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AN ANALYSIS OF THE USE OF PECS IN SUPPORTING VISUAL COMMUNICATION IN CHILDREN WITH DOWN SYNDROME

Dhigdya Vesquita Zaki[1], I Kadek Deva Sancitta Aiswarya[2], Lyoni Zahra Putri Indiawan[3], Rizqi Fajar Pradipta[4]

State University of Malang, Jl. Semarang No. 5 Malang, East Java, Indonesia

*Author of correspondence, Email: rizqi.fajar.fip@um.ac.id

Abstrak

Children with Down syndrome typically have more developed receptive than expressive language skills, which often limits their ability to convey wants and needs verbally. Left unaddressed, this gap can trigger frustration and tantrum behavior. This study describes the process and outcomes of implementing Phase 1 of the Picture Exchange Communication System (PECS) as an effort to shift weak verbal communication toward more functional visual communication in a girl with Down syndrome at SLB Sumber Dharma, Malang, Indonesia. A qualitative single descriptive case study design (N-1) was used. Data were collected through participatory observation across five intervention sessions, parent interviews, and document review (child data form and planning matrix), then analyzed descriptively and thematically. Results revealed an uneven prompt-fading pattern across three PECS Phase 1 sub-behaviors: reaching toward the communication partner reached independence by the fourth session, handing over the picture card reached independence by the fifth session, while independently taking the card had not yet been achieved by the final session. Post-school fatigue, device distraction, and sensory sensitivity were identified as factors affecting the consistency of the child's performance. These findings underscore the need to report PECS outcomes at the sub-behavior level rather than only as global phase-mastery status, particularly for the Down syndrome population, whose literature base remains comparatively limited relative to the autism population.

Keywords: : PECS; Down syndrome; visual communication

1. Introduction

Down syndrome is the most common chromosomal disorder involving trisomy 21, characterized by the presence of an extra copy of chromosome 21, resulting in the individual having 47 chromosomes instead of the usual 46 (Windsperger & Hoehl, 2021). This condition has a wide-ranging impact on a child's physical, cognitive, and communication development. Globally, the birth rate of children with Down syndrome is estimated at 1 in every 700–1,000 live births, making it the genetic disorder with the highest prevalence associated with intellectual disability (Global Down Syndrome Foundation, 2022). In Indonesia, public awareness of this condition continues to grow, but structured early intervention services still need to be expanded, particularly in areas that lack adequate access to rehabilitation specialists and special education professionals.

One of the main challenges faced by children with Down syndrome is difficulty with verbal communication and expressive language. Children's receptive language skills are generally better than their expressive skills, so they often struggle to verbally convey their

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desires, needs, and emotions (Romski et al., 2023). These communication barriers can potentially lead to frustration, tantrums, and obstacles in the child's social development if not properly addressed. Therefore, behavior modification through a structured, evidence-based approach is essential to help children develop more effective and independent functional communication.

One evidence-based intervention that has proven effective in improving functional communication in children with verbal communication impairments is the Picture Exchange Communication System (PECS).

PECS is an augmentative communication system that uses picture card exchanges as a communication medium, enabling children to express their wants and needs without relying on verbal skills (Ganz et al., 2012). Research shows that PECS not only improves functional communication but also encourages communication initiation and, in many cases, facilitates the gradual emergence of speech (Charlop et al., 2021). This paper presents an analysis of behavioral changes and a PECS-based intervention program aimed at reducing communication barriers in a child with Down syndrome, as an effort to shift from weak verbal communication toward more functional visual communication

2. Method

This study used a qualitative approach with a single descriptive case study design. We chose this design because we wanted to explore one case in depth not merely to measure outcomes, but to understand the context and sequence of events as they unfolded (Creswell & Poth, 2018).

2.1. Participant

The participant was SM, a girl with Down syndrome enrolled at SLB Sumber Dharma. She was [insert age] years old. Her diagnosis was confirmed through parental reports and school records, although we did not obtain primary genetic or karyotype documentation. Based on an initial assessment using a planning matrix, SM showed stronger receptive than expressive language, her social interactions remained at a basic level (not yet involving sharing or turn-taking), and she displayed a distinctive sensory profile: low sensitivity to pain but high sensitivity to loud noises and heat. Motor-wise, SM did not present any significant barriers; she could grasp, reach, and hold objects without difficulty.

2.2 Procedures and Instruments

We conducted the PECS Phase 1 intervention across five separate sessions, running from April 25 to May 5, 2026. In each session, SM was supported by a teacher, a therapist, and her parents, who took turns assisting her. We set up several support strategies: instructions were kept to a maximum of three words, picture cards featured SM's preferred items and activities (such as snacks, playtime, and going to the toilet), and we gradually reduced the level of assistance (prompt fading) based on the responses we observed.

