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The Use of Visual Support of PECS and Schedule Based on the Characteristics of Student with Autism

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Abstract: Most individuals with autism have communication problems but they are easier to process information visually. Based on the problem, this study aims to test the effectiveness of visual support methods (PECS and Visual Schedule) on the communication skills and basic behavior of children. This study is an experimental research with Single Subject Research (SSR) using A-B-A model. Data collection techniques are performed with a test of the subject's communication skills and analyzed by descriptive statistical analysis and displayed in graphical form. The subjects in this study was child with who experienced communication problems. The results showed that the use of visual support (PECS and Visual Schedule) is effective to increase communication skills and basic behaviors of children with autism. The use of visual support strategies (PECS and Visual Schedule) for autism with weak criteria in communication can help children become better in developing communication potential.

Keywords: PECS, visual schedule, autism

I. INTRODUCTION

Child development includes physical, mental and emotional changes. Children with autism physically grow and develop like other children, but the child may have a developmental disorder in brain function. One of expert mention autism disorder of neurodevelopmental person and inability communication and social interaction as a people in generally (Pirzadroozbahani et al., 2018). Autism spectrum disorder can describe as a set of five conditions including impaired social interaction, communication both verbal and non-verbal behavior and excessive, repetitive or excessive behavior, interests and activities (Roestorf et al., 2019). Boys are almost five times more easily diagnosed with one of these criteria than girls. Autism is caused by many factors, research has done by (Cheng et al., 2019) state autism is caused by many factors, innate and environmental factors being the main cause. Congenital factors are generally influenced by the condition of the mother during pregnancy. a mother who has diabetes, takes drugs, and is affected by chemical drugs has a high chance that her child has autism. Based on the all terminology take conclude that autism is a developmental disorder that interferes with cognitive function so that it affects language skills, communication and social interaction in children. genital, bad habits of the mother during the process of pregnancy and the environment around pregnant women are some of the causes of a child suffering from autism.

Disturbances or symptoms of children with autism can be minimized to optimize the development and potential of children because the intellectual level in children with autism can vary in the range below the average to above the average age of children. Efforts or interventions to support the development of children with autistic disorders should begin as early as possible right after a child is diagnosed with autism. The use of various visual media such as words, images, and real objects to represent concrete real world and abstract concepts has been shown to reduce symptoms associated with cognitive, communication, and social barriers, especially for individuals with autism disorders (Cihak, 2007). This visual support is often used to encourage communication and learning in children. The inherent communicative nature of this learning strategy makes children who have limited verbal communication challenged. Thus, visual aids can become interventions to support children with autism with cognitive limitations (Saiman et al., 2013).

People with autism have limitations in communication, in general they have difficulty in understanding language and symbols. limited interaction and minimal body contact are the cause of autistic communication problems (Clark, Whitt and Lyons (2019) described autism as a condition delay and difficulties in communication (Wadge et al., 2019). Improvement of cognitive and clinical abilities is a condition of social interaction, it shows that, children with autism must be

trained to improve cognitive and clinical skills so that they can slowly communicate. In other view Prelock and Nelson (2012) explain that children with autism face difficulties in communication, but not be cardinal identical phenomenon. That's mean many others difficulties face children with autism.

The number of children with autistic disorders in Indonesia is increasing. Forecasting results about the number of autistic patients in Indonesia is estimated as many as 2.4 million with the addition of 500 new persons / year (The Ministry of Women's Empowerment and Child Protection, 2018). Noting the enormous number of children with autism, the Indonesian government made several breakthrough steps to serve autistic sufferers, one of which was by establishing an autistic service center. there are 30 Autism Service Center institutions (PLA) spread across 33 provinces.

In addition to establishing an autistic service institute, various studies are also conducted by experts to educate children with autism disorders. Some of the problems faced by teachers in educating autistic children are language and social behavior constraints. in order to find the right solution in educating children with autism, research is conducted aimed at finding the right method in improving the communication skills of autistic children.

