

PECS and the Communication Skills for Students with Autism Spectrum Disorders

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Abstract

Developed by Lori Forst and Dr. Andrew Bondy, the Picture Exchange Communication System, or PECS is a communication system designed for students with limited or no communication abilities. Commonly, students with autism spectrum disorders use the picture exchange communication system in their daily lives. Students with autism spectrum disorder use PECS to communicate their emotions, thoughts, and requests to their family, peers, and teachers. Our research focuses on how the picture exchange communication system (PECS) improves the communication skills of students with autism spectrum disorders. We believed that the picture exchange communication system (PECS) will increase the students' ability to communicate with their family, peers, and teachers. We used research journal articles to deepen our knowledge of the picture exchange communication systems and its use for students with autism spectrum disorders. Based on our research, we found that the picture exchange communication system is an effective communication tool for students diagnosed with autism spectrum disorder. We recommended that the picture exchange communication system should be branched out to the students diagnosed with different types of disability to enhance their communication skills.

Understanding Individuals with Autism Spectrum Disorders

General Understanding of Autism Spectrum Disorders.

In 1993, Leo Kanner - an Austrian-American psychiatrist - identified the characteristics of autism spectrum disorder. Kanner defines the word autism as an “escape from reality,” which describes the disorder (Gargiulo & Bouck, 2018, p. 330). According to the Autism Society of American, there are approximately “3.5 million individuals” diagnosed on the autism spectrum (Gargiulo & Bouck, 2018, p. 330). The Individuals with Disabilities Education Act describes autism spectrum disorder as a disorder that impacts the “communication and social interaction,” which affects the educational performance of the student (Gargiulo & Bouck, 2018, p. 331). Also, students diagnosed with autism exhibit characteristics in different areas of the spectrum. Some students may have low-functioning autism, while others may be high-functioning. Students on the autism spectrum “can lead meaningful and productive lives” with the assistance of assistive technology and educational interventions (Gargiulo & Buck, 2018, p. 330).

Prevalence of Autism Spectrum Disorders.

Autism spectrum disorders make up the fastest-growing types of disabilities. The Center for Disease Control reports approximately “1 in 88 children” with autism spectrum disorder in 2012 (Gargiulo & Buck, 2018, p. 335). In 2014, however, this number increased to “1 in 68 children” diagnosed with autism (Gargiulo & Buck, 2018, p. 335). Also, the research shows that males are four times more likely to receive a diagnosis with autism spectrum disorders than their female counterparts. Additionally, the number of students with autism spectrum disorder who receives special education services has shown an “increased more than 8,8000 percent” (Gargiulo & Bouck, 2018, p. 335).

Characteristics of Autism Spectrum Disorders.

Individuals diagnosed with autism exhibit various characteristics. The two common characteristics associated with autism include deficits in social interaction and communication. Additionally, an individual on the autism spectrum may also experience difficulty in the areas of “concentration[and] attention” (Gargiulo & Bouck, 2018, p. 340). Also, students with autism spectrum disorders demonstrate difficulties in academics or behavior.

One of the common characteristics of autism include social interactions. Richard Gargiulo and Emily Bouck (2018) define the deficit in social interaction as “significant impairment in the use of multiple non-verbal behaviors” (p. 338). The limited social interaction hinders an individual on the autism spectrum to develop relationships with their peers.

In addition to social interaction, communication is also a common characteristic associated with autism spectrum disorders. Individuals diagnosed with autism experience a “late acquisition of language” (Shalla & McDonough, 2010, p. 83). Students on the autism spectrum also exhibit difficulties comprehending non-verbal cues on their peers. Similar to social interaction, communication also affects individuals with autism's ability to communicate and build relationships with others.

Additionally, repetitive and restrictive behavior is a characteristic associated with autism spectrum disorders. Individuals with autism exhibit “unusual motor movement [and] engage in non-functional rituals” (Shalla & McDonough, 2010, p. 83). According to Richard Gargiulo and Emily Bouck (2018), students with autism spectrum disorders may have an unusual attachment to inanimate objects or become rigid about their home and school routines (p. 340). Also, students with autism flap their hands or rock back and forth as a calming mechanism.

Theories and Causes of Autism Spectrum Disorders.

When Leo Kanner identified autism spectrum disorder in 1943, early researchers search for underlying causes that contributed to the diagnosis of autism spectrum disorders. According to Richard Gariulo and Emily Bouck (2018), the cause of autism spectrum disorders are complex and unknown (p. 336). Researchers, however, still develop theories to explain the causes associated with autism spectrum disorders.

