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The Using Animation Tutors based on Phase One Picture Exchange Communication System to Improve Vocabulary Skills with Autism Spectrum Disorder

Taryadi Taryadi[1], Sattriedi Wahyu Binabar[2], Era Yunianto[3]
[1] Information System Department, Widya Pratama Institute, Pekalongan, Indonesia
[2,3] Information System Department, Widya Pratama Institute, Pekalongan, Indonesia

ABSTRACT: This study evaluates the web-based Animated Tutor PECS (AT-PECS) using the Picture Exchange Communication System (PECS) method as a means to increase the ability to initiate communication independently in children with Autism Spectrum Disorder (ASD). The objects of this study were children under 5 years of age who had ASD with limited communication skills before being treated using the AT-PECS application. Methods:This study designed an alternating treatment to examine the use of AT-PECS as the primary technique for improving students' abilities with PECS and increasing students' independent communication initiatives. Results: The results obtained from this study indicate that students can accept the use of the PECS method for learning and show an increase in communication initiative skills independently, but the speed in improving vocabulary looks faster when using the AT-PECS application. Conclusion: The study indicate that using the PECS intervention method with the help of ATA can improve the communication skills of ASD children and improve verbal abilities to a certain extent.

KEYWORDS: Animated tutor, Autism spectrum disorder, Communication, PECS.

INTRODUCTION

The stages of child development can be grouped based on the motor, sensory, cognitive, social, and communication milestones. Early stages of child development starting from infancy show different developments such as at 3 months of age being able to respond to sounds and at 6 months of being able to babble [1]. Subsequent developments in communication show the ability to vocalize into words associated with other people and objects. Children whit experience developmental delays will experience disturbances and delays in developing physical growth and development, cognitive abilities, communication skills, adaptation to the environment, and children's socio-emotional development [2]. Developmental delays in children affect the ability to learn and communicate in a variety of ways. Technological aids, direct instructions, and interaction models can improve communication skills for children with stunted growth [3].

Characteristics of early childhood who suffer from autism are characterized by developmental delays that are not in accordance with the stages of development of the child's age. Autism Spectrum Disorder (ASD) is a complex neurodevelopmental disorder with signs of disturbances in social areas, communication skills, and behaviors that are shown in repetitive and unconscious patterns ([1]. Taylor et al. [4] added that the characteristics of children with autism who experience developmental delays are motor and sensory skills, behavior, cognitive, and rigid thinking skills[5]. Poor response to name calls, loss of speech and social skills, unable to maintain eye contact, poor control over objects or toys, lack a smile and social responsiveness, does word loops in speech or phrases are other characteristics of autistic children [6]. ASD children have limitations in verbal communication, the inability to express emotions, communicate, and ask for things [7].

Experts recommend learning models to improve communication skills naturally with peer models, imitating more mature people, being responsive, and learning games[8]. Communication learning can be started from the child, according to interests, authentically regulated, and naturally strengthened [9].

One of the effective, inexpensive, and versatile communication interventions is the PECS[10]. PECS uses image media as a means of communication, making requests, and expressing ideas. PECS has three main goals, namely, students begin to

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communicate independently, approach and find friends to communicate with, and use appropriate images to convey messages[11, 10].

One of the communication learning models for ASD and mentally retarded children is PECS which has ease of use, reduces communication demands, strengthens relationships, and flexibility in use[12][13]. Tien[14] evaluates the use of the PECS method by comparing and reviewing research that has been carried out by 27 previous researchers. Of the 394 trainees who followed the PECS method, there was only one participant who was not able to master the PECS system at least at stage 1. Tanner [12] Ganz and Simpson [15] found that the PECS system was able to increase the number of words spoken by autistic children. In addition, it can increase the complexity of words and the ability to speak longer. In general, the PECS method is able to improve communicative abilities for children with autism and mental retardation socially[16].

MATERIALS AND METHODS

1) Participants
   This study involved four preschoolers with autism syndrome disorders, a teacher, and a therapist. Special education is given to children involved in research in the form of educational services covering 4 days a week of learning in special preschool children's development classes. The instructions given to 4 children for 4 hours per week are inclusive instructions in a preschool setting that are no different from general education.
2) Setting
   The research was carried out in schools for children with special needs and disabilities in Pekalongan City. The school has students ranging from preschool to elementary school. Participants in this study were enrolled as preschoolers (under 7 years old) where there were 8 children in the class.
3) Materials
   The provision of primary and secondary treatment was chosen by identifying the assessment of each child's preferences at breakfast/snack, playtime, and learning time. Tutoring software with animation based on PECS learning is used to model the objects that are used as treatment reinforcement. Every action taken by the teacher/instructor is recorded and documented.
4) Variables and Data Collection
   The number of independent initiations carried out by students is the dependent variable to be analyzed. Self-initiation is the activity of students taking pictures and giving the pictures to the teacher without the help of the teacher or the teacher's orders. Event logging was used to count the number of independent student initiations that occurred. Students are given the opportunity to participate in two interventions that include only PECS and PECS with an animated tutor to obtain independent initiation. The number of interventions and materials given to each student shown in the table 1.

