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Improving Students' Critical Thinking Skills Using The Problem Based Learning (PBL) Learning Model

Ajeng Inda Desima¹, Hendriyadi², Ani Pajrini³

^{1,2,3} Yasni Bungo Islamic University Jambi, Indonesia

indahdesimaajeng@gmail.com, el.hendriyadi@gmail.com, Anipajrini@iaiyasnibungo.ac.id

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*Correspondence Address:

indahdesimaajeng@gmail.com

Abstract:

Critical thinking skills are an essential competency in social studies learning because they allow students to identify problems, analyze information, provide reasons, draw conclusions, and solve environmental problems responsibly. However, initial observations in class V B SDN 192/II Sungai Buluh show that learning still tends to be teacher-centered and has not encouraged student involvement, with the average critical thinking ability in the pre-cycle stage only reaching 43.8%. This study aims to improve students' critical thinking skills through the application of the Problem Based Learning (PBL) model in the IPAS material of Bumiku Sayang, Bumiku Malang. The research uses Kurt Lewin's model class action research design which includes the stages of planning, implementing actions, observation, and reflection, with 21 subjects of class V B in two cycles, each consisting of two meetings. Data were collected through observation of four-scale critical thinking skills, observation of learning activities, written tests, documentation, and field notes, then analyzed descriptively quantitative and qualitatively. The results showed that the average critical thinking ability increased from 43.8% in the pre-cycle to 85.6% at the end of Cycle II, with all indicators exceeding the success criteria of at least 80%, including problem identification 84%, information analysis 84%, reasoning 84%, conclusion drawing 90%, and problem solving 86%. It can be concluded that environmental problem-based PBL is effective in creating contextual, collaborative, reflective, and student-centered IPAS learning.

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Introduction (مقدمة)

Critical thinking skills are essential competencies in 21st-century learning because they allow students to identify problems, assess the relevance of information, formulate reasons, draw conclusions, and determine solutions responsibly. In the learning of Natural and Social Sciences (IPAS) in elementary schools, these competencies are important because the material connects natural phenomena, social life, and environmental problems (Zhafira et.al., 2026). A curriculum that emphasizes active learning demands a shift from information transmission to investigative activities that provide space for students to ask questions, discuss, test evidence, and reflect on their learning outcomes (Thomas et.al., 2025). However, initial observations in class V B SDN 192/II Sungai Buluh show that learning still tends to be teacher-centered. Students have not consistently explained basic concepts, analyzed information, expressed conflicting opinions, or solved problems independently. Of the 21 students, only about five students seemed to have good critical thinking skills. This condition emphasizes the urgency of contextual, participatory, and targeted learning interventions to strengthen students' intellectual involvement in IPAS learning.

Problem Based Learning (PBL) is seen as relevant to answer these needs because it places authentic problems as the starting point for learning. Through PBL, students not only receive explanations from the teacher, but also construct knowledge through activities to understand problems, gather information, propose hypotheses or alternative solutions, discuss, present findings, and reflect (Akçay & Fen, 2025). This series of activities is in line with the dimension of critical thinking, especially focusing on problems, providing evidence-based reasons, drawing inferences, using information according to the situation, clarity of explanations, and reviewing decisions (Indrapangastuti, 2023). A number of studies report that PBL has the potential to improve students' critical thinking skills and problem-solving through collaborative and contextual learning (Wei et al., 2023). However, its effectiveness does not occur automatically; the quality of the problem, teacher facilitation, group management, availability of time, and assessment instruments determine the depth of the student's thinking process. Therefore, the application of PBL to elementary school IPAS needs to be designed as a learning action that is systematic, carefully observed, and reflected based on evidence of changes in students' abilities in each cycle of classroom action research in a real and consistent manner.

State-of-the-art research on PBL shows the development of focus from testing general learning outcomes to strengthening higher-level thinking competencies, science literacy, collaboration, and problem-solving (Yuhana & Fajari, 2025). At the elementary school level, PBL is widely used to relate material to real-life situations so that concepts are not understood verbally and separated from context. Previous research has also indicated that student involvement increases when problems are presented concretely, assignments are done collaboratively, and teachers provide guiding questions (Tesfaw et.al., 2024). However, some studies emphasize more on the comparison of scores before and after treatment or cognitive learning outcomes, while the development process of each critical thinking indicator has not always been tracked in detail (Tang, 2024). In addition, variations in student characteristics, materials, and classroom conditions make the findings between studies cannot be generalized directly. Therefore, classroom action research is needed to document how PBL planning, implementation, observation, and reflection produce learning improvements that are responsive to the needs of grade V students in environmental science materials and elementary school contexts.

