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THE APPLICATION OF SELF-REFLECTION IN THE PROBLEM-BASED LEARNING MODEL TO DEVELOP STUDENTS' CRITICAL THINKING SKILLS: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

This study systematically investigates the integration of self-reflection within the Problem-Based Learning (PBL) model and its impact on enhancing critical thinking skills among elementary school students. Employing a Systematic Literature Review (SLR) guided by the PRISMA protocol, 20 articles were retrieved from reputable databases including Google Scholar, SINTA, DOAJ, Garuda, and ResearchGate. The selection process comprised five stages: identification, initial screening, eligibility assessment, methodological quality evaluation, and final inclusion. Only five studies met all criteria, focusing on PBL with embedded self-reflection at the elementary level, presenting empirical evidence, and examining critical thinking as the primary outcome. Findings reveal that incorporating structured self-reflection into PBL fosters active student engagement, deepens conceptual understanding, and cultivates metacognitive awareness key foundations of critical thinking. Moreover, self-reflection enables learners to assess their cognitive processes, refine learning strategies, and link experiences to targeted learning objectives. This review recommends that educators embed reflective practices within PBL designs to promote critical, autonomous learners equipped for the demands of 21st-century education.

Keywords: Self-Reflection; Problem-Based Learning; Critical Thinking; Elementary School.

INTRODUCTION

Education in the current era no longer emphasizes mastery of subject matter alone, but also the development of higher-order thinking skills, one of which is critical thinking. This skill is important for students to have so that they are able to analyze information, solve problems, and make decisions logically. As times change and global challenges become increasingly complex, critical thinking has become a competency that must be developed from an early age, especially in schools. Therefore, the learning process in the classroom needs to be designed in such a way as to encourage students to think actively, rather than just memorize. Unfortunately, the learning system in many schools is still dominated by conventional approaches that tend to make students passive. In fact, this approach is no longer relevant to the needs of the times. To overcome this, a learning model is needed that encourages students to think and engage actively. One model that is widely used and proven to be effective is Problem-Based Learning (PBL). PBL is a learning model that places students at the center of learning activities by giving them real problems to analyze and solve. Research by Rahmadana et al. (2023) shows that the application of the PBL model can significantly improve students' average critical thinking scores. Similarly, Mufidah and Setiawan (2022) state that the application of PBL in the context of local culture can optimize student engagement in reflective and critical thinking.

The PBL model provides ample space for students to explore information, discuss, and make decisions based on logical arguments. This is certainly in line with the main objective of critical thinking skills. Research (Nu'man, 2023) shows that students who learn using the PBL model experience an increase in critical thinking skills from moderate to high within two learning cycles. Similar research by (Anwar et al., 2023) also found that the use of the problem-based learning model effectively improved students' critical thinking skills, with an average increase from 47.58 to 71.85 and an effect size of 1.87. These findings show that PBL is not just a learning strategy, but also capable of fostering deeper thinking skills. However, the implementation of PBL will be maximized if it is supported by strategies that can help students reflect on their thinking processes. One important strategy in this regard is self-reflection. Self-reflection helps students understand how they learn, what they have mastered, and what still needs improvement. By reflecting, students learn not only from the final results but also from the thinking processes they experience during learning. This kind of self-reflection is essential in the PBL model because it encourages students to become aware of their own thought processes when solving problems.

Forms of self-reflection can vary, such as writing journals, discussing, or assessing group work. In the context of PBL, reflection is usually done at the end of learning so that students can reassess the process they have gone through. Research conducted by Nurfadilah et al. (2025) found that students who routinely engage in metacognitive reflection in the PBL model show improvement in constructing arguments, evaluating ideas, and summarizing discussion results. In other words, self-reflection plays an important role in strengthening students' critical thinking skills. Although self-reflection has been proven to have a positive impact, the fact is that many teachers have not maximized its use in learning. This could be due to a lack of understanding of how to facilitate reflection or limited time available in class. In addition, some teachers consider that reflection is sufficient when done verbally and does not need to be formalized. In fact, without structured reflection, students may find it difficult to recognize errors or shortcomings in their thinking process. Sutika et al. (2023) mention that student reflection in PBL learning still tends to be superficial and does not touch on critical thinking aspects comprehensively.

