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Teaching Children with Autism Spectrum Disorder to Request Objects Utilizing the Picture Exchange Communication System

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Abstract

Children with autism spectrum disorder or ASD often have problems with social communication and interaction. Their ability to communicate and use language also depends on their intellectual and social development. While some children with ASD may not be able to communicate using speech or language and others may have very limited speaking skills, there are some who may have rich vocabularies and be able to talk about specific subjects in detail. This quasi-experimental study attempted to find out if children with ASD who are unable to talk would have improved expressive communication skills, specifically in requesting objects, while being taught the picture exchange communication system or PECS. The study also discussed the challenges encountered while learning to use PECS. The findings showed that there was an improvement in the skills of the participants; however, this was not statistically significant. Nevertheless, based on the positive experience of teaching PECS within a limited time, the study recommended steps to implement the use of PECS for students with ASD.

Keywords: autism spectrum disorder; picture exchange communication system; quasi-experiment.

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1. Introduction

Expressive communication refers to the ability to communicate using verbal language and non-verbal cues such as gestures and facial expressions. While this may be easy to do for children, those with autism spectrum disorder or ASD may have difficulty articulating their needs and wants. Having studied the communication skills of four-year-old children with autism, Mullen [1] revealed that early childhood with limited or no verbal communication skills are not able to functionally communicate their needs by the end of their early childhood education. They would have difficulty communicating with their peers, leading to frustrations and eventually the cause of their tantrums. Communication disorders in children with ASD lead to emotional changes [2]; and deficits in social skills may negatively impact several essential domains including academic achievement, interpersonal relationships, behavior, mental health, and adult life outcome [3].Without proper support and effective interventions regarding their social skills deficit, children with autism may often struggle to obtain social competence and may experience challenges in the school, home, and community setting. Research has shown that communication skills can be improved through alternative augmentative communication (AAC) which also leads to improved social behavior and interaction [4]. Additionally, AAC supports not only communication but also the cognitive development of the child, as the child with ASD can use the AAC to participate in educational activities, improving their learning outcomes. One effective tool used in AAC is the picture exchange communication system (PECS). It has been proven effective in supporting expressive communication in children with ASD because of its structured, visual-based mode of communication [5]. Specifically, children with ASD using PECS will be able to communicate with their peers using visuals and concrete objects. Using this tool, teachers would have cards with pictures, symbols, words, or photographs that the child may use to ask for things like water, food, pencil, and the like. PECS has helped children with ASD communicate effectively with others, especially those who are non-verbal, have limited or unclear speech, and do not use functional communication systems at home or in the school environment. Frost, Bondy and Sam [6] expressed that in teaching children to use pictures to represent their emotions, their needs and wants, PECS offers a structured and alternative method for expressing themselves. This system also enables children to initiate communication with others, which is often a struggle for children with autism. However, given the body of literature that supports PECS as an effective intervention for enhancing the expressive communication skills of children with autism, only a few local teachers utilize PECS as an augmentative and alternative communication tool. Perhaps, these teachers made attempts but their effective practices were not documented or published. With such scenario, this study attempted to explore and document the effectiveness of PECS in teaching expressive communication skills, specifically in requesting objects.This study is anchored on the Symbolic Interaction Theory, which explains interactions through symbols while forming relationships with the people surrounding a child with ASD. As Nickerson [7] wrote, the Symbolic Interaction Theory explains how societies are created and maintained through the repeated actions of everyone. People in communities understand their social worlds through communication, like the exchange of meaning through language and symbols. This theory focuses of how individuals create meaning through social interactions using symbols as language, gestures and expressions [8].There are four main principles under the Symbolic Interaction Theory. First, it suggests that individuals act on the subjective meaning of the objects. Second, interactions happen in a social and cultural context wherein objects, people, and situations must be defined and characterized according to individuals' meanings. Third, it posits that for individuals, meanings originate from

interactions with other individuals and with society. Finally, the meanings that an individual has created and recreated through a process of interpretation happen whenever individuals interact with other people. This acquisition of communication skills through PECS guided by the Symbolic Interaction Theory is further enhanced through Skinner's theory of verbal behavior which defines this as a social behavior that is reinforced through the mediation of other persons.

