

EFFECTIVENESS OF PROBLEM-BASED LEARNING MODEL IN IMPROVING CRITICAL THINKING AND INFORMATION LITERACY OF STUDENTS OF THE WEST BANDUNG LEARNING ACTIVITY STUDY CENTER (SKB)

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Abstract

This study aims to analyze the implementation process, effectiveness, and supporting and inhibiting factors of the Problem-Based Learning (PBL) model in improving the critical thinking and information literacy skills of Package C students at the Learning Activity Center (SKB) in West Bandung Regency. The study used a mixed methods approach with an exploratory sequential design and involved 25 students. Data collection techniques included observation, interviews, and pretest-posttest tests. The results showed that PBL implementation was carried out in stages, from preparation to presentation of ideas, which encouraged students to actively analyze real problems, search for and evaluate information, and develop logical solutions. Descriptive analysis showed an increase in the average score from 61.48 on the pretest to 84.12 on the posttest. The paired sample t-test yielded a significance value of 0.000 with an average N-Gain of 0.57 (moderate category). Supporting factors included institutional support, educator competence, infrastructure, and student collaboration, while inhibiting factors included time constraints, media, differences in abilities, and problem complexity. This study confirms that PBL is effective when supported by optimal learning management.

Keywords: Problem-Based Learning Model, Critical Thinking, Information Literacy, Learning Activity Center

Abstrak

Penelitian ini bertujuan menganalisis proses implementasi, efektivitas, serta faktor pendukung dan penghambat penerapan model Problem Based Learning (PBL) dalam meningkatkan kemampuan berpikir kritis dan literasi informasi peserta didik Paket C di Sanggar Kegiatan Belajar (SKB) Kabupaten Bandung Barat. Penelitian menggunakan pendekatan mixed methods dengan desain exploratory sequential dan melibatkan 25 peserta didik. Teknik pengumpulan data meliputi observasi, wawancara, serta tes pretest–posttest. Hasil penelitian menunjukkan bahwa implementasi PBL dilaksanakan secara bertahap, mulai dari persiapan hingga presentasi gagasan, yang mendorong keaktifan peserta didik dalam menganalisis masalah nyata, mencari dan mengevaluasi informasi, serta menyusun solusi secara logis. Analisis deskriptif menunjukkan peningkatan nilai rata-rata dari 61,48 pada pretest menjadi 84,12 pada posttest. Uji paired sample t-test menghasilkan nilai signifikansi 0,000 dengan rata-rata N-Gain sebesar 0,57 (kategori sedang). Faktor pendukung meliputi dukungan kelembagaan, kompetensi pendidik, sarana prasarana, dan kolaborasi peserta didik, sedangkan faktor penghambat mencakup keterbatasan waktu, media, perbedaan kemampuan, dan kompleksitas masalah. Penelitian ini menegaskan bahwa PBL efektif apabila didukung pengelolaan pembelajaran yang optimal.

Kata kunci: Model Pembelajaran Berbasis Masalah, Berpikir Kritis, Literasi Informasi, Sanggar Kegiatan Belajar

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INTRODUCTION

Education plays a central role in developing superior human resources (HR), namely individuals with high competence, character, and competitiveness in facing global challenges. In the era of Industrial Revolution 4.0 and Society 5.0, adaptive skills, critical thinking, innovation, and collaboration are essential. Education is not merely the transfer of knowledge, but rather the process of shaping personality, work ethic, and life skills (Sarifuddin, 2025). Therefore, the education system must be able to adopt learning models that not only optimize academic achievement but also support the holistic development of character and 21st-century competencies.

Although various educational reforms have been implemented to improve the effectiveness of the teaching and learning process, the Indonesian education system still grapples with a fundamental problem: students' low ability to optimally absorb and understand subject matter. Conventional teacher-centered learning models are still frequently used, where the learning process is dominated by lectures, memorization, and one-way assignments. As a result, students play more of a passive role, while the teacher remains the sole source of information. This situation has resulted in low problem-solving and collaboration skills in the modern era (Syahri et al., 2021).

