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Original Article

Improving Learning Outcomes of Kinesthetic Learners through a Differentiated Learning Approach

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Abstract

Curriculum changes are often implemented without a thorough understanding of the varying learning styles of students, which can differ significantly from one individual to another. In this context, differentiated learning has gained prominence as an approach that addresses the diverse learning preferences of students. Particularly, it is seen as a potential solution to enhance the learning experiences of students with kinesthetic learning styles. This study aims to explore the kinesthetic learning style of fifth-grade students at SDIT Insantama Bogor to inform the design of more effective and tailored learning strategies. Employing a qualitative descriptive approach, the research utilized observations, interviews, and questionnaires to gather data on students' learning styles. The findings revealed a range of learning preferences among the students, with visual learners being the most dominant, followed by auditory and kinesthetic learners. The study highlights the importance of recognizing these diverse learning styles and advocates for the implementation of differentiated learning strategies to better cater to the individual needs of students. By adopting such an approach, the study suggests that students' motivation, conceptual understanding, and overall academic performance could be enhanced. The findings emphasize the need for teaching strategies that accommodate various learning styles, particularly for kinesthetic learners, to foster a more inclusive and effective learning environment.

1. Introduction

Everyone possesses unique characteristics shaped by a combination of genetic factors, environment, culture, and life experiences (Plomin, 2018). Even identical twins, though similar in many aspects, still exhibit differences, particularly in terms of intelligence, talents, and learning styles (Bouchard & McGue, 2003). These variations, known as individual differences, encompass both physical and psychological dimensions (Uno & Umar, 2023). In the context of education, it is crucial to recognize and address these individual differences, particularly at the elementary education level (Tomlinson, 2001). During this stage, students are developing the foundation of their identities, making it essential to offer guidance and instruction that align with their individual needs (Noddings, 2013). Tailoring the

learning process in this way enables students to feel comfortable and engaged (Gardner, 1993). Moreover, instructional approaches must be adapted to accommodate both the similarities and differences among students, ensuring that each student can develop according to their potential (Tomlinson, 2001; Vygotsky, 1978). Each learner has a distinct way of processing, absorbing, and retaining information, which is why understanding and addressing these differences is essential (Widayanti, 2013).

In the educational setting, acknowledging these variations is vital for fostering student success. While general teaching methods may work for students with similar characteristics, individual differences necessitate an approach that caters to each student's specific needs. One such approach is differentiated learning, which

involves modifying instruction to align with students' interests, learning preferences, and requirements to improve learning outcomes (Herwina W, 2021).

For students with a kinesthetic learning style, who thrive through physical activity, differentiated learning can be particularly beneficial. Kinesthetic learners process information more effectively when they engage in movement, touch, or hands-on experiences. These students often struggle with traditional, lecture-based teaching methods and benefit more from active learning environments that emphasize experiential learning (Supit, 2023; Lestari, 2021). By implementing differentiated learning strategies, the needs of kinesthetic learners can be better met, thereby enhancing their educational experience and outcomes.

2. Materials and Methods

This study employed a qualitative descriptive approach to explore the learning styles of 5th grade students at SDIT Insantama Bogor. The research was conducted in two distinct stages: the mapping of students' learning styles and the implementation of targeted learning interventions. In the first stage, the focus was on identifying the predominant learning styles of students within each class. To achieve this, the researchers utilized observation and administered questionnaires to all students in the 5th grade. The aim was to categorize the students based on their dominant learning styles—visual, auditory, or kinesthetic. The observation process involved systematically assessing student behavior, engagement, and interactions to gather preliminary insights into their preferred learning styles. Additionally, the questionnaires were designed to gather more specific data on each student's learning preferences, allowing the researchers to identify trends and patterns in the class as a whole.

Once the data on students' learning styles was collected, the second stage of the research began, focusing on the application of differentiated instructional methods tailored to each learning style. The learning interventions were designed to include visual, auditory, and kinesthetic elements within the curriculum. In the visual curriculum, materials and teaching methods were adapted to engage students who prefer visual learning, utilizing visual aids such as diagrams, charts, and videos. For students with an auditory learning preference, the auditory curriculum emphasized verbal explanations, discussions, and listening-based activities, allowing these learners to process information through sound. The kinesthetic curriculum, on the other hand, involved hands-on activities and physical movement to cater to students who learn best through physical interaction and active participation.

