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IMPLEMENTATION OF PICTURE-BASED STORY-TELLING TO OPTIMIZE THE MEMORY RETENTION OF CHILDREN WITH SPECIAL NEEDS IN AN INCLUSIVE EARLY CHILDHOOD CLASSROOM

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ABSTRACT

Low memory retention among children with special needs (CSN) in inclusive classrooms is often associated with instruction that relies heavily on abstract verbal delivery without adequate sensory support. This study describes the implementation of a picture-based story-telling intervention—delivered through preparation, interactive storytelling, and picture-sequencing practice—to stimulate the memory retention of CSN at TK Avicienna Childhoods Medan. A descriptive qualitative approach supported by simple descriptive quantitative data was used. Participants were 11 students in the Al-Latif class (5 neurotypical children and 6 CSN, comprising diagnoses of ADHD, Autism Spectrum Disorder, and Down syndrome), selected purposively. Data were collected through structured observation, a memory-assessment rubric covering three indicators (recalling characters, recalling the sequence of events, and retelling the story) administered before and after the intervention, semi-structured interviews with teachers, and documentation. The mean class memory-achievement score increased descriptively from 58.14% (Moderate) before the intervention to 81.73% (High) afterward, an average gain of 23.59%; because the design did not include a control group or inferential statistical testing, this increase is reported as a descriptive trend rather than a statistically significant effect. Contextually, picture-based stimuli appeared to function as an attentional support for children with ADHD, as visual cues for children with ASD, and as a scaffold for the child with Down syndrome. These findings suggest picture-based storytelling as a promising adaptive strategy for inclusive early-childhood classrooms, though further studies with larger samples and comparison groups are needed to confirm its effectiveness.

INTRODUCTION

Early childhood is a critical foundation in the span of human development, often identified as the golden age. During this period, brain plasticity is at its optimal level for receiving cognitive, motor, linguistic, and socio-emotional stimuli (Sidiq et al., 2025; Yulian & Putri, 2023). Within early childhood education, adaptive and holistic stimulation is required to build a solid foundation of intelligence. This applies universally, not only to typically developing children but also to Children with Special Needs (CSN), who require pedagogical approaches tailored to their learning modalities (Pitaloka et al., 2022; Laksana & Saputro, 2016).

One fundamental obstacle frequently encountered in the learning process of CSN is limited memory retention and slower information processing (Hutabarat et al., 2022; Raharjo, 2012). Limited memory processing directly hinders the ability to absorb, store, and retrieve instructional messages. Conventional verbal instruction, which tends to be monotonous and abstract, often triggers cognitive overload, causing children's attention to become easily distracted and information to be quickly forgotten.

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To bridge this challenge, an innovative multisensory learning strategy is required. The story-telling method integrated with concrete picture media offers a structured pedagogical solution (Khotimah & Sari, 2025; Primastuti et al., 2025; Ulya & Rofian, 2019). According to Dual Coding Theory (Paivio, 1986; Clark & Paivio, 1991), information presented simultaneously through verbal and visual channels is processed through two separate cognitive pathways, thereby strengthening the memory trace within long-term memory (Anggraini & Susanti, 2025; Mutiatun, 2021). Pictures act as simplifiers of abstract concepts and as attentional anchors, while narrative provides meaningful social context.

Existing studies on picture-based story-telling for early childhood have largely examined its effect on language, reading, or general engagement among typically developing children (e.g., Anggraini & Susanti, 2025; Mutiatun, 2021; Ulya & Rofian, 2019), while studies specifically addressing CSN have tended to describe the selection of media or the general characteristics of the children rather than tracking measurable change in memory retention within a mixed-ability, inclusive classroom (Maich & Belcher, 2012; Nisak & Harsiwi, 2024; Sigmon et al., 2016). Few studies have documented how a single picture-based intervention functions differently across specific conditions—ADHD, ASD, and Down syndrome—within the same inclusive setting, and fewer still have paired qualitative classroom observation with a simple pre–post memory indicator to illustrate this variation descriptively. This gap constitutes the novelty addressed by the present study.

