

Implementation of the Problem-Based Learning Model to Enhance Critical Thinking Skills of Elementary School Students: A Literature Review

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ABSTRACT

The rapid development of the Industrial Revolution 4.0 era demands that students possess 21st-century skills, including critical thinking, problem-solving, creativity, communication, and collaboration. However, science learning in schools still faces challenges in equipping students with these skills. Teachers need to act as facilitators capable of implementing innovative learning to enhance students' 21st-century skills in science. One proposed solution is through the problem-based learning model. The problem-based learning model can be an alternative to make students the center of learning. Problem-based learning encourages students to learn independently and collaborate in solving real-world problems. This research aims to develop students' critical thinking skills in science through the implementation of the problem-based learning model, motivated by the low level of these skills. This research employs a literature study, a data collection method from various sources such as journals and books through Google Scholar searches. The collected data were analyzed through selection, comparison, integration, and filtering. The results of the research indicate that understanding and optimizing the problem-based learning model can address the problems of its implementation in elementary schools, thereby potentially improving students' critical thinking skills in science learning.

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1. INTRODUCTION

Education plays a crucial role in preparing the nation's future generations to face increasingly complex challenges of the times. In this era of globalization, strong critical thinking skills and mastery of concepts in Natural Sciences (IPA/Science) are essential foundations for students in Elementary School (SD). Critical thinking skills enable students to analyze information, evaluate arguments, and solve problems effectively. Meanwhile, a deep understanding of science concepts equips them with knowledge about natural phenomena and scientific principles relevant to everyday life.

The rapid development of the Industrial Revolution 4.0 era demands that students possess 21st-century skills, including critical thinking, problem-solving, creativity, communication, and collaboration. However, science learning in schools still faces challenges in equipping students with these skills. Teachers need to act as facilitators capable of implementing innovative learning to enhance students' 21st-century skills in science. Real-

world observations indicate that science learning in elementary schools is often still dominated by lecture and rote memorization methods.

This approach tends to be passive and provides limited opportunities for students to develop critical thinking skills and build a deep understanding of concepts. Consequently, students may be able to memorize scientific facts and terms but struggle to apply this knowledge in different contexts or solve problems involving science concepts. Currently, student-centered learning models that provide opportunities for active interaction with learning materials have significant potential in improving critical thinking skills and concept mastery.

One learning model relevant to this goal is Problem-Based Learning. Based on various studies conducted by experts and published in scientific journals, the Problem-Based Learning model is more effective in enhancing critical thinking skills in elementary school science subjects. One proposed solution is through the problem-based learning model. The problem-based learning model can be an alternative to make students the center of learning. Problem-based learning encourages students to learn independently and collaborate in solving real-world problems. This research aims to develop students' critical thinking skills in science through the implementation of the problem-based learning model, motivated by the low level of these skills.

2. RESEARCH METHOD

The research method employed was a literature study, which involved reviewing several journals from Google Scholar. These journals were then analyzed to extract outlines and key points related to the Problem-Based Learning model, critical thinking skills, the characteristics of the Problem-Based Learning model, and science learning at the Elementary School level.

3. LITERATURE REVIEW

3.1 Problem Based Learning

Problem-Based Learning (PBL) is a learning model designed to stimulate students' critical thinking skills through the process of responding to and finding solutions to various problems. This aligns with Ward's view (in Ngalmun, 2012) which defines PBL as a model that involves students in problem-solving through scientific stages. Thus, students not only acquire knowledge relevant to the problem but also develop problem-solving skills. Through this model, students are challenged to solve problems posed by the teacher.

Problem-Based Learning (PBL) is a learning approach that uses real-world problem contexts to stimulate students' critical thinking and problem-solving abilities in order to understand key concepts and principles within a subject.¹ According to Muhammad Rais et al. (2021), the problem-based learning model is a learning model that can positively influence students' 21st-century skills in science learning. The problem-based learning model provides a context that can support students' critical thinking and problem-solving skills in acquiring knowledge and concepts in science learning (Maula et al., 2014; Anggreni et al., 2019).