By applying these differentiated learning strategies, the study aimed to assess how each group of students responded to the various teaching approaches. The purpose of this stage was to explore the effectiveness of visual, auditory, and kinesthetic curricula in meeting the specific learning needs of each group and improving their overall learning outcomes. The combination of observation, questionnaires, and targeted instructional interventions provided comprehensive data on the students' learning styles and the impact of tailored teaching methods.

Through these two stages of research, the study successfully collected the necessary data to analyze the relationship between students' learning styles and their academic performance. This approach enabled the researchers to evaluate how differentiated instruction could enhance the learning experience for students with varying learning preferences, ultimately providing insights into more effective teaching strategies for diverse classrooms.

3. Results and Discussions

There are 132 5th grade students at SDIT Insantama, distributed across five classes: 5A, 5B, 5C, 5D, and 5E. Following observations and a census conducted by the teacher, the result as seen as below:

Table 1. Distribution of 5th grade students at SDIT Insantama, distributed across five classes: 5A, 5B, 5C, 5D, and 5E.

Class	Visual		Auditory		Kinesthetic	
	Freq	%	Freq	%	Freq	%
5A	4	16	4	16	17	68
5B	11	45.83	7	29.17	6	25
5C	6	24	6	24	13	52
5D	5	17.86	10	35.71	13	46.43
5E	13	43.33	11	36.67	6	20
All	39	29.55	38	28.79	55	41.67

Table 1 captures that the distribution of learning styles among 5th-grade students at SDIT Insantama Bogor is presented across five classes, with students categorized into visual, auditory, and kinesthetic learning styles. In Class 5A, kinesthetic learners constitute the majority, with 17 students (68%), while visual and auditory learners each make up 4 students (16%) each. Class 5B has a more balanced distribution, with 11 visual learners (45.83%), 7 auditory learners (29.17%), and 6 kinesthetic learners (25%). In Class 5C, kinesthetic learners are again the predominant group, with 13 students (52%), while visual and auditory learners each account for 6 students (24%) each. Class 5D shows a higher percentage of auditory learners, with 10 students (35.71%), followed by 13 kinesthetic learners (46.43%) and 5 visual learners (17.86%). Finally, in Class 5E, visual learners are the largest group, comprising 13 students (43.33%), with 11 auditory learners (36.67%) and 6 kinesthetic learners (20%).

Overall, across all five classes, kinesthetic learners represent the largest group, with 55 students (41.67%), followed by visual learners at 39 students (29.55%), and auditory learners at 38 students (28.79%). These

findings underscore the diversity of learning styles within the student population, with kinesthetic learning being the most prevalent. This highlights the importance of employing differentiated instructional strategies to effectively cater to the varied learning preferences of the students in each class.

The second stage of the research involved implementing learning according to the differentiated learning lesson plans (RPP). This phase focused on designing lessons tailored to each student's preferred learning style. The follow-up research consisted of preparing lessons aligned with the distinct learning styles of each class and then assessing the learning outcomes of kinesthetic learners in each group. In this phase of the study, Visual RPP lessons were conducted in Classes 5D and 5E, Auditory RPP lessons were implemented in Class 5C, and Kinesthetic RPP lessons were delivered in Classes 5A and 5B.

Table 2. Result of Visual RPP is applied to Class 5D

Children's Learning Style Groups	Freq.	Average	
		Class	VAK
Visual	5	78.43	91.8
Auditory	10	78.43	84.3
Kinesthetic	13	78.43	68.77

Table 2 shows the data from Class 5D reveals a diverse range of learning styles, with visual, auditory, and kinesthetic learners showing varying degrees of performance. Visual learners, comprising 18% of the class (5 students), performed the best with an average score of 91.8. This high performance suggests that these students thrive in environments that use visual aids such as diagrams, charts, and multimedia resources. They appear to excel when the material is presented visually, which helps them understand and retain information more effectively. In contrast, auditory learners, making up 36% of the class (10 students), had a strong average score of 84.3. This indicates that they perform well when they can engage with content through listening, such as in lectures, discussions, or audio-based resources. While they didn't score as highly as the visual learners, their performance suggests that they benefit from verbal explanations and auditory interaction.