Preliminary observation in the inclusive classroom of TK Avicienna Childhoods Medan found that several CSN (including children with ADHD, ASD, and Down syndrome) experienced notable difficulty retelling simple story plots or remembering learning characters, which affected the achievement of the daily lesson plan (RPPH). Based on this background, the study addresses three questions: (1) how is the picture-based story-telling method implemented in the inclusive classroom; (2) how does the memory retention of children with special needs change following the intervention; and (3) what factors support and hinder the implementation process.

RESEARCH METHODS

This study used a descriptive qualitative approach supported by simple descriptive quantitative data, aimed at portraying classroom dynamics, children's emotional responses, and changes in memory retention as they naturally occurred within the inclusive setting, without an experimental or quasi-experimental design (Nisak & Harsiwi, 2024). Consistent with this design, the pre- and post-intervention memory scores reported below are treated as supporting, descriptive evidence of the observed pattern rather than as proof of a statistically significant or causal treatment effect, since the study did not employ a control group, randomization, or inferential statistical testing. The study was conducted in the Al-Latif class of TK Avicienna Childhoods Medan during the 2025/2026 academic year. Eleven students were selected through purposive sampling, comprising five neurotypical children and six children with special needs, with varied cognitive and behavioral characteristics (one with Down syndrome, three with ADHD, and two with ASD).

Data were gathered through methodological triangulation, comprising the following techniques:

a) Structured observation: directly observing children's behavior and engagement during the story-telling intervention using an observation sheet.
b) Memory-assessment test (pre-test and post-test): measuring children's memory ability based on three main indicators (recalling characters, recalling the sequence of events/sequencing, and retelling the story content), with a score range of 1–24.
c) Semi-structured interviews: conducted with the classroom teacher and companion therapist (GPK) to explore in depth each child's cognitive development profile.
d) Documentation: collecting the daily lesson-plan (RPPH) modules, home recording sheets, and photographic/video records of learning activities.

Memory retention was measured using a rubric composed of three indicators—recalling characters, recalling the sequence of events, and retelling the story—with a maximum score of 8 for each indicator (Table 1), for a total possible score of 24. The rubric was developed by the researchers based on the class's daily lesson-plan (RPPH) indicators and reviewed by the classroom teacher and companion therapist for content relevance prior to use; it is not a nationally standardized psychometric instrument, and this is acknowledged as a limitation of the study.

Table 1. Memory-Assessment Rubric Indicators

No	Memory Aspect	Performance Indicator	Maximum Score

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1	Recalling Story Characters	Naming the main and supporting characters and recognizing their visual features.	8
2	Recalling the Sequence of Events	Arranging picture cards chronologically (beginning, middle, end) and explaining the plot.	8
3	Retelling the Story	Retelling the narrative content in simple language and stating the moral message.	8

Qualitative data were analyzed using the interactive model of Miles, Huberman, and Saldáña (2014), consisting of data reduction, data display, and conclusion drawing. Quantitative scores were analyzed descriptively by calculating percentage achievement and percentage gain for each subject and for the class as a whole, in order to illustrate the pattern of change before and after the intervention rather than to test statistical significance.

RESULTS AND DISCUSSION

To protect the privacy of the young participants, all subjects are identified using anonymized codes (S1–S11) instead of their real names throughout the following presentation. Parental/guardian consent for participation and data collection was obtained by the school prior to the study, consistent with standard research-ethics practice for research involving young children and children with special needs.

1. Findings

The implementation of picture-based story-telling at TK Avicienna Childhoods was carried out through three structured stages: preparation (developing an adaptive RPPH, selecting an illustrated narrative story, and arranging the classroom in a half-circle), delivery (interactive opening, presentation of the visual story, guided question-and-answer, and picture-sequencing practice), and evaluation. The results of children's memory-retention measurement before and after the intervention are presented in detail in Table 2.