Table 1. Material dan interventions to each student

Material	PECS Only	PECS + ATA*
Food	Anita	Fadli
	Budi	Dedi
Toy	Fadli	Anita
	Dedi	Budi

*Note: ATA = Animated Tutoring for Autims

An efficient intervention was defined as the number of independent student initiations of 100% carried out in three consecutive sessions.

5) Experimental Procedures
   Baselines. Baseline data collection was carried out in three sessions. During the baseline, students were given 10 opportunities to exchange pictures with the teacher to see the initiation of requests for items that students wanted. The time used to wait for a response from students is 30 seconds to give students the opportunity to independently place the picture to

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the teacher through his outstretched hand. During this process, no verbal or physical instructions were given by the accompanying teacher.

Intervention. The intervention process was carried out in a special preschool class. Students will receive instruction using the PECS only or ATA prior to the PECS learning model.

During the intervention process with ATA plus PECS, children are shown an animated image that is in a gadget that is available independently to ask for the item desired by the teacher.

The accompanying teacher places the most desired item about 50 cm from the student and reaches out with the palm of the hand facing up. The intervention process required a waiting time of 30 seconds to give the child the opportunity to request pictures independently. The recipient responds by giving goods to the child and positive reinforcement to the child.

Replication. After the system performed 100% self-initiation or successively for three sessions, the preferred and achieved procedures were replicated using the less effective procedures during the intervention process.

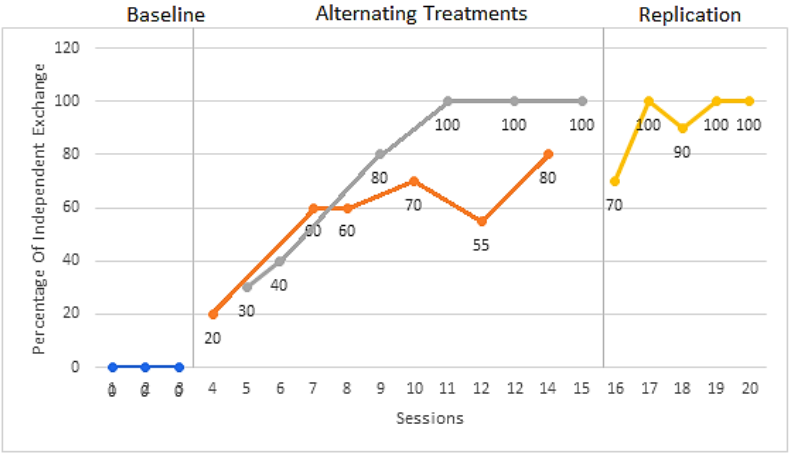
RESULTS

In the baseline stage, there were no students who independently started the exchange of pictures when snacks or toys were served. After the PECS intervention began to increase independent initiation from students, when given the opportunity to ask for food or toys, the average independent initiation increased by 54%.

By using the PECS and ATA interventions, it was seen that all students reached the specified criteria, and when using the PECS intervention alone, none of the students reached the criteria. Although there were two students who approached the criteria during the PECS intervention only, namely Budi and Dedi. All students performed an independent initiation process faster when ATA was added to the PECS procedure during the intervention. After the intervention process, the replication phase used the PECS and ATA methods so that students asked for food or toys that had not been obtained at the time of the intervention with PECS only. The replication of the procedure shows that students are increasing their self-initiation by an average of 96% and the criteria can be achieved after 5.5 sessions.

1) Anita's independent exchanges

During the baseline stage, Anita did not use picture cards independently to ask for food or toys. At the intervention stage with PECS, Anita exchanged picture cards independently by an average of 58% in the range of 20%-80% when she was given food in front of her. Furthermore, during the intervention with PECS and ATA, Anita used picture cards independently by an average of 75% in the range of 30% - 100% of the time given. Anita was able to complete and achieve the independent initiation criteria after six intervention sessions. The visible fractionation of the two types of intervention, namely in sessions 9-15, showed that In the replication phase, Anita reached the criteria for requesting food after 6 sessions with an average achievement of 92% in the range of 70%-100% of the time required (see Figure 1).