Students' 21st-century skills in science learning are necessary for them to solve various scientific phenomena that occur in life (Khamdit & Siridhrungsri, 2022). Research by Fitri & Yuanita (2020) shows that the application of the problem-based learning model in science learning supports problem-solving abilities, which are essential for students in facing the 21st century.²

The characteristics of the Problem-Based Learning (PBL) model include: (1) the presentation of questions or problems as a trigger, (2) an emphasis on the integration of various fields of knowledge, (3) the existence of a real investigation process, (4) the creation and exhibition of products or works, and (5) the presence of collaboration among students. Arends (cited in Reta, 2012) identifies these characteristics in the PBL model.³

3.2 Critical Thinking

Critical thinking, as one of the higher-order thinking skills, is a conscious and organized process used in various mental activities, including solving problems, making decisions, arguing, analyzing assumptions, and conducting scientific research. The essence of critical thinking lies in the ability to form structured arguments and systematically evaluate the value of personal and others' viewpoints. Critical thinking is the ability to think deeply and evaluate one's own and others' thinking processes. According to John Dewey (cited in Hendra, 2011), the purpose of school is to teach students how to think correctly.

Dewey defines critical thinking as an active, persistent, and careful process of considering any belief or form of knowledge, by looking at it from various perspectives and providing supporting reasons and drawing

¹ Eka Anisa Aprina, Erma Fatmawati, and Andi Suhardi, 'Penerapan Model Problem Based Learning Untuk Mengembangkan Keterampilan Berpikir Kritis Pada Muatan IPA Sekolah Dasar', *Didaktika: Jurnal Kependidikan*, 13.1 (2024), pp. 981–90.

² Yayat Suharyat and others, 'Meta-Analisis Penerapan Model Pembelajaran Problem Based Learning Untuk Meningkatkan Keterampilan Abad-21 Siswa Dalam Pembelajaran IPA', *Jurnal Pendidikan Dan Konseling (JPDK)*, 4.5 (2022), pp. 5081–88, doi:10.31004/jpdk.v4i5.7455.

³ Fia Ayuning Pertiwi, Reza Hilmy Luayyin, and Mohammad Arifin, 'Problem Based Learning Untuk Meningkatkan Keterampilan Berpikir Kritis: Meta Analisis', *JSE: Jurnal Sharia Economica*, 2.1 (2023), pp. 42–49, doi:10.46773/jse.v2i1.559.

conclusions. By actively involving students in exploring learning materials and constructing ideas based on observation and discussion, it is hoped that they can understand the material well and develop their thinking abilities.⁴ According to Ennis, as stated in Costa (1985), critical thinking abilities can be identified through five indicators. These five indicators include:

Elementary clarification ability (providing simple explanations), Basic support ability (building basic support for an idea), Inference ability (drawing logical conclusions), Advanced clarification ability (providing more detailed explanations), and the ability to use Strategies and tactics (effective thinking strategies and tactics).⁵

4. RESULTS AND DISCUSSIONS

This research commenced with the reduction stage, which is the initial process of selecting and simplifying raw data. At this stage, a selection of relevant research designs was conducted, where in this context, journal articles implementing the Problem-Based Learning model to enhance the critical thinking skills of Elementary School students were chosen. Subsequently, the selected journals were analyzed, and the final stage involved drawing conclusions. The following are some of the journal articles used in this research:

- a. "The Implementation of the Problem-Based Learning Model to Develop Critical Thinking Skills in Elementary School Science Content" by Eka Anisa Aprina in *Jurnal Kependidikan*, Vol. 13, No. 1, February 2024, with research results indicating that problems in the implementation of the Problem-Based Learning model in elementary schools can be overcome by better understanding and maximizing the steps used in the application of the Problem-Based Learning model.
- b. "Improving Critical Thinking Skills and Thematic Learning Outcomes in Elementary School Science Content Through the Problem-Based Learning Model for 5th Grade" by Ridha Unnafi Walfajri in *Jurnal Basicedu* Volume 3 Number 1 Year 2019 Pages 16-20, with research results showing that the implementation of the Problem-Based Learning model can improve critical thinking skills and learning outcomes.
- c. "Meta-Analysis of the Implementation of the Problem-Based Learning Model to Enhance 21st-Century Skills of Students in Science Learning" by Yayat Suharyat in *Jurnal Pendidikan dan Konseling* Volume 4 Number 5 Year 2022, with results showing that the problem-based learning model can enhance students' 21st-century skills as indicated by an Effect size (ES) of 0.68, which is categorized as high.
- d. "The Influence of the Problem-Based Learning Model on Elementary School Students' Critical Thinking Skills in Science Content" by Resti Fitria Ariani in *Jurnal Imiah Pendidikan dan Pembelajaran* p-ISSN : 1858-4543 e-ISSN : 2615-6091, with results indicating that the use of the problem-based learning model can improve the critical thinking skills of elementary school students (Nurlaeli, 2022).⁶
- e. "The Implementation of the Problem-Based Learning Model to Improve the Critical Thinking Skills of Fifth-Grade Elementary School Students" by Maulida Anggraina Saputri in *JPdK* Volume 2 No. 1 Year 2020 Pages 92-98, with results from the use of the Problem-Based Learning (PBL) model showing that this model can improve the critical thinking of fifth-grade elementary school students, with the lowest increase being 0.61% and the highest being 18.15% (Saputri, 2020).⁷
- f. "Comparison of Problem-Based Learning and Inquiry Learning Models in Terms of Students' Critical Thinking Skills in Elementary School Science Subjects" by Dwi Ratna Efendi in *JURNAL BASICEDU* Volume 5 Number 3 Year 2021 Pages 1277-1285, with results indicating that the Problem-Based Learning model is more effective in improving critical thinking skills in elementary school science subjects.⁸
- g. "Meta-Analysis of the Influence of the Problem-Based Learning (PBL) Model on Elementary School Science Critical Thinking Abilities" by Kafiga Hardiani Utama in *Jurnal Basicedu* Volume 4 Number 4 Year 2020 Pages 889-898, with results showing that the problem-based learning (PBL) model can improve elementary school students' critical abilities in science learning content.⁹
- h. "The Implementation of the Problem-Based Learning Model to Enhance Critical Thinking Skills in Elementary School Science Learning" by Shofiyah Maqbullah in *Metodik Didaktik*: Vol. 13 No. 2, January 2018, Pages

⁴ Aprina, Fatmawati, and Suhardi.

⁵ Pertiwi, Luayyin, and Arifin.

⁶ Nurlaeli Nurlaeli, 'Pengaruh Model Pembelajaran Problem Based Learning Terhadap Kemampuan Berpikir Kritis Matematika Siswa SMP', *Tsaqofah*, 2.1 (2022), pp. 23–30, doi:10.58578/tsaqofah.v2i1.253.

⁷ Maulida Anggraina Saputri, 'Penerapan Model Pembelajaran Problem Based Learning Untuk Meningkatkan Kemampuan Berfikir Kritis Siswa Kelas V Sekolah Dasar', *Jurnal Pendidikan Dan Konseling (JPDK)*, 2.1 (2020), pp. 92–98, doi:10.31004/jpdk.v1i2.602.

⁸ Hermin Nurhayati and Nuni Widiarti, Langlang Handayani, 'Komparasi Model Pembelajaran Problem Based Learning Dan Inquiry Learning Ditinjau Dari Keterampilan Berfikir Kritis Siswa Pada Mata Pelajaran IPA Di Sekolah Dasar', *Jurnal Basicedu*, 5.5 (2020), pp. 3(2), 524–32 <<https://journal.uin.ac.id/ajie/article/view/971>>.

