

THE EFFECT OF THE PECS METHOD ON VOCABULARY MASTERY OF CHILDREN WITH AUTISM AT SLB NEGERI PURWOREJO

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Abstract

This study aims to determine the effect of the Picture Exchange Communication System (PECS) method on the vocabulary acquisition of children with autism at SLB Negeri Purworejo in the 2024/2025 academic year. The research employs a quantitative approach using a single-subject experimental method (Single Subject Research) with an A-B-A design. The subjects of the study were two ninth-grade students with autism spectrum disorder. Data were collected using a multiple-choice vocabulary test consisting of 16 items. The results showed an increase in vocabulary scores after the PECS method intervention. These findings demonstrate that the PECS method led to a substantial improvement during the intervention phase. However, in subject SA, the effects did not persist as strongly as in subject GA after the intervention ended. This suggests individual differences in vocabulary retention, potentially influenced by internal factors such as focus, attention, or learning motivation. Data from the first baseline phase showed low and very low scores, while the intervention phase showed a stable increase. These findings indicate that the PECS method has a positive effect on the vocabulary acquisition of children with autism.

Keywords: children with autism; communication; PECS method; special school; vocabulary

Abstrak

Penelitian ini bertujuan untuk mengetahui pengaruh metode Picture Exchange Communication System (PECS) terhadap pemerolehan kosakata anak autis di SLB Negeri Purworejo pada tahun ajaran 2024/2025. Penelitian ini menggunakan pendekatan kuantitatif dengan metode eksperimen subjek tunggal (Single Subject Research) dengan desain A-B-A. Subjek penelitian adalah dua siswa kelas sembilan dengan gangguan spektrum autisme. Data dikumpulkan menggunakan tes kosakata pilihan ganda yang terdiri dari 16 item. Hasil penelitian menunjukkan peningkatan skor kosakata setelah intervensi metode PECS. Temuan ini menunjukkan bahwa metode PECS menghasilkan peningkatan yang substansial selama fase intervensi. Namun, pada subjek SA, efeknya tidak bertahan sekuat pada subjek GA setelah intervensi berakhir. Hal ini menunjukkan adanya perbedaan individu dalam retensi kosakata, yang berpotensi dipengaruhi oleh faktor internal seperti fokus, perhatian, atau motivasi belajar. Data dari fase baseline pertama menunjukkan skor rendah dan sangat rendah, sedangkan fase intervensi menunjukkan peningkatan yang stabil. Temuan ini menunjukkan bahwa metode PECS memiliki pengaruh positif terhadap pemerolehan kosakata anak autis.

Kata kunci: anak autis; komunikasi; kosakata; Metode PECS; Sekolah Luar Biasa

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INTRODUCTION

Human beings are social creatures who have an inherent need to establish relationships with others through communication. Communication plays a crucial role in human life as a means of

interaction between individuals, including for children with special needs such as those with Autism Spectrum Disorder (ASD). Children with autism are individuals with complex developmental conditions that result in impairments in social interaction, verbal and non-verbal communication, as well as repetitive behaviors. The severity of these impairments may vary across individuals (Artanti & Wulandari, 2022).

Language acquisition in children with autism shows different characteristics compared to neurotypical children. They often face difficulties in understanding and expressing contextual meaning (Callen & Miller, 2021). Sitorus (2017) reported that school-aged children with autism were generally only able to construct short sentences that were frequently out of context. Ezmar and Ramli (2016) added that children with autism tend to use echolalia, speak with minimal intonation, and have unclear articulation, thereby limiting their vocabulary mastery. This contrasts with typically developing children aged 6–12 years, who generally demonstrate relatively advanced language skills (Hurlock, 2003). Moreover, internal factors such as difficulties in focusing, understanding instructions, and motor coordination also hinder communication (Rahmatrisilvia, 2015).

Various intervention strategies have been developed to support language development in children with autism, one of which is morphological training. Basic vocabulary exercises involving nouns, verbs, and adjectives are considered effective, with nouns being the easiest type of vocabulary to master due to their concrete nature (Febriyanto & Yanto, 2019). Visual-based learning has also been proven to support successful communication in children with autism, as it delivers information in a direct and explicit manner (Rahayu, 2015).