One of the approaches researchers explored was psychogenic theories. Psychogenic theories focus on the “basic psychological bonds” between the parent and their children (Gargiulo & Bouck, 2018, p. 334). Over the years, the continued research conducted by the Autism Society of America on the biological cause of autism dismissed psychogenic theories.

In addition to the psychogenic theories, organic theories were developed to explain the reason behind autism spectrum disorders. Organic theories hypothesized that the behavior of the mother resulted in their child diagnosed with autism. The increased number of “seizures in individuals with autism” supported organic theories (Gargiulo & Bouck, 2017, p. 334). The connection to intellectual disabilities, however, resulted in the conclusion for organic theories.

Although the two theories attempted to explain the causes of autism, the abnormal brain chemistry and development are the contributing factors associated with the reason behind autism. According to Francesca Happé (2005), the “neurophysiology of [the] brains” contributes to causes link to autism spectrum disorders (p. 3). Yet, researchers suggest that the causes associated with autism spectrum disorders are not centralized in “one specific location of the brain,” but there are multiple regions of the brain that are involved in the reason behind the diagnosis of autism (Gargiulo & Bouck, 2017, p. 334).

Introduction of the Picture Exchange Communication System

Background Information.

Under the Individuals with Disabilities Education Act (IDEA), students with autism spectrum disorders exhibit difficulties in communication and social interactions with their peers. Lori Frost and Andrew Bondy developed the picture exchange communication system (PECS) to address the communication difficulties that students on the spectrum face in their daily lives. The picture exchange communication system is an evidence-based communication system for students with limited to no communication skills. The picture exchange communication system includes a “presentation or selection of a picture” that serves as a communication approach for students on the spectrum (Gargiulo & Bouck, 2017, p. 354). There are six phases of instruction for the picture exchange communication system, and each of the stages builds on each other.

The first phase of the picture exchange communication system focuses on teaching students the physical exchange of the pictures. According to Frost and Bondy, the first phase requires the students on the autism spectrum “to look at [and] hand the picture” to the speech pathologist or exceptional education teacher (Collet-Klingenberg, 2008, p. 2). Once the students master the first phase, the second phase of the picture exchange communication system involves increasing “spontaneity and generalization” for the student on the spectrum (Collet-Klingenberg, 2008, p. 4). The goal is to develop opportunities for the student diagnosed on the autism spectrum to enhance their social and communication ability by expressing their thoughts and requests to their communication partner.

In addition to the first and second phases, the third phase teaches students to distinguish between the pictures. During the instruction of the third phase, the exceptional education

professionals teach the students the difference between the two pictures. Then, they increase the number of images displayed to the student. Additionally, special education professionals monitor the student's progress. Once the student grasps the third phase, they begin to construct sentences using the pictures, which is the fourth phase of the picture exchange communication system. According to Collet-Kingenbeg (2008), the objective is to use the 'I want' sentence starter with the pictures the students successfully used to communicate their wants (p. 9).

The fifth phase focuses on the student's response to the question – what do you want? – using the picture exchange communication system. According to Collet-Klingenberg (2008), the objective is for the exceptional education professionals to instruct the student on the spectrum to respond to the question (p. 11). The final phase of the picture exchange communication system focuses on commenting on a question. The student with autism spectrum disorders must “listen and respond to their communication partner to gather more information (Collet-Klingenberg, 2008, p. 12). For the last phase, the exceptional education professionals prepare and introduce new comments and responses to the student on the autism spectrum. Then, the professionals monitor and evaluate the student's progress.

Additional Target Population.

Although students on the autism spectrum use the picture exchange communication system, it can enhance the communication skills for multiple disabilities. The picture exchange communication system benefits students with developmental disabilities and speech-language disorders. Additionally, students with intellectual disabilities can also benefit from the picture exchange communication system. Furthermore, students with cerebral palsy can use the picture exchange communication system as a means of communication for them as well.

Theory behind the Picture Exchange Communication System.

