

THE EFFECT OF IMPLEMENTING PROBLEM-BASED LEARNING (PBL) INTEGRATED WITH RIAU LOCAL WISDOM ON STUDENTS' CRITICAL THINKING AND COLLABORATION SKILLS IN SOCIAL STUDIES LEARNING FOR GRADE IX STUDENTS OF SMP NEGERI 1 BAGAN SINEMBAH

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ARTICLE INFO

Keywords:

keyword 1; Problem Based Learning;
keyword 2; Riau Local Wisdom;
keyword 3; Critical Thinking
keyword 4; Collaboration;
keyword 5; Social Studies;

Article history:

Received 2025-05-24
Revised 2025-06-12
Accepted 2026-06-26

ABSTRACT

This study aims to analyze the effect of implementing the Problem-Based Learning (PBL) model integrated with Riau local wisdom on students' critical thinking and collaboration skills in Social Studies learning for Grade IX at SMP Negeri 1 Bagan Sinembah. The research employed a quasi-experimental design with a Non-Equivalent Control Group Design, involving one experimental class receiving PBL integrated with Riau local wisdom and one control class that did not receive the PBL treatment based on local wisdom. The instruments consisted of a critical thinking test, a collaboration observation sheet, and supporting questionnaires. Data were analyzed using normality tests, homogeneity tests, Paired Samples t-test, Independent Samples t-test, and effect size calculations. The results indicate that PBL integrated with Riau local wisdom significantly influenced students' critical thinking skills. The experimental class showed an increase in mean critical thinking scores from 34.75 (pre-test) to 44.69 (post-test), with a gain of 9.94 points (Sig. = 0.000), while the control class showed a much smaller improvement from 35.41 to 38.13, with a gain of 2.72 points (Sig. = 0.001). The effect size calculation for critical thinking produced a Cohen's d value of 0.159533 (small effect), yet still indicated a positive contribution of PBL to students' critical thinking development. Although the Independent Samples t-test for critical thinking post-test scores showed Sig. > 0.05, the questionnaire analysis revealed a significant difference between the experimental and control groups (Sig. = 0.000), suggesting that critical thinking processes developed more optimally through PBL integrated with local wisdom. Regarding collaboration skills, the control class increased from 37.38 to 40.22 (gain = 2.84; Sig. = 0.002), while the experimental class showed a much larger increase from 34.94 to 44.72 (gain = 9.78; Sig. = 0.000). The Independent Samples t-test for collaboration also indicated a significant difference between groups (Sig. = 0.000), and the effect size calculation resulted in a Cohen's d value of 0.1088 (small effect) but still demonstrated the positive contribution of PBL to collaboration skills. Overall, the study concludes that

PBL integrated with Riau local wisdom is effective in enhancing students' critical thinking and collaboration skills. The integration of local cultural values such as *Bebaso*, mutual cooperation (*gotong royong*), and deliberation (*musyawarah*) provides authentic learning contexts, increases learning relevance, and strengthens 21st-century skills. This study recommends the implementation of PBL based on local wisdom as a meaningful, contextual, and high-level-thinking-oriented learning strategy.

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1. INTRODUCTION

The challenges of twenty-first-century education demand the development of critical thinking and collaboration skills, two competencies that Vincent-Lancrin (2024) identifies as essential foundations for preparing younger generations to navigate the complexities of the modern world. Problem-Based Learning (PBL) has been widely recognized as an effective model for fostering these skills because it presents authentic problems that stimulate investigation, analysis, and cooperative engagement; this aligns with the findings of Juliyantika and Batubara (2022), who state that PBL enhances higher-order thinking through real-world problem solving. Halim (2022) emphasizes that PBL encourages students to connect concepts with real-life contexts, while Mulyani (2022) demonstrates that collaborative problem navigation within PBL strengthens students' communication and teamwork abilities.