⁹ Kafiga Hardiani Utama and Firosalia Kristin, 'Meta-Analysis Pengaruh Model Pembelajaran Problem Based Learning (PBL) Terhadap Kemampuan Berpikir Kritis IPA Di Sekolah Dasar', *Jurnal Basicedu*, 4.4 (2020), pp. 889–98, doi:10.31004/basicedu.v4i4.482.

106-112 METODIK, with results indicating an increase in each cycle that has been adjusted to the indicators of critical thinking.¹⁰

- i. "The Implementation of the Problem-Based Learning Model to Enhance Critical Thinking Skills and Science Learning Outcomes of Fifth-Grade Elementary School Students" by Venta Prawesti Sukowati in *JiIP (Jurnal Ilmiah Ilmu Pendidikan)* (eISSN: 2614-8854) Volume 6, Number 12, December 2023 (10641-10646), with research results proving that the application of the PBL model can improve the critical thinking skills and science learning outcomes of fifth-grade students at SD Negeri Dukuh 05 in the second semester of the 2022/2023 academic year, with the average critical thinking score in the pre-cycle being 41, cycle I being 42.6, and cycle II being 66.4. Meanwhile, the average science learning outcome score in the pre-cycle was 50.36, cycle I was 60.95, and cycle II was 70.31. This data proves that the PBL model can be used to improve critical thinking skills and simultaneously enhance learning outcomes.¹¹
- j. "The Influence of the Problem-Based Learning (PBL) Model on Students' Critical Thinking Skills in Science Learning for Fourth Grade at SDN 1 Beleka in the 2021/2022 Academic Year" by Melya Mariskhantari in *Jurnal Ilmiah Profesi Pendidikan* Volume 7, Number 2b, June 2022, with data analysis results showing $df=79$, yielding a t-statistic (t-hitung) of 3.122, which is greater than the t-table value. Therefore, the proposed hypothesis (H_a) is accepted. It can be concluded that there is an influence of the problem-based learning (PBL) model on the critical thinking skills of fourth-grade students in science learning at SDN 1 Beleka in the 2021/2022 academic year.¹²

5. CONCLUSIONS

Based on this research, it can be concluded that the Problem-Based Learning (PBL) model is effective in enhancing students' critical thinking skills. This effectiveness is due to PBL's problem-based approach, where students are presented with and motivated to solve problems. Furthermore, PBL organizes students in learning tasks relevant to the problems, motivates them to gather information, encourages the execution of experiments to produce work, and ultimately provides opportunities for teachers to conduct evaluations and provide feedback. The overall analysis results indicate that the implementation of the Problem-Based Learning model positively contributes to the improvement of students' critical thinking skills.

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¹⁰ Shofiyah Maqbullah, Tati Sumiati, and Idat Muqodas, 'Penerapan Model Problem Based Learning (Pbl) Untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Pada Pembelajaran Ipa Di Sekolah Dasar', *Metodik Didaktik*, 13.2 (2018), pp. 106–12, doi:10.17509/md.v13i2.9500.

¹¹ Venta Prawesti Sukowati and Nyoto Harjono, 'Penerapan Model Problem Based Learning Untuk Meningkatkan Kemampuan Berpikir Kritis Dan Hasil Belajar IPA Siswa Kelas V SD', *JiIP - Jurnal Ilmiah Ilmu Pendidikan*, 6.12 (2023), pp. 10641–46, doi:10.54371/jiip.v6i12.3212.

¹² Melya Mariskhantari, I Nyoman Karma, and Khairun Nisa, 'Pengaruh Model Pembelajaran Problem Based Learning (PBL) Terhadap Kemampuan Berpikir Kritis Siswa Pada Pembelajaran IPA Kelas IV SDN 1 Beleka Tahun 2021/2022', *Jurnal Ilmiah Profesi Pendidikan*, 7.2b (2022), pp. 710–16, doi:10.29303/jipp.v7i2b.613.

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