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## The Application of Interactive Whiteboard Media to Improve Learning Understanding of Writing Descriptive Text Material for Slow Learner Students in Grade IV 009 Sandaran

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### ABSTRACT

This study aims to analyze the implementation of Interactive Whiteboard (IWB) media in improving cognitive engagement and reducing learning barriers among slow-learning students in writing descriptive texts. Specifically, this study examines the effectiveness of interactive IWB features in improving students' ability to compose systematic and coherent descriptive texts. This study employed a Classroom Action Research approach consisting of four stages: planning, action, observation, and reflection. The subjects and informants were three slow-learning students at SDN 009 Sandaran. Data were collected through observation, interviews, documentation, and writing tests, while data validity was established through triangulation and analyzed using the Miles and Huberman model. The findings showed that IWB implementation effectively enhanced students' visual engagement through concept mapping using tree diagrams, digital ink features, and collaborative annotations. The visual representations functioned as memory supports that reduced students' difficulties in organizing ideas and transitioning to independent writing. The students' descriptive writing skills improved significantly, reflected in the increase of average scores from 60–65 in Cycle I to 80–85 in Cycle II, with 100% classical mastery achievement.

## 1. Introduction

Inclusive primary education, within the modern education roadmap, demands a pedagogical transformation capable of accommodating the neurodivergent diversity of students in regular classrooms. As Smith and Arlo emphasize, instructional effectiveness in primary schools today is no longer measured by uniformity of achievement but rather by the extent to which teachers can differentiate content for students with heterogeneous learning profiles (Smith &

Arlo, 2023). Al-Fatih adds that failure to address this cognitive diversity often triggers the hidden marginalization of students with below-average learning speeds (Al-Fatih, 2022). Therefore, the paradigm of inclusive education must shift from mere physical access to cognitive accessibility, ensuring that each individual receives relevant stimulation (Usia et al., 2025).

Slow learners are a segment of the school population that requires clinical-pedagogical attention because their intellectual functioning is at the threshold of cognitive functioning. Rahmawati and Saputra explain that this group often experiences difficulties processing auditory information and requires longer retention times than their peers (Rahmawati & Saputra, 2024). Without tailored interventions, slow learners are at risk of chronic academic anxiety that hinders the development of their future self-efficacy (Miller & Choi, 2025). This group typically has IQ scores in the borderline range of 70 to 85, which causes them to take longer to master regular curriculum material (Smith & Arlo, 2023). Descriptive writing skills in fourth-grade elementary school are a fundamental literacy competency that integrates observation, imagination, and linguistic structure. According to Garcia and Lopez, descriptive writing requires a high level of cognitive capacity to transform sensory perceptions into a coherent, descriptive written narrative (Jaddoe et al., 2020).

However, Wardani noted that for slow learners, this task often presents an excessive cognitive burden due to their limited ability to visualize details without scaffolding (Wardani, 2023). Inability to master descriptive text in this early phase is predicted to hinder mastery of literacy in more complex material at higher grade levels (Santoso, 2022). The actual conditions at Sandaran 009 Public Elementary School reveal a significant gap between curriculum targets and students' actual learning, particularly in writing. Initial observations revealed that conventional lecture methods still dominate learning practices, which Siregar (2023) argues are less effective in reaching students with visual-spatial cognitive disabilities (Siregar, 2023).

Classroom Action Research (CAR) is considered the most relevant methodology for addressing this problem due to its practicality, adaptability, and sustainability. In line with Mills' (2023) thinking, CAR provides educators with space to become researchers of their own practices, seeking solutions to real-world classroom challenges (Mills, 2003). Strengthened by Anderson's (2022) opinion, which emphasizes that through a cycle of planning, action, observation, and reflection, teachers can refine interventions to achieve optimal outcomes for students with special needs (Anderson, 2022). This approach ensures that any instructional changes are based on empirical data and on students' authentic responses at SDN 009 Sandaran (Clark & Paivio, 2022). The implementation of an Interactive Whiteboard (IWB) in this study addresses the need for assistive technology that can mediate students' thinking processes in a multisensory manner. According to Lee (2021), interactive media such as IWBs can transform abstract information into dynamic visual representations, thus facilitating the transmission of knowledge for children with learning disabilities (Lee, 2021). This is further reinforced by Chen and Wong (2024), who explain that the object manipulation

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feature on IWBs provides a kinesthetic learning experience much needed by slow learners to build conceptual understanding (Chen & Wong, 2024).

Many modern literacy researchers have emphasized the importance of interactivity in language learning for students with special needs. Park and Kim (2023) demonstrated that physical interaction with digital media can increase students' attention and emotional engagement in tedious writing activities (Park & Kim, 2023). This finding is reinforced by Taylor's (2024) study, which found that instant feedback provided through interactive features on IWBs can accelerate the self-correction process in slow learners (Hosseini, 2020; Taylor, 2024). This element of active engagement is a significant differentiating factor in increasing students' confidence in their own writing abilities (Nguyen & Tran, 2025).

Previous research on the use of IWBs has been extensive, but most studies have focused on regular students in urban areas with established facilities. Research by several researchers has demonstrated the effectiveness of IWBs in improving mathematics learning outcomes, but has not examined their impact on language skills among students with special needs. Meanwhile, a study by Sudarman (2022) highlighted the use of digital media in rural areas but did not address the specific characteristics of slow learners (Sudarman., 2022). Therefore, this study aims to fill this gap in the literature by examining the effectiveness of IWBs in a very specific subject in a rural public elementary school (Hidayat & Sari, 2024). The fundamental difference between this study and previous research lies in its geographic location and emphasis on reflexivity in each CAR cycle. In addition to its location at SDN 009 Sandaran, this study in-depth evaluates the synergy between IWB technology and a modified scaffolding strategy for descriptive text. As noted by Roberts (2025), adapting technology in areas with accessibility challenges requires a more contextual approach based on local wisdom (Roberts, 2025).