Seeing the great potential of self-reflection in supporting PBL, but also recognizing the limitations of practice in the field, it is important to conduct a more in-depth study on this matter. One approach that can be used for a comprehensive review is Systematic Literature Review (SLR). Through this approach, various previous research results are collected and analyzed systematically to identify patterns, trends, and relevant findings. In addition, the use of the SLR method with the PRISMA protocol also helps to ensure that the journal selection and analysis process is conducted transparently and accountably. This study specifically aims to examine how self-reflection is applied in the PBL model and how it relates to the development of students' critical thinking skills. This study used 20 accredited articles consisting of 13 SINTA national journals and 7 reputable international journals, all published in 2020 and above. The focus of analysis in this study included the form of self-reflection application, its implementation strategies in learning, and its impact on students' critical thinking skills at various levels of education.

The questions that are the focus of this review are as follows:

Table 1 Problem Formulation

Dimension	Problem Statement
Application of Self-Reflection	How does the application of self-reflection in the Problem-Based Learning (PBL) model improve the critical thinking skills of elementary school students?
The Role of Self-Reflection in the Learning Process	How does the integration of self-reflection in the Problem-Based Learning model affect the engagement and depth of the learning process of elementary school students?

To answer the problem formulation objectively and systematically, this study uses a Systematic Literature Review (SLR) approach with reference to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method. This approach allows researchers to identify, evaluate, and synthesize findings from various relevant scientific articles in a structured and transparent manner. The search process was conducted through four main databases, namely Google Scholar, SINTA, DOAJ, and ResearchGate, with publications limited to those published between 2020 and 2025. The keywords used included “self-reflection,” “Problem-Based Learning,” “PBL skills in elementary school,” and “elementary school.” In the initial identification stage, 20 relevant articles were found. Next, a screening process was conducted using inclusion criteria, namely a focus on self-reflection in problem-based learning at the elementary school level, relevance to 4C skills, and touching on the tri-center role of education. After going through the exclusion stage, only five articles met all the criteria and were eligible for further analysis. These five articles will form the basis for compiling a thematic synthesis and answering the research questions in depth, as well as contributing to reflective and contextual educational practices. Based on this background, this study was designed to systematically examine how self-reflection is applied in the Problem-Based Learning model and the extent to which it is related to the development of students' critical thinking skills. This study is expected to provide theoretical contributions to the development of reflective and problem-based learning models, as well as practical recommendations for teachers and curriculum developers in designing meaningful and effective 21st-century learning.

RESEARCH METHODS

This study uses the Systematic Literature Review (SLR) method as its main approach. This method was used to collect, select, and review relevant scientific articles on self-reflection in the Problem-Based Learning (PBL) model and its relationship to the development of 21st-century skills in elementary school students. The use of the SLR method was considered appropriate because it was able to compile the results of previous studies systematically and comprehensively, thereby providing a deeper understanding based on scientific evidence. A similar approach was also used by Ningrum et al. (2024) in examining the application of PBL on students' mathematical reflective abilities, as well as by Sutika et al. (2023), who researched the effectiveness of PBL in building higher-order thinking skills and character in elementary schools.

The article search process was conducted by following the steps outlined in the PRISMA method. There are four stages in PRISMA, namely: identification, screening, eligibility testing, and final selection. Researchers searched for articles from several reliable journal sources, such as Google Scholar, Garuda, SINTA, DOAJ, and ResearchGate. The keywords used included: “self-reflection,” “Problem-Based Learning,” “problem-based learning,” “elementary school skills,” and “tri-center education in elementary schools.” To narrow down the search and ensure quality, only articles published from 2020 to 2025 were included. In addition, the articles must be available in full text and have undergone peer review.

Articles included in this study must meet several inclusion criteria, namely: 1) discussing self-reflection, 2) using the Problem-Based Learning model, 3) focusing on elementary school students, 4) touching on 21st-century skills and the role of the surrounding environment. Meanwhile, the exclusion criteria include: articles that are only final assignments such as 1) theses or dissertations, 2) articles published before 2020, 3) articles that are not relevant to the topic, 4) and articles that do not present research data clearly. Thus, the articles used in the analysis are truly in line with the objectives of this study and can serve as a strong basis for examining how self-reflection in problem-based learning can support the 21st-century skills of elementary school students.