To address these challenges, the development of innovative learning models based on conceptual integration is an urgent need. One approach that offers a promising solution is the problem-based learning (PBL) model, which prioritizes problem-solving as the starting point of the learning process. This model positions students as active subjects constructing knowledge through contextual and collaborative learning experiences (Damayanti, Nindiasari, & Mustafa, 2025).

Technological advances and digitalization in education are accelerating the transformation of learning methods, necessitating a more adaptive and context-appropriate model. The approach used must also emphasize the interconnectedness of concepts. PBL can create a dynamic, collaborative, and meaningful learning environment, encouraging students to become problem solvers, innovators, and lifelong learners (Sunaryo, 2014).

Information literacy is also a key competency that must be developed in the digital age. Students are required not only to be able to access information but also to evaluate its credibility, select relevant sources, and use it appropriately. Research shows that information literacy is closely related to independent learning skills, as information-literate students tend to be more active in planning, evaluating, and developing their learning process (Maulida et al., 2024).

However, empirical studies in various schools indicate that students' information literacy remains at a moderate level. For example, research at SMP Negeri 1 Cimahi revealed that students remained weak in selecting information sources and assessing learning outcomes, even though problem identification was well-developed (Lubis & Batubara, 2023). This highlights the need for learning models that directly integrate information literacy with student learning activities.

Furthermore, the effectiveness of PBL is also influenced by various factors such as teacher readiness, supporting facilities, and student engagement. Research shows that the use of interactive media in PBL can help address misconceptions and improve students' critical thinking skills (Farwati et al., 2024). Thus, the combination of appropriate learning strategies and media can strengthen PBL's role in achieving 21st-century educational goals.

However, research on PBL generally focuses on formal educational contexts such as junior high and senior high schools, while studies in non-formal education settings such as the Learning Activity Center (SKB). SKB, however, has diverse student characteristics and emphasizes real-world experiences, making it a potential area for implementing problem-based learning models (Paramita et al., 2025).

Furthermore, issues that emerged at SKB West Bandung included the absence of a comprehensive learning model, minimal technology integration, and limited data-based evaluation. These obstacles indicate that while SKB has significant potential for developing contextual learning, the appropriate implementation of models like PBL still requires policy support, teacher training, and the use of technology (Sarifuddin, 2025).

Based on the above description, research on the effectiveness of PBL implementation in improving critical thinking and information literacy in students at SKB West Bandung is crucial. This research is expected to provide a comprehensive overview of the implementation process, effectiveness, and supporting factors.

METHODS

The research method used in this study was a mixed methods exploratory sequential design. The exploratory sequential design involves collecting and analyzing qualitative data in the first stage, followed by collecting quantitative data in the second stage based on the results of the first stage. This strategy places the primary emphasis on qualitative data. The following illustrates the exploratory sequential design.

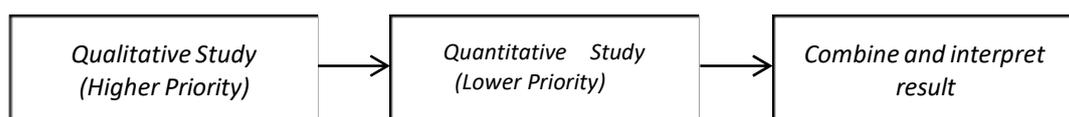


Figure 1. The Exploratory Sequential Design

In this study, qualitative methods were used to answer the first and third research questions: 1) How does the implementation of the Problem-Based Learning Model improve critical thinking and information literacy among students at the Learning Activity Center (SKB) in West Bandung? 2) What are the supporting and inhibiting factors for implementing the Problem-Based Learning Model in improving critical thinking and information literacy among students at the Learning Activity Center (SKB) in West Bandung? 3) What are the supporting and inhibiting factors for implementing the Problem-Based Learning Model in improving critical thinking and information literacy among students at the Learning Activity Center (SKB) in West Bandung? Furthermore, quantitative methods were used to answer the second research question: Is the Problem-Based Learning Model effective in improving critical thinking and information literacy among students at the Learning Activity Center (SKB) in West Bandung? The quantitative method used in this study was experimental.

