

Application of Multisensory Strategies in Differentiated Classroom Learning to Overcome Reading Delay in Elementary School Students

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Abstract

Reading is a fundamental skill essential for elementary school students' success. However, many students experience reading delays due to learning methods that are not suited to their learning styles. These delays impact letter recognition, academic achievement, and reading comprehension. This study aims to assess the effectiveness of implementing multisensory learning strategies in Indonesian language subjects in differentiated classrooms to address reading barriers in elementary school students. Multisensory strategies engage various senses such as sight, hearing, kinesthetics, and touch, through activities such as reading with pictures, writing using textured media, and listening to audio. Differentiated learning is carried out by grouping students based on reading ability and learning style. This study used a quantitative method with a quasi-experimental one-group pretest-posttest design without a control group. The subjects were 84 third-grade students from three elementary schools in Cirebon, with a focus on 16 students with reading delays. Data were analyzed using a paired t-test. The results showed significant improvements in students' reading skills after the intervention, including letter recognition, spelling, and sentence comprehension. The novelty of this study lies in the integration of multisensory strategies with a differentiated classroom approach, a practice rarely studied in Indonesian elementary education. This research contributes to the development of adaptive and inclusive learning approaches, particularly in the development of learning strategies that are responsive to the needs of students with reading delays.

Keywords: multisensory strategies, differentiated classroom, reading delay, elementary school students, bahasa Indonesia

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INTRODUCTION

Reading is a fundamental skill that is crucial in the educational process. Reading ability is not only related to Indonesian language lessons but also serves as a gateway to understanding all other subjects. In the context of elementary education, early reading mastery is crucial for students' success at subsequent levels.

Reading is a very important basic skill in everyday life (Suparlan, 2021). If reading skills are inadequate, students will have difficulty in absorbing information from various subjects (Main et al., 2023; Nurmawati et al., 2023). Therefore, reading is very important to teach children from an early age (Kirsch & Bergeron-Morin, 2023), so that they get used

to acquiring various new information or knowledge (Dalillah et al., 2024). However, in many elementary schools, students are still found who have delayed reading or slowly reading. Delays in reading Not only hinder students ' academic development (Astari, 2024), but also have an impact on self-confidence, social participation, and readiness to follow literacy-based learning.

This is also exacerbated by the lack of teacher learning strategies tailored to the individual needs of students, especially for those who have difficulty recognizing letters, spelling, or understanding the meaning of words in the text (Nuraini et al., 2021; Ulfah, 2024). For example, they face difficulty distinguishing letters with similar shapes, such as the letter "b" with a "d" or the letter "m" with an "n". separating letters with almost the same sound, namely the letters "f," v "and" p " (Nursanti et al., 2020). Students have difficulty in reading words containing digraphs such as ng, ny, kh, and sy as well as diphthongs such as ai, au, and oi. When reading, there are often missed letters in each word, the reading is not yet fluent, and the pronunciation of the letters is still stammering. Students also still have difficulty in uniting or combining letters into one whole word (Suchyadi, 2022). Indicators of students who have difficulty reading can be seen from reading fluency, spelling difficulties, misidentification of words, omissions, reversals, and the meaning of Proverbs. This difficulty can affect reading comprehension, reading speed, and students ' confidence in communicating orally and in writing. Therefore, learning strategies tailored to individual needs are needed to help them overcome these obstacles (Gustiani et al., 2022).

This condition requires new and innovative solutions in learning Indonesian, especially the ability to read, which can adjust the diversity of students ' abilities. One of the strategies that is beginning to be widely noticed in basic education is the multisensory strategy (Shelemo, 2023). This strategy emphasizes the importance of using more than one sense in the learning process, such as visual, auditory, kinesthetic, and tactile (Basam & Sulfasyah, 2018). Multisensory strategies are believed to be effective in helping students who experience reading barriers (Nada et al., 2023; Yahya, 2025), because it can stimulate more cognitive and sensory pathways in the learning process, thus multisensory strategies support the learning process more interesting. Using multisensory strategies, students practice combining auditory, visual, tactile, and pronunciation functions when introducing the sound symbols of language, both written and spoken. This suggests that multisensory strategies can be used to address students ' lack of reading skills. This paves the way for further research on the use of multisensory in learning (Peduc, 2016; Shelemo, 2023). Multisensory strategies are able to support the improvement of early reading skills in elementary school students through stimulation of various senses, which helps them in recognizing letters, understanding text, and associating between sounds and letters more effectively (Simanjuntak et al., 2020).

