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

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Abstract:

This study aims to explore the application of Problem-Based Learning (PBL) in enhancing students' creativity in contemporary classrooms. PBL as a learning approach that focuses on solving real problems is expected to stimulate critical and innovative thinking among students. The results of the study indicate that through PBL, students are more active in collaborating, developing creative solutions, and showing increased engagement in learning. However, the implementation of PBL faces several structural barriers in the curriculum, such as limited time allocation and assessments that emphasize conventional academic outcomes rather than creative processes. Teachers play an important role as facilitators who are able to encourage the exploration of ideas and facilitate group discussions. This study suggests the need for changes in curriculum policies and assessment systems to optimize the benefits of PBL in enhancing students' creativity.

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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. Unfortunately, in practice, much classroom learning remains one-way and teacher-centered, hampering students' potential to develop creativity(Magaji & Ade-Ojo, 2023; Nadya et al., 2023). 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(Prastowo, 2023). This raises concerns about students' low competitiveness and readiness to face the challenges of the 21st century(Hamduuna et al., 2023). 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., (2023), PBL can encourage students to learn actively through problem-solving processes relevant to their life contexts. Meanwhile, further research by Otaya et al., (2023) 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. 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(Amiruddin et al., 2022; Damayanti et al., 2024). 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, Huberman & Saldaña, 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.

RESULTS 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.

RESULTS
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 affirm the pivotal role of Problem-Based Learning (PBL) in enhancing student creativity and critical thinking. By presenting real-world problems in open and contextualized formats, PBL creates a learning environment that stimulates divergent thinking and encourages students to generate original ideas(Anggo et al., 2023; Liu et al., 2023). Students became more proactive in proposing solutions, often incorporating unconventional yet relevant approaches(Muhith et al., 2023; Putri, 2024). This suggests that PBL not only builds cognitive understanding but also nurtures a mindset open to innovation and exploration.

A central aspect of PBL's success lies in the role of the teacher as a facilitator. Rather than functioning as the primary source of knowledge, teachers act as guides who stimulate students' curiosity, support independent inquiry, and encourage collaborative learning(Al Shloul et al., 2024; Li et al., 2024; Tan et al., 2021). By asking thought-provoking questions and offering space for discussion and experimentation, teachers foster a classroom climate where students feel confident to express ideas and learn from trial and error(Zulyusri et al., 2023). This shift from teacher-centered to student-centered pedagogy is critical in fostering learner autonomy and deeper engagement.

Despite these pedagogical strengths, the implementation of PBL is often challenged by structural barriers within the existing curriculum framework. Analysis of curriculum documents and assessment structures reveals a dominant emphasis on standardized content delivery and final cognitive outcomes(Poszler & Lange, 2024). Time allocation across subjects tends to prioritize coverage of material over exploration, leaving little room for sustained inquiry or collaborative problem-solving(Anglani et al., 2023; Hasanah et al., 2024). Moreover, current assessment systems focus heavily on individual academic results particularly written tests while neglecting process-oriented competencies such as teamwork, innovation, and critical analysis.

These structural limitations suggest a misalignment between the goals of PBL and the realities of the school system. For PBL to function as a core pedagogical strategy rather than a supplemental activity, systemic changes are required(Mamad & Vígh, 2024; Zamroni et al., 2023). These include greater flexibility in curriculum planning, more inclusive assessment models that value both the process and product of learning, and institutional support for teacher development in facilitation skills.

In summary, this study underscores the transformative potential of PBL in cultivating creativity and higher-order thinking skills. However, to realize this potential on a broader scale, educational systems must evolve to support more student-centered and inquiry-driven learning environments. Aligning curriculum, instruction, and

assessment with the principles of PBL is essential to equip students with the competencies needed in a complex, collaborative, and innovation-driven world.

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. PBL encourages students to be more active in collaborating, thinking critically, and seeking innovative solutions within a supportive and exploratory environment. Learning becomes a dynamic process where students construct understanding through dialogue, inquiry, and practical engagement. However, despite these benefits, the implementation of PBL often encounters structural barriers such as rigid curriculum timeframes and assessment systems that emphasize cognitive outcomes over creative and collaborative processes. These limitations risk marginalizing PBL as an experimental method rather than embedding it as a core instructional approach.

Nevertheless, the role of the teacher as a facilitator proves to be a vital factor in supporting the success of PBL. Teachers who are able to guide, scaffold, and create a psychologically safe learning space help students explore, take intellectual risks, and develop autonomy. Their ability to balance curriculum demands with learner-centered strategies becomes key to realizing the potential of PBL. Therefore, to optimize the benefits of this approach, it is essential to reform curriculum policies and assessment frameworks shifting toward greater flexibility and a broader recognition of 21st-century skills. With the right structural support, PBL can become a transformative force in shaping creative, confident, and future-ready learners.

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