA) assigned to J.K. Through these discussions, we concluded that throughout the six-week implementation period, changes and inconsistencies in the student’s medication may have led to significant variations in behaviors. Therefore, the impact of visual supports on J.K. behavioral outcomes cannot be accurately concluded.

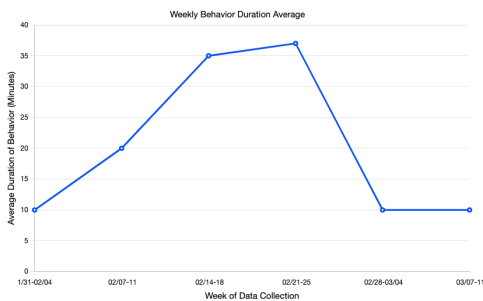


Figure 6. Weekly behavior duration average for student J.K. The average duration (in minutes) was plotted for each week of the study, which was conducted from January 31 to March 11, 2022.

Two additional students, A.V. and O.T., did not have a significant number of behaviors recorded. The behaviors that were observed can be summarized as small instances that did not cause a disruption to peers during instruction. Therefore, the benefits of visual aids on these students’ behavior were not evaluated.

When beginning data collection all the students received a weekly average conduct grade that reflected completion of tasks and behavioral impacts on those assigned tasks. These results concluded that students with less behaviors were able to thoroughly complete assigned tasks and had less distractions on given tasks (Table 1).

Table 1: Grades Assessment

| | | Freckle (Math) | Freckle (Math time Min) | Freckle (Read/ELA) | Freckle (BE/ELA time Min) | PMA (R/ Raw) | PMA (Band) | PMA (Math Raw) | PMA (Band) |
|---|----------------------|----------------|-------------------------|--------------------|---------------------------|--------------|------------|----------------|------------|
| 1 | J.A. (Gen. Ed.) | N/A | N/A | N/A | N/A | 10 | 10 | 13 | 13 |
| 2 | E.H. (Gen. Ed.) | N/A | N/A | N/A | N/A | 15 | 15 | 16 | 16 |
| 3 | J.K. (Access Points) | 45 | 55 | 80 | 122 | N/A | N/A | N/A | N/A |
| 4 | O.T. (Gen. Ed.) | N/A | N/A | N/A | N/A | 16 | 16 | 14 | 14 |
| 5 | A.V. (Access Points) | 70 | 100 | 45 | 114 | N/A | N/A | N/A | N/A |

N/A on Assessment due to assessment being specifically for student’s om General Education Standards or Assess Points Standards

***J.K. dislikes math and exhibits frustration when assigned math tasks which prevents accurate reflection of math skills and math comprehension

**J.A. and E.H. receive small group assessment/ tested together both have behavioral issues scores reflect assessment when with students completing talking and yelling at one-another

Academic Results

The average student performance on weekly assessments over the six weeks of intervention was compiled. Comparing the baseline of performance to the student outcomes at the conclusion of the study, there was an increase in overall student performance per weekly assessment. The students’ baseline data

in academic performance was collected during the week of 01/31-02/04. This reflected their initial academic performance level prior to the use of visual supports. After the implementation of the visual supports, students J.A., J.K. and A.V. increased academic performance by five percent, while O.T. increased by ten percent and E.H, maintained his strong understanding of math academics (Table 2). The increases in math assessment data suggests that the visual supports assisted the students in improving their academic performance. To continue, the student’s averages in reading performance also similarly increased to suggest that the visual supports assisted in improving academic performance (Table 3).

Table 2: Weekly Math Assessment Data

| | | Math (01/31-02/04) | Math (02/07-11) | Math (02/14-18) | Math (02/21-25) | Math (02/28-03/4) | Math (03/07-11) |
|---|----------------------|--------------------|-----------------|-----------------|-----------------|-------------------|-----------------|
| 1 | J.A. (Gen. Ed.) | 80 | 80 | 85 | 75 | 80 | 85 |
| 2 | E.H. (Gen. Ed.) | 100 | 95 | 100 | 95 | 90 | 100 |
| 3 | J.K. (Access Points) | 70 | 70 | I.C. | I.C. | 80 | 75 |
| 4 | O.T. (Gen. Ed.) | 90 | 90 | 100 | 100 | 95 | 100 |
| 5 | A.V. (Access Points) | 80 | 80 | 85 | 75 | 80 | 85 |

Table 3: Weekly Reading Assessment Data

| | | Read/ELA (01/31-02/04) | Read/ELA (02/07-11) | Read/ELA (02/14-18) | Read/ELA (02/21-25) | Read/ELA (02/28-03/4) |
|---|----------------------|------------------------|---------------------|---------------------|---------------------|-----------------------|
| 1 | J.A. (Gen. Ed.) | 70 | 70 | I.C. | I.C. | 80 |
| 2 | E.H. (Gen. Ed.) | 90 | 90 | 100 | 95 | 90 |
| 3 | J.K. (Access Points) | 90 | 90 | 100 | 100 | 95 |
| 4 | O.T. (Gen. Ed.) | 90 | 95 | 100 | 95 | 90 |
| 5 | A.V. (Access Points) | 70 | 70 | 75 | 75 | 80 |

Conclusions

After conducting this inquiry project on how visual supports impact students’ learning outcomes, I concluded that the visual supports had positively impacted students’ academic outcomes. The visual

supports had greater impact on students’ academic outcomes than their behavioral outcomes.

Implications

To further reflect on the overall implications of this inquiry, I have learned and gained a better understanding of teaching students with exceptionalities. For example, I learned that through visual supports students with verbal and communication needs have more access to the vocabulary because the images in the visual support provide context that was missing without using the visual support. Additionally, this inquiry informed my teaching practices that I will use moving forward as an educator. Prior to analyzing the results, my teaching practices stemmed from the use of high leverage practices. When collecting student outcome data from this inquiry, I realized that visual supports coupled with high leverage practices provide additional forms of scaffolding for students that need additional assistance on learning academic content. This realization has led me to think of ways I can include more types of visual supports within the classroom to provide support to my students. While there were many benefits of visual supports within this inquiry project, I also need to continue to try to implement visual supports and gather data to improve behavioral outcomes for my students. Through additional data collection and implementation of visual supports I would be able to determine which visual support will work best within my teaching pedagogy and classroom management. In the future, I plan to continue the use of visual supports within my classroom to allow students the access they need to academic vocabulary and academic content.

To better execute this inquiry there is a need for adjustments to the inquiry research design. When originally conducted, this inquiry examined three visual supports being used accompanying one another. The use of all three supports did not allow for conclusive results of which support made the

impact on the student's outcomes. For this study to be conclusive, the visual supports would need to be implemented one at a time and implemented with validity. Further, visual supports also should be expanded beyond the Exceptional Students Educational classroom to understand the impacts of

visual supports on other students. Visual supports benefitted my students with moderate to severe disabilities. Therefore, I am curious how visual supports can assist students in general education classrooms reach their potential.

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