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Improving critical thinking through problem-based learning with flipped classroom in pancasila education

Cici Purnamasari^{*)}, Isnarmi Moeis, Suryanef Suryanef, Hasrul Hasrul
Universitas Negeri Padang, Padang, Indonesia

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ABSTRACT

Objective: This study aimed to examine the effectiveness of integrating the Problem-Based Learning (PBL) model with Flipped Classroom principles in improving students' critical thinking skills in Pancasila Education. **Methods:** This study employed Classroom Action Research based on the Kemmis and McTaggart model involving 35 Grade XI students at SMAN 1 Tigo Nagari. The intervention was conducted over two action cycles comprising planning, action, observation, and reflection. Data were collected through observations, tests, interviews, questionnaires, and documentation, and analyzed using descriptive qualitative and quantitative techniques. **Results:** Students' critical thinking improved from 27.14% before the intervention to 54.05% in Cycle I and 80.00% in Cycle II. The mean learning achievement increased from 67.14 to 89.86, while classical mastery improved from 22.86% to 97.14%. **Conclusion:** Integrating PBL with Flipped Classroom principles effectively enhanced students' critical thinking skills and learning achievement by promoting active participation, collaborative inquiry, and meaningful learning experiences.



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Corresponding Author:

Cici Purnamasari,
Universitas Negeri Padang
Email: cicipurnamasari349@gmail.com

Introduction

The increasing complexity of social and civic issues has strengthened the need to develop higher-order thinking skills, particularly critical thinking, as an essential competency for responsible citizenship. In Pancasila Education, students are expected to analyze societal issues, evaluate diverse perspectives, and apply Pancasila values in solving authentic problems (Adi et al., 2026; Fridayanti & Tirtoni, 2025). However, preliminary classroom observations at SMAN 1 Tigo Nagari indicated that students showed limited participation in discussions and had difficulty analyzing problems and constructing logical arguments. These conditions highlight the need for more student-centered learning approaches that actively promote critical thinking (Nisa & Junaedi, 2025; Susilowati et al., 2025).

Problem-Based Learning (PBL) has been widely recognized for improving critical thinking through authentic problem solving and collaborative inquiry, while the Flipped Classroom approach enhances learning by shifting content acquisition outside the classroom and maximizing in-class interaction (Anita et al., 2024; Azkia et al., 2025; Idrus, 2025; Rizkia et al., 2025). Previous studies also report that both approaches improve learning engagement, autonomy, and higher-order thinking skills (Hanabila & Surur, 2026; Langgi et al., 2025). Nevertheless, these instructional models have generally been investigated separately, leaving limited evidence regarding the benefits of integrating both approaches.

Existing studies have predominantly focused on STEM subjects using quasi-experimental or survey designs, whereas research integrating PBL and Flipped Classroom in Pancasila Education remains scarce (Suwandi et al., 2025; Wildan et al., 2025; Yulianti, 2024). Furthermore, limited attention has been given to how iterative instructional improvement through Classroom Action Research contributes to the development of students' critical thinking (Erwanto & Triantoro, 2025; Fariji et al., 2025). This gap indicates the need to investigate the effectiveness of an integrated instructional model in authentic classroom settings.

This study addresses the gap by integrating the inquiry-based characteristics of PBL with the preparatory learning process of the Flipped Classroom, where students study instructional materials before class and engage in collaborative problem-solving during classroom activities (Nugroho et al., 2026; Sofiani et al., 2025; Suastika et al., 2022). The novelty of this study lies in implementing this integrated model through Classroom Action Research in Pancasila Education, providing practical evidence of how continuous instructional refinement improves students' critical thinking and learning achievement (Hadikusuma et al., 2024; Yunitasari et al., 2025).

Based on these considerations, this study aims to examine the effectiveness of integrating Problem-Based Learning with Flipped Classroom principles in improving the critical thinking skills and learning achievement of Grade XI students in Pancasila Education at SMAN 1 Tigo Nagari. The findings are expected to strengthen the literature on student-centered learning and provide practical guidance for teachers in implementing innovative instructional strategies to foster higher-order thinking skills.

Method

This study employed a Classroom Action Research (CAR) design based on the Kemmis and McTaggart model, consisting of two cycles of planning, action, observation, and reflection. The research was conducted during the second semester of the 2025/2026 academic year at SMAN 1 Tigo Nagari, West Sumatra, involving 35 Grade XI students selected purposively based on preliminary observations indicating low critical thinking skills and limited classroom participation. The intervention integrated Problem-Based Learning (PBL) with Flipped Classroom principles by providing digital learning materials before class and implementing the five PBL phases during classroom activities. Reflection from Cycle I was used to improve teacher facilitation and collaborative learning in Cycle II. The action was considered successful when at least 80% of students achieved high critical thinking performance and the minimum mastery criterion.