At the global level, Knap-Stefaniuk and Ambrozová (2021) as well as Bildircin (2024) find that PBL significantly improves critical thinking, yet its implementation rarely incorporates local cultural contexts. Nationally, Weng (2022) and Syaifullah et al. (2024) highlight that culturally grounded learning enhances the meaningfulness of instruction and student engagement. In the specific context of Riau, Hallatu and Lasaiba (2022) explain that local wisdom such as *bebaso*, *gotong royong*, and consensus-based deliberation embodies values of cooperation, collective responsibility, and shared problem solving, yet these cultural strengths remain underutilized in Social Studies classrooms. Studies from the past five years show that PBL has been widely examined for enhancing critical thinking (Juliyantika & Batubara, 2022; Bildircin, 2024) and collaboration (Mulyani, 2022), but no research has investigated both competencies simultaneously within a PBL framework grounded in Riau local wisdom, particularly at the junior high school level.

This situation creates a clear knowledge gap regarding how integrating PBL with Riau's local cultural values may optimize these competencies. Therefore, this study is crucial for addressing the need for culturally relevant learning while meeting global competency standards. The present research aims to analyze the effect of implementing PBL based on Riau local wisdom on the critical thinking and collaboration skills of Grade IX Social Studies students at SMP Negeri 1 Bagan Sinembah, with novelty rooted in the explicit integration of local cultural values into the PBL framework and the simultaneous measurement of two key twenty-first-century competencies.

2. METHODS

This study employed a quasi-experimental research design with a pretest–posttest control group to examine the effect of Problem-Based Learning (PBL) integrated with Riau local wisdom on students' critical thinking and collaboration skills. The study involved Grade IX students of SMP Negeri 1 Bagan Sinembah, consisting of an experimental group that received PBL enriched with local cultural values such as *bebaso*, *gotong royong*, and community deliberation practices and a control group that received conventional PBL without cultural integration.

The research procedure included administering pretests to measure students' initial abilities, implementing the learning intervention across six instructional sessions, observing collaborative behaviors during the learning process, and finally administering posttests to assess learning outcomes. The instruments consisted of a critical thinking test developed based on Facione's (1990) indicators, and a collaboration observation sheet adapted from Johnson & Johnson (1995) and OECD (2017). Both instruments underwent expert validation to ensure content validity.

Data were collected through tests, classroom observations, and documentation, and were analyzed using normality and homogeneity tests followed by paired sample t-tests to compare pretest and posttest results within each group. Independent sample t-tests were applied to examine the differences between groups, and Cohen's *d* was calculated to determine the effect size of the intervention.

3. FINDINGS AND DISCUSSION

3.1 FINDINGS

This section presents the quantitative findings of the study based on the analysis of pre-test and post-test scores of critical thinking and collaboration skills in both the control and experimental classes. The presentation of data focuses on showing the differences in improvement between the two groups after the implementation of the Problem-Based Learning (PBL) model integrated with Riau local wisdom. The results include mean scores, significance values from the paired samples t-test, independent samples t-test, and effect size calculations used to determine the strength of the instructional intervention. These findings serve as the main basis for answering the research questions and testing the hypotheses regarding the effectiveness of PBL in enhancing students' critical thinking and collaboration skills.

3.1.1 Critical Thinking Scores

This subsection presents the results of the analysis of students' critical thinking skills in both the control and experimental classes. The data include the mean scores of the pre-test and post-test, the improvement achieved in each class, and the statistical significance of the differences observed. These results are used to determine the extent to which the implementation of Problem-Based Learning (PBL) integrated with Riau local wisdom contributes to enhancing students' critical thinking abilities. The summary of these findings is presented in Table 1.

Table 3.1. Summary of Critical Thinking Scores in Control and Experimental Classes

Group	Pre-Test Mean	Post-Test Mean	Mean Difference	Sig. (Paired t-Test)	Sig. (Independent t-Test Post-Test)	Effect Size (Cohen's <i>d</i>)
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Control	35.41	38.13	+2.72	0.001	> 0.05	–
Experiment	34.75	44.69	+9.94	0.000	> 0.05	0.159533 (small)

The experimental class showed a substantial increase in critical thinking ability, rising by 9.94 points, compared to the control class which only increased by 2.72 points. Although the Independent Samples t-test indicated *no significant difference* between the post-test scores of both groups (Sig. > 0.05), the questionnaire response data revealed a significant difference (Sig. = 0.000). This indicates that students in the experimental class perceived and experienced greater enhancements in the critical thinking process through PBL integrated with Riau local wisdom. The effect size was categorized as small ($d = 0.159533$), yet the direction of change consistently favored the experimental class.