A total of 20 scientific articles were collected from the initial stage of literature search through databases such as Google Scholar, Garuda, SINTA, DOAJ, and ResearchGate, using keywords such as “self-reflection,” “Problem-Based Learning,” “21st-century skills,” and “tri-center education in elementary schools.” After screening based on abstracts and full texts and testing using inclusion and exclusion criteria, five articles were found to fully meet all requirements and were worthy of further analysis. The article selection process followed the stages in the PRISMA method, namely: identification, screening, feasibility testing, and the final inclusion stage. The five articles were then analyzed using a qualitative thematic synthesis approach, highlighting three main dimensions: the application of self-reflection in problem-based learning models, the contribution of the tri-center of education in supporting the reflection process, and the influence of reflection on the development of students' 21st-century skills, particularly critical thinking, communication, collaboration, and creativity (4Cs). Each article was reviewed to understand the learning design used, how teachers applied reflection in the classroom, and the challenges that arose in practice. The results of this analysis are expected to provide a comprehensive picture of the effectiveness of reflection in Problem-Based Learning and serve as a basis for teachers and schools in designing learning that is more reflective, collaborative, and in line with the needs of 21st-century students.

Sinta, Researchgate, Google Scholar, DOAJ, Garuda
“self-reflection”, “problem-based learning in elementary schools”, “Problem-Based Learning”, “Problem-Based Learning model for elementary schools”, “reflective learning strategies”, “application of reflection in PBL”, “PBL for 21st century skills”, “4C skills in elementary education,” “reflection in problem-based learning,” “problem-based learning in primary school,” “reflection and 21st century skills,” “self-reflection in education,” “critical thinking skills of elementary school students,” “collaboration in elementary school learning,” and “the tri-center of education in 21st century learning.”

Based on the results of a literature search using a combination of pre-determined keywords, 20 articles were found to be relevant to the research topic. All of these articles were then further analyzed using a Systematic Literature Review (SLR) approach that refers to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol. The article selection and screening process is described in detail through the stages in the following flowchart.

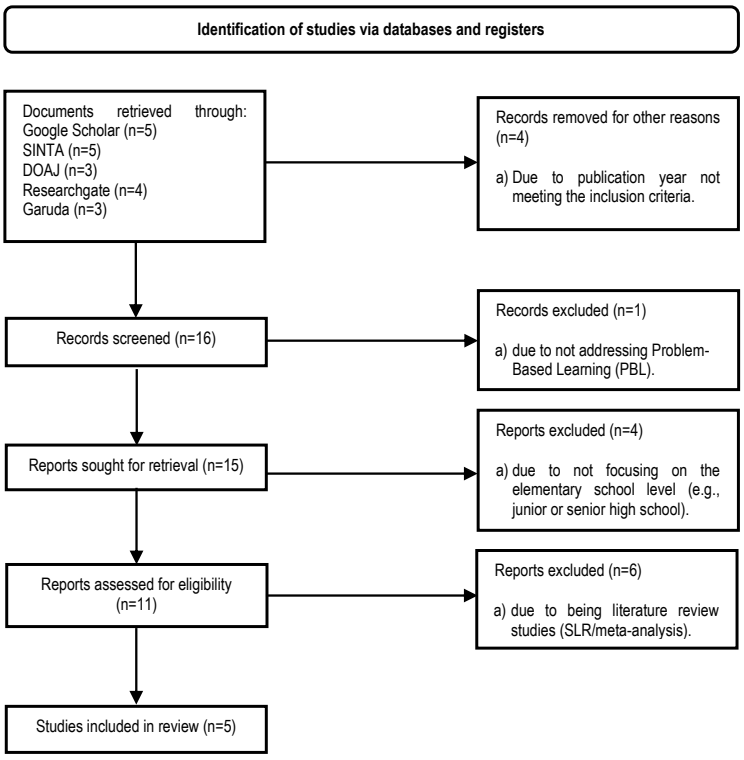

Figure 1. Flowchart Identificationof Studies

The data analysis process in this study used a Systematic Literature Review (SLR) approach with reference to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol as a systematic framework for reviewing relevant scientific articles. In the initial identification stage, 20 articles were obtained from various credible sources, namely Google Scholar, SINTA, DOAJ, Garuda, and ResearchGate. Of these, 4 articles were immediately eliminated because they did not meet the basic criteria, namely publication year below 2020, leaving only 16 articles to proceed to the next stage. At the screening stage, selection was based on the title and abstract to measure the extent to which the substance of the article was in line with the focus of the study, namely the relationship between self-reflection, the PBL model, and the development of critical thinking in elementary school students. As a result, 5 articles were excluded because they were not relevant to primary education (e.g., conducted on university students or junior high/high school students) or did not contain explicit discussions of self-reflection or PBL. Thus, 11 articles proceeded to the eligibility assessment stage.