This research departs from the practical and scientific need to improve social studies learning in the material "Bumiku Sayang, Bumiku Malang" through PBL. The material provides environmental issues that allow students to connect knowledge with daily experiences, for example about the impact of human behavior on the earth and efforts to protect the environment (Suryawati et.al., 2020). In this context, critical thinking is not understood as limited to the ability

to answer problems, but rather as the ability to identify problems, analyze information, make excuses, draw conclusions, and choose reasonable solution steps (Setiawan, 2023). The research was carried out with Kurt Lewin's model classroom action research design through a cycle of planning, action, observation, and reflection. This design allows researchers and teachers to monitor changes in the learning process while correcting obstacles that arise in the next cycle (Rahayu et.al., 2025). Thus, the research not only tests the application of PBL, but also produces contextual evidence on facilitation strategies that encourage students to be more active, effective, confident in conveying ideas, and being responsible for the results of discussions in IPAS learning in a measurable, sustainable, and according to class needs.

The research gap of this research lies in the limited study that operationally combines the application of PBL with the gradual monitoring of five indicators of critical thinking in elementary school science learning, namely identifying problems, analyzing information, providing reasons, drawing conclusions, and solving problems. Previous studies generally affirm the benefits of PBL for critical thinking, but have not fully explained the improvement mechanism in the classroom with the dominance of a teacher-centered approach and the need for higher guidance such as at SDN 192/II Sungai Buluh. The novelty of this research lies in the use of two-cycle classroom action research that integrates environmental problems in the material "Bumiku Sayang, Bumiku Malang", observation sheets based on five indicators, and cycle reflection as a basis for improving teacher facilitation and group work. *The novelty* results in a contextual understanding of changes in students' critical thinking skills during the action process, not just differences in final achievements. This research also offers a model of PBL practice that can be replicated adaptively by elementary school teachers in other social studies learning.

The purpose of this study is to improve students' critical thinking skills through the application of *Problem Based Learning* in the material "Bumiku Sayang, Bumiku Malang" in class V B SDN 192/II Sungai Buluh. The research measures the ability to identify problems, analyze information, provide reasons, draw conclusions, and solve problems after learning actions are carried out. Based on these objectives, the formulation of the research problem is: how to plan the application of the *Problem Based Learning* model to improve students' critical thinking skills in science learning class V B SDN 192/II Sungai Buluh?; how to implement the *Problem Based Learning* model in improving students' critical thinking skills in science learning class V B SDN 192/II Sungai Buluh?; and how to improve students' critical thinking skills after the application of the *Problem Based Learning* model in science learning class V B SDN 192/II Sungai Buluh? The three formulations place planning, action processes, and improvement results as analytical units in classroom action research and are oriented towards learning improvement.



Method (منهج)

This study uses the Kurt Lewin model *classroom action research* design to improve students' critical thinking skills through the application of the *Problem Based Learning* (PBL) model in Natural and Social Sciences (IPAS) learning (Wahyuningtyas et.al, 2023). The Kurt Lewin model was chosen because it provides cyclical learning improvement procedures through the stages of planning, implementing actions, observation, and reflection. The research was carried out in the even semester of the 2025/2026 school year in class V B SDN 192/II Sungai Buluh. The research subjects amounted to 21 students, according to the observation data used in the analysis, with the composition and identity of students following the class attendance list at the time the action was carried out. The action was focused on the IPAS material "Bumiku Sayang, Bumiku Malang" with environmental issues as an authentic learning context. The context was chosen because it allows students to relate the concept of IPAS to real problems, such as waste, environmental pollution, the impact of human behavior, and environmental conservation efforts. The research was carried out in two cycles, with each cycle consisting of two meetings. Each meeting lasted for 2×35

minutes. Cycle II was designed based on the results of the reflection of cycle I to improve the quality of teacher facilitation, students' understanding of problems, equal distribution of group participation, and the ability to convey reasons and solutions independently.