At SLB Negeri Purworejo, observations revealed that most autistic students, particularly those in the ninth grade, experienced significant difficulties in mastering vocabulary. Two students were identified as being unable to name objects in their classroom environment and tended to be passive during interactions. This highlights the need for more appropriate instructional methods. Although teachers had utilized audiovisual media such as animated videos, other methods like phonics (Febriana, 2015), play-based learning (Yuniati & Rohmadheny, 2020), and floortime (Pradini, 2016) had not yet been optimally applied. In fact, contextual and engaging learning approaches are essential to overcome such communication barriers (Sukmadinata, 2014).

The Picture Exchange Communication System (PECS) is a visual method designed to help children with autism communicate functionally through picture-based exchanges. This method not only enhances expressive communication but also helps expand vocabulary through structured picture exchanges. Dani (2018) demonstrated that PECS is effective in improving verbal skills in children with autism. Research by Juniayanti and Komang (2022) showed an increase in communication skills by up to 62% in experimental classes. Similarly, Doherty et al. (2018) found that PECS maintained its effectiveness even one month after the intervention, with children's response rates remaining above 80%.

Despite extensive research supporting visual communication interventions for children with autism, most studies have focused primarily on general communication outcomes rather than specific linguistic components, such as vocabulary acquisition. Existing evidence on the effectiveness of the Picture Exchange Communication System (PECS) largely emphasizes improvements in functional communication and verbal initiation, while empirical investigations examining its impact on structured vocabulary mastery—particularly at the secondary school level—remain limited. Furthermore, few studies have explored PECS implementation within Indonesian special education contexts, where instructional practices, learner characteristics, and educational resources may differ substantially from those reported in international literature. This lack of context-specific and linguistically focused evidence creates a critical gap in understanding how PECS contributes to systematic vocabulary development among autistic students. Therefore, empirical investigation is needed to determine the effectiveness of PECS in improving vocabulary mastery among ninth-grade students with autism at SLB Negeri Purworejo. Based on field observations and supported by previous research, this study aims to evaluate the effect of the PECS method on vocabulary mastery in children with autism at SLB Negeri Purworejo in the 2024/2025 academic year.

METHOD

This study employed a quantitative experimental approach using a single-subject research design (A-B-A model) to examine the effect of the Picture Exchange Communication System (PECS) on vocabulary mastery in children with autism. The A-B-A design consists of three phases: baseline-1 (A1), intervention (B), and baseline-2 (A2), during which data were collected repeatedly in each session to observe changes resulting from the intervention. The subjects of this study were two ninth-grade students at SLB Negeri Purworejo, identified by the initials GA and SA. They were selected using purposive sampling based on initial observations of communication barriers during learning activities.

Data were collected through an achievement test in the form of 16 multiple-choice questions developed based on an item blueprint covering aspects of word classes, meaning, semantic relationships (synonyms and antonyms), and word forms. The instrument's validity was assessed through content validity using expert judgment from three specialists, with Aiken's V values ranging from 0.75 to 0.92, indicating a high level of validity. Reliability testing was conducted using the inter-rater method, analyzed with SPSS version 29, yielding an Intraclass Correlation Coefficient (ICC) of 0.959, which is categorized as excellent.

The research procedure was carried out in 12 sessions: three sessions for baseline-1, six sessions for the PECS-based intervention, and three sessions for baseline-2. Each intervention session lasted 60 minutes and followed the initial phases of the PECS method, namely: "How to Communicate," "Increasing Spontaneity," and "Discrimination." Data analysis used descriptive visual statistics by presenting graphs and conducting within-condition (trend, stability, level) and between-condition

(phase transition) analyses. This analysis aimed to measure changes in the subject's performance before, during, and after the intervention.

RESULTS AND DISCUSSION

Result

This study was conducted from July to August 2024 at SLB Negeri Purworejo. The participants were two ninth-grade students diagnosed with Autism Spectrum Disorder (ASD) who exhibited communication difficulties, particularly in vocabulary mastery. The subjects were selected using purposive sampling based on observation results and matching characteristics.

Table 1. Characteristics of Research Subjects

Subject	Initials	Gender	Age	Class	Type of Disability	School
1	GA	Male	14	IX	Autism	SLB Negeri Purworejo
2	SA	Female	14	IX	Autism	SLB Negeri Purworejo

1. GA Subject Research Results

Measurements for subject GA were carried out across three phases: baseline-1 (A1), intervention (B), and baseline-2 (A2). Each phase comprised three to six sessions, representing the subject's vocabulary performance before, during, and after the PECS intervention. The scores obtained in each session are presented in Table 2.

