



## Research Article

# The Importance of Using Concrete Manipulative Materials in Enhancing Skills of Students with Autism Spectrum Disorder as Perceived by SPED Teachers

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**ABSTRACT**

The study aims to evaluate the efficacy of concrete manipulative materials in enhancing the skills of students with Autism Spectrum Disorder (ASD) based on the perception of Special Education (SPED) teachers. Using a case study design, the researchers employed purposive sampling to select respondents, including SPED teachers working with students with ASD. Survey questionnaires were used to assess the effectiveness of manipulative materials across three categories: life skills, intellectual skills, and behavioral skills. The findings indicated that the three levels of ASD significantly impact the efficacy of these materials. A thorough understanding of these levels is crucial for selecting appropriate manipulatives for teaching. Collaboration with the health and education sectors is essential for supporting students with Autism Spectrum Disorder.

**INTRODUCTION**

Ensuring that learners globally have access to quality education is crucial. While providing educational access and financial support are fundamental, they are not sufficient to guarantee effective learning and development for all students. Governments worldwide have introduced various programs to support learners with disabilities, but challenges remain, particularly for those with Autism Spectrum Disorder (ASD).

ASD is a neurodevelopmental condition marked by difficulties in social interaction, communication, and repetitive behaviors (Loomes, Hull, & Mandy, 2017). The prevalence of ASD is rising, affecting approximately 1% of the global population. The term

“spectrum” highlights the wide range of symptoms and severity levels associated with the disorder. Individuals with ASD often have unique learning needs that may not align with traditional educational methods. Key subtypes of autism include Asperger’s syndrome, Rett syndrome, Childhood Disintegrative Disorder, Kanner’s syndrome, and Pervasive Developmental Disorder-Not Otherwise Specified (Cha Daude, Maria, Shahbodin, & Ahmad, 2018).

Research has shown that children with autism frequently face challenges in skill acquisition, prompting educators and researchers to explore various educational techniques. These include using visual aids, videos, and authentic materials within educational



settings (Aksoy, 2018). In the Philippines, where approximately 1.2 million individuals are on the autism spectrum (Autism Society Philippines, 2018), there is a growing emphasis on innovative teaching strategies. Educators are increasingly adopting manipulative materials - tangible objects that students can handle and interact with – and integrating technology to improve learning outcomes. Manipulative materials are particularly useful in teaching skills such as mathematics, counting, and sorting, which are often challenging for students with ASD. Despite their potential benefits, many Special Education schools in the Philippines continue to rely more on concrete materials than technological aids.

Given the prevalence of ASD and the identified challenges in traditional teaching methods, research into the effectiveness of manipulative materials in educational settings for children with autism is needed. Investigating how these materials can enhance learning and skill acquisition, particularly in the context of the Philippines, can provide valuable insights into improving educational practices for students with ASD.

## Literature Review

### *Concrete Manipulative Materials*

Manipulative teaching materials are objects from the real world that children can touch, move, or build models with to learn concepts. Manipulative are hands-on models that use all the senses and are perfect for engaging students (Ipapo, Hipona, Salvedia, Martin, 2021). In addition, manipulation allows the students to connect ideas, convert symbols into phys-

ical objects, and facilitate better understanding. Manipulative materials refer to physical objects students can handle and manipulate during learning activities. These materials are designed to engage multiple senses, providing tactile, visual, and sometimes auditory feedback. Studies have shown that manipulation can help enhance intellectual skills such as problem-solving, abstract thinking, and memory development (McCarthy, Firestone, & Pisano, 2022).

In the context of special education, especially for students with ASD. Manipulative materials are often used as educational tools to support students' learning and development. The materials can take various forms and serve different purposes depending on the specific needs of the students. They are typically chosen based on their ability to engage and stimulate the senses, promote hands-on learning, and provide sensory exploration and integration opportunities. Manipulative materials offer a valuable opportunity for students to engage their senses, facilitating sensory integration, and enhancing their overall cognitive functioning. These materials can be particularly beneficial for students with autism in learning new concepts and reinforcing learning through hands-on experiences. Hobbs (2022) added that manipulative materials can provide sensory input that helps students with ASD process and integrate sensory information more effectively, leading to improved sensory skills among students with autism.