Based on the obstacles faced by autistic children and utilizing the potential or advantages possessed by children with autism, researchers used the PECS (Picture Exchange Communication System) method as an effort to improve communication skills in children with autism. PECS is developed for autistic children because most autistic children have extraordinary visual memory, they can memorize easily, they are visual learners, they can process a lot of material in quick steps, and are very thorough in doing tasks perfectly (Ganz and Simpson, 2008). In the modification process the use of visual schedule is a development of the PECS method that is adapted to the characteristics of the children to be faced because PECS itself is not always given to children with autism but with children with other developmental disorders.

Children with autistic disorders generally prefer the media of images in learning (Rn et al., 2013). Color variations and the use of striking colors will be able to attract the attention of children. the implementation of learning with the use of image media is called PECS (Picture Exchange Communication System). The PECS used in this study is in the form of a picture card of an object that a childlike. This card measures 6 x 8 cm. The pictures used in this study are pictures of toys that have been adapted to objects that are liked by children.

With these cards it is expected to be able to assist children in communicating, which include: (1) able to take a picture card of the desired object; (2) able to turn in a picture card of the desired object; (3) able to walk towards the communication board; (4) able to take the desired object at the communication board; and (5) able to choose the picture of the object as he wishes and submit the picture.

Visual schedule is a visual tool or media with pictures and writing that functions as a regulator of activities for children in one day about what needs to be done, this schedule board is set by the teacher or therapist before the learning process begins. There are several criteria for evaluating behavior using this visual schedule, namely:

1. The child is able to walk to his own schedule board.
2. The child is able to take the top schedule card.
3. The child is able to walk towards space based on their visual schedule.
4. The child is able to save the visual schedule in front of the place / room that he wants according to his schedule card.

The subject of this study is a 7-year-old who has developmental disabilities in communication and has a tendency to learn with a visual learner style. According to (Saiman et al., 2013) visual learners are children with this learning style who love to see pictures and video and generally find it easier to digest the information they can see than what they hear. This is shown by the habit of children who love to see pictures in books, watching TV or video, and children can also arrange blocks according to the examples in the picture. To convey their wishes the child usually pulls other people to do his will, when other people cannot fulfill their wishes the child will cry with anger or temper tantrums. Potential behavior of children today is that children are autistic children with a visual learner type. It also experienced other developmental disorders in terms of social and behavior. From the types of learning styles that children have, it is hoped that they can be helped by using visual support using the PECS method.

II. METHOD

This study uses an experimental method, with a single subject approach or Single Subject Research (SSR). SSR refers to the research strategy developed to document changes in the subject's individual behavior. The model used is the A-B-A design model. In this model two baseline conditions were used before and after the intervention. Baseline (A1): observing session behavior of research subjects before getting intervention, Intervention (B): intervention activities using the PECS method. Baseline (A2): subject's ability after intervention. This study was conducted during 16 sessions of baseline conditions with 30 minutes each session, namely 5 sessions of baseline conditions A-1, 6 sessions the research subjects in this study were 7-year-old autistic students who experienced obstacles in communication both verbally and nonverbally.

The research subjects in this study were students who had the following criteria: students aged 6 years; children are autistic who experience obstacles in communication both verbally and nonverbally, often tantrums. Who is currently in therapy at UPTD Disabilities Education Service Malang City?

Students or subjects in this study named AT, AT are students who are 6 years old with autism. AT is less able to communicate either verbally or non-verbally, often angry is not clear. If he wants something, the child usually cries, or just stares at the person in front of him (the teacher or his parents) without being able to point or mention the desired object or activity. If there is no one

around him, the child will usually fulfill his wish by grabbing the objects he wants by climbing or crying out loud even rolling on the floor so that his wishes are fulfilled immediately

III. RESULTS

A. Result of Baseline condition Research (A-1)

"Baseline (A) is a condition of data records multiple times before conducting the intervention" (Sunanto, 2005). At this stage, the measurements of the child's ability of communication and behavior conducted by using visual Support (PECS and visual schedules) without any intervention. Measurement of baseline condition (A-1) was carried out 5 session within 30 minutes. The baseline data (A-1) in this study is as follows in Table 1.