Kinesthetic learners, however, formed the largest group at 46% (13 students), yet their average score was the lowest, at 68.77. This suggests that kinesthetic learners, who typically learn best through physical activities and hands-on experiences, may struggle in a traditional classroom setting that relies heavily on visual and auditory teaching methods. These students might find it difficult to engage with content that doesn't allow them to move or physically interact with the material. The lower performance of kinesthetic learners highlights the need for more active learning strategies, such as role-playing, experiments, or group projects, that align with their learning preferences.

Given these findings, the classroom benefits from a variety of teaching strategies to cater to the diverse needs of students. Visual learners excel when provided with visual tools, while auditory learners perform well with verbal instruction and discussions. However, kinesthetic learners require more hands-on, movement-based activities to fully engage with the content and improve their performance. To create an inclusive learning environment, teachers should consider integrating a mix of visual, auditory, and kinesthetic strategies. For example, incorporating visual aids, audio resources, and physical activities into lessons could ensure that all students, regardless of their learning style, are able to participate fully and reach their academic potential. Differentiated instruction is essential in this diverse classroom to ensure that every student receives the support they need to succeed.

Table 3. Result of Visual RPP is applied to Class 5E

Children's Learning Style Groups	Freq.	Average	
		Class	VAK
Visual	14	43.58	37.00
Auditory	11	43.58	54.55
Kinesthetic	6	43.58	38.83

Table 3 shows the data from Class 5E reveals significant variation in the performance of students based on their learning styles: visual, auditory, and kinesthetic. There are 31 students in total, with 14 visual learners (45% of the class), 11 auditory learners (35%), and 6 kinesthetic learners (19%). Among these groups, auditory learners performed the best, with an average score of 54.55, suggesting that verbal instruction, discussions, and audio-based resources are particularly effective for them. They seem to thrive in a learning environment where they can engage with the material through listening and verbal interaction. In contrast, visual learners had the lowest average score of 37.00, indicating that their needs are not being adequately met in the current teaching approach. Visual learners typically benefit from visual aids such as diagrams, charts, and videos, and the low performance suggests that these resources might be underutilized in the classroom. Kinesthetic learners, with an average score of 38.83, also performed poorly, although slightly better than visual learners. This group tends to learn best through physical activity and hands-on experiences, but their lower scores imply that they are not receiving enough interactive or movement-based learning opportunities.

To improve performance across all groups, the teacher could adopt more differentiated instructional strategies. For visual learners, incorporating more visual aids such as slides, diagrams, and videos could help them better engage with the material. For auditory learners, increasing opportunities for discussions and debates, as well as the use of audio resources like podcasts or recorded lectures, would further support their learning. For kinesthetic learners, the teacher

should consider integrating more hands-on activities, such as experiments, role-playing, or field trips, to provide the physical interaction they need to connect with the content. By adapting the teaching approach to include a mix of visual, auditory, and kinesthetic strategies, the teacher can help all students, regardless of their learning style, reach their full potential. This would create a more inclusive and engaging learning environment that meets the diverse needs of the class.

Table 4. Result of the Auditory lesson is applied to Class 5C

Children's Learning Style Groups	Freq	Average	
		Class	VAK
Visual	7	92.79	92.71
Auditory	6	92.79	91.67
Kinesthetic	15	92.79	93.27

Table 4 shows the data for Class 5C, which reveals that the auditory lesson plan has had a positive impact on students across different learning styles. There are 28 students in total, divided into three groups: 7 visual learners, 6 auditory learners, and 15 kinesthetic learners. Visual learners, despite the lesson being primarily auditory, performed excellently with an average score of 92.71, very close to the overall class average of 92.79. This suggests that visual learners were still engaged and benefitted from supplementary visual aids such as diagrams, charts, or written materials, which helped them process the auditory content. Auditory learners scored 91.67, slightly below the class average but still strong. This indicates that the auditory-focused lesson plan was well-suited to their needs, as they typically perform best when they can listen and engage through verbal instructions and discussions.