### *Autism Spectrum Disorder*

Harris (2017) cited that “Autism” was first coined by Leo Kanner in 1943. His findings indicated that it



was a neurodevelopmental condition, and he suggested that these children possessed an inherent difficulty in establishing the typical, biologically ingrained connections with others from birth. Autism Spectrum Disorder (ASD) is a neurological and developmental disorder that affects how people interact with others, communicate, learn, and behave. Although Autism can be diagnosed at any age, it is described as a “developmental disorder” because symptoms generally appear in the first two years of life (Bethesda, 2023). Autism is a developmental disability caused by differences in the brain (Cohen, 2022). The disorder includes limited and repetitive patterns of behavior. “Spectrum” in autism spectrum disorder refers to the wide range of manifestations and severity of symptoms (Mayo, 2018). Additionally, autism spectrum disorder has three levels where children with ASD are diagnosed, namely; level 1 for requiring support, level 2 for requiring substantial support, and level 3 for requiring very substantial support.

Furthermore, autism spectrum disorder encompasses a range of conditions characterized by challenges in social interaction, communication, and certain behavioral patterns. These patterns include difficulties transitioning between activities, a tendency to focus on details, and unusual reactions to sensations. The abilities and requirements of individuals with autism vary and may change over time. While some can lead independent lives, others experience significant disabilities and rely on lifelong care and assistance (Ryan, 2023). The same report reveals that education and employment opportunities are often affected by autism. In addition, Jadhav and Schaepper (2021) cited that autism spectrum disorder is a mul-

ti-faceted developmental condition characterized by ongoing difficulties in social communication, limited interest, and repetitive behavior. Although autism is regarded as a lifelong disorder, the extent of functional impairment resulting from these challenges differs among individuals with autism. The signs and symptoms of ASD can include problems with social communication and interaction, and restricted or repetitive behavior or interest.

### *Life Skills of Autism Spectrum Disorder*

Life skills are vital part of the education of children with autism. Velasquez (2022) indicates that teaching life skills to children with autism spectrum disorder is especially important since it can help them prepare for the daily demands of engaging in their community and workplace and feeling independent at home. Life skills are important for everyone. Daily living skills or independent living skills are other names for life skills. Basic life skills include taking care of oneself, cooking, managing money, shopping, organizing a space, and using transportation (Wargo, 2023). Velasquez (2022) discusses that many individuals with ASD are visual learners. On his study, he cited the seven essential life skills for those with autism. He included executive functioning skills, communication skills, self-care skills, occupational skills, social skills, emotional regulation skills, and safety awareness skills. These skills are important for students with ASD to learn.

### *Intellectual Skills of Autism Spectrum Disorder*

Howlin (2018) states that, the vast range of skills



and challenges related to ASD is denoted by the word “spectrum.” Intellectual capacity can range from severe intellectual disability to exceptional intelligence; some people use and/or understand language only minimally, while others have well-developed vocabularies, and symptom severity can likewise range from severely incapacitating to only mildly so. Children with autism may acquire abilities more slowly than children with average development. Additionally, they could acquire skills in a different sequence than typical children. Some autistic children learn to name colors, remember the way to familiar places, or pick out words in the grocery store. They might only sometimes be able to extrapolate these advantages. As a result, kids might be unable to advance from being colors to identifying the hues in a picture or from word recognition to reading books ( Bethesda, 2020).

Robert and Griffin (2020), in their study, found that approximately 80% of individuals with ASD have an associated intellectual disability. This means they may struggle with intellectual tasks such as problem-solving, abstract reasoning, and critical thinking. On the other hand, studies have found that individuals with ASD without intellectual disabilities may have strengths in decoding skills, which refers to the ability to read words accurately and fluently (Berenguer, et al 2021). Furthermore, children with ASD may experience challenges with Executive Functioning skills (EF), which refers to a set of cognitive skills that help us regulate, control, and manage our thoughts and behavior. Children with ASD may have difficulty planning, organizing, and completing tasks independently ( Hajri et. al 2019).

Berenguer et.al (2021) revealed that students with autism spectrum disorder have lower reading comprehension skills that assess cognitive flexibility. People with severe autism can struggle intellectually and speak with limited vocabulary. Although the IQs of high-functioning autism patients are average or above average, they struggle to understand body language and other subtle kinds of communication (Adcer, 2023).

### *Behavioral Patterns of Autism Spectrum Disorder*

Individuals with Autism Spectrum Disorder, whether young or grown, might display restricted and repetitive behavioral patterns, interests, or activities. The signs mentioned encompassing behaviors such as repetitive motions like rocking or hand-flapping, engaging in potentially harmful activities like biting or head-banging, establishing rigid routines and becoming upset by minor changes, exhibiting coordination difficulties or unusual movement styles like walking on toes and demonstrating peculiar stiff or exaggerated body language. The students might also exhibit a strong fascination with specific details of an object without comprehending the objects’ overall purpose, show heightened sensitivity to light, sound, or touch while possibly ignoring pain or temperature sensations, refrain from engaging in imitative or imaginative play, fixate intensely on certain objects or activities, display specific and inflexible food preferences, and more.