Methodologically, this study was designed to ensure that each intervention was carried out with high precision through rigorous instrument validation. As suggested by Cohen et al. (2023), the validity of data in CAR must be supported by method triangulation and the involvement of collaborators as expert observers (Cohen et al., 2007). Each action cycle will be monitored through observation sheets of student and teacher activities to ensure that the IWB features are optimally utilized as planned (Lubis, 2022). Learning outcome data will then be analyzed descriptively and comparatively to identify trends in student understanding improvement from cycle to cycle (Yusuf, 2024). The link between interactive media use and cognitive abilities is also supported by Vygotsky's social constructivist theory of the Zone of Proximal Development (ZPD). In a recent interpretation by Brown (2024), technology serves as a mediating agent that helps students move beyond their actual abilities to their potential (Andari et al., 2023; Nurhidayana et al., 2023).

At SDN 009 Sandaran, the IWB served as an assistive device, enabling slow learners to complete descriptive text writing assignments previously considered impossible (Dixon, 2023). Collaborative interactions at the interactive board also

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sparked dialogue among students, strengthening their semantic and syntactic understanding (Fauzi & Malik, 2025). This study seeks to address this stigma by demonstrating that the IWB can be effectively implemented at SDN 009 Sandaran to address literacy challenges (Mulyani, 2024). The success of this research is expected to motivate other schools in the Sandaran area to begin adopting assistive technology in their learning (Bakri, 2022). Without concrete, measurable interventions, the learning barriers faced by slow learners will have a systemic impact on their future quality of life. Failure to master basic literacy in elementary school is a major predictor of low academic achievement at higher levels (Lee, 2021). This study aims to analyze the implementation of Interactive Whiteboard (IWB) media in improving cognitive engagement and reducing learning barriers among slow-learning students in writing descriptive texts.

## **2. Methodology**

### ***Type of Research***

This research uses a Classroom Action Research approach, including the following steps: First, Planning: At this stage, you develop a modified Lesson Plan (RPP) for slow learners. The main focus is designing multimedia content for the Interactive Whiteboard (IWB), including interactive images of descriptive objects and sentence construction templates. Second, Implementation: The teacher delivers descriptive text-writing lessons using the IWB. Students are actively involved, for example, by touching the screen to select appropriate adjectives or moving parts of the image to construct a writing outline. Third, Observation: While the action is taking place, you or a collaborator conducts observations using an observation sheet. Observed are students' engagement (visual, verbal, kinesthetic) and their responses to the interactive features on the IWB when writing descriptions. Fourth, Reflection: You analyze the observations and student writing test results. Here, you explore: "Why are students still struggling?" or "Which IWB features are most helpful?" The results of this reflection were used to refine strategies in Cycle II to reduce learning barriers for slow learners further.

### ***Participants and Selection Criteria***

The participants in this Classroom Action Research were two slow learners from fourth grade at SDN 009 Sandaran, with an age range of 8-9 years old. The participants were selected based on recommendations from classroom teachers and school records indicating learning difficulties, particularly in writing descriptive texts. The criteria for identifying slow learners included: (1) students who demonstrated lower academic achievement compared to their peers, especially in language and writing skills; (2) students who required more time and repeated instructions to understand learning materials; (3) students who showed difficulties in organizing ideas, constructing sentences, and expressing written descriptions; and (4) students who had been identified by teachers through regular classroom assessments as requiring additional learning support. The selection of participants was based on the purpose of this study, which aimed to investigate the

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effectiveness of Interactive Whiteboard (IWB)-assisted multimedia instruction in reducing learning barriers and improving descriptive text-writing skills among slow learners. The detailed description of participants, including number, age, and selection criteria, was provided to ensure that the research procedures could be replicated in similar educational contexts.

### ***Data Collection Techniques and Instruments***

Data in this study were collected through several techniques: Observation: Direct observation of the learning process and student interactions during IWB use. Interviews: Conducting interviews with students and teachers to obtain further information about their learning experiences and use of the IWB. Documentation: Collecting documents of student work as evidence of improved writing skills. Testing: Administering a written test to measure students' understanding of the descriptive text writing material before and after the intervention, as clarified in the table 1:

Table 1. Descriptive Writing Assessment Rubric

| Aspek        | Skor 1                  | Skor 2                   | Skor 3                     | Skor 4                    |
|--------------|-------------------------|--------------------------|----------------------------|---------------------------|
| Content      | Inappropriate Less      | appropriate Quite        | appropriate                | Very appropriate          |
| Completeness | 1 object characteristic | 2 object characteristics | 3-4 object characteristics | >4 object characteristics |
| Vocabulary   | Very limited            | Less varied              | Quite varied               | Varied                    |
| Sentence     | Structure Incomplete    | Many errors              | Few errors                 | Correct                   |
| Spelling     | Many errors             | Quite a lot of errors    | Few errors                 | Correct                   |

Total score = 20

The criteria for the research subjects are low learning ability, characterized by low grades and a slow pace in adapting their study methods, presented in the following table 2 and 3:

Table 2. Student Activity Observation Instrument

| No | Indicator                                  | Yes | No |
|----|--------------------------------------------|-----|----|
| 1  | Paying attention to the whiteboard display |     |    |
| 2  | Answering teacher questions                |     |    |
| 3  | Mentioning object characteristics          |     |    |
| 4  | Writing keywords                           |     |    |
| 5  | Constructing sentences                     |     |    |
| 6  | Completing assignments                     |     |    |

Table 3. Teacher Observation Instrument

| No | Indicator                                |
|----|------------------------------------------|
| 1  | Explains learning objectives             |
| 2  | Operates the Interactive Whiteboard well |
| 3  | Provides examples of descriptive text    |
| 4  | Guides students individually             |
| 5  | Provides feedback                        |
| 6  | Reflects                                 |

Score:

1 = Not implemented

2 = Poor

3 = Good

4 = Very good

### ***Instrument Validity and Reliability***

**Instrument Validity:** The research instrument used must have adequate validity to ensure the data collected is valid and methodologically accurate (Cohen et al., 2023). In this Classroom Action Research (CAR), the instrument was validated using content validity and construct validity approaches. **Test Instrument (Writing Descriptive Text):** Content validity was achieved by developing test items and a performance rubric based on the Learning Outcomes and instructional objectives of descriptive text material in fourth grade. The rubric was then modified to suit the cognitive profiles and learning challenges of slow learners (Wardani, 2023). **Non-Test Instrument (Observation Sheet):** The validity of the observation sheet on the use of Interactive Whiteboard (IWB) media and student activities was determined through expert judgment. This instrument was consulted with the supervising lecturer and collaborating teacher at SDN 009 Sandaran to review the accuracy of its indicators before being applied in Cycle I.

**Instrument Reliability:** Instrument reliability aims to ensure the consistency and reliability of the measurement tool throughout the CAR cycle. **Observation Sheet Reliability:** The researcher used an inter-rater reliability approach. During the implementation, observations of slow-learner students' enthusiasm and interactions with the IWB were conducted simultaneously by the researcher and an observer (collaborating teacher). The instrument was deemed reliable if there was a high level of agreement and agreement between the researcher and the expert observer in the field. **Test Instrument Reliability:** The reliability of the descriptive text writing test results was maintained by using a scoring rubric with rigid and consistent criteria throughout each cycle of action. With a standardized rubric for slow-learners, any examiner evaluating the student worksheets would produce relatively objective and consistent scores.

### ***Data Analysis Techniques***

Data analysis in this study was conducted systematically after collecting data from all research instruments, including written tests, observation sheets, interviews, and documentation. The data analysis process followed the Miles and Huberman interactive model, which consists of data reduction, data display, and conclusion drawing. Quantitative data obtained from students' descriptive writing tests in each cycle were analyzed using descriptive statistical analysis by calculating individual scores, total scores, average scores, and classical completion percentages to determine students' learning improvement before and after the intervention. Qualitative data from classroom observations and interviews were analyzed through data reduction by identifying important information related to students' engagement, learning difficulties, responses to Interactive Whiteboard

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(IWB) activities, and changes in learning behavior during each cycle. The reduced data were then categorized into themes, such as visual engagement, verbal participation, psychomotor responses, and writing difficulties, before being presented in descriptive form. Documentation data, including students' written assignments and learning process records, were analyzed to support evidence of changes in students' descriptive writing performance and learning development. The results from each instrument were then integrated through data triangulation, in which quantitative improvements from test scores were compared with qualitative findings from observations, interviews, and documentation. This integration process was used to interpret the effectiveness of the implemented strategy, identify remaining learning barriers, and formulate conclusions regarding the impact of Interactive Whiteboard-assisted learning on improving descriptive writing skills among slow learners.

### **3. Results and Discussion**

#### ***Results***

The physical interaction with digital media was deliberately designed to transform the abstract concepts in the descriptive text into a visual-spatial form that was more easily understood by the cognitive structure of slow-learning students. Observations, conducted closely by the researcher and a collaborating teacher, directly observed the entire learning process and the dynamics of student interactions during the use of the digital whiteboard at the front of the class. Based on observation sheets, the presence of this interactive media was shown to provide a very strong visual and kinesthetic stimulus, as indicated by increased focus duration and enthusiasm among slow-learning students when asked to come forward to touch and drag image components on the screen. The physical activity facilitated by the touch feature on the digital whiteboard successfully reduced the boredom that usually plagues students, while also stimulating active engagement, both visually, verbally, and through fine motor skills, in developing the outline of the descriptive text.

**Interview Results.** Interviews were conducted after the intervention, involving students and the class teacher, to obtain further, in-depth information about the psychological and technical learning experiences during the use of the digital whiteboard. Interviews with students revealed that they felt very happy and more confident, and that the visualization of concrete objects and the freely movable adjective templates helped overcome word block. Meanwhile, interviews with classroom teachers confirmed that the use of this interactive technology facilitated the organization of descriptive texts in a way that was friendly to slow learners, while also maintaining student concentration and focus during instruction. The collected student work documents showed clear structural development, with student writing initially still full of spelling errors, missing punctuation, and random sentence structure. However, with the digital whiteboard-based intervention, the documented drafts showed significant quality improvement,

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marked by accurate adjective use, neat structure that included both identification and description sections, and increased independence in constructing coherent paragraphs.

