



## Analysis of differentiated learning with problem-based learning model to improve learning activity

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### ABSTRACT

Elementary school learning often fails to optimally accommodate students' learning styles, potentially hindering their participation and comprehension. This study aims to analyze the implementation of differentiated learning based on learning styles through the Problem-Based Learning (PBL) model to improve students' learning activity in primary education. A descriptive qualitative approach was employed, involving a teacher and sixth-grade students from SDN 104246 Jati Baru as research subjects. Data were collected through observation, interviews, and documentation, and analyzed descriptively using data reduction, data display, and conclusion drawing. The findings indicate that implementing differentiated learning strategies with the PBL model enhances students' active participation, confidence, and responsibility throughout the learning process. Student engagement increased when the instruction was tailored to their individual learning styles: visual, auditory, or kinesthetic. Furthermore, the teacher reported greater ease in managing the class fairly and adaptively. These results demonstrate that the integration of differentiated learning and the PBL model is not only theoretically relevant but also empirically effective in fostering inclusive and meaningful learning. The study recommends continuous teacher training in applying differentiation strategies and developing contextual, flexible instructional materials.

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### ABSTRAK

Pembelajaran di tingkat sekolah dasar dengan gaya belajar peserta didik sering kali belum diakomodasi secara optimal, sehingga berpotensi menghambat partisipasi dan pemahaman mereka. Penelitian ini bertujuan untuk menganalisis penerapan pembelajaran berdiferensiasi berbasis gaya belajar dengan model Problem Based Learning (PBL) dalam meningkatkan aktivitas belajar peserta didik sekolah dasar. Pendekatan yang digunakan adalah kualitatif deskriptif dengan subjek penelitian terdiri dari guru dan peserta didik kelas VI SDN 104246 Jati Baru. Teknik pengumpulan data mencakup observasi, wawancara, dan dokumentasi, sedangkan analisis data dilakukan secara deskriptif melalui reduksi, penyajian data, dan penarikan kesimpulan. Hasil penelitian menunjukkan bahwa penerapan strategi pembelajaran berdiferensiasi dengan model PBL mampu meningkatkan partisipasi aktif, rasa percaya diri, dan tanggung jawab peserta didik selama proses pembelajaran berlangsung. Peserta didik menunjukkan keterlibatan yang lebih tinggi ketika pembelajaran disesuaikan dengan gaya belajar mereka, baik visual, auditori, maupun kinestetik. Selain itu, guru juga merasakan kemudahan dalam mengelola kelas secara adil dan adaptif. Temuan ini menunjukkan bahwa integrasi pembelajaran berdiferensiasi dan model PBL tidak hanya relevan secara teoritis, tetapi juga efektif secara empiris dalam menciptakan pembelajaran yang inklusif dan bermakna. Penelitian ini merekomendasikan perlunya pelatihan guru dalam menerapkan strategi diferensiasi serta pengembangan perangkat ajar yang kontekstual dan fleksibel.

**Kata Kunci:** aktivitas belajar; gaya belajar; pembelajaran berdiferensiasi; pembelajaran berbasis masalah

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## INTRODUCTION

Education plays a strategic role as the primary foundation for shaping a generation of learners who are adaptable to the challenges of the 21st century. The quality of learning is greatly influenced by teachers' ability to design strategies responsive to students' diverse learning needs (Amelia *et al.*, 2025). Learning practices, such as lectures and memorization, which still dominate, are no longer effective at stimulating active student participation and often ignore individual learning style differences. The imbalance between the learning approach and the characteristics of students results in low engagement and suboptimal learning outcomes, as evidenced by previous studies, which state that a homogeneous approach to heterogeneous students tends to hinder meaningful learning processes (Sunedi & Syaflin, 2024).

The need for learning innovations that are oriented towards student diversity is becoming increasingly prominent (Setiawan *et al.*, 2024). Differentiated learning has proven effective in addressing this challenge, as it enables teachers to adapt methods, materials, and media to students' readiness and learning styles (Agustiana *et al.*, 2023). The effectiveness of this approach is evidenced by research showing a significant increase in student motivation and learning activity following the implementation of differentiation strategies (Zulaiha *et al.*, 2024). The application of learning strategies that consider individual learning preferences has also been shown to have an effect on increasing student engagement and academic achievement.