Each research cycle includes four stages. In the planning stage, the researcher and the classroom teacher compile teaching modules, student worksheets, visual media, environmental problem scenarios, critical thinking ability observation instruments, teacher and student activity observation sheets, field notes, and written tests. At the action implementation stage, PBL is applied through student orientation to problems, heterogeneous group organization, guided investigation, identification of facts and causes of problems, preparation of alternative solutions, presentation of discussion results, intergroup responses, and learning reflection (Niswa et.al., 2022). The teacher acts as a facilitator who provides guiding questions, regulates the distribution of participation, monitors group work, and provides feedback on the student's thinking process. The observation stage is carried out during learning to document teacher activities, student involvement, and the development of critical thinking skills. In the reflection stage, researchers and teachers analyze the results of observations, tests, documentation, and field notes to identify the success and obstacles to action. The results of the reflection of cycle I are used as the basis for improving actions in cycle II, especially through simplification of problems, the use of visual media, improvement of LKPD, affirmation of the role of group members, and *strengthening scaffolding* for students who are not able to analyze information and formulate evidence-based arguments.

The main data of the study was obtained through the observation of students' critical thinking skills using a four-scale assessment rubric. The five indicators observed include: (1) the ability to identify problems; (2) the ability to analyze information; (3) the ability to give reasons or arguments; (4) the ability to draw conclusions; and (5) the ability to solve problems. In each indicator, the maximum class score was 84, which is the result of multiplying 21 students with the highest score of four. Supporting data were obtained through observation of teacher and student activities, the results of group discussions, written tests at the end of the cycle, learning documentation, and field notes. The use of various data sources is intended to strengthen the triangulation of processes and action outcomes, so that the interpretation of improving critical thinking skills is not only based on quantitative scores, but also on changes in student engagement, argumentation quality, and independence during learning (Morgan, 2024). Data analysis is carried out descriptively, quantitatively, and qualitatively. The scores of each indicator are summed and converted into percentages using the formula:

$$P = \frac{f}{N} \times 100\%$$

P is the percentage of achievement; f is the score obtained; and N is the maximum score. The percentage is used to describe the change in critical thinking achievement in the first and second meetings, Cycle I of the first and second meetings, and Cycle II fN of the first and second meetings. The success of the action is determined when the achievement of each indicator reaches at least 80%, which indicates the category of good or excellent, accompanied by increased student involvement in discussion and problem-solving activities.

Result (نتائج)

The planning for the implementation of *Problem Based Learning* was prepared based on the results of the pre-cycle which showed an average of 43.8% students' critical thinking skills. These initial achievements showed that students were not optimal in identifying problems, analyzing information, providing reasons, drawing conclusions, and solving environmental problems in the IPAS material "Bumiku Sayang, Bumiku Malang". Researchers and classroom teachers then

compiled teaching modules, student worksheets, visual media, environmental problem scenarios, four-scale observation rubrics, and evaluation tests. The action design followed the PBL stages, namely problem orientation, heterogeneous group organization, guided investigation, solution preparation, presentation, and reflection. In cycle II, planning is refined based on the reflection of cycle I through simplifying problem redactions, adding contextual images, affirming the role of each group member, and compiling LKPD with columns of facts, causes, impacts, evidence, solutions, and conclusions. This design reflects social constructivism because students build understanding through authentic problems, group dialogue, and gradual help from teachers.

Tabel 1. Hasil perencanaan penerapan PBL

Components	Cycle I	Cycle II Enhancement
Planning basics	Average pre-cycle critical thinking of 43.8%	Reflection on obstacles during Cycle I
Material and context	IPAS "Bumiku Sayang, Bumiku Malang" through environmental issues	Problems are clarified with images and examples of the surrounding environment
Devices	Teaching modules, LKPD, media, problem scenarios, observation rubrics, and tests	The LKPD is revised with the columns of facts, causes, impacts, evidence, solutions, and conclusions
Learning organization	Heterogeneous groups for discussion and investigation	The role of group members is emphasized so that participation is more evenly distributed
Teacher facilitation	Guiding questions in the discussion process	<i>Scaffolding</i> is strengthened for analysis, argumentation, and conclusion drawing
Assessment indicators	Five indicators of critical thinking ability	Five indicators are maintained to evaluate the impact of improvements
Success targets	Achievement of indicators towards good categories	Each indicator reaches a minimum of 80%