Next, at the eligibility stage, the articles were thoroughly analyzed based on their full text content. At this stage, two articles were excluded due to limited access to the full text or insufficient methodological information for analysis. Of the total nine articles that were successfully reviewed in their entirety, an assessment of the quality and suitability of the research design was conducted. A total of 4 articles were eliminated because they were only secondary literature studies (SLR or meta-analysis) without primary data, had too small a research sample, or used inappropriate methods (e.g., non-experimental or theoretical opinion). Thus, five articles were found to fully meet the inclusion criteria, namely: (1) focusing on elementary school level, (2) discussing the application of self-reflection in the Problem-Based Learning (PBL) model, (3) having empirical data through a quasi-experimental or classroom action approach, and (4) evaluating students' critical thinking skills as one of the main variables. These five articles were analyzed in depth to compile a synthesis of findings and answer the research questions in this study.

RESULTS AND DISCUSSION

Based on a Systematic Literature Review (SLR) analysis using the PRISMA protocol, out of 20 articles identified through searches on Google Scholar, Garuda, DOAJ, and SINTA (2020–2025), 5 articles met the inclusion criteria for further review. The research findings are presented in the following table.

Table 2. Research Findings

No	Title	Author(s)	Year	Category	Publisher
1.	Implementation of the Problem-Based Learning Model Assisted by Picture Card Media to Improve Fifth Grade Elementary Students' Critical Thinking Skills	Amelia Dhea Puspita dan Adi Winanto	2025	Journal	Pendas: Journal of Elementary Education
2.	Implementation of the Problem-Based Learning Model to Enhance Critical Thinking Skills and Cognitive Learning Outcomes in Elementary School Science	Fauriza Tahta Alfinatusya'diyah, Hendratno, Bekti Nuryani, dan Mahalisa Dyah Prostanti	2021	Journal	Pendas Mahakam: Journal of Primary Education and Learning
3.	Implementation of the Problem-Based Learning Model to Improve Elementary School Students' Critical Thinking Skills	Jati Rahmadana, Ahmad Khawani, dan Media Roza	2023	Journal	Basicedu Journal
4.	The Effectiveness of Problem-Based Learning Model in Improving Higher Order Thinking Skills and Character of Elementary School Students	I Made Sutika, I Made Astra Winaya, Ida Bagus Rai, I Made Sila, I Nengah Sudiarta, I Made Kartika, dan I Gede Sujana	2023	Journal	Journal of Education and Teaching

5.	Problem Based Learning On Literacy Mathematics: Experimental Study Study in Elementary School M.	M. Farhan, Rarasaning Satianingsih, dan Yustitia	Via	2024	Journal	*Journal of Medives : Journal of Mathematics Education IKIP Veteran Semarang*

Based on a systematic review of 20 articles, five articles met all inclusion criteria and were analyzed further. These articles consisted of three accredited national journals and two open-access international journals. All articles focused on the application of the Problem-Based Learning (PBL) model to improve the critical thinking skills of elementary school students. One article written by Puspita (2025) shows that the use of picture cards in problem-based learning can help fifth-grade students develop more critical thinking skills. The researchers noted that students' critical thinking skills improved significantly from before the intervention to after the second cycle was completed. In addition, Samsul Adianto and Rony Budyanto (2021) discussed PBL in third-grade science learning. The results of this study indicate that the PBL model can encourage students to be more active and able to evaluate problem-solving steps through self-reflection. Furthermore, Rahmadana et al. (2023) also researched the application of PBL to improve critical thinking skills in fifth-grade elementary school students. This study shows that after the learning process through two cycles, students' critical thinking skills increased from 30% to 60%.