In general, it can be seen that not all students who enter elementary school have a kindergarten education background. Some students go straight to primary school without going through the preschool stage due to various factors, such as limited access to education in the area, or lack of parental understanding of the importance of basic preschool education. This condition causes students ' learning readiness when entering elementary school to be very diverse (RM Riyanto & Wardhani, 2021). On the other hand, education is currently starting to encourage differentiated classroom practices, namely teaching processes that are tailored to the readiness, interests and learning styles of each student (Wahyuni, 2022). Differentiated learning provides space for teachers to design learning strategies that are more equitable and inclusive. Therefore, combining multisensory strategies in the classroom differentiates into promising combinations to overcome Reading delays in elementary school students. The multisensory strategies implemented in this class are designed based on the student's learning style profile. This gives students the

opportunity to learn using the strategies that best suit their needs, as well as giving teachers the space to adapt teaching materials and strategies to the needs of each group.

Previous studies have shown that multisensory strategies have a positive effect on improving students' reading skills (Pakpahan & P, 2023; Shidqi & Budi, 2023; Trimurtini & Bektiningsih, SB, 2023; Wijaya et al., 2023) states that teaching that combines visual, auditory, kinesthetic, and tactile elements helps students understand letters and words better. Other research shows that multisensory strategies are effectively applied to students who experience information processing disorders or mild dyslexia (Sarika, 2021). Nevertheless, most previous studies still apply multisensory strategies conventionally and do not explicitly integrate them in differentiated learning. In fact, the success of this strategy is greatly influenced by how teachers adjust learning to various learning styles and different levels of Student Readiness. Therefore, the combination of multisensory strategies and differentiated classroom concepts has become a research area that has not been explored much, especially in the context of basic education in Indonesia.

Furthermore, many teachers at the elementary school level are not familiar with or have not been trained in systematically implementing multisensory strategies (Wijaya et al., 2023). In addition, although they can understand technologies relevant to their subjects, they find it difficult to design media that can accommodate the different needs and levels of readiness of students (Utari et al., 2025). The strategy used is still dominated by conventional approaches based on lectures and drills, which are less effective in reaching students with reading delays. In this context, research on the application of multisensory strategies in differentiated classes becomes essential to enrich educational practices and provide more targeted solution alternatives.

Many elementary school students experience reading delays, which impacts their academic achievement. If not addressed seriously, this condition will continue to hinder students' academic progress. Meanwhile, the learning strategies used by teachers tend to be uniform and not suited to students' learning styles. Therefore, innovative and responsive approaches are needed, one of which is multisensory strategies that can be implemented in differentiated classrooms. This approach aligns with the Independent Curriculum, which emphasizes student-centered learning.

Research in Indonesia that specifically examines the effectiveness of multisensory strategies in the context of differentiated classes has not been widely conducted. Most previous studies have only highlighted one type of learning strategy. In this study, multisensory strategies are combined with the principle of differentiated classes to create an Indonesian learning experience that is more responsive to the individual needs of students. Many previous studies have focused on students with special needs (e.g. dyslexia), whereas this study focused on regular students experiencing reading delays in differentiated classroom situations. Therefore, this study was conducted to obtain answers to the problems of learning success by applying multisensory strategies in differentiated classes in elementary schools. In addition, this study was conducted to provide answers on how to overcome students who experience reading delays. Based on this, the study entitled "Application of multisensory strategies in learning Indonesian differentiated classes to overcome the delay in Reading Elementary School students" has the novelty of multisensory strategies can overcome slowly reading if applied in learning, so it is very important to do.

METHODS

This study uses a quantitative approach with a quasi - experimental method (Maula et al., 2023; Wajdi et al., 2024). This study aims to measure the effectiveness of

multisensory strategies in Indonesian language learning to overcome Reading delays in elementary school students in differentiated classes. The design used was one group pretest-posttest design, in which the subject group of students who had delayed reading were treated and tested before and after learning.

