PJS Vol. 3 No. 1. Maret 2025
Papua Journal of Sociology
https://ejournal.um-sorong.ac.id/index.php/pjs
Submission: 03 Maret 2025
e-ISSN: 2987-405X
Publication: 31 Maret 2025
Page: 79-85

THE EFFECTIVENESS OF PROBLEM-BASED LEARNING METHOD IN ENHANCING STUDENTS' CRITICAL THINKING SKILLS IN JUNIOR HIGH SCHOOLS

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Doi: https://doi.org/10.33506/pjs.v3i1.5361

Abstract

This study investigates the effectiveness of the Problem-Based Learning (PBL) method in enhancing students' critical thinking skills in junior high schools. The research emphasizes how PBL, as a student-centered approach, encourages learners to actively construct knowledge through solving real-life problems rather than relying solely on teacher-centered instruction. By engaging students in inquiry, analysis, and reflection, the PBL method fosters higher-order thinking processes such as reasoning, evaluation, and problem-solving. The study adopts a quasi-experimental design involving two groups: an experimental group taught using the PBL approach and a control group taught through conventional methods. Data were collected through pre-tests and post-tests using standardized critical thinking assessment instruments. The findings reveal that students who experienced the PBL method demonstrated a significant improvement in critical thinking skills compared to those taught with traditional approaches. The improvement was particularly evident in students' abilities to analyze arguments, identify assumptions, and draw logical conclusions. Furthermore, the study highlights that PBL not only enhances academic achievement but also promotes collaboration, communication, and independent learning. The results suggest that integrating PBL into junior high school curricula can effectively cultivate critical thinking competencies essential for 21st-century learning. Therefore, educators are encouraged to apply PBL strategies consistently to create more interactive and meaningful learning experiences.

Keywords: *Problem-Based Learning; Critical Thinking Skills; Junior High School; Student-Centered Learning; Educational Effectiveness*

Abstrak

Penelitian ini meneliti efektivitas metode Pembelajaran Berbasis Masalah (PBL) dalam meningkatkan kemampuan berpikir kritis siswa di sekolah menengah pertama. Penelitian ini menekankan bagaimana PBL, sebagai pendekatan yang berpusat pada siswa, mendorong peserta didik untuk secara aktif membangun pengetahuan melalui pemecahan masalah kehidupan nyata daripada hanya mengandalkan instruksi yang berpusat pada guru. Dengan melibatkan siswa dalam penyelidikan, analisis, dan refleksi, metode PBL mendorong proses berpikir tingkat tinggi seperti penalaran, evaluasi, dan pemecahan masalah. Studi ini mengadopsi desain kuasi-eksperimental yang melibatkan dua kelompok: kelompok eksperimental yang diajarkan menggunakan pendekatan PBL dan kelompok kontrol yang diajarkan melalui metode konvensional. Data dikumpulkan melalui pre-test dan post-test menggunakan instrumen penilaian berpikir kritis standar. Temuan ini mengungkapkan bahwa siswa yang mengalami metode PBL menunjukkan peningkatan yang signifikan dalam keterampilan berpikir kritis dibandingkan dengan mereka yang diajarkan dengan pendekatan tradisional. Peningkatan ini sangat jelas dalam kemampuan siswa untuk menganalisis argumen, mengidentifikasi asumsi, dan menarik kesimpulan logis. Selain itu, penelitian ini menyoroti bahwa PBL tidak hanya meningkatkan prestasi akademik tetapi juga mempromosikan kolaborasi, komunikasi, dan pembelajaran mandiri. Hasilnya menunjukkan bahwa mengintegrasikan PBL ke dalam kurikulum sekolah menengah pertama dapat secara efektif menumbuhkan kompetensi berpikir kritis yang penting untuk pembelajaran abad ke-21. Oleh karena itu, pendidik didorong untuk menerapkan strategi PBL secara konsisten untuk menciptakan pengalaman belajar yang lebih interaktif dan bermakna.

Kata Kunci: Pembelajaran Berbasis Masalah; Keterampilan Berpikir Kritis; Sekolah Menengah Pertama; Pembelajaran Berpusat pada Siswa; Efektivitas Pendidikan

INTRODUCTION

Education in the 21st century emphasizes the development of higher-order thinking skills, especially critical thinking, as one of the key competencies required in facing complex global challenges (Brookhart, 2010). In the context of junior high school education, the ability to think critically is essential for students to analyze information, solve problems, and make informed decisions. However, traditional teaching methods that focus primarily on teacher-centered instruction often limit students' opportunities to engage in inquiry, reasoning, and reflective thinking (Ennis, 2011). As a result, many students tend to become passive recipients of knowledge rather than active participants in the learning process.