The experimental design used in this study was a pre-experimental design. There was no control class. The pre-experimental design used was a one-group pretest-posttest design. The one-group pretest-posttest design was chosen to provide more accurate results, as researchers could compare the conditions before and after the treatment. The following illustrates the one-group pretest-posttest design.

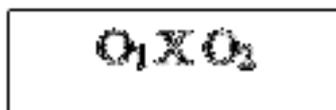


Figure 2. One Group Pretest Posttest Design

Description:

O1: Pretest score (before treatment)

O2: Posttest score (after treatment)

The subjects in this study were 25 Package C students at a Learning Activity Center in West Bandung Regency. The instruments used in this study were tests, observations, and interviews. Qualitative data were collected through three stages, based on Milles and Huberman (1994): data reduction, data display, and conclusion drawing/verification. Next, the quantitative data was statistically tested using the SPSS 26 application, namely descriptive analysis, normality test, paired sample t-test or Wilcoxon test and N-gain calculation.

RESULTS AND DISCUSSION

Results

The process of implementing the Problem-Based Learning Model to Improve Students' Critical Thinking and Information Literacy at the Learning Activity Center (SKB) in West Bandung

This research was conducted in a planned manner, starting with the permitting process, preliminary study, pretest, implementation of problem-based learning (PBL) in four meetings, and then the posttest and interviews. The activities took place from July to August 2025, focusing on the Indonesian Language Package C material with the theme "Providing Intelligent Ideas for Problems Around Us." The textbooks used are as follows:

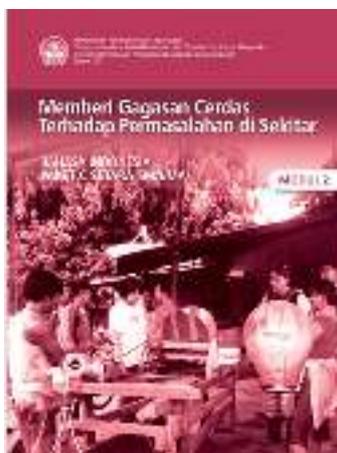


Figure 3. Indonesian Language Package C Textbook

The process of implementing the problem-based learning model to improve students' critical thinking and information literacy was carried out through the following stages

Table 1. Implementation Schedule

Aspect	Day	Date	Description
Permitting	Saturday	July 19, 2025	Issuance of research permit and coordination with the Head of the West Bandung SKB Foundation
Preliminary Study	Sunday	July 20, 2025	Interview with SKB teachers regarding student needs
Pretest	Sunday	July 27, 2025	Test administered before treatment.
Meeting 1	Sunday	July 27, 2025	Instructional delivery using a problem-based learning model
Meeting 2	Sunday	August 03, 2025	Instructional delivery using a problem-based learning model
Meeting 3	Sunday	August 10, 2025	Instructional delivery using a problem-based learning model
Meeting 4	Sunday	August 24, 2025	Instructional delivery using a problem-based learning model
Posttest & Interview	Sunday	August 31, 2025	Test administered after treatment and interviews with teachers and students.

The research began with a permitting process on July 19, 2025, involving the SKB Foundation, Indonesian language teachers, and the adjustment of materials to the curriculum. Package C. The textbooks used were modified to be relevant to real-world problems, with learning objectives focused on identifying information, making arguments, and making recommendations to support students' critical thinking and information literacy. A preliminary study conducted on July 20, 2025, through interviews and observations, showed that learning in the SKB was still predominantly lecture-based, with students tending to be passive, and having difficulty conveying coherent ideas. Teachers considered PBL highly relevant because it had the potential to encourage students to be more active in discussions, analyze real-world problems, and improve information literacy. However, challenges such as time, facilities, and varying student abilities remained.