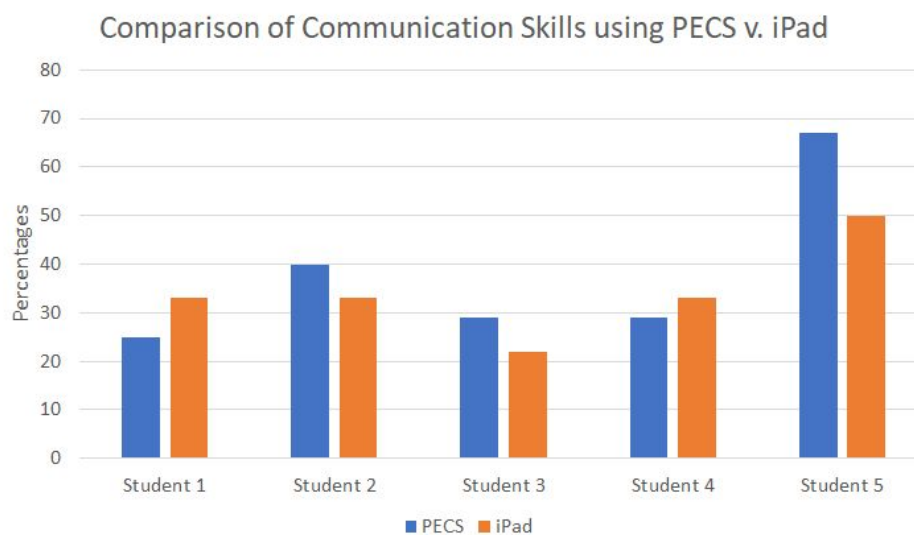
Generally, students on the autism spectrum exhibit difficulty in social and communication skills. Through the use of pictures, the picture exchange communication system enhances the student's ability to communicate with others. Before the development of the picture exchange communication system, speech-language therapists used various teaching interventions to improve the communication ability of students on the spectrum. One of the approaches used was a speech imitation program in which the student mimics the "sound and word production" of the specialists (Bondy & Frost, 2001, p. 725). However, speech-language therapists recognize the limitation of the approach and began to search for an alternative communication method. Some of the alternative techniques include sign language and picture or symbol-based communication systems. From the perspective of the student on the spectrum, these communication programs did not acknowledge the significance of "engaging in a communicative exchange" (Bondy & Frost, 2001, p. 727). The communication programs assumed the students with autism spectrum disorders know how to use the words in various contexts of a conversation.

In the early 1980s, Lori Frost and Andrew Bondy developed the picture exchange communication system, a "self-initiated functional communication system," for students diagnosed with autism (Bondy & Frost, 2001, p. 727). According to Bondy and Frost (2001), the outcome of the picture exchange communication system motivates the students to "communicate using the pictures" (p. 727). Currently, the picture exchange communication system allows the students on the spectrum to express themselves to their family, peers, and educators.

Research Findings

Study #1.

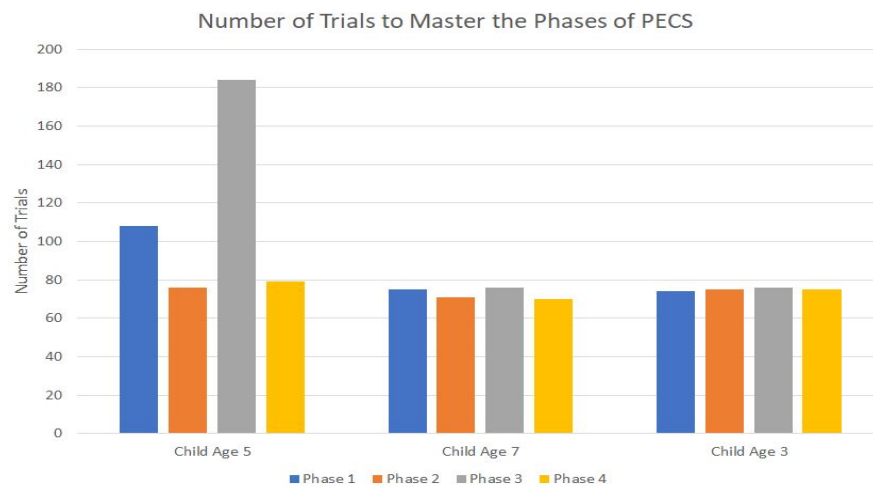
In the article, “Comparing the Picture Exchange Communication System and the iPad for Communication,” Doris Hills and Margaret Flores (2014) compares the effectiveness of the two communication approach for students with autism spectrum disorders. Although the picture exchange communication system and iPad are different communication methods, they still enhance the communication skills of students with a disability. Hills and Flores conducted their study at an extended school year program with students. They investigate the students’ use of the picture exchange communication system and the iPad to request their snack.