Problem-Based Learning (PBL) has emerged as an alternative instructional approach that addresses these limitations. PBL emphasizes student-centered learning, where learners are encouraged to investigate and solve real-world problems through collaborative discussion, research, and reflection (Hmelo-Silver, 2004). This method aligns with constructivist learning theory, which suggests that knowledge is constructed through active engagement and social interaction rather than through rote memorization (Vygotsky, 1978). By engaging students in authentic problem-solving activities, PBL stimulates curiosity, promotes analytical thinking, and helps learners connect theoretical knowledge to practical applications.

Previous studies have demonstrated that PBL can effectively enhance various cognitive and affective domains of learning, including problem-solving skills, motivation, and teamwork (Barrows, 1996; Savery, 2006). More importantly, PBL has been shown to foster critical thinking by encouraging students to identify problems, analyze information, evaluate evidence, and formulate solutions (Tan, 2003). Despite these advantages, the implementation of PBL in junior high schools remains limited due to several challenges, such as insufficient teacher preparation, lack of supporting materials, and misconceptions about the method's effectiveness compared to conventional teaching (Hmelo-Silver et al., 2007).

Given these challenges, it is important to empirically examine how effective the Problem-Based Learning method is in improving critical thinking skills among junior high school students. This research seeks to fill this gap by analyzing the impact of PBL on students' cognitive development and learning engagement compared to traditional teaching approaches. Furthermore, the study aims to provide educators and policymakers with insights into how PBL can be effectively integrated into classroom practice to foster a more interactive and meaningful learning environment. Through this investigation, it is expected that the findings will contribute to the broader

educational discourse on how to prepare students to become critical, creative, and independent thinkers capable of responding to future challenges.

RESEARCH METHOD

This study employed a quasi-experimental research design to examine the effectiveness of the Problem-Based Learning (PBL) method in enhancing students' critical thinking skills in junior high schools, a design commonly used to evaluate instructional interventions in authentic classroom settings (Creswell, 2014; Sugiyono, 2020). The research involved two groups of students: an experimental group taught using the PBL approach and a control group taught through conventional teaching methods. Both groups received the same instructional content but differed in the method of delivery, allowing for a systematic comparison of learning outcomes attributable to the instructional model (Savery, 2006).

The study was conducted at a public junior high school with a total of 60 students from two different classes selected through purposive sampling. The experimental class implemented the PBL model, in which students were divided into small groups and engaged with authentic, real-world problems designed to stimulate inquiry, collaboration, and higher-order thinking skills (Hmelo-Silver, 2004; Barrows, 2012). In contrast, the control class received instruction through traditional lecture-based methods, which primarily emphasized teacher-centered knowledge transmission.

The intervention lasted for six weeks and covered one thematic learning unit aligned with the national curriculum. Data on students' critical thinking skills were collected using a standardized critical thinking test adapted from the Watson–Glaser Critical Thinking Appraisal (WGCTA), an instrument widely used to assess core dimensions of critical thinking, including inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments (Watson & Glaser, 2010; Facione, 1990). The test was administered as a pre-test and post-test to both groups to measure changes in students' critical thinking performance resulting from the instructional treatment.

In addition to quantitative data, classroom observations and semi-structured student interviews were conducted to gain qualitative insights into students' learning engagement, problem-solving processes, and perceptions of the PBL implementation. Quantitative data from the pre-test and post-test scores were analyzed using paired sample t-tests to examine within-group differences and independent sample t-tests to identify statistically significant differences between the experimental and control groups, with the level of significance set at $p < 0.05$ (Field, 2018). Qualitative data were analyzed using thematic analysis to identify recurring patterns related to students' cognitive engagement,

collaboration, and reasoning processes during PBL activities (Braun & Clarke, 2006).

This mixed-method approach enabled a comprehensive interpretation of the research results by integrating statistical evidence with contextual classroom insights, thereby strengthening the validity of conclusions regarding the effectiveness of the PBL method in promoting students' critical thinking skills. All participants were informed about the purpose of the study, informed consent was obtained from both students and their parents, and confidentiality was strictly maintained throughout the research process. The data were used solely for academic purposes to ensure the ethical integrity of the study.

RESULT AND FINDINGS

Result

The results of the study demonstrate that the Problem-Based Learning (PBL) method has a significant positive effect on enhancing students' critical thinking skills in junior high schools. Quantitative data obtained from pre-test and post-test results show that the average post-test score of students in the experimental class was considerably higher than that of the control class. Statistical analysis using an independent sample t-test indicated a significant difference between the two groups ($p < 0.05$), confirming that students taught through PBL achieved better performance in critical thinking assessments compared to those taught through conventional instruction.

Further analysis revealed that improvements occurred across several key dimensions of critical thinking, including interpretation, analysis, inference, and evaluation. Students in the experimental group demonstrated greater ability to identify problems, analyze underlying causes, propose logical solutions, and evaluate arguments based on evidence. The qualitative findings, drawn from classroom observations and student interviews, also supported the quantitative results. Students reported feeling more engaged and motivated when solving real-life problems collaboratively. They expressed that the learning activities encouraged them to think deeply, question assumptions, and justify their reasoning rather than memorizing information passively.