Table 2. Scores of Subject GA

Phase	Score	Category
<i>Baseline-1 (A1) Session 1</i>	4	Very Low
<i>Baseline-1 (A1) Session 2</i>	4	Very Low
<i>Baseline-1 (A1) Session 3</i>	4	Very Low
<i>Intervensi (B) Session 1</i>	6	Low
<i>Intervensi (B) Session 2</i>	7	Moderate
<i>Intervensi (B) Session 3</i>	6	Low
<i>Intervensi (B) Session 4</i>	6	Low
<i>Intervensi (B) Session 5</i>	7	Moderate
<i>Intervensi (B) Session 6</i>	7	Moderate
<i>Baseline-2 (A2) Session 1</i>	6	Low
<i>Baseline-2 (A2) Session 2</i>	6	Low
<i>Baseline-2 (A2) Session 3</i>	6	Low

The subject consistently scored 4 (very low category) across all three baseline-1 sessions. Following the implementation of the PECS method, scores improved to 6 and 7 across six intervention sessions. In the post-intervention phase (baseline-2), scores stabilized at 6. There was

no overlap between phases A1 and B or between B and A2, indicating a clear and stable treatment effect.

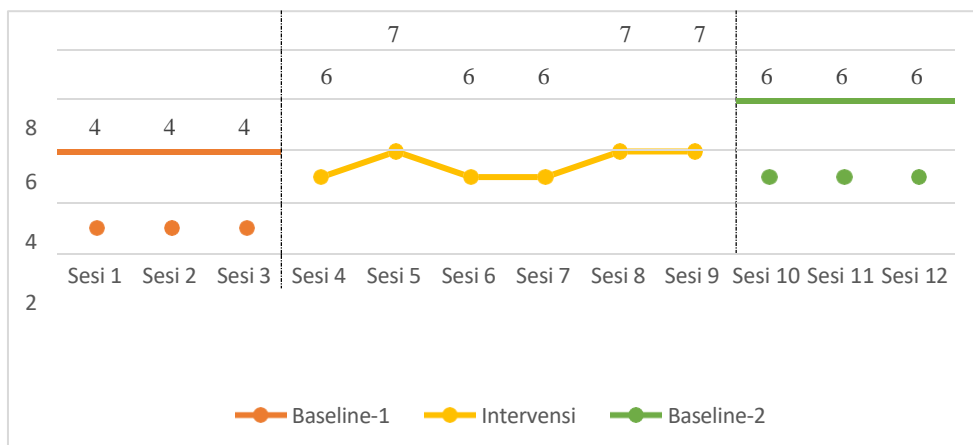


Figure 1. Score Progression Graph: Baseline-1 (A1), Intervention (B), and Baseline-2 (A2)

The graph above illustrates changes in subject GA's vocabulary mastery across the three phases. Scores remained flat at 4 during baseline-1, showing no spontaneous progress. During the intervention phase, scores increased consistently, peaking at 7 in the final sessions. After the intervention ceased, scores remained stable at 6, suggesting retention of the gains.

These findings reflect a positive and sustained impact of the PECS method. The upward trend during intervention and stability across phases further confirm the intervention's effectiveness.

Table 3. Summary of Between-Phase Analysis – Subject GA

Comparison	A1/B	B/A2
Number of variables changed	1	1
Changes in directional tendencies and their effects	 (=)	 (+)
Change in stability tendency	Stable to stable	Stable to stable
Change in Score Level	4 – 6 (+2)	7 – 6 (-1)

The table above presents a summary of the between-phase analysis for subject GA, aimed at evaluating the effectiveness of the Picture Exchange Communication System (PECS) intervention across each phase transition.

In the comparison between baseline-1 (A1) and the intervention phase (B), there was an increase in scores from 4 to 6, with a level change of +2 points. The data trend shifted from flat to increasing, with no overlap between A1 and B scores (0%), indicating a clear and positive effect of the PECS intervention. The data in both phases also showed high stability (100%), suggesting that the observed changes were not due to chance or random fluctuation.

Conversely, the comparison between the intervention (B) and baseline-2 (A2) phases showed a slight decrease in scores from 7 to 6, with a level change of -1 point. The trend shifted from increasing to flat. However, the data remained within a stable range, and there was an overlap of 66.67%, indicating that some A2 scores still fell within the range of the intervention phase. This suggests that although the intervention was discontinued, its effects persisted in the short term.