A pretest was conducted on July 27, 2025, with 10 essay questions measuring critical thinking indicators. The results indicated that students' abilities were still limited, necessitating a problem-based learning intervention. The learning process was conducted over four meetings. The first meeting (July 27, 2025) addressed the topic of plastic waste, where students began to identify problems despite their shyness. The second meeting (August 3, 2025) discussed the impact of social media, generating intelligent ideas supported by data sources. The third meeting (August 10, 2025), on household waste sorting, emphasized logical argumentation, while the fourth meeting (August 24, 2025), on healthy consumption patterns, concluded with an interactive presentation demonstrating the development of communication skills and the use of relevant data. Posttests and interviews conducted on August 31, 2025, confirmed improvements in critical thinking and information literacy skills. Observational data showed a consistent increase in students' average information literacy scores, from 66% (good) in the first meeting to 89% (very good) in the fourth meeting.

Overall, the implementation of PBL has been proven to shift students' learning patterns from passive to active, improving their skills in identifying problems, seeking valid information, developing logical arguments, and presenting creative solutions. Thus, the research objective of improving critical thinking and information literacy among Package C students at the West Bandung Special Education Center (SKB) was successfully achieved.

The Effectiveness of the Problem-Based Learning Model in Improving Students' Critical Thinking and Information Literacy at the Learning Activity Center (SKB) in West Bandung

The effectiveness of the problem-based learning model in improving critical thinking and information literacy in students at the Learning Activity Center (SKB) in West Bandung was determined by the results of a pretest and posttest. These results were then processed using SPSS 26, yielding the following results.

Table 2. Quantitative Data Processing Results

Category	Pretest	Posttest	Description
Number of Students	25	25	Pre = Post
Minimum Score	45	65	Pre < Post
Maximum Score	80	90	Pre < Post
Normality Test	0,177	0,189	Normally Distributed
Paired Sample T-Test		0,000	Significant Difference in Means
Mean N-Gain		0,57	Improvement

Based on the table above, the pretest results show a minimum score of 45 and a maximum score of 80, while the posttest score increased to 65 to 90. The normality test yielded significance values of 0.177 (pretest) and 0.189 (posttest), which are greater than 0.05, indicating a normal distribution of the data. The Paired Sample T-Test obtained a significance value of $0.000 < 0.05$, indicating a significant difference in the mean between the pretest and posttest. The average N-Gain score of 0.57 is considered moderate, indicating an increase in students' critical thinking and information literacy skills after implementing the problem-based learning model. Thus, the implementation of PBL has proven effective in improving the quality of learning at SKB West Bandung.

Supporting and inhibiting factors for the implementation of the Problem-Based Learning Model in improving students' critical thinking and information literacy at the Learning Activity Center (SKB) in West Bandung

Supporting and inhibiting factors for the implementation of problem-based learning (PBL) in improving critical thinking and information literacy in students at the West Bandung Special Education Center (SKB) were obtained from teacher and student interviews.

Teacher interviews revealed a relatively good understanding of PBL. Teachers understand that PBL is student-centered learning based on real-life problems to foster analysis, collaboration, and problem-solving. PBL has been implemented in Indonesian Language Package C, although limited due to time and media constraints. The strategies used by teachers align with PBL syntax: presenting problems, dividing students into groups, guiding discussions, and directing students to develop and present solutions.

Supporting factors from the teacher perspective include support from the SKB principal and colleagues, the availability of a conducive learning environment, relevant teaching materials,

and student motivation for active discussion. Teachers also benefit from the increasing student interest and participation from meeting to meeting. Furthermore, the teacher's role in providing guiding questions and facilitating access to information contributes to the development of students' critical thinking skills. However, several obstacles arose, including limited face-to-face time, simple learning media, and differences in students' abilities to collaborate and understand complex problems. Teachers also assessed that some students remained passive in discussions, lacked confidence during presentations, and had difficulty selecting valid information.