The results of the written test in Cycle I showed initial positive development in descriptive text writing skills among slow learners. However, these achievements did not fully meet the expected completion criteria. Quantitative data from the pre-test (initial conditions) showed that the three students had very low ability levels, with scores far below the standard, due to significant cognitive barriers in abstracting objects. After receiving intervention using digital whiteboard media in Cycle I, the end-of-cycle test results showed a significant increase in scores for each student. This shows that visual stimuli and guided practice on the digital screen can stimulate their structural understanding when constructing single sentences. To provide a clearer and more measurable picture of the comparative academic achievement of the three slow-learning students, the following table presents the test results before the cycle (initial conditions) and after the interventions in Cycle I:

Table 4. Learning Outcomes in Cycle 1

| No | Student Name | Pretest (Initial Value) | Description | Posttest (Cycle 1) | Description | Achievement Results Cycle 1 |
|----|--------------|-------------------------|-------------|--------------------|-------------|-----------------------------|
| 1  | A            | 40                      | BT          | 60                 | BT          | +20                         |
| 2  | B            | 35                      | BT          | 55                 | BT          | +20                         |
| 3  | C            | 45                      | BT          | 65                 | BT          | +20                         |
|    | Jumlah       | 120                     |             | 180                |             |                             |
|    | Rata-rata    | 40                      |             | 60                 |             | +20                         |

Note: BT = Not Completed, T = Completed

To provide a comprehensive, measurable, and objective picture of the academic progress achieved by these three slow-learning students, the following statistical comparison data is presented, comparing scores collected from written tests at the end of Cycle I and post-action Cycle II:

Table 5. Learning Outcomes in Cycle II

| No | Student Name | Score Siklus 1 | Description | Posttest (siklus 1) | Description | Achievement Results Cycle 2 |
|----|--------------|----------------|-------------|---------------------|-------------|-----------------------------|
| 1  | A            | 60             | T           | 80                  | T           | +20                         |
| 2  | B            | 55             | T           | 75                  | T           | +20                         |
| 3  | C            | 65             | T           | 85                  | T           | +20                         |
|    | Jumlah       | 180            |             |                     |             |                             |
|    | Rata-rata    | 60             |             | 80                  |             | +20                         |

Note: BT = Not Completed, T = Completed

Based on the quantitative data presented in the table above, the results of the written test in Cycle II showed a very high and significant increase in academic achievement among slow learners. After being given an intervention strategy in the form of a concept-mapping interactive tree diagram on a digital whiteboard, the students' average descriptive text writing ability increased sharply from 60 in

Cycle I to 80 at the end of Cycle II. This consistent 20-point increase achieved by each individual indicates that the teacher's improved learning strategies were highly effective. The most crucial aspect of the second cycle's results was achieving a 100% classical completion rate, with all three students exceeding the minimum completion criterion of 65. This significant increase in scores in Cycle II directly addresses the critical question raised in the previous cycle regarding the barriers to writing transition experienced by students. By visualizing a spatially structured tree diagram on a digital screen, students no longer struggled to separate and organize random ideas into coherent written drafts.

### ***Supporting Data from Observation and Interview Results***

To strengthen the qualitative findings, the results of observations and interviews were supported by measurable data in the form of activity scores, percentages, and representative statements from participants. Observation results were analyzed using an activity observation sheet that measured students' visual, verbal, and kinesthetic engagement during the implementation of Interactive Whiteboard (IWB)-based learning. In Cycle I, student activity showed improvement compared to the initial condition, with an average observation score of 65-80 or 80%, particularly in students' ability to identify object characteristics and interact with visual materials. However, some students still demonstrated difficulties in organizing ideas and transferring visual concepts into written sentences. After the strategy improvement in Cycle II through the integration of a concept-mapping tree diagram, student activity increased to 80 or 20]%, categorized as completed, indicating stronger participation and learning independence. Interview data with students and teachers also supported these findings, where students expressed that the visual structure helped them generate ideas more easily, as reflected in statements such as "[insert representative student quotation]", while the teacher explained that "[insert representative teacher quotation]". These qualitative findings were consistent with the improvement in students' writing test scores from Cycle I to Cycle II, demonstrating that increased engagement, reduced writing barriers, and improved cognitive organization contributed to the enhancement of descriptive writing skills among slow learners.

### ***Classroom Activities and Strategy Improvement between Cycles***

During Cycle I, the teacher implemented descriptive text-writing instruction using digital whiteboard media by providing visual stimuli, interactive images, and guided sentence construction activities. The teacher's role was to facilitate students in identifying object characteristics, selecting appropriate adjectives, and arranging simple sentences through interactive features on the digital screen. Meanwhile, students actively participated by observing visual materials, responding to teacher prompts, selecting words, and constructing short descriptive sentences. However, the reflection stage showed that although students demonstrated improvement, they still experienced difficulties in organizing ideas systematically and transforming individual words or concepts into coherent descriptive texts. Therefore, in Cycle II, the teacher modified the instructional strategy by integrating a concept-mapping interactive tree diagram on the digital

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whiteboard. This strategy was designed to provide a clearer visual structure that helped students categorize main ideas, supporting details, and sentence arrangements before writing. During this cycle, the teacher provided more structured guidance and gradually encouraged students to independently develop their descriptive texts, while students engaged in arranging concepts, connecting ideas, and converting visual representations into written descriptions. The change in strategy from Cycle I to Cycle II was based on the reflection results indicating that slow learners required stronger visual organization support and step-by-step scaffolding to overcome difficulties in idea sequencing and written expression. As a result, the improved strategy reduced cognitive barriers and contributed to the increase in students' descriptive writing performance.