The implementation of PBL was carried out in two cycles, each consisting of two meetings lasting 2×35 minutes. In cycle I, teachers presented environmental issues, organized students into heterogeneous groups, guided investigations through guiding questions, and facilitated the presentation of discussion results. Students began to be involved in problem observation, information gathering, and preparation of alternative solutions, but participation was not even and some students' arguments were still not evidence-based. The average class achievement increased from 43.8% in the pre-cycle to 45.6% in the first meeting and 48.0% in the second meeting in the first cycle. Improvements in the second cycle were made through the use of visual media, more systematic LKPD, group role sharing, and strengthening teacher feedback. The average achievement increased to 55.0% in the first meeting and 85.6% in the second meeting. The improvement of the process shows that authentic problems, group interactions, and *teacher scaffolding* lead students to build understanding collaboratively according to the principles of social constructivism.

Table 2. Results of PBL implementation based on the development of class achievement

Stage of action	Main activities	Average critical thinking achievement
Precycle	Learning tends to be teacher-centred	43,8%

Cycle Meeting 1	I	Problem orientation, group formation, and initial investigation	45,6%
Cycle Meeting 2	I	Discussions, solution development, presentations, and reflections	48,0%
Cycle Meeting 1	II	Improvement of LKPD, visual media, and group role sharing	55,0%
Cycle Meeting 2	II	Directed inquiry, reinforcement of arguments, presentations, and reflections	85,6%

The improvement of students' critical thinking skills after the application of the *Problem Based Learning* (PBL) model in the learning of IPAS material "Bumiku Sayang, Bumiku Malang" showed significant results in all observed indicators. The average critical thinking ability of students in class V B SDN 192/II Sungai Buluh increased from 43.8% in the pre-cycle stage to 85.6% at the end of Cycle II, resulting in an increase of 41.8 percentage points during the series of actions. The ability to identify problems increased from 46% to 84%, the ability to analyze information increased from 42% to 84%, and the ability to give reasons or arguments increased from 44% to 84%. The indicator of drawing conclusions recorded the highest increase, from 40% to 90%, while problem-solving ability increased from 47% to 86%. All indicators at the end of Cycle II had exceeded the minimum success criteria of 80% set in this study, so that the actions were declared successful overall. These achievements reinforce the assumption that authentic environmental problems, heterogeneous group work, and adaptive teacher *scaffolding* contribute to the gradual and continuous strengthening of students' reasoning in each action cycle.

Table 3. Improvement of critical thinking skills

Indicators of critical thinking	Precycle	Cycle I		Cycle II		Transcendental-final ascension	Success status
		First meeting	Second meeting	First meeting	Second meeting		
Identify issues	46%	48%	50%	57%	84%	38 points	Achieved
Analyze information	42%	45%	47%	54%	84%	42 points	Achieved
Providing a reason/argument	44%	45%	47%	53%	84%	40 points	Achieved
Pulling a conclusion	40%	42%	46%	57%	90%	50 points	Achieved

on							
Trouble shoot	47%	48%	50%	54%	86%	39 points	Achieved
Average class achievement	43,8%	45,6%	48,0%	55,0%	85,6%	41.8 points	Achieved



Discussion (مناقشة)

Vygotsky's theory of social constructivism is the basis of this research because it explains that knowledge is built through the interaction between individual experiences, contextual problems, language, and social collaboration (Wibowo et.al., 2025). Students are not positioned as recipients of information and are given the opportunity to interpret environmental phenomena, test information, convey reasons, and revise their understanding through dialogue with friends and teachers. This principle is in line with *Problem Based Learning*, which initiates learning from authentic problems and directs students to work in groups to investigate, formulate conclusions, and determine solutions (Saleh et al., 2022). The concept of proximal developmental zones explains the importance of *scaffolding* in the form of guiding questions and feedback when students face difficulties (Al-Hamadi & Yousif, 2025). In classroom action research, teachers act as facilitators who reduce assistance as students' independence increases. The theory of social constructivism therefore explains the logical relationship between PBL actions, collaborative activities, and increased critical thinking indicators of identifying problems, analyzing information, providing reasons, drawing conclusions, and solving problems.