Respondents of this study were students of SDN Pegajahan 1, SDN Pegambiran 1, and SDN Sinarancang 1 in the city and Regency of Cirebon totaling 60 students. The sampling technique in this study is purposive sampling technique. located in Cirebon, West Java province. Primary Data obtained directly used for this study by researchers.

Table 1. Kriteria Partisipan

School	Class Level	Total number of students			Number of students who have difficulty reading			Percentage (%)
		P	L	Σ	P	L	Σ	
SDN Pegajahan 1	3	12	15	27	3	4	7	25,93%
SDN Pegambiran 1	3	17	14	31	1	3	4	12,90%
SDN Sinarancang 1	3	16	10	26	3	2	5	19,23%

Observation techniques are used to monitor student activity during learning, record student engagement, and implementation of multisensory strategies. The observation criteria used as the following table.

Table 2. Observational Criteria

Observed Aspects	Behavioral Indicators
Visual	Students are able to observe and respond to images, colors, symbols, or writing displayed in learning media.
Audio	Students listen well to the teacher's instructions, recognize letter sounds, and respond appropriately to songs or stories.
Kinesthetic	Students actively engage in physical activity, such as writing, letter-arranging, role-playing, or other movement activities that support learning.
Emotional involvement	Students showed enthusiasm, interest, and participation during the activities.
Response to differentiation	Students participate in activities according to their ability level and learning style
Development Of Reading Skills	Students showed improvement in fluency in reading letters, sounds, or words.

The research instrument has been validated to ensure the validity of the instrument involving two expert lecturers in the field of education, and also one school teacher who is experienced as a practitioner. After getting the result from the validator, the data is analyzed by calculating the percentage. The conclusions of all findings refer to the validity criteria presented in Table 3 below.

Table 3. Validation Criteri

No.	Percentage Scale (%)	Validity Rate
1.	85,01%-100%	Very valid, or can be used without revision
2.	70,01%-85%	Valid enough, or can be used but need a small revision
3.	50,01%-70%	Less valid, it is recommended not to be used because it needs a major revision
4.	01,00%-50%	Is not valid, or cannot be used

Based on Table 3, it can be described that the validation process has been carried out on the three main components of the learning instrument, namely reading ability tests, teaching modules, and learning assessments. Validation is carried out by three validators, consisting of two lecturers and one teacher. Assessment is carried out in the form of a score which is then entered into the form of a percentage, and the average is calculated to determine the level of validity of each component. The data were analyzed quantitatively using paired sample t-test paired sample t-test to see the difference in the results, pre-test and post-test scores of students who had delayed reading. The analysis was done with the help of SPSS software. Decision-making criteria: there is a significant difference between the results before and after teaching if the significance value $p < 0.05$. Conversely, if the significance value of $p > 0.05$, then there is no significant difference (Priyastama, 2017).

RESULTS & DISCUSSION

Based on the results of this study, a number of data were obtained related to the application of multisensory strategies in differentiated classes in Grade III students in three elementary schools in Cirebon Before the instrument is used in research, a validation process is carried out by experts and practitioners to ensure the feasibility and suitability of the contents of the instrument with learning objectives. Expert validation was carried out on three components, namely reading ability tests, teaching modules, and learning assessments. Based on the results of the analysis of validation data that has been entered in the form of percentages, the assessment of research instruments is presented in the following table:

Table 4. Data Validation Results

No.	Component	Validator 1 (Lecture) %	Validator 2 (Lecture) %	Validator 3 (Teacher) %	Average (%)	Validity Rate
1.	Reading Ability Test	95,83%	95,83%	93,75%	95,14%	Sangat Valid
2.	Teaching Module	86,11%	88,89%	91,67%	88,89%	Sangat Valid
3.	Learning Assessment	81,67%	90,00%	86,67%	86,11%	Sangat Valid

$$\text{Percentage} = \left(\frac{\text{(score value obtained)}}{\text{(maximum score value)}} \right) \times 100\%$$

Based on Table 4, the results of expert validation of research instruments include three components, namely reading ability tests, teaching modules, and learning assessments. The assessment was conducted by three validators, consisting of two lecturers and one teacher. Based on the analysis, the average percentage of validity for the Reading Ability Test component is 95.14%, teaching module is 88.89%, and Learning Assessment is 86.11%. The three components are in the category of very Valid, which indicates that the instrument is worthy of being used in research. Meanwhile, the observation results as shown in the following table.