The research findings show mixed results. As stated by Hills and Flores (2014), the five students exhibit different responses to “communication interventions” (p. 52). The mixed research findings illustrate that the picture exchange communication system can be as or more effective as the iPad in terms of the student’s communication development. Also, researchers suggest the use of the picture exchange communication system beneficial in early communication development.

Study #2.

In the article, “Effects on Communicative Requesting and Speech Development of the Picture Exchange Communication System.” Jennifer Ganz and Richard Simpson (2004) analyze the impact of the picture exchange communication system of three children with related characteristics of autism spectrum disorders. For their research, each of the three participants met four criteria. The four criteria include (1) no experience with the picture exchange communication system, (2) between the ages of three and seven, (3) demonstrate limited functional speech, and (4) need an augmentative or alternative communication system (Ganz & Simpson, 2004, p. 397). Additionally, the researchers asked each of the parents and educators to complete a checklist and provide a list of words that each child has said.



Based on their research, each of the students excels in using the picture exchange communication system. Also, it enables students with autism spectrum disorders to use “longer phrases and complex syntax” (Ganz & Simpson, 2004, p. 406). These research findings show that the picture exchange communication systems improve social and communication abilities students diagnosed with autism spectrum disorders.

Study #3.

In the research article, “The Picture Exchange Communication System: A Promising Method of Improving Communication Skills,” Jennifer Ganz, Richard Simpson, and Emily Lund (2012) describe the picture exchange communication system as a visual augmentative or alternative communication (p. 178). Their research highlights that the picture exchange communication system is “the most effective and preferred choice” for students on the autism spectrum (Ganz, Simpson, and Lund, 2012, p. 178).

The research article focuses on the six phases that students on the spectrum go through to learn how to use the picture exchange communication system adequately. The first phase teaches the student the icons on the board are the method of communication. In the second phase, the child is taught to retrieve the device independently and find someone to communicate with using the board. The third phase instructs students on how to use the different icons on the picture exchange communication board.

The fourth phase of the picture exchange communication system teaches the student on the autism spectrum to use the board’s sentence strip blocks to create whole sentences, while the fifth phase teaches the students to listen to people and respond to the statements with the picture exchange communication board. As stated by Ganz, Simpson, and Lund (2012), the last phase introduces commenting blocks, which allow students to express their feelings (p. 183).

Within this research article, Ganz, Simpson, and Lund discuss the six phases in great detail. The findings of the article suggest the picture exchange communication system is an essential tool to help students with autism. This article, however, discusses the phases a student must go through to use the board for communication.

Study #4.

In the article, “Long-Term Effects of PECS on Social-Communicative Skills of Children with Autism Spectrum Disorders,” Anna Lerna, Dalila Esposito, Massimiliano Conson, and Angelo Massagli (2013) investigates the effects of the picture exchange communication system training “on the social-communicative skills of children with autism spectrum disorders” (p. 478). The researchers assess the student’s use of the picture exchange communication system in both structured and unstructured environments.

Table 1. Means (SDs) of standard scores on formalized outcome measures at times 1–3, separately for the two groups. MANOVA values of the main effect of group on formalized outcome measures

	PECS			CLT			<i>F</i> (1,36)	<i>p</i>	η^2_p
	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3			
<i>GMDS</i>									
Language	34.9 (9.2)	42.3 (14.5)	50.6 (22.1)	35.4 (9.8)	33.6 (12.4)	37 (19.5)	2.33	0.136	0.061
Personal–Social	65.0 (9.9)	66.0 (6.9)	59.6 (13.1)	50.7 (14.6)	56.9 (11.6)	50.3 (9.5)	9.95	0.003	0.217
Non-verbal IQ	78.4 (17.5)	72.7 (13.2)	65.3 (23.1)	68.0 (15.6)	73.7 (21.9)	58.3 (19.6)	0.89	0.351	0.024
<i>ADOS</i>									
Communication	5.9 (1.2)	4.3 (1.3)	3.9 (2.3)	6.4 (1.8)	6.4 (1.5)	6.9 (0.9)	15.34	0.0001	0.299
Social	9.3 (1.9)	7.3 (3.2)	5.7 (3.2)	10 (1.9)	9.6 (1.5)	9.9 (3.6)	8.41	0.006	0.189
Total score	15.0 (2.6)	11.6 (3.7)	9.6 (5.1)	16.4 (3.4)	16.0 (2.9)	16.7 (3.8)	14.59	0.001	0.288
<i>VABS</i>									
Communication	54.8 (14.2)	64.4 (6.8)	70.6 (15.2)	52.6 (5.9)	55.5 (5.8)	57.8 (13.9)	5.38	0.026	0.130
Social	63.3 (7.5)	84.4 (22.5)	70.6 (8.5)	58.8 (2.9)	60.7 (3.6)	63.3 (5.9)	12.73	0.001	0.261