Note : ATA = Animated Tutor Autism ; PECS = Picture Exchange Communication System

Figure 1. Anita's percentage of independent exchanges with and without ATA

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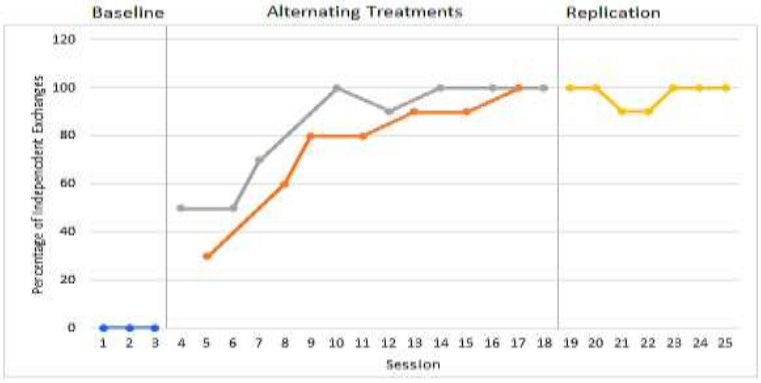
2) Budi's Independent Exchanges

At the baseline stage, Budi did not exchange picture cards independently when food or toys were provided in front of him. At the intervention stage with PECS only, Budi independently initiated the exchange of images by 78% from a time range of 40%-100% by showing goods and food. Subsequently, with the PECS and ATA interventions, the mean independent initiation of image exchange increased to an average of 83% over a 50% - 100% time range chance and reached the expected criteria after 7 intervention sessions. After the intervention period was carried out in the replication phase, there was an increase in independent initiation of food by 97% in the range of 90% - 100%, and the criteria were met after conducting the experiment for 7 sessions (see Figure 2).

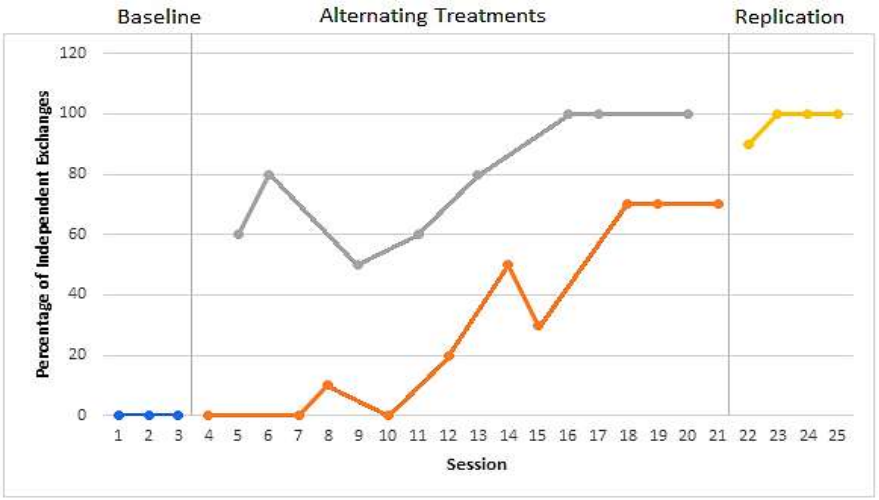


Note : ATA = Animated Tutor Autism ; PECS = Picture Exchange Communication System

Figure 2. percentage of independent exchanges

3) Fadli's Independent Exchanges

During the baseline stage, Fadli did not initiate an independent game exchange even though food or toys were provided. After the first intervention was performed with PECS only, Fadli started to initiate independently by exchanging images an average of 32% in the time range of 0%-70%. In the next stage, with the provision of PECS and ATA interventions, Fadli's independent initiation to exchange images increased to an average of 79% of the chances of getting food in the range of 60% -100% and the sessions achieved were eight PECS and ATA sessions. In the replication phase, Fadli initiated the demand for toys independently by an average of 98% in the range of 90% - 100%, and the criteria could be achieved after four sessions (see Figure 3).