Table 2. Pre-test and Post-test Results of Children's Memory Retention

No	Subject Code	Characteristic / Condition	Pre-test (%)	Post-test (%)	Gain (%)
1	S1	Typical	70.83 (17)	95.83 (23)	+25.00
2	S2	Down Syndrome	37.50 (9)	66.67 (16)	+29.17
3	S3	ADHD	45.83 (11)	75.00 (18)	+29.17
4	S4	Typical	75.00 (18)	100.00 (24)	+25.00
5	S5	ASD	41.67 (10)	70.83 (17)	+29.16
6	S6	ADHD	41.67 (10)	70.83 (17)	+29.16
7	S7	Typical	66.67 (16)	91.67 (22)	+25.00
8	S8	ADHD	37.50 (9)	66.67 (16)	+29.17
9	S9	ASD	45.83 (11)	75.00 (18)	+29.17
10	S10	Typical	70.83 (17)	95.83 (23)	+25.00
11	S11	Typical	66.67 (16)	91.67 (22)	+25.00
	Overall Class Mean		**58.14**	**81.73**	**+23.59**

2. Discussion

Based on the data above, memory retention increased descriptively and consistently across all subject groups. The class mean rose from 58.14% (Moderate category) to 81.73% (High category), with an average gain of 23.59%. Because the sample size within each diagnostic subgroup was very small—three children with ADHD, two with ASD, and one

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with Down syndrome—these patterns should be read as illustrative, case-level observations rather than generalizable claims about each condition, and are discussed accordingly below.

a) Increase among typical children: the typical-student group achieved post-test scores in the Very High category (91.67%–100.00%). Serial pictures appeared to support their logical schema for organizing the story sequence independently, without requiring repeated guidance (Kusumawati & Firdaus, 2026).
b) Increase among children with ADHD: the three children with ADHD (S3, S6, and S8) moved from an initial range of 37.50%–45.83% to 66.67%–75.00%. Dynamic visual stimulation combined with the kinesthetic act of holding picture cards appeared to support attentional engagement and to help lengthen these children's attention span, consistent with prior case-study findings on audiovisual media and ADHD concentration (Septiani et al., 2026).
c) Increase among children with ASD: the two children with autism (S5 and S9) showed an increase reaching 70.83%–75.00%. Consistent with prior work suggesting many autistic learners process visual information relatively well (Maich & Belcher, 2012; Nisak & Harsiwi, 2024), picture media appeared, in these two cases, to function as visual cues that eased the processing of otherwise complex verbal narration—an interpretation that should be treated cautiously given the very small number of subjects.
d) Increase among the child with Down syndrome: subject S2 improved from 37.50% to 66.67%. The visual approach, combined with gradual scaffolding, appeared to provide processing time conducive to this child's speech delay, in line with prior evidence that visual supports can aid communication and participation for children with complex communication needs (Bhana et al., 2020; Mardhia & Pransista, 2025).

3. Supporting and Inhibiting Factors

Supporting factors: the availability of varied visual media, a calm and conducive inclusive classroom, support from therapists and companions through PSLC Avicienna, and active parental collaboration through daily home recording sheets. Inhibiting factors: fluctuations in mood and occasional tantrums among CSN, a relatively short attention span at the start of activities, and limited time for in-depth one-on-one scaffolding amid the dynamics of the classroom.

CONCLUSION

The implementation of picture-based story-telling at TK Avicienna Childhoods Medan was carried out systematically through three stages—preparation, interactive delivery, and lesson-plan-based evaluation—and descriptively increased children's memory-retention achievement, with the class average rising from 58.14% (pre-intervention) to 81.73% (post-intervention), a gain of 23.59%. Picture media appeared to adapt to the cognitive needs of children with special needs in different ways: as a focus-anchoring tool for children with ADHD, as a visual cue for children with ASD, and as a scaffold for the child with Down syndrome, complementing the gains observed among neurotypical peers.

These findings should be interpreted within the boundaries of the study's design. The sample was small (11 children, including only one to three children per diagnostic category), drawn from a single classroom, without a comparison or control group, and observed only over the intervention period reported here; consequently, the increase in scores is best read as a descriptive, exploratory pattern rather than as statistically confirmed or generalizable evidence of effectiveness. These limitations are important considerations for readers and for the design of future research.

For practicing teachers in inclusive early-childhood classrooms, the findings suggest that continuing to develop and vary picture-based media—for example, three-dimensional visuals or pop-up books—may help sustain children's enthusiasm for learning, and that institutions may benefit from providing regular training on adaptive multisensory strategies. For future researchers, this study points to the value of testing picture-based story-telling with larger and more diverse samples, incorporating a comparison group and, where appropriate, inferential statistical analysis to establish effectiveness more rigorously; extending the observation period; and exploring the combination of visual storytelling with interactive digital media or augmented-reality technology.

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