Table 1
Statistical Data Result

Session	Value %
1	40
2	33
3	53
4	46
5	46

Based on table above, the communication and behavior capabilities of autistic child at the first session of the condition get 40% value while the second session baseline condition-1 (A-1) decreases by 33%, in the third session Up to 53% and in the next session stable at a value of 46% until the 5th session. A data is stable when the value range of each data point is no more than five, and the data acquisition in baseline condition-1 (A-1).

The initial conditions of communication skills and behavior of children with autism before being given an intervention using visual support (PECS and Visual schedules). Baseline condition data (A) was obtained during the five-session study, namely the first session to the fifth session. Baseline conditions indicate the value of the ability to use visual support (PECS and visual schedules) of research subjects, namely AT.

The length of the conditions from baseline-1 is five sessions. In graph 4.1 it can be seen that the value of children's ability in communication skills and behavior in the first session is 40, while the second session tends to decrease by 33. This reduction can be seen from several factors, such when the implementation of the baseline session the two children seem unable to use visual support better because when they were given a picture card, the children just pointed to the card, even to pick up the schedule children are still often look down.

The child still tends to snatch and cry when asking for objects or toys that the child wants, the child does not want to take the visual schedule and in the third session the communication skills and behavior of children increases by 53%. And in the fourth and fifth sessions the child's communication skills are stable at 46%. The stability of the value of the child's ability to express his desire for toys that are liked is stable by seizing or crying when the desired object is not given immediately. Based on the stability value obtained by children that is 53%, it can be seen that children have difficulty in expressing their desires, and cannot show a good behavior. Baseline results (A) communication skills and behavior using visual support (PECS and visual schedules) obtained by AT subjects in the range of 33% to 53%.

B. Result of Implementation of Baseline Intervention Conditions (B)

After baseline conditions A-1 conducted, the next step is to implement the intervention conditions (B). Baseline (B) condition measurement was carried out in 6 sessions. That is from 10 August 2018 to 20 August 2018, with intervention time for 30 minutes each session. The intervention is done step by step which the step is to introduce pecs the first session, the research subjects are given an intervention taking a picture card on a communication board placed on a table or a place close to the child, and the object that the child likes to hold with the teacher's left hand, when the child wants to reach an object in the hands of the teacher's hands the prompter (helper) directs the child's hand to take the card.

Then the cards handled by the child are directed to be handed over to the teacher and exchanged for the objects the child wants. This exercise is done several times in one session. On the second day the child was given a test from the first session intervention. And on the third day the next stage of intervention is to use a visual schedule in front of the child's class.

The visual schedule board is the same as PECS using pictures according to the schedule of activities of the child has some distance from the child so that it gives an opportunity for children to walk to pick up cards on the visual schedule board and save the schedule card in a room that match with the child's schedule. In the fourth session the child was given a measurement test to administer the third session intervention.

And in the fifth session the child is given the next stage for communication, that is, the child tries to be given some distance of his communication board with the child so that the child can take cards on the communication board which are some distance away from the child and to intervene in his behavior by giving the child the opportunity to take his own visual schedule away from his class that is, the schedule is near the stairs so that it also provides the opportunity for the child to walk some distance to take the schedule and enter his class.

And also, for activities in the sixth session the children are given a measurement test of the fifth stage of the intervention, and the intervention is continued until the intervention stages are carried out to be stable, i.e. until the eighth day.

Based on Table 2 the results of measurement of intervention conditions (B) communication skills using PECS cards in children with autism that is in the sixth session the conditions get a value of 93%, while in the seventh session the value obtained by the child has decreased to 86%, this is due to the session this child from the morning has been rather quarrel and lacks concentration and if the child's needs is not obey immediately the child becomes a tantrum. In the eighth session the intervention conditions (B) began to increase to 93%. And in the ninth session the value of students increased by 100%. And stable until the eleventh session (Table 2).