Overall, the between-phase analysis strengthens the finding that the PECS method is effective in improving vocabulary mastery in children with autism. The increase in scores, high data stability, and minimal overlap during the transition from A1 to B indicate a successful intervention. Meanwhile, the results from B to A2 demonstrate partial retention, supporting previous findings that PECS not only facilitates communication development but also helps maintain functional language skills.

2. SA Subject Research Results

The vocabulary performance of subject SA was measured across three observation phases: baseline-1 (A1), intervention (B), and baseline-2 (A2). Each phase consisted of three to six sessions. The score data from each session are presented in Table 3 below:

Table 4. Scores of Subject SA

Phase	Score	Category
<i>Baseline-1 (A1) Session 1</i>	3	Very Low
<i>Baseline-1 (A1) Session 2</i>	3	Very Low
<i>Baseline-1 (A1) Session 3</i>	3	Very Low
<i>Intervensi (B) Session 1</i>	4	Low
<i>Intervensi (B) Session 2</i>	5	Low
<i>Intervensi (B) Session 3</i>	6	Moderate
<i>Intervensi (B) Session 4</i>	6	Moderate
<i>Intervensi (B) Session 5</i>	7	Moderate
<i>Intervensi (B) Session 6</i>	6	Moderate
<i>Baseline-2 (A2) Session 1</i>	6	Moderate
<i>Baseline-2 (A2) Session 2</i>	5	Low
<i>Baseline-2 (A2) Session 3</i>	6	Moderate

Subject SA consistently scored 3 during the baseline-1 (A1) phase, which falls into the very low category. During the intervention phase, the scores increased from 4 to 7; however, in the baseline-2 (A2) phase, there was a slight fluctuation between 5 and 6. This suggests a positive effect of the intervention, although the impact was not as strong as that observed in subject GA.

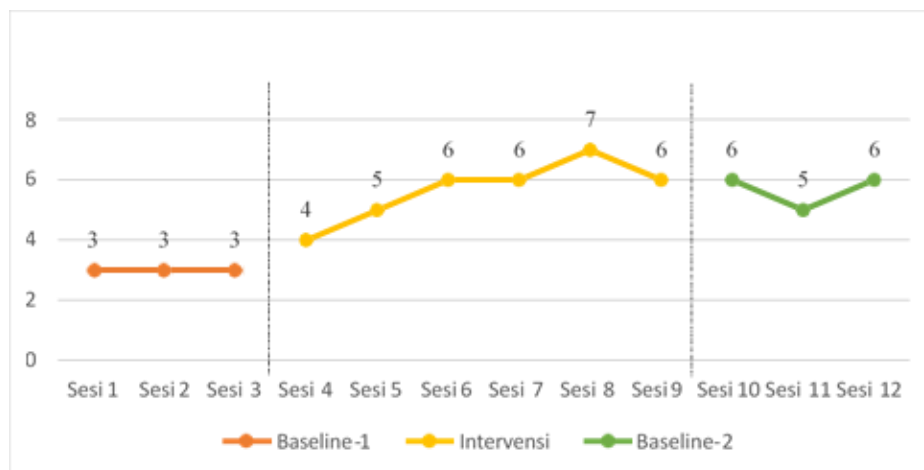

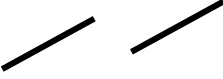


Figure 2. Recapitulation Graph of Data in Baseline-1 (A1), Intervention (B), and Baseline-2 (A2)

The graph above shows that the score trend during the baseline-1 phase was flat, indicating no natural improvement prior to the intervention. During the intervention phase, the data trend increased consistently, reaching its peak in session 8. In contrast, the baseline-2 phase showed a return to a flat trend, though with slight fluctuations, and the scores remained within the range of the intervention phase.

This suggests that although the intervention was discontinued, some effects of the PECS method were retained in the short term. However, the overlap percentage between phases B and A2 was 83.33%, indicating that many of the post-intervention scores still fell within the intervention range. This implies that the retention of results in subject SA was not as strong as in subject GA and would require additional reinforcement.

