

## Article

## An Explorative Probe on The Utilization, Effectiveness, and Challenges of Visual Support in Teaching Students with Autism Spectrum Disorder

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**Abstract:** This study examines the utilization and effectiveness of visual cues and supports in teaching children with autism spectrum disorder (ASD). The findings indicate that visual supports are extensively used to enhance communication, comprehension, and engagement among students with ASD. A statistically significant correlation was found between the extent of use and the effectiveness of visual supports, suggesting that increased use enhances their effectiveness. Despite the benefits, several challenges were identified, including a lack of individualization in visual systems, limited generalization of skills, access and availability issues, limited attention spans, and resistance to change. These challenges highlight the need for more personalized, accessible, and adaptable visual supports to optimize educational outcomes for children with ASD.

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**Keywords:** Autism spectrum disorder, visual support, communication enhancement, special education

### Introduction

Teaching students with autism spectrum disorder (ASD) presents unique challenges and requires specialized approaches to foster effective learning environments. Educators must navigate a spectrum of needs, as children with ASD often exhibit varying levels of cognitive, communicative, and social abilities. The heterogeneity within this group necessitates individualized teaching strategies that can cater to diverse learning preferences and developmental stages (Zou et al., 2020). In practice, this often means employing a combination of structured routines, visual aids, and technology-enhanced learning tools to create an accessible and supportive educational experience. For instance, research by Macdonald et al. (2021) highlights the effectiveness of using digital platforms that offer interactive and customizable learning activities tailored to the individual needs of



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students with ASD. Additionally, incorporating interests and strengths of students with ASD into the curriculum can enhance engagement and motivation, leading to more meaningful learning experiences (Koegel et al., 2020). By understanding and leveraging the unique profiles of students with ASD, educators can create dynamic and inclusive classrooms that support all learners.

Among the numerous challenges in teaching students with ASD, educators often face difficulties related to communication barriers, sensory sensitivities, and behavior management. These challenges can impede the learning process, making it essential for teachers to adopt interventions that address these specific needs. Additionally, the lack of standardized teaching methods for ASD often leads to trial-and-error approaches, further complicating the educational experience for both students and teachers (Ashburner et al., 2021).

Visual support has emerged as a crucial tool in the education of students with ASD. Visual aids such as picture schedules, social stories, and visual timetables can significantly enhance understanding and retention of information. These tools help bridge communication gaps, reduce anxiety by providing clear expectations, and promote independence among students. Research has shown that visual supports are particularly effective in improving social interactions and academic performance in children with ASD (Gonzalez-Lopez & Kamps, 2022). Communication barriers can be particularly pronounced, as many students with ASD have difficulty understanding and using verbal language, which can hinder their ability to follow instructions and participate in classroom activities. To overcome these barriers, educators might use alternative communication methods, such as picture exchange communication systems (PECS) or augmentative and alternative communication (AAC) devices, which have been shown to improve communication skills and classroom engagement (Hart & Banda, 2021). Sensory sensitivities can also disrupt learning; for instance, some students might be overly sensitive to noise or light, necessitating environmental modifications like noise-canceling headphones or controlled lighting (Williamson & Campbell, 2021). Behavior management remains another critical area, as students with ASD may exhibit behaviors such as self-stimulation, aggression, or withdrawal, which require specific, individualized behavior intervention plans (BIPs) to effectively address and manage these behaviors in a supportive manner (Conroy et al., 2019).

Exploring the utilization, effectiveness, and challenges of visual support in teaching students with ASD is essential for developing more effective educational strategies. Previous studies indicate that while visual supports are beneficial, their implementation is not without obstacles. Issues such as the availability of resources, training for educators, and the adaptability of visual aids to individual student

needs are critical factors that influence their success. Moreover, the effectiveness of visual supports varies, with some studies highlighting significant improvements in communication and engagement, while others report minimal impact (Banda et al., 2021).

Despite the recognition of visual supports' benefits, several research gaps remain. To what extent do educators utilize identified visual supports in teaching children with ASD? What level of effectiveness do these supports achieve in promoting communication and engagement among children with ASD, according to special education teachers? Additionally, what specific challenges do educators encounter when using visual supports? Addressing these questions is crucial for advancing our understanding and improving the practical application of visual aids in special education.