2. Materials and Methods

2.1 Research Design

The research design employed was the quasi-experiment, a type of quantitative research that aims to determine the cause-effect relationship between the independent and dependent variables. This type of design is a convenient alternative where true experiments cannot be used for ethical or practical reasons.

The study involved the implementation of the Picture Exchange Communication System (PECS) in six progressive phases.[9] The first phase is "initial communication" wherein the child is taught to pick from the communication book a card containing the picture of an object and release it on the communication partner's hand in exchange for the real object. Initially, this skill is taught with two trainers, with one trainer in front of the child acting as the communication partner, and another trainer at the back of the child providing the physical prompts. The second phase is "distance and persistence" wherein the child is taught to pick a picture card from the communication book and then approach the communication partner at a distance. This skill is taught progressively by increasing the distance between the child, the communication partner, and the communication book. The third phase is "picture discrimination" wherein the child learns to choose one picture card that represents his/her desired object and places this on the communication partner's hand. There are two items presented at this stage; one item is the much-desired item, while the other one is the less-desired item. The fourth phase is "sentence structure" wherein the child learns to construct simple sentences using a detachable sentence strip that starts with "I want" and then is followed by the picture of the object that he/she wants. The fifth phase is "responding to questions." The child is taught to answer the question "What do you want?" by selecting the appropriate picture and placing this after the phrase "I want" on the sentence strip. The final phase is "commenting" wherein the child expands communication beyond requests, using phrases that begin with "I feel/ see/ like…" This last phase was not attempted in this study.

2.2 Research Setting

The study took place at the Inclusive Learning Resource Center (ILRC) of the City Central School in Cagayan de Oro City, Philippines. The Center holds self-contained classes for children with ASD and intellectual disabilities. As defined by the country's Department of Education (DepEd) in its Order No. 044 s. 2021, the ILRC refers to a learning center with improved physical infrastructure and facilities that provide support to teaching and learning, using appropriate, accessible, disability and gender-sensitive instructional learning materials, tools, devices, and the like. Further, it provides assessment tools and instruments to evaluate developmental domains and specific areas of concern to determine appropriate services and placement decisions, as well as support to medical, health, and allied professionals for the care, rehabilitation, habilitation, and development of learners with disabilities.

Formerly called the Special Education Center, the ILRC, as stipulated in DepEd order no. 045, s. 2021, provides the necessary support services to all types of marginalized and disadvantaged learners.

2.3 Participants

The study's participants included three children with ASD who were assessed as non-verbal and have never used PECS as a communication tool. They were enrolled in different classes with different time schedules at the ILRC. The following were the participants:

- Child A, a nine-year old boy who interacts only with his special education teacher;
- Child B, a nine-year old girl who throws tantrums when she cannot play with her toys; and
- Child C, a ten-year old boy with a cleft palate who has social deficits.

2.4 Data Gathering Procedure

Since the work station of the researcher was very far from the ILRC, the conduct of the experiment was done by a hired research assistant. The researcher ask permission from the principal of the City Central School to conduct a study at their Inclusive Learning Resource Center. Prior to the principal's approval, the researcher informed the special education teachers that their pupils with ASD were to be involved in the said experiment. The researcher complied with Republic Act No. 10173 also known as the Data Privacy Act of 2012, which protects the personal information of the children with autism. In line with this, a parent's consent was likewise complied with, stating that all data gathered during the implementation of the study would remain strictly confidential. It was also stated in the said consent that the parents of the child will allow the research assistant to take pictures and videos to record the progress of the child. The recording of observations was made during pre-intervention and during intervention, which was on the third week after introducing PECS.

The implementation was done individually since the participants had different class schedules. Child A's schedule was at 7:30 am to 8:30 am. Child B's schedule was at 8:30 am to 9:30 am, and child C's time was at 10:30 am to 11:30 am. On the first week of the implementation, the research assistant focused solely on developing rapport with the participants as she was new to them. She then slowly introduced PECS, according to the interest and response behavior of each child. She taught the children how to construct simple sentences on the detachable sentence strips that start with the phrase, "I want," followed by the picture symbolizing the item desired or requested.