We gathered data through three main channels. First, participatory observation: during each session, we acted as facilitators while simultaneously tracking three sub-behaviors

(taking the card, reaching toward the partner, and handing over the card). The level of support provided was recorded on a 1–4 scale, ranging from full physical and verbal assistance (1) to complete independence without any help (4). Second, we conducted semi-structured interviews with SM's parents to learn about her daily habits at home and how she responded outside the intervention sessions. Third, we reviewed school documents, including the planning matrix and the child data form, to complete SM's background profile.

2.3 Data Analysis

Once the data were collected, we processed them through three stages: data condensation, data display, and conclusion drawing and verification, following the framework outlined by Miles, Huberman, and Saldaña (2014). The pattern of prompt reduction across the three sub-behaviors was visualized in a line graph for clarity, while field notes and interview excerpts were used to interpret and contextualize those patterns. To strengthen the trustworthiness of our findings, we applied source triangulation (cross-checking information from teachers, parents, and therapists) and method triangulation (combining observational, interview, and documentary data).

3 Results and Discussion

3.1 Result

Based on the planning matrix, the research team and the teacher determined that the characteristic with the greatest impact on SM's daily functioning was verbal communication difficulties; therefore, the program objective was formulated as "strengthening weak verbal communication to become stronger visual communication" through PECS Phase 1. The supporting strategies established included: (a) modifying instructional language to a maximum of three words, (b) using picture cards for activities the child enjoys (playing and buying snacks), and (c) providing prompts gradually, which were then reduced as independent responses emerged. The program was implemented collaboratively by the teacher, the supporting therapist, and the parents, both at school and at home.

Phase 1 of PECS was implemented over five sessions between April 25 and May 5, 2026. In each session, the communication partner and facilitator observed three sub-behaviors that make up a single card-exchange cycle: picking up a card or object, reaching toward the communication partner, and handing over the picture card. A summary of the observation results is presented in Table 1, while the patterns of change in the level of assistance for each sub-behavior are visualized in Figure 1.

Table 1. Observation Results from Five Phase 1 PECS Intervention Sessions for Three Sub-Behaviors

Sesi (Tanggal)	Drawing a Card	Reaching Out to Communication Partners	Handing Over the Card	Key Information
1 (25 Apr 2026)	Full physical and verbal assistance	Full physical and verbal assistance	Full physical and verbal assistance	The child is still adjusting; modeling techniques are used to demonstrate how to give and receive cards.
2 (28 Apr 2026)	Full physical and verbal assistance	Full physical and verbal assistance	Mild verbal assistance	Their focus narrows to two activities (playing, drinking); the child begins to get bored and throws cards and concrete objects.
3 (1 May 2026)	Mild verbal assistance	Mild verbal assistance	Mild verbal assistance	Neutral activities are replaced with activities the child enjoys (snacking, playing); the child wets the bed without taking the initiative to go to the bathroom.
4 (4 May 2026)	Mild verbal assistance	independent	Mild verbal assistance	Three main cards are provided (snack, play, bathroom); the child begins choosing cards as desired before being asked.
5 (5 May 2026)	Mild verbal assistance	independent	independent	The children were tired after school and distracted by their devices; the session lasted only about 20 minutes, but the highest scores for two sub-behaviors were achieved during this session.

Figure 1. Prompt Fading Pattern for the Three Phase 1 PECS Sub-Behaviors Over Five Intervention Sessions