The direction of this research focuses on Children's Paradise Montessori School (CPMS) located at H. Abellana, Mandaue City. By examining the experiences and practices at CPMS, this study aims to provide insights into the effective use of visual supports in teaching students with ASD. This research will contribute to the broader educational discourse by identifying best practices, potential challenges, and areas for further investigation, ultimately enhancing the educational outcomes for children with ASD.

## **Methodology**

This study employed a descriptive correlational design as outlined by Wisdom and Creswell (2013), incorporating both qualitative and quantitative techniques to explore the utilization, effectiveness, and challenges of visual support in teaching students with autism spectrum disorder (ASD). The primary research tool was a survey questionnaire, which was specifically designed and modified to align with the study's objectives and to address the needs of General Education and Special Education teachers at Children's Paradise Montessori School (CPMS) and the Integrated Learning and Living Center (ILLC) in Mandaue City. The questionnaire consisted of 20 items evaluated on a 4-point Likert scale, ranging from 1 (Not Effective) to 4 (Very Effective), assessing the effectiveness of various visual cues in teaching children with ASD. In addition to the survey, data collection was supplemented with informal interviews and detailed observations to provide a richer context and deeper understanding of the respondents' experiences and practices. The descriptive method was employed to analyze patterns and trends from the data, facilitating the formulation of facts and insights into teaching practices for students with ASD. Correlational analysis was conducted to determine the relationship between the extent of visual cues usage and their perceived effectiveness in promoting communication and engagement among children with ASD.

## Results and Discussion

Table 1. Age and Gender

Age Range (years old)	Male		Female		Total	
	Freq.	%	Freq.	%	Freq.	%
50 & above	–	–	6	12.00	6	12.00
45 to 49	1	2.00	4	8.00	5	10.00
40 to 44	–	–	6	12.00	6	12.00
35 to 39	1	2.00	2	4.00	3	6.00
30 to 34	4	8.00	8	16.00	12	24.00
25 to 29	–	–	13	26.00	13	26.00
24 & below	1	2.00	4	8.00	5	10.00
Sub-Total	7	14.00	43	86.00	50	100.00

The provided data illustrates the age and gender distribution of a group of 50 individuals. Notably, the majority of participants are female, comprising 86% (43 individuals) of the total, while males account for the remaining 14% (7 individuals). The age group with the highest frequency is 25 to 29 years, representing 26% (13 individuals) of the total population, all of whom are female. The next largest group is those aged 30 to 34 years, comprising 24% (12 individuals), with males making up 8% (4 individuals) and females 16% (8 individuals) of this category. Age groups 50 and above and 40 to 44 both include 12% (6 individuals) each, exclusively female. The 45 to 49 years category consists of 10% (5 individuals), with males at 2% (1 individual) and females at 8% (4 individuals). The 35 to 39 years category shows a smaller representation with 6% (3 individuals), where males and females represent 2% (1 individual) and 4% (2 individuals) respectively. Finally, the youngest age group, 24 years and below, comprises 10% (5 individuals) with males and females accounting for 2% (1 individual) and 8% (4 individuals) respectively. This data highlights a significant gender imbalance favoring females across all age categories.

Table 2. Highest Educational Attainment

Education Attainment	Male		Female		Total	
	Freq.	%	Freq.	%	Freq.	%
Doctorate	–	–	1	2.00	1	2.00
with units in Doctoral	–	–	7	14.00	7	14.00
Master's degree	1	2.00	9	18.00	10	20.00
with units in Master's degree	5	10.00	12	24.00	17	34.00
Bachelor's degree	1	2.00	14	28.00	15	30.00
Sub-Total	7	14.00	43	86.00	50	100.00

The data on highest educational attainment shows a clear predominance of females across all levels of education among the group of 50 individuals. Females constitute 86% (43 individuals) of the

total population, while males account for only 14% (7 individuals). The most common educational attainment is having units in a Master's degree, which is held by 34% (17 individuals) of the group, including 10% (5 individuals) of males and 24% (12 individuals) of females. Following this, 30% (15 individuals) have a Bachelor's degree, with 2% (1 individual) being male and 28% (14 individuals) being female. Those with a Master's degree make up 20% (10 individuals) of the group, comprising 2% (1 individual) of males and 18% (9 individuals) of females. Individuals with units in a Doctoral degree account for 14% (7 individuals), all of whom are female. Lastly, the smallest group, representing 2% (1 individual), has attained a Doctorate, and this individual is female. This data underscores a significant gender disparity in educational attainment, with females vastly outnumbering males across all levels of education within this sample.