Note : ATA = Animated Tutor Autism ; PECS = Picture Exchange Communication System

Figure 3. Fadli's percentage of independent exchanges

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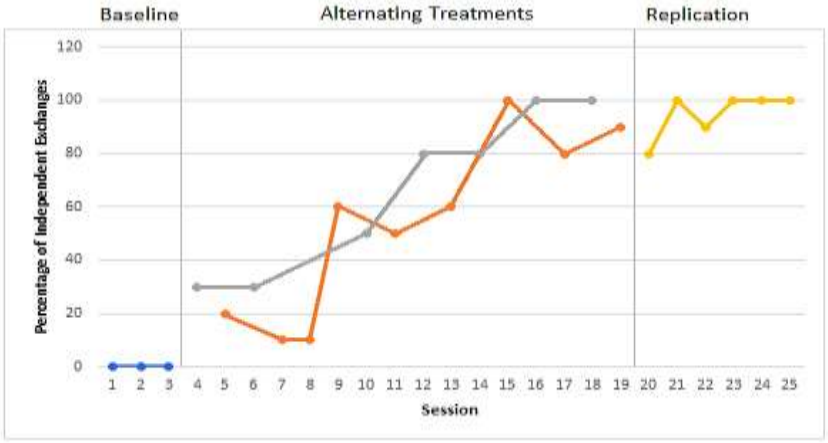
4) Dedi's Independent Exchanges

During the baseline period, Dedi had not yet started an independent initiative to exchange pictures of the food or toys provided. During the PECS intervention, Dedi experienced an average increase in the independent initiation of image exchange by 59% in front of toys. In the PECS and ATA intervention phases, Dedi's independent initiation rate increased by an average of 71% in the range of 30% - 100% and reached the criteria after going through eight intervention sessions. Dedi experienced better improvement during the intervention with PECS and ATA, although functionally he showed similar results for both interventions. In the replication phase, Dedi achieved an average independent initiation rate of 95% in the range of 80% - 100% of the criteria and through achievement after six sessions (Figure 4).



Note : ATA = Animated Tutor Autism ; PECS = Picture Exchange Communication System

Figure 4. Dedi's percentage of independent exchanges

DISCUSSION

This study aims to evaluate the PECS method using Animated Tutors as a way to improve independent communicative interactions of preschool students by improving verbal communication skills. The given intervention provides an effective increase in the demand for primary objects, namely food and secondary or toys. This intervention also shows an increase in the ability to communicate with others through the PECS method, where this method is an effective, functional, economical, and practical way of communication. And the final result shows the achievement of the goal to increase the independent initiation of students to exchange pictures independently.

The results of this study support previous research that has been carried out where the use of PECS and multimedia is effective for improving new skills [17][18][19] and communication skills [20].

The results of this study can be used as a literature review related to aniated tutors and PECS in their various implementations. First, animated tutors can be used as a teaching priming technique using PECS as a learning method. Bellini & Akullian [21] conducted a study using the PECS method and multimedia video as a way to teach communication skills but carried out separately. This technical innovation results in faster acquisition and mastery of students as objects. By viewing the animation presented in the application before engaging in communication interactions, students with autism can imitate more accurately and independently initiate the communication of the desired request.

Second, by using an animated tutor, students are able to master the PECS method more quickly than without the intervention. PECS is a simple and effective communication system through the exchange of images to express ideas. Besides, PECS can be used as a means of communication and is proven to be able to improve verbal communication skills. Training time for students can be reduced by the intervention of PECS and animated tutors.

Some of the limitations in this study are that all designs are single cases, the sample used is small, namely only four participants, so that the interpretations and conclusions made in this study refer to small participants. The validity and generalizability of the results of this study can be increased by increasing the size of the sample and participants. Besides that, it is

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also necessary to evaluate the characteristics of the participants to see the relationship between the student's character and the results of the study.

The limited time for conducting research is the next limiting factor. Time restrictions occur because the interventions provided are school-based so they can only be done when students are in school. However, it was found that participating students had increased motivation and reinforcement obtained through preference assessment.

CONCLUSION

Based on the data and discussions that have been carried out, it is concluded that PECS with ATA (animated Tutor for Autism) can improve communication for autistic children. Communication by the child is the ability to respond to the teacher's words by expressing and being able to do what the teacher commands, besides being able to convey the child's wishes through sentences or words that can be understood by other parties. This shows that the approach through the PECS method is effectively able to improve expressive communication skills in ASD children. This is evidenced by the results of the test scores which have increased from baseline to intervention conditions. This can be seen in the child's ability to respond and answer questions. The ability of system-independent initiation to request food or toys is enhanced by the presence of PECS and ATA intervention.