Table 2
Intervention Condition Measurement Results (B)

Session	Value %
6	93
7	86
8	93
9	100
10	100
11	100

The results of the implementation of the intervention conditions (B) Communication Ability and behavior of children with visual support (PECS & Visual Schedule) in autistic children with indicators: children are able to pick up the objects indicated; children are able to take a picture card of the desired object; children are able to give cards to the teacher; children are able to walk to take a picture card of the object that is desired on the communication board; and the child is able to choose the picture according to his wishes depicted with a red line graph obtained score at the sixth session in this condition at 66%. The lowest score in this condition is 60% which occurred in the seventh session. In the eighth and ninth sessions the students get 93%. And in the tenth to thirteenth sessions students get a stable value of 100%.

C. Baseline Conditions Implementation Results-2 (A2)

The last step after the intervention condition (B) is measurement at baseline condition -2 (A2). Measurements on this condition are carried out to find out how much influence the intervention (B) has on the research subjects or this condition can be called a control condition. Measurement of the baseline condition -2 (A2) was carried out every day for 5 days starting on August 21 to 28, 2018. With a period of 30 minutes / session. At baseline -2 (A2) the initial conditions or communication skills and behavior of the research subjects were repeated in using visual support (PECS and visual schedules) as communication aids. In this condition an evaluation is carried out to determine the extent to which the interventions that have been carried out can affect the communication skills and behavior of students. And the data obtained in this study up to the stable data are displayed in Table 3.

Table 3
Condition Measurement Results -2 (A2)

Session	Value %
12	100
13	93
14	100
15	100
16	100

Based on Table 3, the acquisition of baseline measurement results -2 (A2) condition of Communication Ability and the behavior of children with visual support (PECS & Visual Schedule) for autistic children in UPT ABK Education Services in Malang, namely in the fourteenth session received a value of 100%. Whereas in the fifteenth session the values obtained by students tended to decrease by 96%. While in the sixteenth to the eighteenth session the value obtained by students was stable at 100%.

The results of the implementation of the baseline condition -2 (A2) Communication Ability and behavior of children with visual support (PECS & Visual Schedule) for autistic children depicted with green lines obtained the highest score of 100%. In the fifteenth session the scores obtained decreased by 93%. Whereas in the sixteenth to the eighteenth session the scores obtained by students were stable at 100%. The results of data acquisition in research subjects in measuring the effect of using visual support (PECS and visual schedules) on communication skills and behavior of children with autism in UPT ABK Education Services in Malang can be described in Table 4.

Table 4
Statistical Data Result

Session		Value %
1	Baseline (A1)	40
2		33
3		53
4		46
5		46
6	Intervention (B)	93
7		86
8		93
9		100
10		100
11		100
12	Baseline (A2)	100
13		93
14		100
15		100
16		100

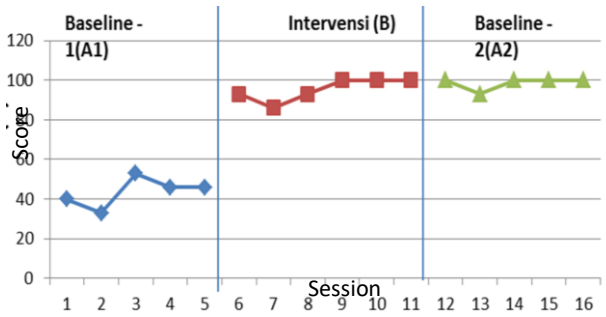

Figure 1
Recapitulation Measurement Results

Figure 1 shows the acquisition of data on the study of communication skills and behavior of children with autism using visual support (PECS & visual schedules) starting from baseline -1 (a1), Intervention conditions (B), and base line-2 (A2). The blue line in the graph describes the acquisition of data at baseline condition -1 (A1), the red line on the graph describes the acquisition of data at intervention condition (B), and the green line on the graph describes the data acquisition at baseline -2 (A2).

The following is a summary table of data analysis results between baseline conditions -1, intervention conditions, and baseline conditions -2 is displayed in Table 5.