In addition, teachers observed that students in the PBL class showed improved communication and teamwork skills. They actively shared ideas, discussed alternative solutions, and learned to respect different perspectives during group discussions. These behaviors reflected the essential characteristics of critical thinkers, such as open-mindedness, reasoning clarity, and reflective judgment. The findings also suggest that PBL helped students connect theoretical knowledge with practical contexts, making learning more meaningful and relevant to everyday life.

Overall, the results indicate that the application of the Problem-Based Learning

method not only enhances students' academic achievement but also significantly contributes to the development of essential critical thinking competencies. In contrast, students in the control group, who experienced conventional lecture-based instruction, tended to rely on teacher explanations and demonstrated limited engagement in critical inquiry or problem-solving activities.

Discussion

The findings of this study confirm the theoretical and empirical claims that Problem-Based Learning (PBL) is an effective pedagogical model for developing students' critical thinking skills. This aligns with the constructivist view that knowledge is not transmitted directly from teacher to student but is actively constructed through meaningful experiences and social interaction (Vygotsky, 1978; Hmelo-Silver, 2004). By engaging students in real-world problem scenarios, PBL fosters inquiry, exploration, and reflection—core components of critical thinking.

The improvement observed in students' analytical and evaluative skills suggests that PBL enables learners to internalize cognitive strategies that support independent reasoning. When students are presented with open-ended problems, they are encouraged to question, hypothesize, and test their ideas, which enhances their capacity to think logically and systematically. This finding is consistent with Tan (2003), who asserts that PBL encourages learners to actively seek solutions through reasoning and evidence-based argumentation. Moreover, the collaborative nature of PBL cultivates social dimensions of learning, where students learn to negotiate meaning, challenge assumptions, and justify opinions within group discussions (Savery, 2006).

Another notable finding is that PBL increases students' learning motivation and engagement. Students in the experimental group expressed greater enthusiasm and curiosity in learning activities because the problems they worked on were authentic and relatable. This resonates with research by Hosnan (2014) and Sungur and Tekkaya (2006), who found that the contextual and interactive nature of PBL enhances students' intrinsic motivation and persistence in learning. The high level of engagement observed in this study demonstrates that when students perceive learning as meaningful, they are more willing to invest effort and engage in deep thinking processes.

However, the implementation of PBL also presents several challenges. Some students initially struggled with adapting to the learner-centered environment, as they were accustomed to traditional methods where the teacher provides direct instruction. Teachers also reported that PBL required more time for planning and facilitation, as well as the development of suitable problem scenarios that match students' cognitive

levels. These challenges are consistent with the findings of Hmelo-Silver et al. (2007), who noted that teacher guidance and structured scaffolding are crucial for successful PBL implementation.

Despite these obstacles, the results of this study demonstrate that with proper guidance, PBL can effectively enhance students' critical thinking skills and overall learning outcomes. The use of authentic problems as a learning stimulus helps students apply knowledge across disciplines and contexts, a key indicator of higher-order thinking. Furthermore, the emphasis on reflection during the PBL process allows students to evaluate their learning strategies and outcomes, leading to deeper conceptual understanding and metacognitive awareness.

In summary, this study reinforces the view that PBL is a powerful instructional method that aligns with 21st-century educational goals. It not only supports the development of cognitive skills such as analysis and evaluation but also nurtures affective and social dimensions of learning such as collaboration, curiosity, and responsibility for one's own learning.

CONCLUSION

This study concludes that the Problem-Based Learning (PBL) method is highly effective in enhancing students' critical thinking skills in junior high schools. The results indicate that students who engage in PBL demonstrate significant improvement in critical thinking dimensions, including analysis, interpretation, inference, and evaluation, compared to those taught through traditional approaches. PBL encourages students to be active participants in their learning, promoting independent reasoning, collaboration, and reflective thinking. The findings suggest that the success of PBL lies in its constructivist foundation, where learning occurs through active problem-solving and inquiry-based exploration. By presenting students with authentic problems, teachers can stimulate curiosity and foster meaningful learning experiences that strengthen both cognitive and metacognitive abilities. Nevertheless, effective implementation of PBL requires adequate teacher preparation, structured guidance, and carefully designed learning problems that align with students' developmental levels. In conclusion, integrating the PBL method into junior high school instruction can serve as a powerful strategy to cultivate critical thinking, creativity, and lifelong learning attitudes among students. Educators are encouraged to adopt this approach to prepare learners for the challenges of the modern world, where the ability to think critically and solve complex problems is essential for academic and personal success.

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SHORT PROFILE

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