REFERENCES

1. American Psychiatric Association.: Diagnostic and statistical manual of mental disorders: DSM-5. 2013. Washington, D.C: American Psychiatric Association.
2. Anna, N. & Santoso, C.L. Pendidikan anak, ed 5. 2017. Family Press. Jakarta.
3. Biederman, G.B., & Freedman, B.: Modeling skills, signs and lettering for children with Down syndrome, autism and other severe developmental delays by video instruction in classroom setting, Journal of Early and Intensive Behavior Intervention, 4. 2007. 736–743.
4. Taylor, R., Smiley, L., & Richards, S.: Exceptional students: Preparing teachers for the 21st century. 2009. New York, NY:McGraw-Hill.
5. Berry, A., Borgi, M., Francia, N., Alleva, E., & Cirulli, F.: Use of assistance and therapy dogs for children with Autism Spectrum Disorders: A critical review of the current evidence, Journal of Alternative and Complementary Medicine, 19(2). 2013. 73–80.
6. Corcoran, J., Berry, A., & Hill, S.: The lived experience of US parents of children with Autism Spectrum Disorders: A systematic review and meta-synthesis, Journal of Intellectual Disabilities, 19(4). 2015. 356–366.
7. O'Haire, M.: Animal-assisted intervention for Autism Spectrum Disorder: A systematic literature review, Journal of Autism and Developmental Disorders, 43(7). 2013. 1606–1622.
8. Russell, S., & McCloskey, C.: Parent perceptions of care received by children with an Autism Spectrum Disorder, Journal of Pediatric Nursing-Nursing Care of Children & Families, 31(1). 2016. 21–31.
9. Schreibman, L., Dawson, G., Stahmer, A., Landa, R., Rogers, S., McGee, G., et al.: Naturalistic developmental behavioral interventions: Empirically validated treatments for Autism Spectrum Disorder, Journal of Autism and Developmental Disorders, 45(8), 2411–2428.
10. Bondy, A., & Frost, L.: A picture's worth: PECS and other visual communication strategies in autism, Bethesda, 2002. MD:Woodbine House.
11. Preston, D., & Carter, M.: A review of the efficacy of the picture exchange communication system intervention, Journal of Autism and Developmental Disorders, 39.2009. 1471–1486.
12. Tanner, K., Hand, B., O'Toole, G., & Lane, A.: Effectiveness of interventions to improve social participation, play, leisure, and restricted and repetitive behaviors in people with Autism Spectrum Disorder: A systematic review, American Journal of Occupational Therapy, 69(5). 2015.
13. National Institute of Neurological Disorders and Stroke.: Autism fact sheet, Washington, DC: Author. 2009.
14. Tien, K.C.: Effectiveness of the picture exchange communication system as a functional communication intervention for individuals with autism spectrum disorders: A practicebased research synthesis, Education and Training in Developmental Disabilities. 43. 2018 61–76.

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www.ijcsrr.org

15. Ganz, J.B., & Simpson, R L.: Effects on communicative requesting and speech development of picture exchange communication in children with characteristics of autism, Journal of Autism and Developmental Disorders, 34(1). 2014.pp.395-409
16. Flippin, M., Reszka, S., & Watson, L.R.: Effectiveness of the picture exchange communication system (PECS) on communication and speech for children with autism spectrum disorders: A metaanalysis, American Journal of SpeechLanguage Pathology, 19(1). 2010. pp.178-195.
17. Kaewkiriya, T.: A Design and Development of E-Learning Content for Multimedia Technology Using Multimedia Games, International Journal of Software Engineering & Application, (IJSEA).2013.
18. Leow, F.T.: Interactive Multimedia Learning Innovating Classroom Education in A Malaysian University, The Turkish Online Journal of Educational Thecnology -TOJET.2014.
19. Gianluca, D.L., Gonzales, C.H., Padmaja, B., & Gondy, L.: A Smart-Phone Application and a Companion Website for the Improvement of the Communication Skills of Children with Autism: Clinical Rationale, Technical Development and Preliminary Results. J Med Syst, 35(1).2011. pp.703-711
20. Charlop-Christy, M.H., Carpenter, M., Le, L., Le-Banc, L., A., & Kellet, K.: Using the picture exchange communication system with children with autism: Assessment of PECS acquisition, Speech, Social-Communication behavior, and problem behavior, Journal of Applied Behavior Analysis, 35(1). 2012. pp.213-231.
21. Bellini, S., & Akullian, J.: A meta-analysis of video modeling and video self-modeling interventions for children and adolescents with autism spectrum disorders. Exceptional Children. 2007. 73, 264–287.

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