### **MATERIALS AND METHODS**

To have accurate information on the effectiveness of concrete manipulative materials, the researchers



utilized the descriptive method research Voxco (2021) defined descriptive research design as a research design that aims to systematically obtain information to describe a phenomenon, situation, or population. It helps answer the what, when, where, and how questions regarding the research problem rather than why. The researchers chose the descriptive method because it is the most appropriate method to describe the effectiveness of concrete Manipulative Materials in enhancing the intellectual skills of students with autism spectrum disorder.

### *Locale*

This study was conducted at Senator Claro M. Recto Memorial Integrated School and Gaudencio B. Lontok Memorial Integrated School, which offer special education for children with disabilities.

### *Sampling and Respondents*

The study's respondents are the seven (7) special education teachers handling autism students in the special education department of Senator Claro M. Recto Memorial Integrated School and five (5) special education teachers handling students with autism of Gaudencio B. Lontok Integrated School, for a total of 12 respondents in Lipa City.

The researchers utilized purposive sampling, in which units were selected because they have characteristics needed in the sample (Frost, 2020). In this technique, units were selected "on purpose." The main goal of purposive sampling is to identify the cases, individuals, or communities best suited to gather

the right information to achieve the study's objective.

### *Research Instruments*

To obtain and satisfy the study's primary objectives researchers designed self-made survey questions to assess concrete manipulative materials in enhancing the skills of students with autism spectrum disorder. The survey questionnaires were considered the primary data gathering tool used to collect the data for the analysis of the study. The data gathered by the researchers was analyzed for the findings and conclusions of the study.

### *Data Gathering Procedure*

In this study, the researchers utilized the following instruments to gather all the data needed for The Importance of Using Concrete Manipulative Materials in Enhancing Skills of Students with Autism Spectrum Disorder as Perceived by SPED Teachers. The researchers used self-made survey questionnaires to obtain information from the Special Education teachers handling children with autism at Senator Claro M. Recto Memorial Integrated School and Gaudencio B. Lontok Integrated School in Lipa City. The researchers conducted a first draft of the interview guide questions. The guide questions are presented to the research adviser so that comments and suggestions can be sought. After interpreting all suggestions, the final draft of the questionnaire was created. The researchers asked for the help and assistance of the research adviser to check the type, grammar, and content of the questions. The validation was done to ensure the accuracy and appropriateness of the questions



before conducting the interview. After the validation, the researchers conducted an interview. To acquire the information the researchers need, letters are given to the principals of Senator Claro M. Recto Memorial Integrated School and Gaudencio B. Lontok Memorial Integrated School, and the Special Education teachers handling students with autism. After the interviews, the researchers analyzed the data, and the purpose and literature were utilized to support the collected data.

## RESULTS AND DISCUSSION

### Assessment of Concrete Manipulative Materials in Enhancing Skills of Students with Autism Spectrum Disorder.

**Table 1. Assessment of Concrete Manipulative Materials in terms of Life Skills**

CONCRETE MANIPULATIVE MATERIALS CAN...	WEIGHTED MEAN	VERBAL INTERPRETATION	RANKING
1. help improve fine motor skills as they require precise hand movement and coordination.	3.33	Strongly Agree	6.5
2. facilitate communication by serving as a common point of focus for both the student and the teacher.	3.75	Strongly Agree	2
3. use in group activities and can encourage collaboration and social interaction, fostering the development of essential social skills.	3.33	Strongly Agree	6.5
4. use in teaching students with autism to practice daily activities.	3.58	Strongly Agree	4
5. gain their confidence to talk and communicate verbally and non-verbally.	3.25	Agree	8
6. encourage them to learn and participate inside the classroom.	3.67	Strongly Agree	3
7. help them make their own decisions.	3.00	Agree	10
8. help them find a job that is related to their skills	4.00	Strongly Agree	1
9. help them learn how to care for themselves and protect themselves from harm.	3.08	Agree	9
10. can be used to teach them to have self-advocacy in learning.	3.47	Strongly Agree	5
<b>Composite Mean</b>	<b>3.45</b>	<b>Strongly Agree</b>	

As gleaned in the table, the respondents strongly agreed that concrete manipulative materials can help students with autism spectrum disorder find a job that is related to their skills, which garnered the highest weighted mean of 4. The data gathered implies that concrete manipulative material plays a significant role in teaching students with ASD to learn and practice

daily living activities. Velasquez (2022) cited that life skills are important in the education of children with autism. Teaching life skills using concrete manipulative materials is an effective strategy that could help the students be aware and learn basic life skills, as well as help them prepare for the daily demands of the community and their workplace.