Table 5. Observation Results

No	Name	Total Score	Percentage	Category
1	Student 1	20	83%	Very Active

No	Name	Total Score	Percentage	Category
2	Student 2	24	100%	Very Active
3	Student 3	20	83%	Very Active
4	Student 4	17	71%	Active
5	Student 5	24	100%	Very Active
6	Student 6	19	79%	Active
7	Student 7	24	100%	Very Active
8	Student 8	24	100%	Very Active
9	Student 9	24	100%	Very Active
10	Student 10	24	100%	Very Active
11	Student 11	20	83%	Very Active
12	Student 12	24	100%	Very Active
13	Student 13	19	79%	Active
14	Student 14	20	83%	Very Active
15	Student 15	17	71%	Active
16	Student 16	24	100%	Very Active

$$\text{Percentage} = \left(\frac{\text{(score value obtained)}}{\text{(maximum score value)}} \right) \times 100\%$$

Table 6. Class Recapitulation

Categories	Total of Student	Percentage
Very Active (≥80%)	12	75%
Active (60-79%)	4	25%

The results of observations of 16 students showed that the application of multisensory learning strategies successfully increased overall learning participation. The data in the table above reveals that 75% of the students (12 out of 16) achieved the very active category with a score above 80%, of which 7 students even achieved a resounding

achievement with a perfect score of 100% in all aspects of the assessment.

Based on the results of pre-test data obtained from all students, researchers identified a number of students with low reading skills. These students are then used as the subject of research. After being given treatment in the form of learning with multisensory strategies for three days in each school, post-test was conducted again to see the development of students' reading skills. Here are the data obtained from before and after the application of strategi multisensory.

Table 6. Assessment Of Reading Tests

SDN Pegajahan 1

No.	Student Name	Aspect / Indicator Student Assessment											
		Before					After						
		A	B	C	D	E	Number	A	B	C	D	E	Number
1.	Students 1	1	1	1	1	1	5	4	3	3	4	4	20
2.	Students 2	3	3	2	3	2	13	4	5	5	5	5	24
3.	Students 3	3	3	2	1	2	11	5	4	4	3	4	22
4.	Students 4	3	3	3	2	2	13	5	5	4	5	5	24
5.	Students 5	3	3	3	3	4	13	5	5	5	5	5	25
6.	Students 6	2	2	2	2	2	10	4	5	4	4	5	22
7.	Students 7	2	3	2	4	5	16	5	5	5	5	5	25

SDN Pegambiran 1

No.	Student Name	aspect / indicator Student Assessment											
		Before					After						
		A	B	C	D	E	number	A	B	C	D	E	number
1.	Students 1	3	3	1	2	3	11	5	4	4	4	5	24
2.	students 2	3	3	2	3	3	14	4	5	4	4	5	24
3.	students 3	1	3	1	1	1	7	5	4	4	4	3	20
4.	students 4	2	1	1	1	1	6	5	4	4	5	4	22

SDN Sinarancang 1

No.	Name of student	aspects / indicators of Student Assessment											
		Before					After						
		A	B	C	D	E	number	A	B	C	D	E	number
1.	Students 1	3	3	2	2	2	12	5	5	5	5	5	25
2.	students 2	2	2	2	2	2	10	4	4	4	5	5	22
3.	students 3	2	2	2	2	2	10	5	5	4	4	5	22
4.	Students 4	1	1	1	1	1	5	4	4	4	4	4	20
5.	Students 5	3	3	3	3	3	15	5	5	5	5	5	25

Description Assessment Indicators:

- A = Accuracy Voiced Writing
- B = Accuracy Pronunciation
- C = Reading Fluency
- D = Clarity Of Reading
- E = Accuracy Intonation

Description Scoring:

- 5 = Very Precise
- 4 = Precise
- 3 = Quite Precise
- 2 = Less Precise
- 1 = Not Very Precise

Based on the assessment results of the reading test assessment table applied in three elementary schools, showed that the application of multisensory strategies contributed significantly to improving students' reading skills. Assessment of students' reading ability refers to five indicators according to (Safari, 2019), namely: accuracy of voicing writing, accuracy of pronunciation, reading fluency, reading clarity, and intonation accuracy. With a multisensory approach that involves visual, auditory and kinesthetic aspects, students are not only helped in recognizing letters and words, but also more easily understand the structure and meaning of reading as a whole, thus having an impact on improving grades in each of these assessment indicators.