The implementation of differentiated learning in elementary schools remains suboptimal because teachers find it difficult to understand and adapt to approaches that are appropriate to students' readiness, interests, and learning styles. The dominance of the teacher-centered approach limits students' active involvement, resulting in low levels of questioning, discussion, and expression of opinions (Gheysens *et al.*, 2022; Rahmah *et al.*, 2022). The mismatch between the learning approach and students' learning needs is the main cause of low student activity (Kusumasari *et al.*, 2024). The Problem-Based Learning (PBL) model, when integrated with differentiated learning, is a strategic approach to enhancing students' engagement with the material. PBL enables the exploration of knowledge through contextual problem-solving, encouraging intellectual, emotional, and social engagement (Khairani *et al.*, 2023; Widyatama *et al.*, 2024). This integration creates learning that is not only active but also personalized and relevant to individual needs (Mulyasari *et al.*, 2022; Zhao *et al.*, 2020).

Previous studies have shown that integrating differentiated learning with PBL improves student learning outcomes, engagement, and skills by tailoring content, processes, and products to visual, auditory, and kinesthetic learning styles. The application of differentiated learning-based PBL in biology subjects has been shown to improve students' collaboration skills (Afelia *et al.*, 2023). The application of PBL with content and process differentiation in the third-grade elementary school sub-theme resulted in higher learning outcomes, categorized as high (Rohmah *et al.*, 2023). The integration of PBL with differentiated instruction based on visual, auditory, and kinesthetic learning styles increased students' average scores (Sakti & Luthfiyah, 2024). The application of differentiated learning through the PBL model can accommodate differences in students' learning needs and foster enthusiasm and active participation from beginning to end (Sarief, 2022).

However, previous studies have limitations in terms of pre-experimental design, narrow scope, and lack of comprehensive integration of both approaches in elementary school IPAS learning. The Merdeka Curriculum places IPAS as a vehicle for developing scientific, empathetic, and community-based thinking. The multidisciplinary nature of IPAS requires contextual and interactive learning to enable students to relate scientific concepts to social realities (Azzahra *et al.*, 2023). IPAS learning is ineffective if it relies solely on lectures or memorization (Wahyudi *et al.*, 2023). An innovative approach that combines PBL and differentiation is crucial for active, creative, and reflective student engagement (Dwipranoto *et al.*, 2023;

Sari & Maemonah, 2024). This study makes an original contribution by integrating differentiated learning strategies based on learning styles with PBL within the IPAS context for sixth-grade elementary school students. The novelty lies in applying content, process, and product differentiation based on visual, auditory, and kinesthetic learning styles, systematically organized across PBL stages. This integrated model was selected as a potential solution to address low levels of student learning activity and is expected to create a meaningful, active, and relevant learning experience tailored to individual needs (Rosiyani *et al.*, 2024).

The learning conditions at SDN 104246 Jati Baru reveal a clear gap between the curriculum's idealism and classroom practice. The students' learning activities in IPAS remain in the low category. The learning process remains teacher-centered, and students tend to be passive in expressing their opinions, asking questions, and participating in discussions. Based on initial observations of sixth-grade students, only 35% met the Minimum Completion Criteria (KKM), while the rest fell short of the set achievement standard. This phenomenon reinforces the assumption that conventional learning approaches have not accommodated the diversity of student learning styles (Shegefandini *et al.*, 2025). The low level of active participation in the learning process indicates the need to shift methods towards participatory, contextual, and adaptive models.

This study aims to analyze how the design and implementation of differentiated learning, based on visual, auditory, and kinesthetic learning styles, combined with the PBL model, can improve sixth-grade students' learning activities in IPAS. The results of this study are expected to enrich the literature on the development of innovative learning strategies that support the diversity of elementary school students and to provide a theoretical and practical foundation for implementing more effective and inclusive learning.

## LITERATURE REVIEW

### Differentiated Learning

Differentiated learning is an instructional approach that adapts instruction to students' readiness, interests, and learning styles to create relevant and personalized learning experiences (Purba *et al.*, 2023). This strategy emphasizes variation in learning content, processes, and products according to individual needs. Content differentiation involves presenting material across multiple media, such as text, video, and interactive visuals, whereas process differentiation is achieved through tiered activities and grouping by learning styles (Amalia *et al.*, 2023; Widyawati, 2023). Learning products can also vary, including posters, reports, and presentations tailored to students' strengths (Mahendra *et al.*, 2024). The success of implementing this strategy depends on initial diagnostic assessments and teachers' ability to comprehensively map students' needs (Herwina, 2021; Viqri *et al.*, 2024). Before implementing an innovation such as differentiated learning, it is essential to assess the school's readiness to adopt it (Hadi & Wahyudin, 2024). All of these approaches align with the spirit of Merdeka Belajar (Freedom of Learning), which views students as unique individuals in the educational process (Agusta *et al.*, 2024; Sakliressy, 2023). Differentiated learning is a strategy that adapts learning content, processes, and products to learners' characteristics, making the learning experience relevant, personalized, and student-centered. Its successful implementation depends on initial diagnostic assessments and teachers' ability to comprehensively map learning needs.