On the other hand, the respondents agreed with the statement that concrete manipulative materials can help students with ASD learn to make their own decisions which garnered the lowest weighted mean of 3. The results explain that concrete manipulatives can be used to teach students with ASD to enhance their abstract reasoning skills which develop their decision-making skills. Bennie (2018) explains that executive functioning encompasses various aspects and abstract and verbal reasoning are included in its range. Since concrete manipulative materials could be manipulated and interacted with, it enhances the students understanding and executive functioning skills (Burmeister, 2020).

The composite mean of 3.45 generalized that the respondents agreed with each of the indicators regarding the assessment of concrete manipulative materials in enhancing the life skills of students with an autism spectrum disorder. It implies that concrete manipulative materials are an effective way of teaching daily life skills to students with ASD. Velasquez (2022) supported the results of the study as he explained that many individuals with ASD are visual learners, and the use of concrete manipulative materials can cater to learning styles and enhance their overall understanding and retention of life skills.



**Table 2. Assessment of Concrete Manipulative Materials in terms of Intellectual Skills**

CONCRETE MANIPULATIVE MATERIALS CAN...	WEIGHTED MEAN	VERBAL INTERPRETATION	RANKING
1. students with autism acquire a deeper understanding of complex lessons and activities.	3.83	Strongly Agree	2
2. students with autism understand the sequence of activities.	3.17	Agree	5.5
3. students with autism acquire letters, numbers, and shapes.	2.67	Agree	9
4. students with autism memorize familiar places and colors.	3.67	Strongly Agree	4
5. students with autism excel in tasks requiring visual searches, such as locating a triangle with a complicated image.	2.33	Disagree	10
6. students with autism practice multiple opportunities for independent application and practice their acquired knowledge.	3.75	Strongly Agree	3
7. students with autism acquire new academic skills with comprehensive guidelines.	3.17	Agree	5.5
8. students with autism control and manage their thoughts and behavior.	2.83	Agree	8
9. students with autism learn through visual aids and verbal cues which assist them in learning each step individually.	3.75	Strongly Agree	7
10. students with autism acquire skills to enhance their social and cognitive development.	3.97	Strongly Agree	1
<b>Composite Mean</b>	<b>3.21</b>	<b>Agree</b>	

Table 2 shows the respondents strongly agreed that concrete manipulative materials can help students with autism acquire skills to enhance their social and cognitive development, which garnered the highest weighted mean of 3.97. The data gathered implies that concrete manipulative materials help students with ASD enhance their intellect; it helps them to regulate, control, and manage their thoughts and develop their reasoning and thinking skills. Howlin (2018) stated that children with autism may acquire abilities more slowly than children with average development because of their intellectual capacity. Because of that, children diagnosed with ASD could acquire skills in a different sequence.

Likewise, the respondents disagreed with the statement that concrete manipulative materials can help students with autism excel in tasks requiring visual searches, such as locating a triangle with a complicated image, which has the lowest weighted mean of 2.33. The results imply that students with autism

have difficulties in visual searches using concrete manipulatives. Green (2014) explains that children with autism had some difficulties using concrete manipulatives mostly in activities such as identifying the hues in a picture or from word recognition to book reading.

The composite mean of 3.21 generalizes that respondents agreed on each of the indicators regarding the assessment of concrete manipulative materials in enhancing the intellectual skills of students with autism spectrum disorder. It shows that utilizing concrete manipulatives as a medium of instruction helps the students develop their intellect, particularly problem-solving, abstract reasoning, and critical thinking skills.