Multisensory strategies utilize various media and learning approaches that involve the senses, such as touching embossed letters, touching cats directly, listening to sounds, seeing pictures, composing words, and repeating the sounds and rhythms of words in the form of songs or games (Surtikayati & Ritonga, 2023).

To strengthen the results of these findings, statistical analysis was conducted using paired sample t-test. The results of the study in the three schools showed a big difference between the results of pre-test and post-test:

Table 7. Result Pretest dan Posttest

Components	of the average score for the application of multisensory strategies in differentiated			
	classes Pegajahan 1	Pegambiran 1	Sinarancang 1	number of average
	Classes 3	Class 3	Class 3	
number of students	7	4	5	
Mean				
Pretest	46.29	38.00	41.60	41.96
Posttest	92.57	90.00	91.20	91.26
Difference	46.28	52.00	49.60	49.29

Indonesian language learning at the primary and secondary education level according to focuses on developing literacy skills (language and thinking) as a basis for learning and working. Indonesian language subjects at the primary and secondary education levels aim to form and increase students' self-confidence as communicators, critical-creative-imaginative thinkers, and become Indonesian citizens who are skilled in digital literacy and information (Kusmana, 2024).

The results showed that multisensory learning strategies applied in differentiated classes significantly improved the reading ability of students who experienced reading delays. Just as students who used to read in reverse, such as the letter "b" with "d" or the letter "m" with "n", separating letters with almost the same sound, the letters "f", "v" and "p" are now more able to distinguish letters by looking at pictures and letters using flashcards, touching letters using puzzles, and listening to audio (Nursanti et al., 2020). Students who previously had difficulty reading words containing diagraphs or double consonants such as ng, ny, kh, and sy, as well as diphthongs such as ai, au, and oi. When reading, there are often missed letters in each word, reading is not fluent, letter pronunciation is still stammering, and there are still difficulties in combining letters into one whole word (Suchyadi, 2022). Now the student can read more fluently and confidently, because this multisensory strategy involves various senses and learning styles, namely visual, auditory, and kinesthetic (Ani et al., 2022). In the implementation of learning, visual learning style is applied by showing learning videos about pets and wild animals, as well as showing concrete media in the form of pets such as cats. Students are asked to name the animals displayed and classify whether including pets or wild animals.

In auditory learning style, students listen to the sounds of pets and wild animals, then asked to imitate these sounds and guess the type of animal based on the sounds heard. Meanwhile, in the kinesthetic learning style, students actively participated through word-building activities using flashcards and puzzles, and interacting directly with pets. For example, students compose the word "cat" by selecting the correct letters from a flashcard, then touch the cat directly and express their feelings, including explaining the texture of the fur and how to care for the animal.

At the time of the implementation of learning, the majority of students are directly and actively involved in learning activities, they not only follow the teacher's instructions, but also take the initiative to try, ask questions, and discuss. This activity can be seen from the way they interact with teaching materials, Learning media, and with their friends in group activities. Although there are some students who may seem passive or hesitant at first, the varied and fun multisensory strategies manage to gradually awaken their self-confidence and enthusiasm for learning. At the time of the implementation of learning, the majority of students are directly and actively involved in learning activities, they not only follow the teacher's instructions, but also take the initiative to try, ask questions, and discuss. This activity can be seen from the way they interact with teaching materials, Learning media, and with their friends in group activities. Although there are some students who may seem passive or hesitant at first, the varied and fun multisensory strategies manage to gradually awaken their self-confidence and enthusiasm for learning.