Table 5
Visual Analysis of the Result

No	Comparation Condition	B/A1	A2/B
1	Variable	1	1
2	Trend improvement impact and line		
3	Stability of trend change	(+) (-)	(=) (+)
4	Level changed	+47	+7
5	Overlap percentage	0%	-

Based on Table 5, only one variable that was changed, namely Communication Ability and behavior of children with visual support (PECS & Visual Schedule), that is, from the condition of baseline -1 to the condition of intervention. The direction tendency between base line -1 to intervention is decreasing to increase. This means that this condition improves after an intervention is given. While the intervention condition to baseline -2, which is to increase horizontally which means that interventions that have been carried out can improve Communication Ability and behavior of children with visual support (PECS & Visual Schedule) get good grades.

Furthermore, the change in the stability trend between baseline -1, to intervention and intervention to baseline -2 is stable to stable. Communication ability and behavior of children with visual support (PECS & Visual Schedule) increased, it is seen in the baseline-1 (A1) and intervention (B) conditions by 47% so that it can be interpreted that the Communication Ability and behavior of children with visual support (PECS & Visual Schedule) is increasing. In the baseline session -2 the intervention contained a difference of 7% so that it was known that the intervention could affect the research subjects.

The overlap percentage is that data that overlaps from baseline -1 to intervention is 0%. While overlap data from intervention to baseline -2 need not be calculated because the baseline -2 acts as a control. Based on the 0% overlap percentage results show that the provision of interventions in the form of visual support (PECS & visual schedules) affects the increase in nonverbal communication skills and behavior with indicators: children are able to take the objects shown; children are able to take a picture card of the desired object; children are able to give cards to the teacher; children are able to walk to take a picture card of the object that is desired on the communication board; and the child is able to choose the picture that he wants in Malang ABT Education Services UPT.

IV. DISCUSSION

Data from the research shows that the subject's communication skills have improved after being given an intervention. Baseline results (A) communication skills and behavior by using visual support (PECS and visual schedules) obtained by subjects in the range of 33% to 53%. After being given intervention (B) communication skills and behavior of children with visual support (PECS & Visual Schedule) in autistic children ranges from 60% to 100%. In the baseline phase (A2) communication skills and behavior of children with visual support (PECS & Visual Schedule) in autistic children depicted with green lines obtained the highest score of 100%. Based on data obtained at baseline 1 (A-1) shows the subject's communication skills are only in the range of 33% -53% with a mean score of 43.6%, in this condition the child seems unable to use visual support properly because when given a picture card the card is only designated pointing, to pick up the schedule even children are still very often looked down.

The subject still tends to behave snatch and cry when asking for objects or toys that the child wants, the child does not want to pick up his visual schedule. The subject also had difficulty in expressing his desires, and could not show good behavior. The stability of the value of the child's ability to express his desire for toys that are liked is stable by seizing or crying when the desired object is not immediately given.

After baseline conditions A-1, the next step is to implement the intervention conditions (B). The graph shows the application of the PECS method provides an increase in the subject's communication skills with indicators: children are able to pick up the object indicated; child is able to take a picture card of the desired object; children are able to give cards to the teacher; children are able to walk to take a picture card of the object that is desired on the communication board; and the child is able to choose the picture according to his wishes depicted with a red line graph obtained between 60% -100% with a mean score of 95%.

The final step is measurement at baseline conditions -2 (A2). Measurements on this condition are carried out to find out how much influence the intervention (B) has on the research subjects or this condition can be called a control condition. At baseline 2 (A-2), the results show that the application of visual support (PECS & Visual Schedule) gives an increase in the communication skills of the subjects depicted with green lines obtained the highest score of 93% -100% with a mean score of 98.6%.

V. CONCLUSION

The use of visual support (PECS & Visual Schedule) can be used as an alternative in training the communication of autistic children because this method adapts to the communication characteristics and uniqueness of autistic children. This increase can be demonstrated by changes in the mean level in each condition. The mean obtained by baseline-A (A-1) of 43.6% in the intervention phase obtained a mean level of 95%, while in the baseline-2 (A-2) phase after the intervention was given the mean level of 98.6% was obtained. The use of visual support (PECS & Visual schedules) can improve communication skills and behavior of children with autism.

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