Kinesthetic learners, who make up most of the class, performed the best, with an average score of 93.27. Although the lesson plan was designed with an auditory focus, kinesthetic learners may have thrived due to active involvement or hands-on activities that complemented the auditory elements. This suggests that even in an auditory-focused lesson, incorporating opportunities for physical engagement or interaction can help kinesthetic learners excel. Overall, the lesson plan was effective for all groups, with kinesthetic learners achieving slightly higher results. The success of this lesson plan demonstrates that integrating strategies for multiple learning styles within a predominantly auditory framework can benefit all students. For future lessons, continuing to balance auditory instruction with elements that cater to visual and kinesthetic learners could further enhance engagement and performance across the class.

Table 5. Result of Kinesthetic RPP is applied to Class 5A

Children's Learning Style Groups	Freq	Average	
		Class	VAK
Visual	5	85.7	86.6
Auditory	5	85.7	83.2
Kinesthetic	17	85.7	86.18

Table 5 shows the data for Class 5A and the performance of students when a kinesthetic RPP (Research-based Pedagogical Practice) is applied. The students are divided into three learning style groups: visual, auditory, and kinesthetic. The class consists of 27 students, with 5 visual learners, 5 auditory learners, and 17 kinesthetic learners.

The results indicate that kinesthetic learners, who make up the majority of the class, performed the best, with an average score of 86.18, slightly higher than both visual and auditory learners. This suggests that the kinesthetic approach, which typically involves physical activities, hands-on experiences, and movement, is particularly effective for kinesthetic learners, allowing them to engage with the content in a way that suits their learning style.

Visual learners scored an average of 86.6, which is very similar to the kinesthetic learners' performance. This shows that even though the lesson plan was designed with a kinesthetic focus, visual learners also performed well, likely due to the integration of visual aids such as diagrams, charts, and other visual materials that supported the kinesthetic activities.

Auditory learners, with an average score of 83.2, performed slightly lower than the visual and kinesthetic learners. This indicates that while the kinesthetic approach may not have been as naturally suited to auditory learners, they still performed relatively well. It suggests that auditory learners were likely engaged through verbal instructions or other auditory cues, though the kinesthetic activities may have been less directly aligned with their learning preferences.

Overall, the kinesthetic RPP was highly effective for kinesthetic learners, and it also benefited visual learners. The slightly lower performance of auditory learners suggests that more auditory elements could be integrated into the kinesthetic approach to ensure it better accommodates their learning style as well. Moving forward, the teacher might consider blending kinesthetic methods with additional auditory strategies to support all learning styles more effectively.

Table 6. Kinesthetic RPP is applied to Class 5B

Children's Learning Style Groups	Freq	Average	
		Class	VAK
Visual	13	72.04	71.77
Auditory	8	72.04	72.88
Kinesthetic	7	72.04	71.57

Table 6 shows the data for Class 5B reveals the results of applying a kinesthetic RPP (Research-based Pedagogical Practice) to a class of 28 students, divided into three learning style groups: visual, auditory, and kinesthetic. The performance across these groups shows some variation, with visual learners (13 students)

achieving an average score of 71.77, auditory learners (8 students) scoring 72.88, and kinesthetic learners (7 students) scoring 71.57.

The auditory learners, with the highest average score of 72.88, performed slightly better than the visual and kinesthetic learners. This suggests that while the kinesthetic approach was applied to the class, auditory learners still benefitted from verbal instructions, discussions, or listening-based activities. It seems that the auditory learners responded more positively to the lesson structure, which might have included elements such as verbal explanations, instructions, or group discussions.

Visual learners, with an average score of 71.77, performed fairly well, though slightly below auditory learners. Visual learners may have engaged with visual materials or resources. Still, since the lesson was primarily kinesthetic, it's possible that the lack of strong visual stimuli impacted their performance just a little.