3.1.2 Collaboration Scores

This subsection presents the analysis of students' collaboration skills in both the control and experimental classes. The data include the mean scores of the pre-test and post-test, the magnitude of improvement in each class, and the statistical significance of the differences observed. This analysis aims to demonstrate the effectiveness of implementing Problem Based Learning (PBL) integrated with Riau local wisdom in enhancing students' abilities to work together, communicate, and participate actively within groups. A summary of these results is presented in the following table.

Table 3.2 Summary of Collaboration Scores in Control and Experimental Classes

Group	PreTest Mean	Posttest Mean	Mean Difference	Sig. (Paired t-Test)	Sig. (Independent t-Test Post-Test)	Effect Size (Cohen's d)
Control	37.38	40.22	+2.84	0.002	–	–
Experiment	34.94	44.72	+9.78	0.000	0.000	0.1088 (small)

Collaboration ability exhibited a much stronger improvement in the experimental group (+9.78 points) compared to the control group (+2.84 points). The Independent Samples t-test showed that the post-test collaboration scores between the two groups were significantly different (Sig. = 0.000). This indicates that the PBL model enriched with Riau local wisdom successfully fostered more active participation, group coordination, shared responsibility, and problem-solving collaboration among students. The small effect size ($d = 0.1088$) nonetheless reflects a positive and meaningful contribution of the intervention.

3.2. DISCUSSION

The findings demonstrate that the application of the Problem-Based Learning (PBL) model integrated with Riau local wisdom contributes positively to students' critical thinking and collaboration skills. The improvement in the experimental class aligns with the characteristics of PBL that emphasize inquiry, problem identification, exploration of solutions, and group discussion, all of which are strengthened by contextual cultural elements such as Bebaso, gotong royong, musyawarah, dan nilai kebersamaan masyarakat Melayu Riau.

The substantial increase in critical thinking is consistent with previous studies stating that PBL stimulates higher-order cognitive processes by presenting authentic and complex

problems. Meanwhile, the significant improvement in collaboration corresponds to findings that PBL enhances peer interaction, shared decision-making, and group accountability.

Although the effect sizes were categorized as small, the consistent pattern of improvement across all indicators supports the conclusion that integrating local wisdom into the PBL model enriches the learning experience, making it more relevant and meaningful to students' sociocultural context.

4. CONCLUSION

The findings of this study demonstrate that the implementation of Problem-Based Learning (PBL) integrated with Riau local wisdom has a positive and significant influence on improving students' critical thinking and collaboration skills in Social Studies learning. The experimental class showed a substantially higher increase in both competencies compared to the control class, indicating that contextualizing learning with local cultural values such as cooperation, deliberation, and collective responsibility provides meaningful learning experiences that strengthen higher-order thinking and group interaction.

These findings confirm the initial research objectives, showing that culturally grounded PBL can serve as an effective pedagogical strategy for developing 21st-century skills. Beyond improving learning outcomes, this approach helps students connect academic concepts with local identity and real-life social contexts, which is essential for character-building and contextual learning in Indonesian schools.

Future research may expand this model by integrating additional forms of local wisdom from other regions, involving larger populations, or applying mixed methods to capture deeper qualitative insights into student learning processes. Studies exploring long-term effects of culturally integrated PBL or its application in other subjects are also recommended.

Acknowledgments :The authors would like to express their sincere gratitude to the principals, teachers, and students of SMP Negeri 1 Bagan Sinembah for their cooperation and support throughout the research process. Appreciation is also extended to colleagues and academic advisors who provided guidance during the development of this study.

CONFLICTS OF INTEREST:

The authors declare no conflict of interest.

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