Note: Significant values are shown in bold.

The data table above illustrates the results of the research. This research studies the children one year after their specialized treatment with the picture exchange communication system ended. The research shows the children maintained their ability to use the picture exchange communication following their one-year treatment. These results explain two essential concepts. First, in most cases, students who are taught to use the picture exchange communication system did not need to be retaught once they have mastered the picture exchange communication board. Secondly, the children who use the picture exchange communication system showed improvement in their communication and social skills and their cooperative play with others.

Discussion

Limited Research on PECS and Other Disabilities.

Alaina and Chanelle initially explore the use of the picture exchange communication system for students diagnosed with intellectual disabilities. However, we discovered that there was a limited amount of research on the effects of the picture exchange communication system and the communication skills for intellectual disabilities. This limitation illustrates that the picture exchange communication system has not branched out to other types of disabilities. In their research study, Anna Lerna, Dalila Esposito, Massimiliano Conson, and Angelo Massagli (2013) stated that the picture exchange communication system proves to be an essential approach “to enhance social and communicative skills” (p. 479). If the picture exchange communication system is useful for students diagnosed with autism spectrum disorders, it should have a similar effect for different types of disabilities, such as intellectual disability, cerebral palsy, and speech-language disorders.

Effectiveness of the PECS and the iPad.

In the research study, “Comparing the Picture Exchange Communication System and the iPad for Communication,” Doris Hills and Margaret Flores compare the picture exchange communication system and the iPad to determine which communication tool was more effective for students with autism spectrum disorders. The results of the study varied in terms of which communication tool was useful for students. According to Hills and Flores (2014), the picture exchange communication system allows students to “point to each picture,” while the iPad possesses a “voice [to] speak the sentences” (p. 53). Thus, the picture exchange communication system exhibits a significant impact on the communication skills for students on the spectrum.

Recommendations and Future Directions

Recommendation.

Alaina and Chanelle recommend the picture exchange communication system as a communication tool for students on the autism spectrum. The picture exchange communication system is a low-technological communication tool used in schools and homes. Additionally, the picture exchange communication system is cost-efficient for parents and teachers to purchase for their students on the autism spectrum. Also, teachers and parents can customize the picture exchange communication system unique to the child diagnosed with autism spectrum disorders.

Future Directions.

Students with autism spectrum disorder commonly use the picture exchange communication system as a communication tool. In the future we want to research the effects of the picture exchange communication system for students with different types of disabilities. The four research articles we examine illustrate that the picture exchange communication system does improve communication skills for students on the spectrum. Therefore, we believe that the picture exchange communication system would have a similar effect on students with limited to no communication abilities.

Additionally, we also want to explore the effects on the picture exchange communication system and the neurological development of a student with autism spectrum disorder. One of the research articles we discover compares the effectiveness of the picture exchange communication system and iPad. Although the result findings varied, it sparked new research conversation on the neurological development of students with autism spectrum disorder. It would be interesting to see how communication impacts the brain of a student on the autism spectrum.

Conclusion

The Picture Exchange Communication System, or PECS is a valuable communication tool for students diagnosed with autism spectrum disorders. Students with autism spectrum disorders exhibit difficulties with social interaction and communication; however, the picture exchange communication system creates a non-verbal way for students on the autism spectrum to engage in conversation with their family, teachers, and peers. The picture exchange communication system board offers students on the autism spectrum a way to communicate with their caregivers, peers, and educators in a non-verbal way. While the picture exchange communication system is a relatively low technological tool and has been around since the 1980's, studies show that the picture exchange communication system continues to be a method of communication and yields positive results. Additionally, the other research articles share similar findings. Since the creation of the picture exchange communication systems, it continues to enhance the communication abilities of students diagnosed with autism spectrum disorders.

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