After three weeks, the research assistant implemented the chaining effect, wherein she slowly removed her presence to guide the children with autism on how to use the PECS. There were two types of chaining used – i.e., the forward chaining and backward chaining, both of which are considered effective ways in teaching independence to the child with special needs. The researcher repeated the instructions and modeled what cards to pick when requesting the pre-identified learning items such as book, pencil and notebook, as well as personal items such as water, biscuits and shoes.

Due to the due to the rise in the heat index and other unforeseen events happening at the school, the implementation

of the study was shortened by several days.

2.5 Observational Tools

Data were recorded through an observational tool utilizing a Likert-type scale, which offered a range of answer options that describe the frequency of the behavior being observed, as shown in Table 1 below. The instrument was used to record observations of the child's request for common objects before and during the use of PECS.

Table 1: Guide in the scoring of observations

Frequency	Description	Score
Never	Not observed at any time	0
Rarely	Observed about 1% to 10% of the time	1
Occasionally	Observed about 11% to 30% of the time	2
Sometimes	Observed about 31% to 50% of the time	3
Frequently	Observed about 51% to 70% of the time	4
Usually	Observed about 71% to 90% of the time	5
Every time	Observed about 91% to 100% of the time	6

2.6 Results and Discussion

A quasi-experiment, this study aimed to explore the effectiveness of Picture Exchange Communication System (PECS) in teaching expressive communication skills to children with autism spectrum disorder (ASD).

2.6.1 Requesting Objects Before and After the Introduction of PECS

During the first few days of the implementation, the research assistant gained the rapport of the children. When PECS was initially introduced, all the children seemed to show curiosity in the PECS cards. However, Child B needed engagement with play every time he and the research assistant would have PECS-assisted communication sessions. Play integrated with PECS allows children with autism to engage in meaningful communication in a way that feels natural and enjoyable for them.[9] This approach also helps create positive, interactive experiences wherein the child can explore and develop their social and communication skills.

Table 2 shows the level of expressive communication skills of the participants in terms of the frequency in requesting certain objects before and during the use of PECS. The table shows that before using PECS, both Child A and Child B had almost the same pattern of behavior; they never or rarely requested for the learning objects. Eventually, during the use of PECS, they communicated by picking the cards with the picture of the desired object. Observation data showed that they would never request for the pencil or notebook prior to PECS. Upon learning the use of PECS cards, Child A began to usually ask for these items and Child B began to ask the same, although rarely.

Table 2: Frequency in requesting common objects before and with the use of PECS

Common Objects Requested	Child A		Child B		Child C	
	Before PECS	During PECS	Before PECS	During PECS	Before PECS	During PECS
Book	Rarely	Sometimes	Never	Rarely	Always	Always
Pencil	Never	Usually	Never	Rarely	Always	Always
Notebook	Never	Usually	Never	Rarely	Always	Always
Water	Occasionally	Usually	Never	Rarely	Always	Always
Biscuits	Occasionally	Frequently	Never	Rarely	Always	Always
Shoes	Never	Rarely	Usually	Usually	Always	Always

The behaviors above can be explained by the Symbolic Interaction Theory of Nickerson [7] wherein symbols help children with ASD express their needs and wants. They learned to construct simple sentences on the detachable sentence strips that start with the phrase, "I want," followed by the picture symbolizing the item desired or requested. They were also able answer the teacher when asked "What do you want?" This happened because the pictures or symbols in the cards such as books and pencils already have meanings that children use in their interactions with each other and with the teacher.[9] The Symbolic Interaction Theory posits that meaning arises through social interaction, and PECS relies on both the user and the communication partner interpreting the picture symbols. Thus, the children learned how to request the everyday familiar objects as they bore meaning from the shared understanding.

Similar to what Patel, Kumar and Lee [10] described, children begin to construct messages when they become more familiar with the PECS tool. Koiriyah [11] likewise noted that PECS significantly improves expressive language abilities. For children with autism, learning to express through PECS could also be attributed to their visual processing skills [12] which makes pictures an effective way for them to understand and express ideas.