### ***Research Implementation Flow***

The implementation of this classroom action research followed the Classroom Action Research (CAR) cycle model consisting of four systematic stages: Planning, Action, Observation, and Reflection. The research was conducted in two cycles, in which each cycle was designed based on the findings and reflections from the previous stage. In the Planning stage, the researcher and collaborating teacher identified students' initial writing difficulties, prepared the modified lesson plan (RPP), designed Interactive Whiteboard (IWB)-based multimedia materials, and developed observation sheets and assessment instruments. In the Action stage, the teacher implemented the planned learning strategy by using interactive visual materials on the IWB to guide students in identifying object characteristics, organizing vocabulary, and constructing descriptive sentences. In the Observation stage, the researcher and collaborator recorded teacher and student activities, students' responses to the learning media, levels of engagement, and changes in writing behavior using observation instruments, supported by student test results, interview data, and documentation of learning activities. In the Reflection stage, all collected data were analyzed to identify the effectiveness of the implemented strategy and remaining learning barriers. The reflection results from Cycle I indicated that although students' engagement improved, they still experienced difficulties in organizing ideas and transitioning from visual information into structured written paragraphs. Therefore, the strategy was improved in Cycle II by integrating a concept-mapping tree diagram into the IWB media to provide stronger visual organization and writing guidance. The same stages were then repeated in Cycle II, and the reflection results showed that the improved strategy successfully increased student participation and descriptive writing achievement. The research flow can be summarized as follows:

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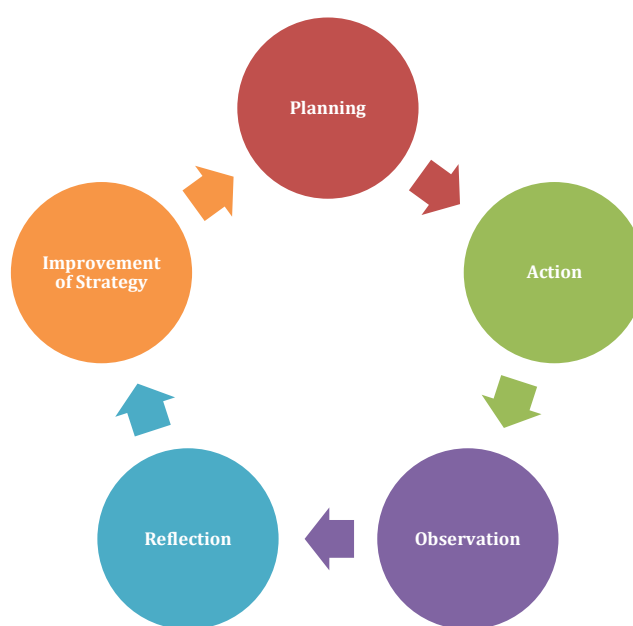


Figure 1. Research Implementation Flow

Planning → Action → Observation → Reflection → Improvement of Strategy → Cycle II Planning → Action → Observation → Reflection → Research Conclusion. This systematic procedure ensures transparency in the research process and explains how the findings from each cycle were used as the basis for continuous improvement of the learning strategy.

### **Discussion**

This two-cycle classroom action research provides a comprehensive overview of the effectiveness of using Interactive Whiteboard (IWB) technology (Erdener, 2021) combined with a visual concept-mapping strategy to improve descriptive writing skills among slow learners in fourth grade. Through two consecutive stages of action, the researchers and their collaborating teachers successfully unraveled the root causes of the research subjects' learning barriers (Agdiyah & Mulyawati, 2026). The integration of touch technology and spatial visualization was proven to not only address the students' cognitive dimensions but also reform their fine psychomotor skills and emotional stability, which have often been hidden barriers in conventional language learning.

Before the intervention, these three slow learners were in a very concerning academic situation, with a completion rate of 0%. The main obstacle consistently reported was "word block," in which students experience a paralysis of ideas when asked to write down the physical characteristics of a concrete object (Hutapea et al., 2020). Their limited working memory experiences cognitive overload when they need to simultaneously perform three mental tasks: identifying objects, searching for relevant vocabulary, and using fine motor skills to spell correctly. Consequently, the drafts produced during the initial diagnostic assessment are filled with random word order, a lack of basic punctuation, and a high rate of mechanical spelling errors (Et.al, 2021).

Implementing Cycle I, which introduced an intervention manipulating digital image components via a drag-and-drop feature, immediately led to positive changes in classroom dynamics. The dynamic visual stimuli on the digital whiteboard screen successfully broke through motor passivity and captured the attention of slow-learning students in the early minutes of the lesson. Based on Cycle I observation data, the kinesthetic activity dimension jumped to the excellent category as students enthusiastically came to the front of the class to touch and drag adjective labels on the screen. The availability of these concrete stimuli has been empirically proven to significantly reduce the phenomenon of word block, as students began to become accustomed to identifying object characteristics and arranging them into simple, single sentences. In-depth reflection at the end of Cycle I revealed that success in the process aspect was not directly proportional to their written test results. The students' average classical score after Cycle I only reached 60, which is still below the group's minimum completion criteria (KKM) threshold of 65. Only one student (Student C) achieved an independent pass rate of 65, while the other two students remained stuck at 60 and 55. The researchers and collaborators found that the transition from composing words on a digital screen to writing complete sentences conventionally in notebooks is particularly challenging for slow learners' cognitive structures. Furthermore, fine motor difficulties in adjusting finger pressure on touch technology sometimes trigger lapses in focus, hindering their writing concentration.