**Table 3. Assessment of Concrete Manipulative Materials in terms of Behavioral Patterns**

CONCRETE MANIPULATIVE MATERIALS CAN...	WEIGHTED MEAN	VERBAL INTERPRETATION	RANKING
1. provide a controlled and monograde way to engage students with different textures, colors, and shapes that could help them become more comfortable with sensory input and reduce challenges.	4	Strongly Agree	1
2. capture the attention of students with ASD and provide clear instructions on how to focus on learning.	3.17	Strongly Agree	8
3. be visually appealing and provide a hands-on way for students to interact with the learning content, increasing their engagement and attention span.	3.83	Strongly Agree	3
4. serve as a productive and positive outlet for students' energy and focus.	3.33	Strongly Agree	6.5
5. reduce challenging behaviors that may arise due to boredom, frustration, or sensory overload.	2.58	Agree	10
6. capture the students' interest and maintain their focus during learning activities.	3.33	Strongly Agree	6.5
7. help them learn different kinds of emotions.	3.5	Agree	9
8. be made as instructional material on making signs and symbols about habits and actions that the students need to learn.	3.75	Strongly Agree	4.5
9. minimize the repetitive behavior of students inside the classroom, such as rooking or hand-flapping, engaging in potentially harmful activities like biting or head-banging, establishing rigid routines and becoming upset by minor changes, exhibiting coordination difficulties or unusual movement styles like walking on toes and demonstrating peculiar stiff or exaggerated body language.	3.75	Strongly Agree	4.5
10. boost the student's energy when participating in activities and communicating with peers.	3.92	Strongly Agree	2
<b>Composite Mean</b>	<b>3.52</b>	<b>Strongly Agree</b>	



Table 6 shows that the respondents strongly agreed that concrete manipulative materials can provide a controlled and monograde way to engage students with different textures, colors, and shapes that could help them become more comfortable with sensory input and reduce challenges, which gained the highest weighted mean of 4. The findings imply that using tangible learning materials is an effective way to engage students with autism in a uniform manner. This approach can help students become more comfortable with sensory input and potentially reduce difficulties they may face in their learning experiences. Bouck et.al. (2016) cited that some students with autism spectrum disorder have difficulties in sensory input, and it may cause them to experience difficulty handling various types of challenges. However, Lanza (2018), stated that concrete manipulative materials help students with ASD regulate their sensory input to develop their attention, and focus, and minimize behavioral challenges.

On the other hand, the statement that concrete manipulatives reduce challenging behaviors that may arise due to boredom, frustration, or sensory overload got the lowest weighted mean of 2.58. Results show that tangible materials can make learning more engaging and accessible, reducing negative reactions. Furthermore, the composite mean of 3.52 generalizes that the respondents agreed with each indicator regarding the assessment of concrete manipulative materials in enhancing skills in behavioral patterns of students with ASD. The findings show that with the use of physical objects, the students will focus on learning and participating in the activities. Because concrete manipulative materials are visually appealing, stu-

dents may focus on the materials and negative reactions to the behavior would be lessened.

## CONCLUSION AND RECOMMENDATIONS

Based on data analysis and interpretation, the respondents strongly agreed that concrete manipulative materials can help students with autism spectrum disorder find a job related to their skills, which have the highest weighted mean of 4 in terms of life skills. Moreover, regarding intellectual skills, the respondents strongly agreed that concrete manipulative materials can help students with autism acquire skills to enhance their social and cognitive development, which obtains the highest weighted mean of 3.97. Meanwhile, the respondents strongly agreed that concrete manipulative material could provide a controlled and monograde way to engage students with different textures, colors, and shapes that could help them become more comfortable with sensory input and reduce challenges, garnering the highest weighted mean of 4, in terms of behavioral pattern.

The proposed program is formulated to enhance and strengthen the utilization of concrete manipulative materials in teaching students with autism spectrum disorder. The school-based program with the title “MANIPULATE,” is an acronym for “Maximizing Autism Natural Development through Proficient Learning through Engagement”. Furthermore, the program consists of activities for each level of autism spectrum disorder, namely; Visual Choice Boards, Visual Cue Cards, Memory Game: Spot the Differences, Puzzle Games, Guess It Game, Shape Search, Scavenger Hunt, I Spy, Crochet Artistry, Homemade Musical Instrument, Clay Art, Sensory Bottle Explo-





ration, Sensory Bin Exploration, and Colorful Collage Art.

The study concludes that Children diagnosed with autism spectrum disorder have various characteristics and symptoms; therefore, it is important to have skillful and knowledgeable teachers who can cater to the diverse learning needs of the students. Aside from that, students with autism spectrum disorder are considered visual learners; therefore, visual supports such as concrete manipulative materials are needed. The materials not only help the students learn simple lessons to complex ones, but they also engage them to interact with others and manipulate the materials, enhancing their senses and functioning skills.

Given the findings above and conclusions, this study recommends that the proposed program Project MANIPULATE be critiqued and evaluated by professionals to ensure that the activities are well suited to the diverse learning needs and capabilities of students diagnosed with different levels of autism spectrum disorder.

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