### Learning Style

Learning styles are cognitive characteristics that determine how learners receive, process, and store information during learning. Learning styles can be classified into three main types: visual, auditory, and kinesthetic. Visual learners tend to understand material through visual media such as images, colors, concept maps, and instructional videos (Maharani et al., 2023; Nuryati & Nceong, 2024). Auditory learners are more responsive to information conveyed verbally, whether through teacher explanations, group discussions, or audio recordings (Dewanti et al., 2024). Kinesthetic learners prefer learning through physical activities and hands-on practice, such as experiments, educational games, or concrete teaching aids (Azzahra & Darmiyanti, 2024). Learning strategies that accommodate variations in learning styles have been shown to improve retention, conceptual understanding, and learning motivation among students (Hasanah et al., 2021; Samawi et al., 2022). Teachers play a crucial role in identifying students' learning profiles through diagnostic assessments and in designing adaptive, participatory learning activities based on these tendencies. Aligning learning approaches with students' learning styles creates a more meaningful and enjoyable learning process.

### ***Problem-Based Learning***

The Problem-Based Learning (PBL) model is a learning approach that uses authentic problems as a starting point for developing critical thinking, collaboration, and problem-solving skills. This process positions learners as active subjects, encouraging them to explore information, formulate solutions, and build knowledge through direct, contextual experiences (Salsabila & Muqowim, 2024; Widyatama et al., 2024). The main characteristics of PBL include the use of real-world problems, the integration of various disciplines, and an experiential approach, which has been shown to increase learners' emotional and cognitive engagement (Mardani et al., 2021).

Teachers act as facilitators who guide the learning process without dominating it, providing support for exploration and fostering a collaborative, reflective learning environment. The PBL stages, which consist of problem orientation, data collection, solution development, and presentation of results, provide space for students to think logically, develop arguments, and actively work together in groups (Firsty & Rosmiati, 2024; Imami et al., 2025). The full involvement of students in this process strengthens their sense of responsibility, increases their confidence, and encourages independent learning (Rahmawati et al., 2025).

The application of PBL in IPAS learning is highly relevant because it can bridge the scientific and social aspects in real-life contexts. Thematic IPAS material requires students to critically analyze natural and social phenomena. The integration of PBL with differentiated learning enables the adaptation of learning strategies to each student's learning style, thereby optimizing participation in problem-solving (Indriani et al., 2025). This strategy not only improves the quality of cognitive and social interactions but also provides space for fairness in learning and fosters continuous intrinsic motivation.

## **METHODS**

This study employs a descriptive qualitative approach to examine in depth the process of implementing differentiated learning based on learning styles through the PBL model. This approach was chosen to explore the naturalistic learning activities of students and teacher responses in a real classroom context, as described by Creswell and Poth in 2023 in their book entitled "Qualitative Inquiry and Research Design: Choosing Among Five Approaches". The subject determination technique used purposive sampling with the following criteria: 1 sixth-grade teacher who implemented PBL-based differentiated learning and 18 students who participated in the learning process. Additional informants, comprising 1 expert in basic education and development, were also purposively selected based on their expertise in the field (Friday & Leah, 2024).

Data collection instruments include observation and interview guidelines, as well as documentation sheets, all developed in accordance with the research focus. The observation guidelines were designed to identify student learning activities in differentiated learning based on learning styles and the PBL model, covering indicators of physical involvement, emotional involvement, participation in discussions, and responses to learning tasks. The interview guidelines aim to explore the perceptions of teachers, principals, and experts regarding the implementation of learning, with a focus on differentiation implementation strategies, PBL stages, and the challenges and impacts on student motivation and learning activities. Documentation sheets are used to record visual and administrative evidence, such as photographs of activities, lesson plans, and records of student learning outcomes, to support data from observations and interviews. The content validity of all instruments was established through expert judgment, with indicators assessed for relevance to the research objectives and focus (Elangovan & Sundaravel, 2021).