Table 3. Teaching Experience

Teaching Experience (in years)	Male		Female		Total	
	Freq.	%	Freq.	%	Freq.	%
30 to 34	–	–	1	2.00	1	2.00
25 to 29	–	–	6	12.00	6	12.00
24 & below	7	14.00	36	72.00	43	86.00
Sub-Total	7	14.00	43	86.00	50	100.00

The data on teaching experience reveals that the vast majority of the 50 individuals have less than 25 years of teaching experience. Specifically, 86% (43 individuals) fall within the 24 years and below category, with males representing 14% (7 individuals) and females a substantial 72% (36 individuals) of this group. The next significant category includes those with 25 to 29 years of teaching experience, comprising 12% (6 individuals), all of whom are female. Finally, the smallest group, with 30 to 34 years of teaching experience, accounts for only 2% (1 individual), and this individual is also female. This data highlights a notable trend where the majority of teaching professionals in this sample are females with relatively shorter teaching experience, while males are present exclusively within the category of 24 years and below.

Table 4. Relevant Training and Seminars Attended

Number of hours	Male		Female		Others	
	Freq.	%	Freq.	%	Freq.	%
50 & above	1	2.00	8	16.00	9	18.00
40 to 49	–	–	1	2.00	1	2.00
30 to 39	1	2.00	5	10.00	6	12.00
20 to 29	2	4.00	5	10.00	7	14.00
10 to 19	1	2.00	12	24.00	13	26.00
9 & below	2	4.00	12	24.00	14	28.00
Sub-Total	7	14.00	43	86.00	50	100.00

The data on relevant training and seminars attended highlights a diverse range of hours invested by the 50 individuals. A total of 28% (14 individuals) have attended 9 hours or fewer of training, with males making up 4% (2 individuals) and females 24% (12 individuals) of this group. Similarly, 26% (13 individuals) have participated in 10 to 19 hours of training, with males representing 2% (1 individual) and females 24% (12 individuals). The next category, 20 to 29 hours, includes 14% (7 individuals), comprising 4% (2 individuals) of males and 10% (5 individuals) of females. Individuals who have attended 30 to 39 hours of training account for 12% (6 individuals), with males at 2% (1 individual) and females at 10% (5 individuals). A smaller portion, 2% (1 individual), have engaged in 40 to 49 hours of training, and this individual is female. Notably, 18% (9 individuals) have received 50 or more hours of training, including 2% (1 individual) of males and 16% (8 individuals) of females. This distribution indicates that the majority of participants, predominantly females, have engaged in various extents of professional development, with a significant portion receiving substantial training hours.

Table 5. Extent of Use of Visual Cues/Supports in Handling Children with ASD In different situations

No.	Survey Indicators	SD	W M	VD
1	Visual supports are employed to enhance communication among students with ASD.	0.54	3.58	AU
2	Visual supports are used to increase comprehension levels in students with ASD.	0.48	3.66	AU
3	Visual supports are integrated to provide predictability and structure for students with ASD.	0.53	3.64	AU
4	Visual supports are utilized to facilitate social interactions for students with ASD.	0.50	3.64	AU
5	Visual supports are tailored to individual learning needs, promoting personalized education for students with ASD.	0.45	3.72	AU
6	Visual supports are used in reducing behavioral challenges commonly observed in students with ASD.	0.53	3.62	AU
7	Visual supports are employed to promote independence among students with ASD.	0.61	3.52	AU
8	Visual supports are utilized to break down complex information for students with ASD and improve their understanding.	0.53	3.62	AU
9	Visual supports support memory retention and recall in students with ASD.	0.57	3.60	AU
10	Visual supports increase student engagement and participation among students with ASD.	0.51	3.70	AU
Average Mean		0.52	3.62	AU