Table 4. Comparison of Between-Phase Analysis – Subject GA

Comparison	A1/B	B/A2
Number of variables changed	1	1
Changes in directional tendencies and their effects	 (=)	 (+)
Change in stability tendency	Stable to variable	Stable to variable
Change in Score Level	3 – 4 (+1)	6 – 6 (0)
<i>Overlap</i>	$\frac{0}{6} \times 100\% = 0\%$	$\frac{2}{3} \times 100\% = 66,67\%$
<i>Presentation</i>	6	3

The table 4 above presents a summary of the between-phase analysis for subject SA, reflecting the subject's response to the Picture Exchange Communication System (PECS) intervention. Comparisons were made between the baseline-1 (A1) and intervention (B) phases, as well as between the intervention (B) and baseline-2 (A2) phases.

In the comparison from A1 to B, the trend shifted from flat (=) to increasing (+), with a score increase from 3 to 7, representing a level change of +4 points. Data stability was maintained across both phases, indicating that the observed change was due to the intervention rather than random fluctuation. The overlap percentage for this comparison was 0%, signifying a clear and strong effect of the intervention on vocabulary mastery.

In the comparison from B to A2, the trend reversed from increasing to decreasing (-), with the score dropping from 7 to 5, resulting in a level change of -2 points. Although this decline suggests a reduction in performance following the discontinuation of the intervention, the data remained within the stable range. However, the overlap between phases B and A2 was relatively high at 83.33%, indicating that a majority of scores in A2 remained within the intervention range.

These findings demonstrate that the PECS method led to a substantial improvement during the intervention phase. However, in subject SA, the effects did not persist as strongly as in subject

GA after the intervention ended. This suggests individual differences in vocabulary retention, potentially influenced by internal factors such as focus, attention, or learning motivation.

Therefore, while the PECS intervention proved effective in the short term for subject SA, additional reinforcement is needed to sustain its impact. These results are consistent with findings by Juniayanti & Komang (2022) and Doherty et al. (2018), who emphasized the importance of ongoing training to maintain the long-term effectiveness of visual communication interventions for children with autism.

Discussion

The effect of the Picture Exchange Communication System (PECS) on the vocabulary mastery of children with autism is reflected in the consistent score improvements observed in both subjects after the intervention. Prior to the intervention, the average score for subject GA during the baseline-1 phase was 4, while subject SA scored an average of 3. Following the intervention, the average scores increased to 6.5 for subject GA and 5.6 for subject SA. This increase indicates that the PECS method contributed positively to vocabulary development in children with autism.

The improvement in vocabulary skills highlights the effectiveness of PECS in facilitating visual-based learning processes that align with the learning styles of children with autism, particularly those identified as visual learners. This finding is consistent with Yolanda and Mukhlis (2024), who emphasized that visual-based methods are more easily accepted by individuals with autism spectrum disorder. The implementation of PECS enables children to understand words through concrete visual representations, thereby facilitating the processes of recognition and verbal expression.

This finding supports previous research by Odluyurt, Aldemir, and Kapan (2016), which demonstrated that PECS is effective in enhancing communication skills in children with autism. Theoretically, children with autism experience developmental challenges in the areas of communication, social interaction, and behavior (Goa & Derung, 2017), making vocabulary learning a fundamental aspect of communication development (Saryono & Soedjito, 2020; Nurgiyantoro, 2014).

Vocabulary serves as the foundation for communicative activities, allowing individuals to comprehend and convey meaning accurately. Therefore, the ability to recognize, understand, and use vocabulary is crucial for children with communication impairments. Nonetheless, PECS has certain limitations. Its use requires supporting materials in the form of numerous picture books or cards that must be carried and prepared, which may cause delays in communication if the appropriate image is not readily available (Kurniawan, Mahtarami, & Lestari, 2016). However, the benefits of PECS in facilitating expressive communication and expanding vocabulary in children with autism generally outweigh these limitations.

In conclusion, the findings of this study indicate that PECS is an effective intervention method that can be integrated into learning practices for children with autism in special education settings, particularly in teaching vocabulary that is concrete and functional in nature.

CONCLUSION

Based on the research findings, data analysis, and discussion presented, it can be concluded that the Picture Exchange Communication System (PECS) method has a positive impact on improving vocabulary mastery in children with autism at SLB Negeri Purworejo in the 2024/2025 academic year. The implementation of PECS resulted in increased scores for both subjects, with data trends showing an upward trajectory and high stability during the intervention phase. These findings indicate that the visual approach offered by the PECS method is effective for teaching vocabulary to students with verbal communication impairments.

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