The research procedure consists of several systematic stages. This research procedure begins with a preparation stage that includes developing research instruments and mapping the activity schedule with the school. Subsequently, data are collected through direct observation of learning activities, in-depth interviews with participants such as teachers, principals, and education experts, and documentation of the activities and learning tools used. All collected data are systematically analyzed and reported in a descriptive narrative to illustrate the dynamics of implementing PBL-based differentiated learning comprehensively and meaningfully. The research was conducted from March 2025 to May 2025.

Data analysis was conducted descriptively and qualitatively through the stages of data reduction, initial coding, grouping into categories, data presentation, and conclusion drawing. Coding was performed manually by labeling quotations and narratives according to predetermined categories. Each coded data point was verified through triangulation between sources and methods to improve validity. The final step in the conclusion was conducted inductively by examining relationships among categories and formulating findings that reflected empirical conditions in the field. This procedure aimed to systematically identify thematic patterns from field data. Data credibility is strengthened through triangulation of sources and methods, namely by comparing the results of observations, interviews, and documentation, and by cross-checking data from students, teachers, and experts.

## RESULTS AND DISCUSSION

### Student Engagement

The learning process showed a significant increase in student engagement following the implementation of a differentiated learning strategy based on learning styles within the PBL model. Observations in April 2025 noted that most students appeared active in the group learning process. Student activities included discussions, answering teachers' questions, and developing solutions based on contextual problems. The observation notes also indicated that students with visual learning styles tended to use pictures and colors to understand the questions; auditory learners were observed actively listening and repeating the teacher's explanations; and kinesthetic learners were enthusiastic when asked to arrange concrete objects during problem-solving activities, as shown in **Figure 1**.



**Figure 1.** Learning Process of Auditory Learners  
Source: Research 2025

The participants' statements reinforce the observational data. The teacher said,

*“Yes, ma'am, the impact of the PBL model can be seen from their learning process, where students appear active and enthusiastic about solving the problems they face”* (Teacher, Personal Communication, April 2025).

The principal revealed that this approach provides a more interactive, context-based learning environment for students.

*“Linking or combining these two approaches will provide a meaningful learning experience that is relevant to the daily lives of students”* (Principal, Personal Communication, April 2025).

The expert also added,

*“This PBL model is excellent at stimulating students' critical thinking. They don't just receive information, but also devise their own strategies to solve problems”* (Expert, Personal Communication, April 2025).

The consistency of findings across all three sources reinforces the belief that this strategy not only encourages learning activities in general but also enables students to play an active role in learning, depending on their characteristics. Documentary evidence, in the form of photographs of student activities and group work, supports the field findings, demonstrating a lively and collaborative classroom atmosphere. The triangulation of observations, interviews, and documentation reinforces the validity of the data that student engagement increases due to the alignment between the learning approach and each individual's learning profile.

## **Student Confidence**

Significant changes were also seen in students' confidence after implementing differentiated learning based on learning styles through the PBL model. Observations showed that students began to express their opinions, ask questions, and present the results of group discussions. These activities were not seen in the learning process before the intervention, where students tended to be quiet and passive. The courage of students in responding to teachers' questions and participating in discussions shows a gradual increase in self-confidence, developed through learning experiences aligned with their learning styles.

The teacher said that students had changed their behavior, becoming more courageous in speaking up in class.

*“In the past, many of the children were passive, but now they are fighting to answer my questions,”* (Teacher, Personal Communication, April 2025).

The principal added,

*“There are students who previously did not want to perform at all, but now they are able to give group presentations, even though they are still shy”* (Principal, Personal Communication, April 2025).

This statement was reinforced by an expert who stated,

*“The increase in self-confidence is the result of learning that provides a safe space and is in line with each student's learning style”* (Expert, Personal Communication, April 2025).

This can be seen in **Figure 2**.



**Figure 2.** Students Presenting the Results of Group Discussions  
*Source: Research 2025*

The photo documentation in **Figure 2** shows students enthusiastically presenting the results of their group discussions in front of the class. The video recording of the lesson also captures the moment when several students who had previously been silent began to actively express their opinions during the question-and-answer session. The triangulation of results from observation, interviews, and documentation reveals consistent findings: the PBL model based on learning styles has a positive impact on students' self-confidence. This success cannot be separated from the role of teachers in fostering an adaptive learning environment and motivating active participation from all students.