Data were collected through observations, achievement tests, questionnaires, semi-structured interviews, and documentation. Critical thinking was assessed using an observation rubric adapted from Facione's six dimensions and reviewed by experts, while teacher implementation was observed to ensure instructional fidelity. Pre-tests and post-tests measured learning achievement, whereas questionnaires and interviews complemented the classroom findings. Quantitative data were analyzed descriptively using means, percentages, and classical mastery, while qualitative data were analyzed through data reduction, data display, and conclusion drawing.

Results and Discussions

This classroom action research was conducted over two intervention cycles to examine the effectiveness of the Problem-Based Learning (PBL) model integrated with Flipped Classroom principles in improving students' critical thinking skills and learning achievement in Pancasila Education. The results are presented sequentially to illustrate changes in students' critical thinking performance, academic achievement, and overall learning outcomes across the pre-action stage, Cycle I, and Cycle II. The findings demonstrate a consistent improvement following the implementation of the instructional intervention, indicating progressive development in both higher-order thinking skills and students' mastery of the learning objectives. The detailed results are presented in Tables 1–3.

Table 1. Improvement in Students' Critical Thinking Skills Across the Classroom Action Cycles

Stage	Critical Thinking Score (%)	Category	Improvement (Percentage Points)
Pre-action	27.14	Low	
Cycle I	54.05	Moderate	+26.91
Cycle II	80.00	High	+25.95
Overall Improvement	27.14 to 80.00	Low to High	+52.86

The classroom action research demonstrated a substantial improvement in students' critical thinking skills following the implementation of the Problem-Based Learning (PBL) model integrated with the principles of the Flipped Classroom. Prior to the intervention, students exhibited a low level of critical thinking, with only 27.14% of the expected critical thinking indicators being achieved. Following the first cycle, the average score increased

to 54.05%, indicating that students had begun to develop more structured reasoning, problem analysis, and collaborative discussion skills. Further refinement of the instructional strategy during Cycle II resulted in an average achievement of 80.00%, representing a high level of critical thinking performance. Overall, the intervention produced a total improvement of 52.86 percentage points, indicating that combining PBL with pre-class learning activities effectively strengthened students' higher-order thinking skills.

Table 2. Improvement in Students' Learning Achievement

Stage	Mean Score	Students Achieving Mastery (n)	Classical Mastery (%)
Pre-action	67.14	8	22.86
Cycle I	81.00	30	85.71
Cycle II	89.86	34	97.14

The improvement in critical thinking skills was accompanied by a marked enhancement in students' academic achievement. Before the intervention, the class average was 67.14, with only 22.86% of students achieving the minimum mastery criterion. After implementing the first cycle, the average score increased to 81.00, while classical mastery rose sharply to 85.71%, indicating that most students had successfully achieved the expected learning outcomes. Additional improvements in instructional implementation during Cycle II further increased the class average to 89.86 and raised classical mastery to 97.14%. These findings suggest that integrating independent pre-class learning with collaborative problem-solving activities not only enhanced students' reasoning abilities but also translated into significantly better academic performance.

Table 3. Summary of Research Outcomes

Variable	Pre-action	Cycle I	Cycle II	Overall Outcome
Critical thinking skills (%)	27.14	54.05	80.00	Improved from low to high category
Mean learning achievement	67.14	81.00	89.86	Continuously increased
Classical learning mastery (%)	22.86	85.71	97.14	Nearly all students achieved mastery

Overall, the findings consistently demonstrate that the implementation of the Problem-Based Learning model supported by Flipped Classroom principles positively influenced both students' cognitive performance and higher-order thinking abilities. Progressive improvements across the two action cycles indicate that repeated exposure to authentic problem-solving activities, supported by independent preparation before classroom meetings, enabled students to participate more actively in discussions, construct stronger evidence-based arguments, evaluate alternative solutions more critically, and achieve substantially better learning outcomes. The convergence of improvements in critical thinking and academic achievement confirms the effectiveness of the instructional intervention in fostering meaningful learning within Pancasila Education.

The overall improvement in students' critical thinking skills throughout the intervention is further illustrated in Figure 1. The line chart provides a visual representation of the progressive increase in critical thinking performance from the pre-action stage to Cycle II, highlighting the effectiveness of integrating the Problem-Based Learning model with Flipped Classroom principles across the two classroom action cycles.