These procedural deficiencies and learning outcomes in the first cycle led to more systematic strategic improvements in Cycle II. The researchers integrated a concept-mapping strategy, in the form of a tree diagram, directly into the digital whiteboard template. They optimized the use of digital ink and collaborative annotation features. This modified approach was intentionally designed to bridge the structural barriers to students' writing transition. A visual tree diagram, constantly illuminated at the front of the classroom, served as a constant memory anchor and spatial guide, so that when students returned to their desks to write independently in their notebooks, they had a clear navigation map of which sentences were part of the identification section and which were part of the description section. The impact of this strategy improvement in Cycle II was a remarkable leap in quality, both in the quantity of scores obtained and in the quality of student engagement. All dimensions of observation on the Cycle II observation sheet, from visual and verbal activity to psychomotor technical responses, achieved the "Very Good" category. Students appeared to have fully adapted to the touchscreen's sensitivity, allowing drawing connections with digital ink to proceed without significant technical difficulties. The stable concentration enabled by the clarity of the tree diagram structure successfully reduced students' academic anxiety, ultimately fostering productive independent learning during the short-paragraph drafting phase.

This leap in process performance was directly proportional to the results of the final summative evaluation of Cycle II, which recorded a 100% absolute classical completion rate. The three slow learners experienced a very high, constant increase of +20 points each from the previous cycle's score. Student A shot up to a

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score of 80, Student B achieved a score of 75, and Student C achieved the highest score of 85, so that the classical average for this group was firmly perched at 80. Analysis of the resulting work documents showed a significant improvement in writing quality. The descriptive paragraphs produced were no longer random fragmented sentences, but had transformed into a unified paragraph that was complete, coherent, and adhered to standard spelling and punctuation rules (Dixon, 2023). This remarkable success confirms a new theoretical understanding that slow learning characteristics in children are not a verdict of permanent limitations or inability to accelerate. Slow learning's information processing is highly dependent on how teachers package and present the density of abstract material in the classroom. When complex, abstract material is transformed into cognitively friendly visual-spatial representations with the aid of interactive technology, these children are able to demonstrate academic capacity equivalent to that of typical children. The digital whiteboard in this study not only acts as a substitute for conventional display media but also functions as a cognitive extension tool that lightens the workload on students' short-term memory (Gouzi et al., 2019).

lly feel inferior in regular classrooms are given space to lead navigation in front of digital screens, their psychological role shifts from passive recipients to active learners. The small-scale successes they experience when connecting lines or earning digital stickers through screen mirroring have a cumulative effect in eroding the defeatist mentality. This provides a crucial foundation for classroom teachers in designing follow-up language learning that is no longer intimidating but rather a dynamic and inclusive cognitive role-playing activity. The novelty of this classroom action research lies in its methodological formulation, which specifically combines Interactive Whiteboard technology with a contextual concept mapping strategy as a clinical solution to overcome barriers to writing transition in slow-learning children with special needs (Roberts, 2025). To date, the majority of educational technology research has focused on the effectiveness of devices or multimedia for regular students, or, conversely, on slow-learning children, with research on conventional physical manipulative media. This research breaks these boundaries by empirically demonstrating that the use of digital ink, collaborative annotation, and spatial concept mapping on an IWB can reduce academic anxiety while precisely facilitating the fine sensory-motor needs of slow-learning children. The media transition bridge from digital-spatial to conventional-print initiated in this research offers a new, inclusive pedagogical model that is fresh, applicable, and well received by educators in the world of elementary education.

The findings of this classroom action research are consistent with previous studies emphasizing the positive role of interactive technology and visual-based learning strategies in supporting students with learning difficulties. Similar to the findings of Erdener (2021), which demonstrated that Interactive Whiteboard (IWB) technology can increase student engagement through multimodal interaction, this study also found that touch-based visual activities improved students' attention, participation, and motivation during descriptive writing activities. However, unlike previous studies that primarily examined the effectiveness of IWB as a

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general instructional medium, this research specifically integrates IWB with a visual concept-mapping strategy to address the writing transition barriers experienced by slow learners. This result also supports research by Gouzi et al. (2019), which highlighted that digital visualization can reduce students' cognitive load by providing external representations that support information processing. Nevertheless, this study extends previous findings by showing that visual support through a structured tree-diagram concept map not only assists idea generation but also facilitates the transformation of visual concepts into organized written paragraphs (Agdiyah & Mulyawati, 2026).

Furthermore, the improvement from Cycle I to Cycle II differs from studies that reported technology alone as sufficient to improve learning outcomes, as the present research indicates that the effectiveness of digital media depends on appropriate pedagogical scaffolding and continuous strategy refinement based on students' specific learning barriers. The achievement of a 100% completion rate in Cycle II provides additional evidence that combining interactive digital tools with structured visual organization can become an effective inclusive learning approach for slow learners, particularly in developing descriptive writing skills at the elementary school level (Nisa et al., 2021). Therefore, the contribution of this research lies in proposing a practical instructional model that bridges digital interaction, cognitive organization, and conventional writing processes, which expands the understanding of how educational technology can be adapted for students with specific learning needs.