The planning for the implementation of *Problem Based Learning* (PBL) in IPAS learning in the material "Bumiku Sayang, Bumiku Malang" was prepared in response to the low critical thinking skills of students at the preliminary stage. The average initial achievement of 43.8% shows that learning that previously tended to be teacher-centered has not provided adequate space for students to identify problems, analyze information, put forward reasons, draw conclusions, and determine solutions. Therefore, action planning is not only oriented to the delivery of material, but is designed to build an authentic learning experience based on environmental problems. The researcher and the teacher compile teaching modules, student worksheets, visual media, problem scenarios, four-scale observation rubrics, and evaluation instruments. The device is directed to activate students in the investigation process. Issues about waste, pollution, and human behavior towards the environment are used as a trigger for discussion because they are close to students' daily experiences (Rahmawati et.al., 2022). Thus, PBL planning makes environmental issues a bridge between the concept of social studies and the need to develop students' critical thinking skills.

Action planning in cycle I follows the PBL syntax which consists of student orientation to problems, organizing learning activities, guided investigations, drafting alternative solutions, presenting discussion results, and reflection. Each stage is designed to direct student activities on five critical thinking indicators measured in the research, namely identifying problems, analyzing information, providing reasons or arguments, drawing conclusions, and solving problems. The problem orientation stage is designed to help students clearly recognize environmental problems. Heterogeneous group organizing aims to create learning opportunities through cooperation and exchange of ideas (Baptista et.al., 2025). Furthermore, guided investigation allows students to

collect, sort, and connect information relevant to the problem being studied. The solution preparation and presentation stage is designed for students to learn to explain the reasons for their choice of action. Reflection serves to help students review the process and results of problem solving. The design is relevant to the characteristics of PBL because learning does not start from providing answers, but from the involvement of students in understanding and solving contextual problems systematically.

The use of heterogeneous groups in action planning is important because students' critical thinking skills are not developed individually, but through the process of social interaction. In group activities, students with different abilities have the opportunity to express opinions, listen to friends' views, express approval or disapproval, and make decisions together. This condition is in line with Vygotsky's theory of social constructivism which places interaction, communication, and collaboration as important elements in knowledge formation (Chand, 2023). PBL planning also places teachers as facilitators, not as the only source of knowledge. Teachers prepare guiding questions to help students find connections between the facts, causes, impacts, and solutions of environmental problems. In the context of this study, guiding questions function as a form of *scaffolding* so that students who are not used to analyzing can carry out the thinking process gradually. With this planning, learning is directed to build students' intellectual independence without eliminating the pedagogical support needed during the investigation process.

The results of the reflection of Cycle I showed that initial planning had encouraged student involvement, but there were still obstacles in information analysis, argument preparation, and drawing conclusions. The achievement of indicators in Cycle I meetings was still at 50%; identifying problems and solving problems each reached 50%, while analyzing information and giving reasons reached 47%, and drawing conclusions reached 46%. These findings show that the initial design of PBL needs to be refined so that the students' reasoning process becomes more directed. Therefore, Cycle II planning contains improvements in the form of simplifying problem redaction, using more contextual visual media, affirming the division of tasks of group members, and revision of the LKPD. The improved LKPD provides columns to record facts, causes, impacts, evidence, alternative solutions, and conclusions. The development of these tools is important because elementary school students need a clear learning structure to turn observed information into reasons and decisions. Thus, reflection serves as an empirical basis for improving the quality of action in the next cycle.

Cycle II planning shows the reflective character of Kurt Lewin's model class action research, as the follow-up actions are structured based on problems found in the previous cycle. The addition of visual media helps students understand the context of environmental problems more concretely, while the revision of the LKPD directs the sequence of reasoning from the introduction of facts to the formulation of conclusions. In addition, the division of roles in groups is designed to reduce the dominance of certain students and open up opportunities for all members to engage in discussions (Hopkins, 2023). This planning strengthens the relationship between authentic problems, collaborative activities, and the development of critical thinking as assumed in the theory of social constructivism. The impact of these improvements was seen at the end of Cycle II, when the achievement of indicators increased to 84% for identifying problems, analyzing information, and providing reasons; 90% for drawing conclusions; and 86% for solving problems. This improvement indicates that systematic, adaptive, and reflection-based PBL planning contributes to the creation of a more active, directed, and student-centered IPAS learning process.