This shows that the PBL model, accompanied by a reflection process, helps students think more deeply about what they are learning. Two international articles also reinforce the findings of the national journal. Research by Sutika et al. (2023) examined the effectiveness of PBL in improving higher-order thinking skills and shaping student character. The results show that PBL not only affects learning outcomes but also shapes positive attitudes in students, such as responsibility and self-confidence. Meanwhile, an article by Farhan et al. (2021) discusses how PBL can improve elementary school students' mathematical literacy. Learning that actively involves students in problem-solving makes them better understand mathematical concepts. In general, the results of these five articles show that the PBL model is very effective in helping elementary school students think more critically, especially when accompanied by self-reflection activities. Through this process, students not only complete problems or assignments, but are also encouraged to understand how they think and learn. This is in line with the goals of 21st-century education, which emphasizes the importance of critical thinking, collaboration, and meaningful learning.

CONCLUSIONS

The application of self-reflection in the Problem-Based Learning (PBL) model has been proven to have a significant impact on the development of critical thinking skills in elementary school students. Through self-reflection, students are encouraged to re-examine their thought processes while solving a problem, so that they become more aware of effective learning strategies. In a study conducted by Puspita (2025), the PBL model was combined with picture cards and applied to fifth-grade elementary school students. Reflection was carried out periodically after learning activities, allowing students to reassess their understanding and approach to problems. As a result, students' critical thinking skills increased significantly from the pre-cycle to post-cycle II. Meanwhile, in another study by Rahmadana et al. (2023), which also used the PBL model with a reflective approach, an increase in students' critical thinking skills was found from 30% in the first cycle to 60% in the second cycle, after two learning cycles. The reflection process was carried out after group discussion sessions, which enabled students to identify errors in their thinking and improve their problem-solving methods. From the perspective of international articles, Sutika et al. (2023) examined the application of PBL in improving students' higher-order thinking skills (HOTS) and character. Self-reflection is an integral part of the learning process in this study. Students not only think critically in solving problems, but also learn to evaluate their thinking and attitudes during the learning process. This shows that reflection in PBL can build students' metacognitive awareness, which is the basis for critical thinking. This reinforces that PBL integrated with self-reflection can build students' critical thinking awareness from an early age. In other words, the reflection process in PBL provides space for students to evaluate their own thinking, while learning from their learning experiences actively. The integration of self-reflection in PBL has a strong influence on students' active engagement and depth of understanding of the learning material. Through reflection, students are encouraged to assess their own learning experiences and understand how they learn effectively. In a study conducted by Samsul Adianto &

Rony Budyanto (2021) on science learning in third grade elementary school, reflection was used after the problem-solving process to help students reevaluate their approach. Students became more engaged in learning because they felt responsible for their own learning process and outcomes. The results of the study showed that through a reflective approach, there was an increase in students' critical thinking skills from 16.67% in cycle I to 79.16% in cycle II, thus demonstrating that the use of a reflective PBL model can effectively improve students' critical thinking skills in learning. From an international perspective, (Farhan et al., 2021) researched the application of PBL in the context of mathematical literacy in elementary schools. Reflection is one of the main strategies in strengthening conceptual understanding. Through this activity, students can relate new knowledge to their previous experiences and explain concepts in their own way. This not only improves their understanding but also makes the learning process more meaningful and profound.

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Based on the results of a systematic review of 20 articles using the Systematic Literature Review (SLR) approach with the PRISMA protocol, five articles were found to meet the inclusion criteria and were analyzed further. The findings show that the integration of self-reflection in the Problem-Based Learning (PBL) model has a positive impact on the development of critical thinking skills and student engagement in learning in elementary schools. Through reflection, students are encouraged to reevaluate their thinking strategies, evaluate their problem-solving processes, and improve their learning methods independently. The PBL model accompanied by self-reflection has also been proven to encourage more active, in-depth, and meaningful learning. Students are not only involved in group discussions, but also develop metacognitive awareness, which is important for building higher-order thinking skills. The success of this strategy depends heavily on the teacher's role in designing systematic reflective learning scenarios that are relevant to real-world problems. Therefore, self-reflection-based PBL can be recommended as an effective alternative learning approach in elementary schools to support the strengthening of critical thinking skills and a more focused and independent learning process.

