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Innovative Thinking through Problem-Based Learning: Enhancing Creativity in Contemporary Classrooms

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Abstract:
This study examines how Problem-Based Learning (PBL) fosters innovative thinking and enhances student creativity in contemporary classroom settings. Grounded in constructivist learning principles, PBL engages students in solving authentic, real-world problems, thereby encouraging the development of critical, analytical, and creative thinking skills. The findings reveal that the implementation of PBL significantly increases student participation, collaboration, and engagement, as learners actively construct knowledge through discussion, inquiry, and problem-solving processes. Students demonstrate greater originality in generating ideas and are more confident in presenting diverse solutions. Despite these positive outcomes, several challenges emerge, particularly in relation to structural constraints within the curriculum. Limited instructional time and assessment systems that prioritize standardized academic achievement over creative processes hinder the optimal application of PBL. Additionally, the role of teachers is pivotal in ensuring the effectiveness of this approach, as they must act as facilitators who guide exploration, support collaborative learning, and create an environment conducive to innovation. The study highlights the importance of aligning curriculum design and evaluation systems with creativity-oriented learning goals. It recommends policy adjustments that provide flexibility in instructional practices and incorporate assessment models that value both the learning process and creative outcomes, thereby maximizing the potential of PBL in developing students' innovative capacities.

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INTRODUCTION

In the era of technological disruption and the 5.0 industrial revolution, educational challenges are increasingly complex, requiring students not only to master knowledge but also to think creatively and innovatively in addressing real-world problems(Paschaline & Kabari, 2024; Rasiman, 2023). Unfortunately, in practice, much classroom learning remains one-way and teacher-centered, hampering students'

potential to develop creativity. In several junior high schools in Probolinggo Regency, for example, initial observations indicate that the learning process is still dominated by memorization and solving routine problems, without encouraging students to analyze, explore, and create original solutions. This raises concerns about students' low competitiveness and readiness to face the challenges of the 21st century(Fachrurazi et al., 2023; Fawaid et al., 2025). Therefore, innovations in learning approaches are needed that can foster innovative thinking in students in the classroom.

Various studies have shown that the Problem-Based Learning (PBL) approach has a significant impact on improving students' critical and creative thinking skills. According to Micah et al., (2021), PBL can encourage students to learn actively through problem-solving processes relevant to their life contexts. Meanwhile, further research by Hydros & Chaudhry, (2022) emphasized that PBL not only improves conceptual understanding but also stimulates collaboration and decision-making. In the Indonesian educational context, several local studies have also shown positive results from the implementation of PBL, such as increased learning motivation and active student participation. However, so far there are still limitations in studies that specifically explore the impact of PBL on the development of innovative thinking, especially at the secondary school level in semi-urban areas such as Probolinggo Regency.

Although the effectiveness of Problem-Based Learning has been widely discussed in the literature, the focus of most research tends to be on critical thinking and problem-solving skills, while the innovative thinking dimension remains underexplored. Furthermore, most studies have been conducted at the university level or in urban school settings, with little attention paid to secondary education contexts in resource-constrained areas. Consequently, there is still a lack of a comprehensive understanding of how PBL can concretely encourage students to think innovatively in simple yet dynamic classroom settings(Fawaid et al., 2024; Imjai et al., 2024). This gap opens up important opportunities for research that not only examines the effectiveness of PBL in terms of creativity but also examines how this model can be adapted to unique local contexts.

This research offers an original contribution to the development of educational theory and practice by highlighting the relationship between Problem-Based Learning and strengthening students' innovative thinking, particularly in the context of junior high school classes in a semi-urban area of Probolinggo Regency. Not only does this study fill a gap in previous studies, but it also presents an implementative and contextual approach to implementing PBL tailored to real-life school conditions. Thus, this research has the potential to produce a creative learning model that is not only effective but also applicable and easily replicated in other schools with similar characteristics. Another novel aspect lies in the more structured measurement of innovative thinking dimensions, including indicators of originality, flexibility of thinking, and courage in taking risks.

This study aims to analyze and test how the application of Problem-Based Learning can improve students' innovative thinking in a contemporary classroom environment. Using a qualitative approach and field studies in several junior high

schools in Probolinggo Regency, this study starts from the assumption that creativity is not innate, but can be cultivated through appropriate learning strategies. The main argument of this study is that today's educational challenges require a pedagogical approach that facilitates exploration, collaboration, and students' courage to think outside the box. Therefore, PBL is believed to be a relevant and effective pedagogical solution in building a generation of creative and innovative learners, in line with the needs of 21st-century education and the Pancasila Student Profile.