Analytically, PBL planning in this study can be understood as a mechanism that transforms social studies learning from information reception activities to problem-based knowledge construction activities. The change in achievement from a pre-cycle average of 43.8% to 85.6% at the end of Cycle II cannot be separated from the interconnectedness between planning

components, namely authentic environmental problems, structured LKPDs, heterogeneous groups, visual media, guiding questions, and action reflections. Authentic problems provide a reason for students to investigate concepts, while group work provides a space to test opinions through dialogue. LKPD and guiding questions provide a structure of thinking for students to move from observation to analysis, argumentation, conclusions, and solutions. Improvements in Cycle II show that the effectiveness of PBL is not only determined by the application of its stages, but also by the quality of *scaffolding* and the suitability of the device to the needs of students. Therefore, planning that is responsive to observational data is the main aspect of successful action. These findings confirm that PBL in IPAS learning can strengthen critical thinking if problems, social interaction, teacher facilitation, and indicator evaluation are designed in an integrated manner.

The implementation of *Problem Based Learning* (PBL) in the learning of science material "Bumiku Sayang, Bumiku Malang" shows a shift in the learning process from a teacher-centered pattern to learning that places students as the main actors of investigation. In Cycle I, teachers begin the activity by presenting environmental problems related to waste, pollution, and the impact of human behavior on the preservation of the earth. Students are directed to observe problems, identify initial information, and express opinions based on daily experiences. After that, students are divided into heterogeneous groups to discuss the causes, impacts, and possible solutions to the problems presented. The teacher facilitates the activity through guiding questions and does not directly provide final answers. This implementation pattern is in line with the characteristics of PBL which makes authentic problems as the starting point for knowledge construction (Smith et al., 2022). In the context of social science learning, environmental problems function as a medium to connect academic concepts with the reality of students' lives. Thus, the implementation of PBL allows students not only to understand the material verbally, but also to develop skills to observe, ask questions, discuss, and solve problems collaboratively.

In Cycle I, student involvement began to be seen through the activities of expressing opinions, recording information, discussing in groups, and presenting the results of the investigation. However, the implementation of actions has not resulted in completely equal participation. Some students still rely on more active friends when identifying problems and formulating solutions. This condition is reflected in the achievement of the first meeting of Cycle I, which is 48% to identify problems, 45% to analyze information, 45% to provide reasons or arguments, 42% to draw conclusions, and 48% to solve problems. In the second meeting, the achievement increased to 50%, 47%, 47%, 46%, and 50%. These changes show that students are beginning to adapt to the problem-based learning process, but are not yet fully able to use information as a basis for arguments and conclusions. These findings show that the implementation of PBL in elementary school students requires intensive facilitation, especially in the early stages. Teachers need to help students understand the flow of activities, distinguish facts and opinions, and connect the data found with the solutions to be proposed.

The implementation of actions in Cycle II is designed as a response to the results of reflection in Cycle I. Teachers clarify the context of the problem through visual media so that students get a more concrete picture of the impact of environmental problems. Students' worksheets are also improved with a more systematic sequence of activities, starting from recording facts, identifying causes and impacts, collecting evidence, preparing reasons, determining alternative solutions, and drawing conclusions. These improvements support students to follow the reasoning stages gradually. Teachers also emphasized the division of roles in groups, such as problem readers, information recorders, opinion presenters, and reporters of discussion results (Nagpal et al., 2025). The strategy aims to reduce the dominance of certain students and expand opportunities for each student to participate. In the implementation of Cycle II, teachers use guiding questions in a more targeted way to stimulate students' analysis, for example by asking them to explain the reasons for choosing solutions and show information that

supports this opinion. Thus, the implementation of PBL in Cycle II focuses not only on the completion of group tasks, but also on the quality of the thinking process built by each student.

The impact of improving the implementation of PBL can be seen in the development of student achievement during Cycle II. At the first meeting, the ability to identify problems reached 57%, analyze information 54%, provide reasons or arguments, draw conclusions 57%, and solve problems 54%. These results show an improvement compared to Cycle I, although some students still need help in developing evidence-based reasons. At the second meeting of Cycle II, all indicators experienced a more substantial increase. The ability to identify problems, analyze information, and provide reasons or arguments each reached 84%. The ability to draw conclusions reached 90%, while the ability to solve problems reached 86%. These achievements show that the implementation of PBL supported by contextual problems, visual media, structured LKPD, group work, presentations, and feedback was able to strengthen students' intellectual engagement. Students no longer only mention environmental problems, but begin to be able to relate facts to causes, provide reasons for solutions, and formulate conclusions based on the results of the discussion (Rohayat & Hidayat, 2026). Thus, the actions in Cycle II meet the set success criteria, namely a minimum achievement of 80% in each critical thinking indicator.