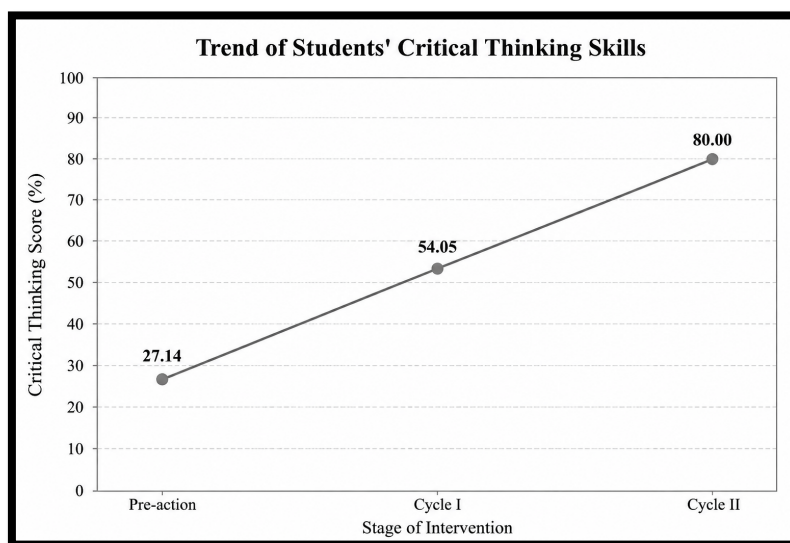


Figure 1. Trends in Students' Critical Thinking Skills Across the Classroom Action Cycles

The findings indicate that integrating Problem-Based Learning (PBL) with Flipped Classroom principles effectively enhanced students' critical thinking skills in Pancasila Education. The improvement was reflected not only in higher critical thinking scores but also in students' ability to interpret problems, analyze evidence, evaluate alternative solutions, and formulate logical arguments during classroom discussions. Classroom observations further showed that students became more confident in expressing opinions and defending their arguments with evidence, supporting the constructivist view that meaningful learning occurs through active knowledge construction. These findings are consistent with previous studies reporting that PBL and Flipped Classroom facilitate higher-order thinking through authentic learning experiences (Lestari et al., 2021; Muchtarom et al., 2026; Sanusi et al., 2025).

The continuous improvement from Cycle I to Cycle II demonstrates the importance of reflective instructional refinement in Classroom Action Research. Reflection after Cycle I identified limited teacher facilitation, uneven student participation, and insufficient collaborative interaction. Accordingly, Cycle II emphasized more structured group discussions, stronger teacher guidance, and greater opportunities for students to present and justify their ideas. Observations indicated that these improvements increased students' participation and collaborative inquiry, while pre-class learning enabled them to enter classroom discussions with better conceptual understanding. These findings support Bloom's revised taxonomy and previous research highlighting the contribution of flipped learning to critical reasoning and classroom interaction (Prasetyarini et al., 2025; Pratiwi et al., 2025; Suarniati et al., 2018).

The improvement in critical thinking was accompanied by higher learning achievement, indicating that both outcomes developed simultaneously through active learning. Students who demonstrated stronger analytical reasoning during problem-solving activities also showed better conceptual understanding in post-test assessments. Questionnaire responses and interview results revealed that independent preparation before class increased students' confidence and readiness to participate in collaborative discussions, enabling them to connect theoretical concepts with authentic civic issues more effectively. These findings are consistent with previous studies showing that combining active learning and flipped instruction improves conceptual understanding and academic performance (Nuemaihom et al., 2025; Sarkadi et al., 2020; Sumardi et al., 2026; Winarno et al., 2023).

Another important finding is that the integration of PBL and Flipped Classroom promoted learner autonomy and collaborative learning. Students actively utilized digital learning materials before class, allowing classroom sessions to focus on discussion, evidence evaluation, and problem solving rather than teacher-centered instruction. Observation and interview findings indicated that students became more responsible for their own learning and participated more actively in group discussions. This supports previous studies suggesting that flipped learning strengthens self-regulated learning and collaborative knowledge construction when integrated with inquiry-based instruction (Aminu et al., 2026; Budiyo, 2026; Utami et al., 2023; Walid et al., 2025).

This study extends previous research by demonstrating the effectiveness of integrating PBL and Flipped Classroom within Pancasila Education through a Classroom Action Research approach. Unlike earlier studies that generally examined each model separately or relied on quasi-experimental designs, this study shows how iterative instructional improvement contributes to the development of students' critical thinking in authentic classroom practice. Although the findings are limited to a single classroom context, they provide practical evidence that integrating student-centered learning with continuous reflection can improve both critical thinking and learning achievement, while offering a pedagogical reference for teachers implementing innovative civic education practices (Daya et al., 2025; Khastini & Maryani, 2025; Wardani et al., 2025; Widiyanto et al., 2026).

Conclusions

This study concludes that the integration of the Problem-Based Learning (PBL) model with Flipped Classroom principles is effective in improving students' critical thinking skills in Pancasila Education. The iterative implementation of authentic problem-solving activities supported by independent pre-class learning enabled students to develop stronger analytical reasoning, evidence-based argumentation, and collaborative problem-solving skills, which were reflected in the substantial improvement in critical thinking performance and learning achievement across the two action cycles. These findings indicate that combining PBL with Flipped Classroom creates a more student-centered learning environment that promotes active engagement and meaningful learning. Therefore, this integrated instructional approach offers a practical pedagogical strategy for fostering higher-order thinking skills in secondary civic education and may serve as a reference for teachers seeking to enhance the quality of classroom learning through innovative instructional practices.

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