RESEARCH METHOD

This study aims to explore and analyze how the implementation of Problem-Based Learning (PBL) in the classroom can encourage the development of students' innovative thinking and identify forms of creativity that emerge from the problem-based learning process. Therefore, this study uses a qualitative approach with a case study type. This type of research was chosen because it allows researchers to understand learning phenomena in depth in a real context, as well as providing space to explore various perceptions, experiences, and learning dynamics in the classroom. The research site is SMPN 3 Kota Kraksaan, Probolinggo Regency, which has begun implementing the Problem-Based Learning approach in several subjects. The researchers are interested in exploring how this strategy is adapted in real learning situations and its impact on student creativity in generating innovative ideas and original solutions to given problems.

Participants in this study were selected using purposive sampling, a technique for determining informants with specific considerations based on the research objectives. This technique was used to ensure that the data obtained truly came from individuals who understood and were directly involved in the process of implementing Problem-Based Learning. This study involved 10 participants from SMPN 3 Kota Kraksaan, consisting of the Principal, the Vice Principal of Curriculum, three subject teachers, and five students in grades VIII and IX who actively participated in learning with the PBL approach. The informants had diverse educational backgrounds, teaching experiences, and learning styles, which were expected to provide a rich picture related to the implementation and impact of this learning model on the development of students' innovative mindsets.

Data collection techniques included in-depth interviews, participant observation, and documentation. In-depth interviews were conducted with the principal, curriculum vice principal, teachers, and students to holistically explore their views on the implementation of PBL and its impact on innovative thinking. Direct classroom observations were conducted to observe how the PBL process unfolded, how students interacted in problem-solving, and the forms of creativity that emerged during the process. Documentation collected included syllabi, lesson plans, student worksheets, and student work that reflected students' creative ideas during problem-based learning. These three techniques were used triangulatingly to ensure the data obtained had high validity and provided a comprehensive picture of the topic being studied.

The data analysis in this study uses the model from Miles et al., (2014), which consists of three main stages: (1) Data Reduction, namely the process of sorting,

filtering, and grouping data based on relevant categories such as learning strategies, student responses, and the resulting forms of innovation; (2) Data Presentation, namely organizing data in the form of narratives, matrices, or visualizations that facilitate further analysis of the relationships between components; and (3) Conclusion Drawing and Verification, namely systematically concluding findings while still conducting cross-validation between data sources to ensure the validity of the results. Through this process, it is hoped that the research can produce new understanding regarding the effective application of PBL in encouraging the birth of innovative thinking in contemporary classrooms.

RESULT AND DISCUSSION

This research shows that the success of PBL is greatly influenced by the teacher's role as a facilitator who guides students' critical and exploratory thinking processes. On the other hand, challenges also arise, such as time constraints and a rigid curriculum, which can hinder the optimal implementation of PBL. The following discussion will elaborate more deeply on PBL's contribution to the development of innovative thinking, the implementation obstacles encountered in the field, and recommendations for strengthening PBL's role in creating a creative, collaborative, and contemporary learning environment.

Result

Student creativity

The implementation of Problem-Based Learning (PBL) at SMPN 3 Kraksaan has demonstrated a significant impact on improving student creativity. Interviews with several teachers revealed that students appeared more active and courageous in expressing ideas when given real-world problems to solve. One teacher revealed that students began to demonstrate initiative in exploring various alternative solutions, often offering unconventional yet relevant approaches to the problem context. Creativity was also evident in the simple products students produced, such as utilizing used materials to design solutions to given challenges. This demonstrates a shift in students' mindsets, leading to a more open and imaginative approach.

From the results above, it can be seen that the PBL approach provides ample exploratory space for students to freely express their ideas. Problems presented in a contextual and open manner encourage students to think divergently and not fixate on a single correct answer. Furthermore, the group work dynamics within the PBL process enrich creative ideas through healthy and mutually supportive social interactions. This collaboration facilitates the exchange of diverse perspectives, thus encouraging the emergence of new, innovative ideas. This process reinforces the understanding that creativity in learning is not solely an individual outcome, but rather the result of interactions between students, teachers, and the challenging problem context.