BIBLIOGRAPHY

Alditia, L. M., Fadillah, N., & Hanis, M. (2024). Analysis of Barriers to Elementary School Students' Critical Thinking Skill in Science Subjects. JIP) STKIP Kusuma Negara, 16(1), 97–111. https://doi.org/10.37640/jip.v16i1.2060

Anwar, I., Rohmani, L. A., & Putra, A. A. I. A. (2023). Peningkatan Berpikir Kritis Siswa Smp Dalam Pembelajaran Ipa Melalui Model Pembelajaran Problem Based Learning. Jurnal Jendela Pendidikan, 3(01), 145–151. Https://Doi.Org/10.57008/Jjp.V3i01.430

Ayuni, R. S., Putri, S., Purnama, S. R., & ... (2024). Problem Based Learning Model in Natural Science Learning in Elementary Schools: Systematic Literature Review &Bibliometric Analysis. Widyagogik: Jurnal ..., 138–153. https://journal.trunojoyo.ac.id/widyagogik/article/view/28430%0Ahttps://journal.trunojoyo.ac.id/widyagogik/article/download/28430/10368

Diva Fatin Syaharani, Alimudin Salo, I. P. V. (2024). Systematic Literature Review Penerapan Nilai-Nilai Lokal Dalam Pembelajaran Ppkn Di Sd Dan Faktor Penghambatnya Delvis. Cendekia Pendidikan, 4(4), 50–54. https://doi.org/10.9644/sindoro.v3i9.252

Eismawati, E., Koeswanti, H. D., & Radia, E. H. (2019). Peningkatan hasil belajar matematika melalui model pembelajaran problem based learning (PBL) siswa Kelas 4 SD. Jurnal Mercumatika : Jurnal Penelitian Matematika Dan Pendidikan Matematika, 3(2), 71–78. https://doi.org/10.26486/jm.v3i2.694

Erliza, R., Permana, D., Fauzan, A., & Syarifuddin, H. (2023). The Development of Mathematical Learning Materials Based on Problem-Based Learning to Enhance Problem-Solving Ability at Senior High School. Scaffolding: Jurnal Pendidikan Islam Dan Multikulturalisme, 5(3), 450–464. https://doi.org/10.37680/scaffolding.v5i3.3742

Farhan, M., Satianingsih, R., & Yustitia, V. (2021). Problem Based Learning On Literacy Mathematics: Experimental Study In Elementary School. Journal Of Medives : Journal Of Mathematics Education Ikip Veteran Semarang, 5(1), 118. Https://Doi.Org/10.31331/Medivesveteran.V5i1.1492

Faudziah, W. S., & Budiman, I. A. (2023). Efektivitas Penggunaan Model Problem Based Learning (PBL) terhadap Kemampuan Berpikir Kritis Matematis Siswa SD. Papanda Journal of Mathematics and Science Research, 2(1), 22–29. https://doi.org/10.56916/pjmsr.v2i1.272

Ghifari, M. T., Nurjanah, N., Herman, T., & Rahmah, H. (2024). Challenges in Developing Junior High School Students' Computational Thinking Skills in Mathematics Through Problem-Based Learning. Kalamatika: Jurnal Pendidikan Matematika, 9(2), 135–146. https://doi.org/10.22236/kalamatika.vol9no2.2024pp135-146

Gunawan, R. (2023). Penerapan Model Problem Based Learning Dalam Meningkatkan Kemampuan Berpikir Kritis Peserta Didik. 22(1), 12–26.

Mufidah, F., & Setiawan, B. (2022). Penerapan Model Problem Based Learning Berbasis Kearifan Lokal Untuk Meningkatkan Keterampilan Berpikir Kritis Peserta Didik. Pensa E-Jurnal : Pendidikan Sains, 10(3), 360–366.

Ningrum, A. K. P., Novaliyosi, N., & Nindiasari, H. (2024). Systematic Literature Review: Model Problem Based Learning Terhadap Kemampuan Berpikir Reflektif Matematis Siswa. Jurnal Educatio Fkip Unma, 10(3), 873–880. Https://Doi.Org/10.31949/Educatio.V10i3.9325

Nofziarni, A., Hadiyanto, H., Fitria, Y., & Bentri, A. (2019). Pengaruh Penggunaan Model Problem Based Learning (Pbl) Terhadap Hasil Belajar Siswa Di Sekolah Dasar. Jurnal Basicedu, 3(4), 2016–2024. https://doi.org/10.31004/basicedu.v3i4.244

Notalia, V., Octaria, D., Sumarno, E., Palembang, S., & Selatan, I. (2023). Implementasi Pembelajaran Berdiferensiasi Model PBL untuk Meningkatkan Hasil Belajar Siswa SMA Negeri 2 Palembang. Jurnal Sinar Edukasi JSE, 04, 10–22.