Table 5 presents the data on the extent of use of visual cues/supports in handling children with ASD in different situations. Based on the data, all indicators consistently show a high level of use, as indicated by the average weighted mean of 3.62, with a standard deviation of 0.52,



signifying an "Always Utilized" (AU) verbal description. Specifically, the highest-rated indicator is the use of visual supports tailored to individual learning needs, promoting personalized education for students with ASD, with a weighted mean of 3.72 and an SD of 0.45. This suggests strong agreement on the importance of individualized visual supports. The use of visual supports to increase student engagement and participation is also highly rated, with a weighted mean of 3.70 and an SD of 0.51. Other significant indicators include enhancing comprehension (WM 3.66, SD 0.48), providing predictability and structure (WM 3.64, SD 0.53), facilitating social interactions (WM 3.64, SD 0.50), and reducing behavioral challenges (WM 3.62, SD 0.53). Additionally, visual supports are used to promote independence (WM 3.52, SD 0.61) and support memory retention and recall (WM 3.60, SD 0.57). The overall findings suggest that visual supports are a critical tool frequently employed across various areas to aid students with ASD, indicating a robust consensus on their efficacy and importance in educational settings.

Table 6. Level of Effectiveness of Visual Cues when used in promoting and engagement of Children with ASD

No	Survey Indicators	SD	WM	VD
1	Real objects provide tangible and concrete examples that facilitate hands-on learning for students with ASD.	0.36	3.90	VE
2	Written words offer a textual representation of information that aids reading and language development.	0.54	3.54	VE
3	Picture cards use visual symbols that enhance communication and support vocabulary acquisition.	0.24	3.94	VE
4	Sign language provides an alternative means of communication for non-verbal or partially verbal students with ASD.	0.68	3.22	ME
5	Picture Exchange Communication System (PECS) enables students to communicate their needs and preferences by exchanging visual symbols.	0.48	3.76	VE
6	Feelings and Emotion Charts help students recognize and express their emotions, enhancing social interaction skills.	0.54	3.70	VE
7	Visual schedules offer predictability and structure, helping students understand and navigate daily routines.	0.33	3.88	VE
8	Timetable cards aid in time management and schedule comprehension.	0.51	3.68	VE
9	Photographs serve as visual aids to reinforce concepts and create visual associations.	0.42	3.84	VE
10	Line drawings simplify complex ideas and provide visual clarity.	0.64	3.38	VE
11	Arranging the environment visually can reduce sensory overload and improve organization.	0.37	3.84	VE
12	Visual boundaries establish personal space and boundaries for social interactions.	0.51	3.70	VE
13	Maps help students with spatial orientation and understanding of physical locations.	0.72	3.36	VE
14	Labels provide clarity and organization by identifying objects and their purposes.	0.43	3.76	VE
15	Timelines assist in understanding sequences, historical events, or schedules.	0.53	3.62	VE
16	Organizational systems enhance students' ability to categorize and locate items.	0.43	3.76	VE
17	Scripts guide social interactions and conversations with predictable phrases.	0.69	3.26	VE

18	Photos reinforce memory and comprehension by providing concrete visual references.	0.44	3.82	VE
19	Drawings offer a means of self-expression and communication.	0.60	3.62	VE
20	Gestures supplement verbal communication and can help convey meaning.	0.42	3.78	VE
Average Mean		0.49	3.70	VE