In the learning process, they not only listen to the teacher's directions, but also take the initiative to conduct experiments, ask questions, and discuss. This involvement can be seen in the way they communicate with subject matter, learning tools, and with their peers in group activities. Although some students may appear passive or hesitant at first, the application of diverse and fun multisensory strategies can slowly increase their self-confidence and motivation to learn. Based on observations made during the learning process, students showed a fairly high level of participation (Inayah, 2020). Only a few students appear to be less active, usually due to personal factors such as shyness, difficulty in understanding instructions, or still in the process of adjusting to new learning methods. However, through the application of consistent and diverse strategies, less active students began to show increased engagement over time (Mulyawati et al., 2023).

Students who did not want to go to the front of the class, slowly they began to be brave and very enthusiastic to present their learning results in front of class friends (Islami & Ferdianto, 2024). With this activity can help students to feel more confident and also want to show their best, this multisensory strategy proved to be very helpful in creating a pleasant learning atmosphere, so that many students who are usually passive become more lively and confident. In fact, students who were previously less interested in Indonesian lessons now showed positive behavioral changes when this strategy was used. These results are in line with the study (Simanjuntak et al., 2020; Wijaya et al., 2023) which states that multisensory strategies are able to improve reading skills, especially in students with learning barriers. This study also reinforces the results of (Pakpahan & P, 2023) which emphasizes the importance of involving all senses in the process of learning to read early. Based on the results of the study, multisensory strategies proved to be very effective in overcoming students' reading delays. This is indicated by an increase in the significance of reading scores, namely the average pre-test score of 41.96 increased to 91.26 on the post-test with a difference of 49.29. With regression analysis $Y=8.53+2.08 X$ the value of the coefficient of determination R^2 of 0.82 shows that 82% variation of post-test scores can be explained by pre-test scores. Active participation of students is also shown by the observation score of 75% of students in the category of very active during learning, supported by media such as flashcard, puzzle, and direct interaction with concrete objects.

Of the three schools that became the location of the study, SDN Pegambiran 1 showed the most significant and even improvement. This is supported by teachers' readiness to implement multisensory strategies in differentiated classrooms, supportive learning environments, and high student engagement. In contrast, other schools showed slightly lower success, which is likely due to media and implementation time limitations. Supporting factors for the successful implementation of this strategy include teacher readiness, the availability of concrete learning media, and active student participation. However, the constraints found during the implementation are limited time and lack of variety of learning media in some schools, which need to be considered in further implementation.

Thus, the results of this study show that the application of multisensory strategies in learning Indonesian in differentiated classes has been shown to have positive results in improving students' reading skills, especially for those who experience obstacles in reading (Sepsita & Wijaya, 2024). This strategy not only improves student academic achievement, but also contributes to the growth of active participation, self-confidence, and student learning interest (Nurhayati & , Langlang Handayani, 2020). The findings in this study indicate that the application of multisensory strategies tailored to the needs and learning characteristics of each student can encourage the creation of a more responsive and inclusive learning process in the classroom. The implication of this study is the need for teacher training on an ongoing basis and the provision of media that support multisensory learning in order to be widely implemented in primary schools, especially in overcoming the challenges of students who experience delays in reading.

CONCLUSION

Based on the research results, it can be concluded that the implementation of multisensory strategies in Indonesian language learning significantly improves the reading skills of students with reading delays. This is evidenced by a significant increase in pre-test scores from 41.96 to 91.26 in the post-test, a difference of 49.29 points. Furthermore, active student participation was also high, as observed at 75%. This strategy combines visual, auditory, kinesthetic, and tactile approaches tailored to students' learning styles and readiness, creating an adaptive, inclusive, and enjoyable learning experience.

These results align with previous research (e.g., Alwashmi et al., 2024; Suparlan, 2021) showing that multisensory learning is effective in improving basic reading skills. However, this study is novel in systematically combining multisensory strategies with differentiated classrooms in an Indonesian elementary school context, a previously understudied area.

This research also yields practical contributions in the form of validated open modules, learning assessments, and reading tests that can be used immediately by teachers. This strategy not only improves academic abilities but also builds students' self-confidence and motivation to learn. Thus, this research provides theoretical and practical contributions to the development of learning strategies that are more responsive to student needs. For long-term implementation, teacher training and the provision of supporting resources are essential for the consistent and widespread implementation of multisensory strategies in elementary schools. This research is expected to serve as a reference for creating a comprehensive, student-centered, elementary learning system.

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