The implementation of PBL in this study shows the relevance of Vygotsky's theory of social constructivism in elementary school science learning. The theory explains that knowledge is built through the relationship between experience, social interaction, language, and support from more competent individuals. In this action, environmental problems provide contextual experiences that students can observe and discuss, while group work creates a space for the exchange of ideas as well as the negotiation of meaning (Ardoyn & Heimlich, 2021). The teacher performs the role of facilitator by providing *scaffolding* through guiding questions, feedback, and the organization of increasingly structured activities. This assistance is especially needed in Cycle I when students are not used to analyzing problems independently. In Cycle II, more active student involvement shows that teacher assistance begins to be reduced as students increasingly understand investigation and discussion procedures. Therefore, the implementation of PBL is not solely understood as the use of certain learning steps, but as a facilitation process that encourages students to move from dependence to independence in thinking. The results of the study reinforce the importance of teachers adjusting the level of assistance to the needs of students during the learning process.

Analytically, the implementation of PBL was successful because there was an alignment between the context of the problem, the stages of action, the role of the teacher, the group activity, and the measured indicators of critical thinking ability. The environmental problems in the material "Bumiku Sayang, Bumiku Malang" made science learning meaningful because students were able to relate knowledge to the conditions they knew. In the initial stage, the achievement of Cycle I, which was still at 50%, showed that changes in the learning approach did not directly result in mature critical thinking skills. However, reflection on these obstacles allowed teachers to improve the implementation in Cycle II through visual media, more structured LKPD, role division, and more specific guiding questions. The increase in the final achievement to 90% shows that the success of PBL is influenced by the quality of facilitation, not just the existence of group problems. Social interaction helps students test ideas, while *scaffolding* helps them turn information into arguments and conclusions. Thus, effective PBL implementation needs to be viewed as an adaptive and reflective process, especially in classroom action research that places observational results as the basis for learning improvement in subsequent cycles.

The improvement of critical thinking skills of students in class V B SDN 192/II Sungai Buluh after the implementation of Problem Based Learning (PBL) shows achievements that are consistent with the purpose of this study, which is to improve social studies learning in the material Bumiku Sayang, Bumiku Malang which previously tended to be teacher-centered. The average critical thinking ability of students increased from 43.8% in the pre-cycle to 85.6% at the

end of Cycle II, or an increase of 41.8 percentage points. The increase did not occur instantly, but gradually through 45.6% and 48.0% in Cycle I, then 55.0% at the first meeting of Cycle II. This gradual increase pattern emphasizes the cyclical character of Kurt Lewin's model class action research, because each action stage is structured based on reflection on the obstacles in the previous stage (Zhai, 2025). These findings are in line with the preliminary study that emphasizes the urgency of contextual and participatory learning interventions to strengthen students' intellectual engagement which was initially low, so that the final results show that environmental problem-based PBL is able to answer these needs empirically and measurably.

The ability to identify problems increased from 46% in the pre-cycle to 84% at the end of Cycle II, an increase of 38 percentage points that confirmed the success of the problem-orientation stage in the PBL syntax. In the initial condition, students generally mentioned environmental phenomena in general without being able to formulate the core problems to be solved, as illustrated in the introduction to the dominance of teacher-centered learning. Once the action was implemented, the use of authentic problems around waste and pollution, reinforced by visual media in Cycle II, helped students focus on the core of the problem in a more targeted manner. This ability determines the direction of the next investigation process, as the clear formulation of the problem makes it easier for students to determine the relevant information to gather (Pozuelo et.al., 2023). These results reinforce the theoretical framework of Vygotsky's social constructivism which emphasizes the importance of contextual experience as a starting point for knowledge formation, while proving that problem-based learning methods are effective in stimulating elementary school students' sensitivity to the real problems around them.

The ability to analyze information increased from 42% to 84%, while the ability to give reasons or arguments increased from 44% to 84%, increasing by 42 and 40 percentage points, respectively. This achievement is closely related to the improvement of the learning instruments described in the research methods section, especially the revision of the students' worksheets in Cycle II which contains columns of facts, causes, impacts, evidence, solutions, and conclusions. This structure helps students who previously only gave short answers without explaining the causal relationship, to gradually process information systematically and convey evidence-based opinions from group discussions. This development is clear evidence that teacher scaffolding through guiding questions, as affirmed in the framework of the proximal development zone theory, plays an important role when students are not used to conducting independent analysis (Marmin et al., 2021). Thus, the increase in these two indicators shows that the quality of learning tools and the intensity of teacher facilitation also determine the depth of students' thinking process in processing information into logical and responsible arguments.