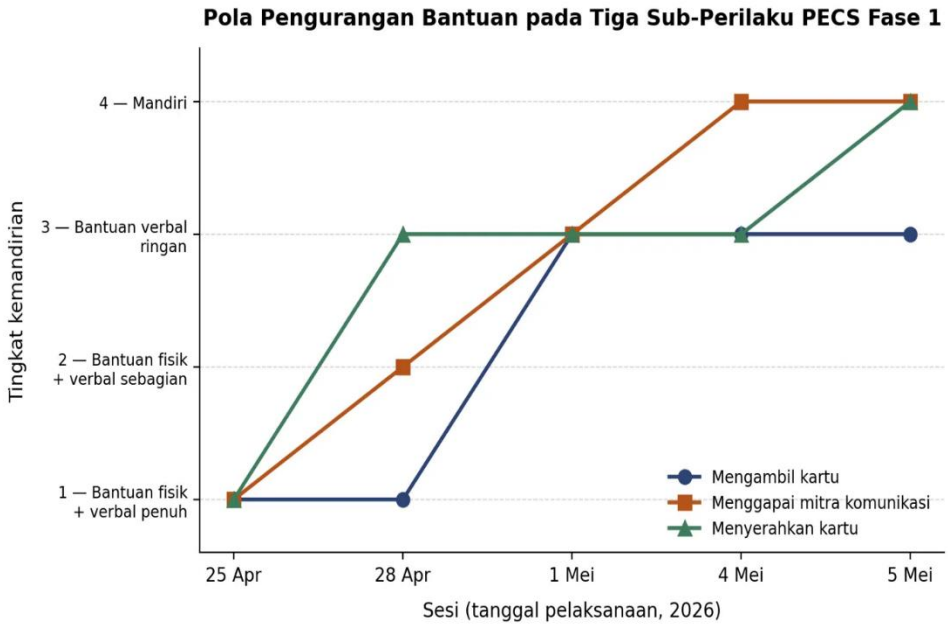


Figure 1 shows that all three sub-behaviors started from the same point in the first session, namely requiring full physical and verbal assistance (level 1). The sub-behavior of reaching out to a communication partner showed the most consistent decrease in the need for assistance and achieved full independence (level 4) in the fourth session, which was maintained through the fifth session. The sub-behavior of handing over a card initially fluctuated, increasing rapidly in the second session but then stagnating at the level of light verbal assistance (Level 3) for three consecutive sessions before finally achieving independence in the fifth session. The sub-behavior of taking a card showed the slowest rate of improvement: it continued to require full physical and verbal assistance through the second session, then remained at the level of light verbal assistance from the third through the fifth session without ever achieving full independence within the scope of this study's observations.

3.2 Discussion

The discussion is focused on relating the data and the results of the analysis with the problem or research objectives and the broader theoretical context. It can also be an answer to the question of why facts are found as in the data. The discussion is written attached to the data discussed. The discussion is tried not to be separate from the data discussed.

The data in Table 1 and Figure 1 reveal patterns that cannot be detected if Phase 1 PECS achievements are reported broadly as "achieved" or "not achieved." The three sub-behaviors that make up a single PECS Phase 1 exchange cycle were found to exhibit different rates of prompt fading in the same child. This pattern is consistent with the systematic review by Cengher et al. (2018), which found that although all prompt fading procedures are generally effective, their efficiency varies depending on the type of procedure and the topography of the target behavior; behaviors involving self-initiation such as selecting and picking up a card without being asked generally require a longer mastery period compared to behaviors that are responsive to cues from a communication partner, such as reaching for a card after it is presented.

The children's records one of the sources for this study did not include the names of the doctors or the results of genetic/karyotype tests confirming the clinical diagnosis of Down syndrome; therefore, the diagnoses in this report are based on parental statements and school records, rather than primary medical documentation verified by the researchers. Sixth, the intervention implementers in this study were students fulfilling the requirements of a Behavioral Modification course, not certified practitioners; therefore, the fidelity of PECS implementation may differ from the ideal conditions reported in clinical or laboratory-based studies.

4 Conclusion

This case study concluded three findings in line with the stated objectives. First, the research subject exhibited the characteristic profile of Down syndrome in the domains of communication (relying on characteristic sounds and gestures, with receptive language more developed than expressive language), social interaction (able to perform basic social activities but not yet capable of sharing or taking turns), sensory processing (hyposensitive to pain, hypersensitive to sound and heat), and motor skills (gross and fine motor skills were classified as good), which collectively formed the basis for selecting PECS as an intervention aligned with

the child's visual-motor strengths. Second, the Phase 1 PECS intervention program was designed and implemented through collaboration among teachers, therapists, and parents over five sessions from April 25 to May 5, 2026, using a strategy of modifying instructional language to a maximum of three words and adjusting target objects/activities based on the child's interests. Third, the intervention outcomes showed an uneven pattern of assistance reduction across the three sub-behaviors comprising PECS Phase 1: the sub-behavior of reaching for a communication partner achieved independence by the fourth session; the ability to hand over a card achieved independence by the fifth session; whereas the sub-behavior of picking up a card still required light verbal assistance through the final observation session.

These findings confirm that the evaluation of Phase 1 PECS success should be conducted at the sub-behavior level of granularity, rather than merely assessing overall phase mastery, so that follow-up interventions can be precisely focused on components that still require reinforcement in this case, the ability to independently initiate the action of taking a card. Given the limitations of a single-case study design without a formal baseline phase and a short observation period, further research is recommended using a single-case design with a measurable baseline (e.g., a multiple-baseline design), involving a longer observation period to include skill maintenance and generalization, and considering the controlled integration of digital devices as reinforcers in session design, given the child's interest in gadgets identified in this study.

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