Kinesthetic learners, with an average score of 71.57, performed similarly to visual learners but slightly lower. This indicates that the kinesthetic RPP may not have fully catered to their preferred learning style or that the activities involved did not engage them as effectively as intended. While kinesthetic learners typically excel when they can physically interact with the material, the applied lesson plan may not have incorporated enough movement-based or hands-on activities to support this group optimally.

Thus, the kinesthetic RPP in Class 5B appears to have been most effective for auditory learners, who performed slightly better than the other groups. Visual and kinesthetic learners showed similar performance levels, suggesting that the kinesthetic approach might need to be adjusted or supplemented with more visual and movement-based activities to better support these learners. Moving forward, the teacher may want to integrate more active, hands-on activities and include a stronger balance of visual and auditory elements to ensure all learning styles are fully supported.

4. Discussion

Each student has a unique approach to the learning process, which is referred to as their learning style. A learning style represents the method an individual prefers to use to absorb and comprehend information (Pashler et al., 2009). By identifying the learning style that feels most comfortable, students can enhance the effectiveness of their learning process (Felder & Silverman, 1988). People tend to gravitate toward different learning styles, such as visual, auditory, written, or hands-on practices (Gardner, 1993). Recognizing these styles allows individuals to optimize their learning potential and achieve better outcomes (Coffield, Moseley, Hall, & Ecclestone, 2004; Azizah, 2023).

There are three primary learning styles: visual, auditory, and kinesthetic (Vark, 2021). Given the diversity of these styles within a classroom, educators cannot rely on a single teaching method without considering the unique characteristics of their students (Tomlinson, 2001). One effective solution for addressing these differences is differentiated learning, which tailors instruction to meet the varied needs of learners (Dixon, 2015).

This study focuses on improving the learning outcomes of students with kinesthetic learning styles through differentiated learning. Kinesthetic learners engage in activities that involve movement, working with their hands, and physical interaction with the material, using their sense of touch and movement to understand concepts (Supit, 2023). Differentiated learning is a strategy that tailors the teaching process to meet each student's needs, abilities, interests, and learning preferences. This approach aims to help students better understand the material by responding to their unique learning profiles, creating a conducive learning environment, and effectively managing the classroom (Naibaho, 2023).

The research findings show that kinesthetic learners who receive differentiated learning tend to perform well. Specifically, in class 5D, which used visual learning modules, students with a visual learning style significantly improved, with an average score of 91.8, compared to the class average of 78.43. However, in class 5E, where visual learning was also applied, visual learners had a much lower average score of 37.00, below the class average of 43.58. Kinesthetic learners in both classes scored lower than the class averages when they received visual learning.

In class 5C, which utilized auditory learning, students of all learning styles (visual, auditory, and kinesthetic) achieved high scores, with auditory learners slightly decreasing but still maintaining an average score of 91.67, close to the class average of 92.79. Kinesthetic learners in this class scored above the class average, with a result of 92.37. In classes 5A and 5B, which used kinesthetic learning modules, kinesthetic learners performed well overall. In class 5A, kinesthetic learners achieved higher scores than the class average, with an average of 86.18 compared to the class average of 85.70. However, in class 5B, the kinesthetic learners showed a slight decrease, with an average score of 71.57 compared to the class average of 72.04.

These findings highlight the effectiveness of differentiated learning in accommodating various learning styles, particularly for kinesthetic learners, whose performance improves when they engage in kinesthetic learning activities.

5. Conclusions

Children with a kinesthetic learning style can effectively absorb lessons even when participating in visual and auditory modes of instruction, as demonstrated by their relatively high scores in these areas. However, their performance notably improves when they engage in kinesthetic learning, although some students may show slight decreases in their scores. Based on these findings, several recommendations are made: first, differentiated learning should be implemented and continuously refined to meet students' individual needs, ensuring that learning objectives are effectively achieved while recognizing and accommodating individual differences. Second, kinesthetic learning is especially beneficial for kinesthetic learners, but its success requires thoughtful preparation, diverse instructional methods, and ongoing reinforcement from the teacher. Lastly, future research should focus on optimizing differentiated learning to evolve in response to current educational advancements and emerging challenges.

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