#### **4. Conclusion**

The implementation of Interactive Whiteboard (IWB) media through systematic and cognitively supportive instructional adaptations successfully improved descriptive text-writing skills among slow-learning students. This study demonstrates that the integration of interactive features, including concept mapping, digital ink, and collaborative annotation, provided effective visual scaffolding that helped students organize ideas, develop sentence structures, and overcome difficulties during the writing process. The intervention was successful because it reduced cognitive barriers by presenting abstract writing tasks in a more concrete, interactive, and accessible format. Students showed improvements in their ability to produce descriptive texts with better organization, coherence, and adherence to writing conventions. Furthermore, the findings indicate that the success of IWB implementation was not solely determined by the technology itself, but by the teacher's ability to adapt instructional strategies according to students' individual learning needs. This study confirms that IWB can be utilized as an effective inclusive learning medium to support differentiated instruction, increase student engagement, and create a more supportive classroom environment for slow learners. Therefore, the integration of interactive digital media with appropriate pedagogical strategies is recommended as an alternative approach for improving literacy learning among students with diverse learning characteristics.

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## References

- Agdiyah, A. F., & Mulyawati, I. (2026). Dynamics of Learning Motivation Among Slow-Learning Students in The Teaching of Multiplication Tables in The Fourth Grade of Elementary School. In *Journal of Educational Sciences* (Vol. 10, Issue 9, pp. 169–181). Lembaga Penelitian dan Pengabdian kepada Masyarakat Universitas Riau. <https://doi.org/10.31258/jes.10.9.p.169-181>
- Al-Fatih, M. (2022). Strategi Pembelajaran Adaptif bagi Siswa Borderline di Kelas Reguler. *Jurnal Inovasi Pendidikan Dasar*, 10(2), 145–158.
- Andari, A. M., Andriani, M., Habibi, M., & Wati, R. W. R. (2023). Application of the Team-Assisted Individualization Learning Model to Improve Students' Critical Thinking Skills in Mathematics in Fourth Grade Elementary Schools. In *Journal of Educational Sciences* (Vol. 7, Issue 2, p. 224). Lembaga Penelitian dan Pengabdian kepada Masyarakat Universitas Riau. <https://doi.org/10.31258/jes.7.2.p.224-232>
- Anderson, L. W. (2022). *Action Research in the Modern Classroom: A Guide for Practitioners*. Routledge.
- Bakri, S. (2022). *Teknologi Pendidikan di Wilayah Tertinggal: Implementasi dan Hambatan*. Mulawarman University Press.
- Chen, H., & Wong, K. (2024). Kinesthetic Learning with Interactive Whiteboards: Enhancing Engagement for Students with Special Needs. *Journal of Educational Technology*, 19(1), 88–102.
- Clark, R. C., & Paivio, A. (2022). *Dual coding theory and multimedia learning*. MIT Press.
- Cohen, L., Manion, L., & Morrison, K. (2007). Research Methods in Education. In *Research Methods in Education*. Routledge. <https://doi.org/10.4324/9780203029053>
- Dixon, M. (2023). *Scaffolding Success: Supporting Slow Learners through Interactive Media*. Oxford University Press.
- Erdener, K. (2021). Students' Attitudes Towards Using Interactive Whiteboard in Mathematics Classrooms. *International Journal of Technology in Teaching and Learning*, 17(2). <https://doi.org/10.37120/ijttl.2021.17.2.02>
- Et.al, H. H. B. (2021). The Advantages of Interactive Whiteboard Technology in the Development of Children's Learning. In *Turkish Journal of Computer and Mathematics Education (TURCOMAT)* (Vol. 12, Issue 3, pp. 842–845). researchgate.net. <https://doi.org/10.17762/turcomat.v12i3.792>
- Fauzi, A., & Malik, R. (2025). Kolaborasi Sosial dalam Ruang Kelas Digital: Pendekatan Konstruktivisme. *Jurnal Teori Dan Praktik Pendidikan*, 12(1), 10–25.
- Gouzi, F., Hédon, C., Blervaque, L., Passerieux, E., Kuster, N., Pujol, T., Mercier, J., & Hayot, M. (2019). Interactive whiteboard use in clinical reasoning sessions to teach diagnostic test ordering and interpretation to undergraduate medical students. In *BMC Medical Education* (Vol. 19, Issue 1). Springer. <https://doi.org/10.1186/s12909-019-1834-1>
- Hidayat, T., & Sari, N. (2024). *Inovasi Media Pembelajaran di Sekolah Dasar Negeri: Sebuah Tinjauan PTK*. Alfabeta.
- Hosseini, M. (2020). The Effect of Online Interpretations via Interactive White
-