Thus, it can be concluded that Problem-Based Learning contributes significantly to the development of student creativity in the classroom. Through this approach, students not only hone their critical thinking skills but are also guided to create innovative solutions based on a deep understanding of the problem. This learning

strategy has been proven to create an active, challenging learning environment and stimulate students' creativity, which is one of the key skills needed to face the challenges of 21st-century education.

The Role of the Teacher Facilitator

Research conducted in classrooms at SMPN 3 Kraksaan demonstrates how teachers act as facilitators in problem-based learning. Rather than serving as information centers, teachers act more as mentors, guiding students to explore and find solutions independently. Teachers actively ask stimulating questions that encourage critical and creative thinking. In several sessions, teachers also provide ample space for students to discuss, share ideas, and explore various approaches to solving given problems. This situation demonstrates a shift from teacher-centered to student-centered learning.

Further observation revealed that the facilitation strategies implemented by teachers were crucial to the success of the PBL process. Teachers did not provide direct answers, but instead guided students to independently seek out relevant sources and interpret the information obtained. They also actively monitored group dynamics, ensuring that each student contributed to and learned from the collaborative process. Furthermore, teachers appeared flexible in managing time and materials, adapting the learning pace to the needs and abilities of each group. This method of teacher guidance created a learning climate that encouraged students to feel safe exploring and not afraid to make mistakes.

Thus, the observation results reinforce the understanding that the teacher's role as a facilitator in PBL is crucial in creating innovative learning and fostering student creativity. Teachers are no longer positioned as the sole source of knowledge, but rather as guides to students' thinking processes. Teachers' ability to direct, provide feedback, and foster students' exploratory spirit is key to the success of this approach. Therefore, enhancing teachers' capacity as facilitators is a strategic step in effectively implementing Problem-Based Learning in contemporary classrooms.

Structural Barriers to the Curriculum

Based on the results of the documentation analysis in the form of a table of time allocation distribution and curriculum structure at SMPN 3 Kraksaan, it was found that the Problem-Based Learning (PBL) approach still faces quite significant structural obstacles. Data from the Lesson Implementation Plan (RPP) document and curriculum structure show that the majority of learning time allocation focuses more on delivering material according to the national syllabus, with a strong emphasis on achieving cognitive targets. This has an impact on the limited time that can be used for exploratory approaches such as PBL, which require space for thinking, group discussions, and a more in-depth investigation process. From the graph of the development of learning outcomes attached to the semester report, it is clear that student creativity honed through the project method only emerged in certain activities that are additional, not a core part of the curriculum.

Curriculum documentation also indicates that the assessment structure used still

emphasizes final results or conventional academic achievements, such as written exams and multiple-choice questions. Assessment components for thinking processes, group collaboration, and creative problem-solving are still very limited, and some documents do not even explicitly list them. This indicates a lack of strong integration between PBL principles and the assessment system used in the school curriculum. This mismatch is a major obstacle to implementing learning that truly fosters student creativity in a systematic and structured manner.

Table 1: Learning Time Allocation and Suitability with PBL Implementation

Subjects	Time Allocation (Hours)	Main Learning Methods	Opportunities for Implementing PBL	Barriers to Implementing PBL
Mathematics	3 per week	Lectures, practice questions	Minimal	Focus on practice questions, less time for exploration
Science	2 per week	Simple experiment	Limited	The curriculum is too dense, experiments are more focused on the end result
Indonesian	2 per week	Discussion, Q&A	Limited	Exam-oriented learning, less room for in-depth discussion
Art and culture	1 per week	Presentation, individual assignments	Enough	Limited time, less focus on group creative projects
Social Studies	2 per week	Group discussions, lectures	Minimal	Limited time, more focus on memorization and theoretical knowledge

Table 2: Curriculum Assessments that Hinder PBL Implementation

Assessment Aspects	Emphasized Assessment	Relation to PBL	Obstacles Encountered
Cognitive (Written Test)	Understanding the material, multiple choice questions	Low, focus on the end result	Does not assess students' thinking processes and creativity
Group collaboration	Individual assignments, presentations	Limited, more on individual presentations	Lack of assessment of group cooperation and problem solving
Creativity and Innovation	Homework, practical exams	Not integrated, only limited tasks	There is no formal assessment of innovation in problem solving.