Meanwhile, student interviews indicated that they had a basic understanding of PBL, a learning process that involves solving real-life problems in groups. Students expressed enthusiasm and enjoyment in discussing and sharing ideas, although some felt embarrassed or afraid of making mistakes when expressing their opinions. When experiencing difficulties, students typically asked teachers, searched online, or returned to the group discussion.

Supporting factors from the student perspective included good group collaboration, clear teacher guidance, the use of media and real-life examples, and an interactive learning environment. However, inhibiting factors included shyness, limited discussion time, difficulty developing coherent arguments, and confusion in comparing information from various sources. Overall, teacher and student interviews confirmed that the implementation of PBL at the West Bandung Special School for Learning (SKB) had a positive impact on the development of critical thinking and information literacy. However, the success of its implementation is highly dependent on the support of infrastructure, teacher training, availability of learning resources, more flexible time management, and ongoing guidance so that students can be more confident, critical, and independent in managing information.

Discussion

The process of implementing the Problem-Based Learning Model to Improve Students' Critical Thinking and Information Literacy at the Learning Activity Center (SKB) in West Bandung

The implementation of the Problem-Based Learning (PBL) model in this study demonstrated a significant shift from conventional learning to participatory learning, where students were gradually involved in identifying problems, seeking information, and developing solutions. The increase in information literacy scores from 66% to 89%, along with significant statistical test results, confirmed that PBL had a positive impact on students' critical thinking and information literacy skills. These results align with the opinion of Duch, Groh, & Allen (2001), who stated that PBL can develop analytical, evaluative, and reflective skills because learning begins with real-life problems that trigger deep cognitive engagement.

However, the effectiveness of PBL is highly dependent on problem design, teacher guidance, and group work dynamics. A study by Yu et al. (2023) showed that the success of PBL is significantly influenced by the adaptation of critical thinking orientations and teacher scaffolding at each learning stage. This aligns with the conditions at the West Bandung Special Education Center (SKB), where time constraints, varying student abilities, and simple learning media are factors that limit the optimal implementation of PBL. Therefore, PBL implementation must be adapted to the local context for optimal results.

From the student perspective, interviews revealed that they were more motivated and confident when given the opportunity to discuss and present ideas. However, barriers such as shyness,

fear of making mistakes, and difficulty filtering credible information persist. This situation indicates that information literacy does not emerge automatically in PBL but requires explicit guidance. Prabowo (2024) found that PBL combined with the use of digital sources and e-resources can improve information literacy because students are accustomed to assessing the credibility of sources and comparing information before organizing it into logical arguments.

Overall, PBL implementation at the West Bandung Special Education Center (SKB) has been shown to improve students' critical thinking skills and information literacy. However, this success is greatly influenced by teacher readiness, the quality of learning media, and available time allocation. Therefore, teachers are advised to receive regular training on PBL design, while students need to be facilitated with adequate digital learning resources to further develop their information literacy. With the support of these factors, PBL is not only an alternative method, but can function as an effective adaptive learning framework to improve the quality of non-formal education.

The Effectiveness of the Problem-Based Learning Model in Improving Students' Critical Thinking and Information Literacy at the Learning Activity Center (SKB) in West Bandung

The effectiveness of the problem-based learning model in improving students' critical thinking and information literacy at the SKB in West Bandung was determined from pretest and posttest results processed using SPSS 26. The analysis showed that students' minimum scores increased from 45 in the pretest to 65 in the posttest, while the maximum score also increased from 80 to 90. The normality test yielded a significance value of 0.177 in the pretest and 0.189 in the posttest, which is greater than 0.05, indicating a normal distribution of the data. Furthermore, the Paired Sample T-Test obtained a significance value of $0.000 < 0.05$, indicating a significant difference in the average values between the pretest and posttest. The average N-Gain value of 0.57 is considered moderate, indicating an improvement in students' critical thinking and information literacy skills after implementing the problem-based learning model.