### **Learning Motivation**

The internal and external motivation of students to participate in learning has increased significantly. The classroom situation, which was previously monotonous, has become more dynamic with students' active involvement at every stage of learning. Teachers explain that after the implementation of differentiated learning and the PBL model, students have shown a higher enthusiasm for learning,

*“The children seem very enthusiastic, so much so that they can't wait for their turn to answer questions or share the results of their discussions”* (Teacher, Personal Communication, April 2025).

The principal emphasized that the classroom atmosphere has become more lively, and the students seem happy with the new methods used by the teachers.

Experts state that students' motivation to learn naturally develops when learning is designed to meet their needs.

*“When teachers accommodate students' learning styles, interests, and readiness, learning becomes relevant and meaningful, which increases their intrinsic motivation”* (Expert, Personal Communication, April 2025).

Field observations show that students no longer rely solely on teacher instructions but actively seek answers, ask questions, and present new ideas independently. This indicates that the learning process has gradually shifted from being teacher-centered to student-centered.



**Figure 3.** Student Learning Process  
*Source: Research 2025*

The documentation of activities in **Figure 3** shows students enthusiastically working together to compile mind maps, create group presentations, and discuss contextual issues. Some learners even volunteered to serve as group leaders or representatives to present the results. The triangulation of results from interviews, observations, and documentation indicates that the consistent application of PBL-based differentiated learning can increase learner motivation because learners feel they have control over how they learn and are valued in the process.

## Discussion

The differentiated learning strategy, based on learning styles and integrated with the PBL model, makes original empirical contributions in line with constructivist theory, which emphasizes that learners construct their own understanding through active interaction with the environment (Indriani et al., 2025). This approach addresses the scientific gap identified in previous studies, which tended to separate discussions of learning styles and PBL models without emphasizing their operational synergy in classroom practice (Maharani et al., 2023). The differentiation of content, process, and product in this study reflects the principle of differentiated learning, which emphasizes tailoring learning to learners' readiness, interests, and learning styles (Amalia et al., 2023; Purba et al., 2023). The innovation of this research lies in systematically integrating differentiation strategies into each PBL syntax, creating learning that is not only adaptive but also grounded in contextual problem-solving.

The findings of this study, which show increases in student engagement, confidence, and motivation to learn, are in line with a study that found an increase in collaboration skills from 58% to 92% through the integration of PBL and differentiated learning (Afelia et al., 2023). The initial conditions, in which only 1 out of 5 groups could discuss effectively, reflect the universal challenges of conventional learning, which do not accommodate diversity in learning styles. The collaborative and participatory classroom climate formed

in this study confirms the finding that providing learning spaces tailored to each student's style creates a personalized and meaningful learning experience (Afelia et al., 2023; Agusta et al., 2024). The increase in self-confidence observed in this study is also parallel to the increase in contribution, flexibility, and problem-solving aspects reported in previous studies.

The visual, auditory, and kinesthetic differentiation strategies applied in this study align with an approach that accommodates learning needs based on readiness, interests, and learning profiles in elementary school students (Sarie, 2022). The findings that visual learners show enthusiasm through images and videos, auditory learners are more responsive in group discussions, and kinesthetic learners are active in experiments and hands-on practice confirm the classification of learning styles proposed in previous studies (Maharani et al., 2023; Dewanti et al., 2024). The results, which show a significant increase from an average of 51.18 to 83.56, reinforce this study's argument that integrating PBL with differentiated learning can increase active participation and learning outcomes when learning styles are systematically accommodated (Sakti & Luthfiyah, 2024).

The effectiveness of differentiated learning strategies using the PBL model, as indicated by an N-gain score of 0.7159 in the high category, provides quantitative validation of the study's qualitative findings (Rohmah et al., 2023). The implementation of differentiation in content and process reported in the study reflects the same principle as this study, providing personalized learning experiences relevant to students' characteristics. The consistency of the four previous studies empirically supports the argument in this study that integrating learning-styles-based differentiated learning into the PBL model not only improves learning outcomes but also develops 21st-century skills such as collaboration, communication, and critical thinking.

The findings of this study reinforce the main characteristics of PBL, namely the use of real-world problems, the integration of various disciplines, and the application of an experience-based approach (Salsabila & Muqowim, 2024; Widyatama et al., 2024). The PBL stages, which consist of problem orientation, data collection, solution development, and presentation of results, have been proven effective when integrated with learning style differentiation strategies (Firsty & Rosmiati, 2024; Imami et al., 2025). The role of teachers as facilitators who create a collaborative and reflective learning environment is evident in this study through their ability to identify and accommodate students' learning profiles through diagnostic assessments (Hasanah et al., 2021; Rahmawati et al., 2025; Samawi et al., 2022).