On the other hand, it was noted that Child C who has a cleft palate could already request for the items at the beginning through gestures or pointing. It appeared that his being non-verbal was a consequence of his cleft palate rather than a deficit in expressive or social skills. When PECS was introduced, it seemed easy for him to similarly point at the representative pictures in the PECS cards. Nevertheless, the augmentative tool helped him express what he wanted, similar to the findings of Green and his colleagues. [13] about children with ASD who had cleft palate. With the familiar items being requested, Child C felt less anxious and thus, was able to shift communicating with the use of the pictures and symbols on the sentence strips. Davis and Brown [14] also provide explanation, saying that children with autism who have strength in comprehension learn how to interact

with their peers and build self-confidence in expressing their needs compared to those with cognitive deficits

2.6.2 Challenges Encountered During the Introduction of PECS

There were three major challenges noted during the introduction of PECS to the three participants. These included the display of tantrums, inattention, and echolalia.

Tantrums. During the pre-intervention phase, the research assistant devoted time building rapport with the children. On the first attempts at introducing PECS, Child A crumpled the materials angrily while Child B went into tantrums. As observed, children with autism may experience tantrums because of feeling overwhelmed by sensory stimuli, frustration with communication difficulties, or disruptions to their routine [15]. Once the routine of a child with autism is disrupted, he/she immediately throws tantrums because it breaks the pattern that they are used to. Additionally, Sutherland and Smith [16] noted that oftentimes, children with autism throw tantrums because of the challenges that goes with adapting to change. There is also a tendency for a meltdown perhaps because the child did not want to be asked or was overwhelmed with the question asked. Children with autism may experience difficulties with attention due to sensory overload, challenges with processing information, or difficulties on tasks given that are not aligned with their interests [17]. That is why getting their rapport and knowing their interest were very important, for them to not be anxious on the activities. Furthermore, the inability to effectively express their needs or feelings verbally may sometimes lead to frustration and they throw tantrums as a form of communication. Emotional reactions are often their way of expressing distress when they are unable to communicate their needs effectively because they cannot express well their feelings to people who surrounds them.

Inattention. Observation notes revealed that participants did not pay attention to the instruction and modeling, and easily became bored or frustrated, which is typical of children with ASD. In line with this, Banire [18] said that getting the attention of a child with ASD is a challenge, which the research assistant encountered during the use of PECS. She integrated play with Child B and had a specific toy in the room that was used during the introduction of PECS to catch the child's attention. The research assistant would say "The orange dog wants to have a notebook. What does the orange dog want?" and so on. But then Child B would not pay attention or seemed bored. Meanwhile, Child A preferred to listen to his special education teacher, not paying attention to what the research assistant was saying. At times, the research assistant integrated songs with PECS to catch the attention of the children. After a week, when the research assistant started the instructions using PECS, Child A listened attentively and answered promptly.

Echolalia. Another observed challenge was that children with ASD tend to parrot or echo what the research assistant said, instead of listening to the instructions about the pictures on the PECS cards. This happened when they were not interested with what is asked or talked about, or when they did not know the answer to the questions asked. Prizant and Rydell [19] have likewise noted that children with autism repeat what they hear. They practice their language skills, wherein they try to understand or remember information and seek comfort in familiar phrases. Echolalia helps children process language when they have difficulties with spontaneous speech. Similarly, Rudy [20] stated that echolalia, is a common feature for children with ASD, might also be a way for

children with ASD to communicate with people, especially their parents, teachers, and the like. In the research assistant's observation, the children echoed each word or phrase that she said until such time that children A and B went into tantrums because they did not want to answer the questions with the PECS cards.

3. Conclusion

This study found out that through PECS, there was an improvement with the communication skills of children with ASD, specifically in terms of requesting familiar or common objects. However, this difference was not significant for all, which may be attributable to one participant's ability to express his needs in other ways prior to the intervention.

Recommendations in the study included allotting more time to introduce PECS to achieve significant improvement in the expressive communication skills. Reinforcement strategies are also a helpful addition to the PECS program so that the teaching is more effective and facilitative.

4. Limitations

Experimentation on the use of PECS was conducted only at the Inclusive Learning Resource Center (ILRC) of the City Central School of Cagayan de Oro City with very few participants. This small size limits the generalizability of the findings and restricted data collection which could have led to a more robust analysis.

The study was conducted during the summer months of April and May with the heat index rising by the day, which prompted the Department of Education to suspend classes. With limited time to conduct the quasi experiment, the use of PECS was not attempted in other classes of the school that had children with autism. Such circumstances made it harder to teach PECS and detect its significant effects on the communications skills of the participants.

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