These findings align with research conducted by Nurhayati & Handayani (2021), which showed that the implementation of PBL significantly improves students' critical thinking skills because they are actively involved in identifying, analyzing, and solving real-world problems. Similarly, Rahmawati (2020) found that PBL can train students to connect information from various sources and develop it into logical arguments, thus directly contributing to improved information literacy.

Furthermore, the effectiveness of PBL is also influenced by supporting factors such as active student involvement in discussions, the teacher's role as a facilitator, and the use of contextual problems relevant to students' daily lives. Research conducted by Sari & Kartika (2022) confirmed that the use of authentic problems in PBL encourages students to think more critically and improves information literacy skills because they are accustomed to selecting and verifying information before drawing conclusions. Thus, the improved outcomes obtained at the West Bandung Special Education School (SKB) strengthen the empirical evidence for the effectiveness of PBL in the context of non-formal education.

Based on these results, it can be concluded that the problem-based learning model is not only statistically effective but also practically relevant in improving the quality of learning at SKB West Bandung. These research findings support the view that PBL is an alternative learning model capable of fostering 21st-century skills, particularly critical thinking and information literacy, which are crucial in facing the challenges of the digital era.

Supporting and inhibiting factors for the implementation of the Problem-Based Learning Model in improving students' critical thinking and information literacy at the Learning Activity Center (SKB) in West Bandung

The implementation of Problem-Based Learning (PBL) at the SKB in West Bandung demonstrates that teachers have a good understanding of this learning concept as a student-centered model based on real-life problems. Teachers recognize that PBL encourages analysis, collaboration, and problem-solving skills. This aligns with research by Awami, Yuhana, and Nindiasari (2022), which states that PBL can develop students' critical thinking skills because the learning process emphasizes active student involvement in group discussions.

Supporting factors from the teacher's perspective include support from the SKB principal, colleagues, a conducive learning environment, relevant teaching materials, and increased student motivation for active discussion. The teacher's role in providing guiding questions also plays a crucial role in developing students' critical thinking skills. These findings align with research by Naim and Barokah (2023), which explains that a supportive learning environment and teacher facilitation are crucial for the effectiveness of PBL in improving elementary school students' scientific literacy and conceptual understanding.

However, there are obstacles to implementing PBL, such as limited face-to-face time, simple learning media, and differences in student abilities in understanding complex problems. This situation aligns with research by Winanda, Hasibuan, and Batubara (2022), which showed that limited facilities, media, and time allocation were the dominant inhibiting factors in problem-based learning in Islamic elementary schools.

From the student perspective, interviews revealed that they understood PBL as learning based on solving real-world problems in groups, and they expressed enjoyment in discussing and sharing ideas. This aligns with research by Lina (2022), which found that PBL, supported by innovative media, made students more enthusiastic, active, and participatory in the learning process.

However, obstacles also emerged from students, including shyness, fear of making mistakes when expressing opinions, difficulty developing coherent arguments, and confusion in selecting information from various sources. These obstacles are similar to the research by Almasari, Murniviyanti, and Irawan (2025), which explained that internal factors such as self-confidence and reading comprehension skills significantly influence students' literacy development in elementary schools.

Overall, supporting factors such as environmental support, teacher facilitation, and student enthusiasm can drive the success of PBL. However, obstacles such as limited time, media, and differences in student abilities remain challenges that need to be overcome. As emphasized in Lina's (2022) research, the success of PBL depends heavily on the support of infrastructure and varied learning strategies to enable students to be more confident, critical, and independent in managing information.

CONCLUSION

Based on the research results, the implementation of the problem-based learning model (PBL) at SKB West Bandung is effective in improving students' critical thinking skills and information literacy. The PBL process encourages students to be more active in discussing, analyzing information, and formulating solutions, as indicated by a significant increase in scores from pretest to posttest and an average N-Gain in the medium to high category. This

effectiveness is supported by infrastructure, the role of teachers, and a conducive learning environment, although there are still obstacles such as time constraints, differences in abilities, and students' lack of confidence. Overall, PBL is a suitable learning strategy to shape students who are critical, independent, and skilled at managing information.

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