The pull-to-conclusions indicator recorded the highest increase among all indicators, from 40% in the pre-cycle to 90% at the end of Cycle II, or an increase of 50 percentage points, while problem-solving ability increased from 47% to 86% with an increase of 39 percentage points. The highest achievement in this pull-to-conclusions indicator was consistent with the stages of presentation of discussions, intergroup responses, and learning reflections that were explicitly designed in the research method as the final part of the PBL syntax. In Cycle I, students still had difficulty constructing evidence-based conclusions and tended to choose solutions in general, but workflow improvements in Cycle II allowed students to connect problems, causes, impacts, evidence, and alternative solutions in a more orderly manner. Achieving above 80% in these two indicators shows that reflective activities in PBL are important to prevent learning from stopping at the information gathering stage, as well as encouraging students to have the opportunity to review ideas and account for decisions made orally and in writing.

The improvement of all critical thinking indicators as a whole emphasizes the synchronization between the research findings and the objectives, problem formulation, and theoretical framework built from the introduction. The five indicators, namely identifying problems, analyzing information, providing reasons, drawing conclusions, and solving

problems, have exceeded the minimum success criteria of 80% set in the research method, so that actions are declared successful as a whole and not just in the average class achievement. This success is inseparable from Kurt Lewin's model class action research design which allows for continuous improvement through the stages of planning, implementation, observation, and reflection in each cycle (Consistente, 2026). Thus, the results of this study answer the formulation of the third problem in its entirety, namely that the application of PBL in the learning of IPAS material Bumiku Sayang, Bumiku Malang significantly improves the critical thinking skills of students in grade V B SDN 192/II Sungai Buluh, as well as strengthening the argument that learning based on relevant environmental problems is applied at the elementary school level to build students' reasoning independence.

Analytically, the average increase in critical thinking skills from 43.8% to 85.6% shows that PBL functions as a learning strategy that integrates authentic problems, investigation, collaboration, argumentation, and reflection in an integrated manner, according to Vygotsky's social constructivism framework that is the basis of this research theory. The pattern of increase in achievement, ranging from 43.8% in the preliminary study, 45.6% and 48.0% in Cycle I, to 55.0% and 85.6% in Cycle II, confirms that improvement does not occur instantaneously, but through a gradual reflection mechanism as designed in Kurt Lewin's model class action research method. The indicator draws conclusions that increase by 50 percentage points shows that the presentation and reflection of the results of the discussion are crucial stages in the formation of critical thinking. However, the results of this study are contextual in 21 students in one class and one specific science subject, so the application in other contexts needs to consider student readiness, problem complexity, media support, and the ability of teachers to provide adaptive scaffolding to different learning needs.



Conclusion (خاتمة)

This classroom action research aimed to improve the critical thinking skills of fifth-grade (Class V B) students at SDN 192/II Sungai Buluh through the Problem Based Learning (PBL) model in the IPAS unit "Bumiku Sayang, Bumiku Malang." The findings show that this objective was achieved and that PBL was effective. First, PBL planning was systematically developed through teaching modules, student worksheets, visual media, environmental problem scenarios, and observation rubrics based on five critical thinking indicators. In Cycle II, the plan was refined based on Cycle I reflection by revising the worksheets, clarifying group roles, and strengthening guiding questions. Second, implementing the PBL stages, from problem orientation, heterogeneous group work, and guided investigation to presentation and reflection, encouraged active student involvement. The teacher acted as a facilitator who provided scaffolding. Third, students' critical thinking skills rose from an average of 43.8% in the pre-cycle to 85.6% at the end of Cycle II, an increase of 41.8 percentage points. All indicators exceeded the 80% success criterion: problem identification 84%, information analysis 84%, reasoning 84%, drawing conclusions 90%, and problem solving 86%. Thus, environmental problem-based PBL, grounded in Vygotsky's social constructivism, creates contextual, collaborative, reflective, and student-centered IPAS learning. Because the study involved a single class, applying it in other contexts should consider student readiness and teachers' ability to provide adaptive scaffolding.

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