The data from Table 6 assesses the effectiveness of various visual cues in promoting engagement and supporting children with autism spectrum disorder (ASD). The average weighted mean across all indicators is 3.70, with a standard deviation of 0.49, indicating that the visual cues are generally considered "Very Effective" (VE). Among the indicators, picture cards, with a weighted mean of 3.94 and an SD of 0.24, are highlighted as the most effective tool in enhancing communication and supporting vocabulary acquisition. Real objects (WM 3.90, SD 0.36) and visual schedules (WM 3.88, SD 0.33) are also rated highly, suggesting that tangible examples and structured routines are highly beneficial for students with ASD. Photographs and environmental organization are similarly rated (both with a WM of 3.84), emphasizing the importance of visual aids in reinforcing concepts and creating organized learning spaces. Picture Exchange Communication System (PECS) and labels, both with a weighted mean of 3.76, underscore their role in enabling communication and providing clarity. Feelings and emotion charts, timetable cards, and visual boundaries, each with a weighted mean of 3.70, are effective in aiding emotional expression, time management, and social interactions, respectively. Conversely, sign language, with a weighted mean of 3.22, and maps, with a weighted mean of 3.36, are considered moderately effective (ME). Other visual supports such as gestures, drawings, and organizational systems show effectiveness in supplementing communication, offering self-expression, and enhancing categorization skills, with weighted means ranging between 3.62 and 3.78. Overall, the findings indicate that various visual cues are highly effective in promoting engagement and supporting the development of children with ASD, with picture cards and real objects being the most impactful.

Table 7. Test of Significance on the Correlation between the Extent of Use of Visual Cues/Supports in Handling children with ASD in different Situations and Level of Effectiveness of Visual Cues when used in promoting and engagement of Children with ASD

Comparing two (2) Independent samples	Wtd Mn	df	Comp. rho	p-value	Results	Decision
Extent of use of visual cues/support in handling Children with ASD in different situations &	3.62	48	0.31383	0.02646	There is a statistically significant correlation between the	Reject Ho



Level of effectiveness of visual cues when used in promoting and engaging Children with ASD	3.67	two research variables.
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The data presented in Table 7 evaluates the correlation between the extent of use of visual cues/supports in handling children with autism spectrum disorder (ASD) in different situations and the level of effectiveness of these visual cues in promoting and engaging children with ASD. The analysis involves comparing two independent samples, with a weighted mean (Wtd Mn) of 3.62 for the extent of use of visual cues and 3.67 for their level of effectiveness. The degrees of freedom (df) for the comparison is 48. The computed correlation coefficient (Comp. rho) is 0.31383, and the p-value associated with this correlation is 0.02646. Given that the p-value is less than the conventional significance level of 0.05, this indicates a statistically significant correlation between the extent of use and the effectiveness of visual cues in handling children with ASD. The result suggests that as the extent of use of visual supports increases, their effectiveness in promoting engagement and supporting children with ASD also improves. Consequently, the null hypothesis ( $H_0$ ), which posits that there is no significant correlation between these two variables, is rejected. This finding underscores the importance of utilizing visual supports consistently to enhance their effectiveness in educational and social settings for children with ASD.

Table 8. Challenges encountered by the Respondents in using visual supports in teaching Children with ASD

Identified Challenges	Freq.	Rank
Limited Generalization of Skills	106	2 <sup>nd</sup>
Lack of Individualization in Visual Systems	122	1 <sup>st</sup>
Resistance to Change	70	5 <sup>th</sup>
Limited Attention	86	4 <sup>th</sup>
Access and Availability	90	3 <sup>rd</sup>

Table 8 outlines the primary challenges faced by respondents when using visual supports in teaching children with autism spectrum disorder (ASD). The most significant challenges include a lack of individualization in visual systems, limited generalization of skills, issues with access and availability of visual supports (ranked third with 90 mentions), limited attention spans and resistance to change. Addressing these challenges is essential to enhance the effectiveness of visual supports in educational settings for children with ASD.

## Conclusion

The analysis of the data reveals that visual cues and supports play a critical role in handling children with autism spectrum disorder (ASD), significantly enhancing communication, comprehension, and engagement among students. The extent of use and level of effectiveness of these visual supports are both rated high respectively, and are found to have a statistically significant correlation, indicating that increased use of visual supports correlates with higher effectiveness. Despite these benefits, respondents identified several challenges, including the lack of individualization in visual systems, limited generalization of skills, and issues with access and availability. Additional challenges such as limited attention spans and resistance to change further complicate the implementation of visual supports. Addressing these challenges is essential to fully leverage the benefits of visual supports for children with ASD, ensuring personalized, accessible, and adaptable educational strategies that can enhance their learning and development outcomes.

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