The application of PBL integration and differentiated learning in IPAS subjects in this study aligns with IPAS's multidisciplinary nature, which requires contextual and interactive learning (Azzahra et al., 2023; Wahyudi et al., 2023). The ability of this strategy to bridge scientific and social aspects in real-life contexts confirms the relevance of PBL for IPAS learning, as previously stated in previous studies (Dwipranoto et al., 2023; Sari & Maemonah, 2024). The simultaneous emotional and cognitive engagement observed in this study supports the argument that integrating PBL with differentiated learning not only improves the quality of cognitive and social interactions but also creates space for fairness in learning and fosters sustainable intrinsic motivation (Indriani et al., 2025).

These research findings reinforce the theory that integrating the PBL model with differentiated learning styles can improve 21st-century competencies, particularly in communication, collaboration, and critical and creative thinking (Salsabila & Muqowim, 2024). The natural growth of learning motivation, as students feel valued and challenged through relevant problems, confirms the importance of inclusive and transformative learning at the elementary school level. When the learning process accommodates different learning styles (visual, auditory, kinesthetic), students not only understand concepts more deeply but also grow as reflective and independent learners, in line with the spirit of Merdeka Belajar (Freedom of Learning), which places students as unique individuals in the educational process (Agusta et al., 2024; Sakliressy, 2023).

This study successfully fills a scientific gap by providing comprehensive empirical evidence on the effectiveness of integrating differentiated learning based on learning styles with the PBL model in the context of sixth-grade science lessons in elementary school. The consistency of the findings with the four previous studies and theoretical validation through the constructivism framework and learning style theory strengthen the contribution of this study to the development of adaptive, inclusive, and needs-based learning practices in a systematic manner (Afelia et al., 2023; Rohmah et al., 2023; Sakti & Luthfiyah, 2024; Sarie, 2022). In addition, these findings have several concrete implications. For teachers, it is necessary to be able to design adaptive learning experiences that integrate learning styles with PBL syntax, as well as to create a learning environment that encourages self-expression and collaboration. For curriculum developers, these research results emphasize the importance of flexible curriculum design that accommodates the diversity of student characteristics. For professional training institutions, this research underscores the urgency of improving teachers' competence in developing differentiation strategies and in real-world, project-based problem-solving. This study emphasizes that integrating differentiated learning styles with the PBL model can foster a participatory, reflective, and transformative learning ecosystem at the elementary school level. This approach offers a new perspective on designing inclusive learning while empowering students' full potential.

## **CONCLUSION**

Differentiated learning strategies based on learning styles, integrated with the PBL model, have proven effective in increasing engagement, confidence, and learning motivation among sixth-grade students at SDN 104246 Jati Baru. This effectiveness is reflected in students' increased engagement in discussion groups, their courage to express their opinions, and their initiative to solve real-world problems. Observational data in April 2025 showed that visual learners actively used images and colors, auditory learners engaged with listening to and repeating the teacher's explanations, and kinesthetic learners were enthusiastic about practical activities and experiments. An increase in confidence was seen in the change in student behavior from being passive to daring to ask questions, answer, and present discussion results in front of the class. Learning motivation also grew significantly, with a more dynamic classroom atmosphere, active participation without coercion, and a shift in the learning process from teacher-centered to student-centered. These findings directly address the problem statement regarding low learning activity and demonstrate the achievement of the research objective to increase learning activity through the integration of differentiated learning and the PBL model. This implementation strategy is recommended to be accompanied by strengthening teacher capacity through continuous professional training, particularly in identifying learning styles and designing adaptive learning.

Further research is recommended to test the effectiveness of differentiated learning strategies based on learning styles, integrated with the PBL model, at other levels of education, such as junior high school and high school, and across various subjects, to examine the consistency of results across different contexts. Longitudinal studies are also needed to assess the long-term impact on student learning outcomes, motivation, critical thinking skills, and collaboration, to obtain a comprehensive picture of the benefits of this strategy in fostering inclusive and transformative learning.

## **AUTHOR'S NOTE**

The author declares that there are no conflicts of interest related to the publication of this article. The author confirms that the article's data and content are free of plagiarism.

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