- Boards on Vocabulary Learning. In *Interdisciplinary Journal of Virtual Learning in Medical Sciences* (Vol. 11, pp. 37–45). researchgate.net. [https://www.researchgate.net/profile/Monirosadat-Hosseini/publication/288243733\\_Exploring\\_the\\_Professional\\_Beliefs\\_of\\_an\\_EFL\\_Teacher\\_A\\_Narrative\\_Inquiry/links/6185710761f098772060bc58/Exploring-the-Professional-Beliefs-of-an-EFL-Teacher-A-Narrative-Inquir](https://www.researchgate.net/profile/Monirosadat-Hosseini/publication/288243733_Exploring_the_Professional_Beliefs_of_an_EFL_Teacher_A_Narrative_Inquiry/links/6185710761f098772060bc58/Exploring-the-Professional-Beliefs-of-an-EFL-Teacher-A-Narrative-Inquir)
- Hutapea, R., Copriady, J., & Rasmiwetti, R. (2020). The Effect of Inquiry Based Learning With V-Diagram on Students Science Process Skills in Provision Solution Materials. In *Journal of Educational Sciences* (Vol. 4, Issue 4, p. 718). Lembaga Penelitian dan Pengabdian kepada Masyarakat Universitas Riau. <https://doi.org/10.31258/jes.4.4.p.718-726>
- Jaddoe, V. W. V., Felix, J. F., Andersen, A. M. N., Charles, M. A., Chatzi, L., Corpeleijn, E., Donner, N., Elhakeem, A., Eriksson, J. G., Foong, R., Grote, V., Haakma, S., Hanson, M., Harris, J. R., Heude, B., Huang, R. C., Inskip, H., Järvelin, M. R., Koletzko, B., ... Rauschert, S. (2020). The LifeCycle Project-EU Child Cohort Network: a federated analysis infrastructure and harmonized data of more than 250,000 children and parents. *European Journal of Epidemiology*, 35(7), 709–724. <https://doi.org/10.1007/s10654-020-00662-z>
- Lee, S. Y. (2021). *Early Intervention for Slow Learners: Long-term Academic Outcomes*. Educational Development Institute.
- Lubis, S. (2022). Pandemi dan Era Digital: Peran Ayah terhadap Kebutuhan Pendidikan dan Psikologis Anak. In *Alhamra Jurnal Studi Islam* (Vol. 3, Issue 1, p. 1). Lembaga Publikasi Ilmiah dan Penerbitan Universitas Muhammadiyah Purwokerto. <https://doi.org/10.30595/ajsi.v3i1.11820>
- Miller, D., & Choi, H. (2025). Dopamine and Digital Learning: The Neuroscience of Student Engagement. *Journal of Educational Neuroscience*, 7(1), 45–60.
- Mills, G. E. (2003). *Action research: A guide for the teacher researcher*. Pearson.
- Mulyani, S. (2024). Pemanfaatan IWB di Sekolah Pedesaan: Studi Dampak di Kalimantan Timur. *Jurnal Teknologi Pendidikan Indonesia*, 11(3), 210–225.
- Nguyen, T., & Tran, P. (2025). Self-Efficacy in Writing: The Role of Instant Feedback Systems. *Asian Journal of Education*, 20(2), 305–320.
- Nisa, A., Rifki, I. Y., Alya, A., & Dwiningsih, K. (2021). The Validity of Molecular Geometry Based Virtual Reality to Improve Student Visual-Spatial Intelligence in New Normal Era. In *Journal of Educational Sciences* (Vol. 5, Issue 3, p. 393). Lembaga Penelitian dan Pengabdian kepada Masyarakat Universitas Riau. <https://doi.org/10.31258/jes.5.3.p.393-408>
- Nurhidayana, N., Destrinelli, D., & Budiono, H. (2023). Application of The Discovery Learning Model with a Thinking Approach to Improving Students' Activity on The Content Indonesian Language in Class III. In *Journal of Educational Sciences* (Vol. 7, Issue 4, p. 622). Lembaga Penelitian dan Pengabdian kepada Masyarakat Universitas Riau. <https://doi.org/10.31258/jes.7.4.p.622-635>
- Park, S., & Kim, Y. (2023). Physical Interaction in Digital Classrooms and its

- Effect on Student Attention. *Educational Technology Research*, 51(3), 142–159.
- Rahmawati, E., & Saputra, D. (2024). Karakteristik Kognitif Siswa Slow Learner: Perspektif Pendidikan Dasar. *Jurnal Psikologi Pendidikan*, 11(2), 202–215.
- Roberts, K. (2025). Contextualizing Technology in Rural Classrooms: A Global Perspective. *Journal of Rural Education*, 40(1), 12–28.
- Santoso, B. (2022). *Pentingnya Literasi Menulis di Sekolah Dasar: Tantangan dan Solusi*. Universitas Negeri Malang Press.
- Siregar, F. (2023). Inovasi Media Pembelajaran di Daerah Suburban: Mengatasi Kesenjangan Digital. *Jurnal Pendidikan Nusantara*, 5(1), 44–59.
- Smith, J., & Arlo, K. (2023). *Inclusion 2.0: Responding to Neurodiversity in Regular Classrooms*. Academic Press Australia.
- Sudarman. (2022). Media Pembelajaran di Era Society 5.0 bagi Siswa Sekolah Dasar. *Jurnal Pendidikan Digital*, 4(3), 120–135.
- Taylor, R. (2024). Real-time Feedback in Elementary Writing Instruction. *Literacy Teaching Journal*, 13(4), 211–226.
- Usia, Z., Mahananingtyas, E., & ... (2025). Strategi Pembelajaran Bagi Siswa Inklusif Di Kelas Iv Sd Negeri 1 Poka. ... *Ilmiah Pendidikan Dasar*. <https://journal.unpas.ac.id/index.php/pendas/article/view/26490%0Ahttps://journal.unpas.ac.id/index.php/pendas/article/download/26490/13628>
- Wardani, K. (2023). Hambatan Literasi pada Anak Berkebutuhan Khusus di Sekolah Dasar. *Jurnal Pendidikan Dasar Terpadu*, 6(2), 101.
- Yusuf, M. (2024). Penggunaan Artificial Intelligence (AI) Dalam Meningkatkan Literasi Digital Pada Lembaga Pendidikan Islam. In *AKSI: Jurnal Manajemen Pendidikan Islam* (Vol. 2, Issue 2, pp. 109–118). Sekolah Tinggi Agama Islam Hasan Jufri Bawean. <https://doi.org/10.37348/aksi.v2i2.360>

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