Nu'man, M. (2023). Penerapan Model Pembelajaran Problem Based Learning Untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Pada Tema Lingkungan Sahabat Kita Di Kelas V Sd Negeri 081235 Sibolga Tahun Pembelajaran 2022/2023 Helen. Aleph, 87(1,2), 149–200. Https://Repositorio.Ufsc.Br/Xmlui/Bitstream/Handle/123456789/167638/341506.Pdf?Sequence=1&Isallowed=Y%0ahttps://Repositorio.Ufsm.Br/Bitstream/Handle/1/8314/Loeblein%2c Lucineia Carla.Pdf?Sequence=1&Isallowed=Y%0ahttps://Antigo.Mdr.Gov.Br/Saneamento/Proees

Nurfadilah, Nurvita, I Komang Werdhiana, & Khairurraziq. (2025). Pengaruh Problem Based Learning Terhadap Kemampuan Berpikir Kritis Pada Pembelajaran Geografi Di Sman 7 Palu. 10, 45–58. Https://Journal.Stkipsingkawang.Ac.Id/Index.Php/Jurnalpipsi/Article/View/6305/Pdf

Puspita, A. D. Dan A. W. (2025). Penerapan Model Problem Based Learning Berbantuan Media Kartu Bergambar Untuk Meningkatkan Keterampilan Berpikir Kritis Siswa Kelas V Sd. 10.

Rahma Audila, (2025). Implementasi Refleksi Diri Peserta Didik di Rumah Bersama Orang Tua Dalam Meningkatkan Hasil Belajar Matematika Tentang Diagram. SENASSDRA 4 No.3: 617–627

Rahmadana, J., Khawani, A., & Roza, M. (2023). Penerapan Model Problem Based Learning Untuk Meningkatkan Kemampuan Berpikir Kritis Peserta Didik Sekolah Dasar. Jurnal Basicedu, 7(1), 224–230. Https://Doi.Org/10.31004/Basicedu.V7i1.4278

Rahmawati, A., & Cahdriyana, R. A. (2023). Penerapan Model Problem Based Learning dengan pendekatan Saintifik Terhadap Kemampuan Bernalar Kritis. Prosiding Seminar Nasional …, 1614–1620.

Samsul Adianto, & Rony Budyanto. (2021). Penerapan Model Problem Based Learning Untuk Meningkatkan Keterampilan Berfikir Kritis Dan Hasil Belajar Kognitif Ipa Siswa Sekolah Dasar. Pendas Mahakam : Jurnal Pendidikan Dan Pembelajaran Sekolah Dasar, 6(2), 162–172. Https://Doi.Org/10.24903/Pm.V6i2.911

Setiyaningrum, M. (2018). Peningkatan Hasil Belajar Menggunakan Model Problem Based Learning (PBL) pada Siswa Kelas 5 SD. Jartika: Jurnal Riset Teknologi Dan Inovasi Pendidikan, 1(2), 99–108.

Sutika, I. M., Winaya, I. M. A., Rai, I. B., Sila, I. M., Sudiarta, I. N., Kartika, I. M., & Sujana, I. G. (2023). The Effectiveness Of Problem-Based Learning Model In Improving Higher Order Thinking Skills And Character Of Elementary School Students. Jurnal Pendidikan Dan Pengajaran, 55(3), 688–702. Https://Doi.Org/10.23887/Jpp.V55i3.57636

Vika Ivania, Erlanda Dinda Lestari, Tiara Noor Rohmah, Rachmalia Arsyl Azzim, Fina Fakhriyah, & Erik Aditia Ismaya. (2023). Systematic Literature Review (SLR): Pengaruh Model Pembelajaran Berbasis Problem Based Learning pada Hasil Belajar Matematika. Student Scientific Creativity Journal, 1(5), 158–167. https://doi.org/10.55606/sscj-amik.v1i5.1962

Wulandari, T. C., & Qamar, K. (2018). Project-Based Learning: Road to Make Connection between Concept and Skills in Mathematics Manipulative Media. Mathematics Education Journal, 2(1), 19. https://doi.org/10.22219/mej.v2i1.5798