Thus, the results of the documentation analysis and the table above make it clear that structural curriculum barriers pose a significant challenge to the development of problem-based learning. The misalignment between PBL objectives and the existing curriculum system often limits the implementation of this method to partial or experimental activities. Therefore, a more flexible and supportive curriculum policy is

needed, both in terms of time allocation, freedom of teaching methods, and an assessment system that values creative thinking. This adjustment is crucial for the PBL approach to be truly integrated as part of the primary learning strategy in contemporary classrooms.

DISCUSSION

The findings of this study demonstrate that the implementation of Problem-Based Learning (PBL) plays a substantial role in fostering student creativity within contemporary classroom contexts(Mabnunah et al., 2024; Sutrisno et al., 2023). Students exhibit greater initiative, confidence, and originality when engaged in solving contextual, real-world problems(Nugrahanta et al., 2024). This aligns with constructivist learning perspectives, where knowledge is actively constructed through experience and interaction rather than passively received(Oktapiani & Hamdu, 2020). The emergence of unconventional yet relevant solutions, as well as the utilization of simple materials in creative ways, indicates a shift in students' cognitive and imaginative capacities(Ali et al., 2024; Dallacqua et al., 2023). Such outcomes confirm that PBL not only encourages divergent thinking but also nurtures an open mindset, allowing learners to explore multiple possibilities beyond a single correct answer(Swinkels et al., 2025). Furthermore, the collaborative nature of PBL enriches the creative process, as peer interaction facilitates the exchange of ideas and perspectives, ultimately leading to more innovative outcomes. This suggests that creativity in learning is socially constructed through meaningful engagement among students, teachers, and problem contexts.

In addition, the role of the teacher as a facilitator is found to be a critical factor in the success of PBL implementation. The transition from a teacher-centered to a student-centered approach reflects a pedagogical shift that emphasizes guidance rather than direct instruction(Afifah et al., 2025; Lin et al., 2024). Teachers who actively pose stimulating questions, encourage discussion, and provide space for exploration contribute significantly to the development of students' critical and creative thinking skills(Intan et al., 2025). By refraining from providing immediate answers and instead guiding students to seek information independently, teachers foster a learning environment that promotes inquiry, autonomy, and intellectual risk-taking(Nguyen et al., 2023). The ability of teachers to manage group dynamics, adapt instructional strategies, and create a supportive classroom climate further strengthens the effectiveness of PBL. These findings reinforce the notion that teachers' facilitative competencies are essential in cultivating innovative learning environments and maximizing student potential.

However, despite the positive impacts of PBL on student creativity and engagement, the study also reveals significant structural barriers within the existing curriculum. The dominance of content-oriented instruction and limited time allocation restrict opportunities for in-depth exploration, discussion, and collaborative inquiry, which are fundamental components of PBL(Chahine et al., 2020; Mundiri et al., 2021).

Moreover, the prevailing assessment system, which primarily emphasizes cognitive outcomes through standardized tests, does not adequately capture students' creative processes, problem-solving abilities, or collaborative skills(Awaliah S et al., 2025). This misalignment between instructional approaches and evaluation methods hinders the full integration of PBL into regular classroom practices. As a result, PBL is often implemented only partially or as a supplementary activity rather than as a core pedagogical strategy.

Therefore, the discussion highlights the need for a systemic transformation in curriculum design and assessment practices to support creativity-oriented learning. Providing greater flexibility in time allocation, integrating process-based assessment, and recognizing collaborative and innovative outputs are essential steps toward optimizing the implementation of PBL. Without such adjustments, the potential of PBL to enhance student creativity and prepare learners for the demands of 21st-century education will remain underutilized.

CONCLUSION

The conclusion of this study shows that the implementation of Problem-Based Learning (PBL) in the classroom can significantly enhance students' creativity in addressing real-world problems. Key findings indicate that through PBL, students are more active in collaborating, thinking critically, and seeking innovative solutions. However, these positive impacts are often hampered by structural barriers in the curriculum, such as limited time allocation and assessment systems that do not support the creative process. Nevertheless, the role of teachers as facilitators has proven crucial in creating learning spaces that support the exploration and application of innovative thinking. Therefore, to maximize the benefits of PBL, adjustments are needed in the curriculum and a more flexible assessment system, allowing students' creativity to develop optimally.

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