Journal of Higher Education and Academic Advancement
Homepage : https://journal.antispublisher.id/index.php/EJHEAA
Email : admin@antispublisher.com

e-ISSN : 3032-1123
JHEAA, Vol. 1, No. 12, December 2024
Page 12-24

Literature Review: The Effectiveness of the Problem-Based Learning Model with a Differentiated Approach in Improving the Learning Outcomes of Elementary School Students

Muhammad Firdaus[1], Ahmad Suriansyah[2], Wahdah Refia Rafianti[3]
[1,2,3]Elementary School Teacher Education, FKIP, Lambung Mangkurat University, Indonesia

Check for updates OPEN ACCESS

DOI : https://doi.org/10.61796/ejheaa.v1i12.1092

Sections Info

Article history:
Submitted: December 01, 2024
Final Revised: December 02, 2024
Accepted: December 05, 2024
Published: December 06, 2024

Keywords:
Problem based learning
Differentiated approach
Learning outcomes
Primary school

ABSTRACT

Objective: *This study aims to explore the integration of Problem-Based Learning (PBL) with differentiated instruction in elementary schools to enhance student engagement, academic achievement, and motivation.* ***Methods:*** *The research employed a mixed-method approach, combining quantitative assessments of academic performance with qualitative observations of student participation. Differentiated strategies were implemented to tailor content, processes, and products to various learning styles, including visual, auditory, and kinesthetic.* ***Results:*** *The integration of PBL and differentiated instruction significantly improved students' academic performance across subjects such as mathematics, science, and civics. It also fostered critical thinking, creativity, and collaboration, aligning with 21st-century skill development.* ***Novelty****: This study underscores the potential of combining PBL with differentiated approaches to address the diverse needs of learners and create adaptive, inclusive classrooms, providing a practical framework for overcoming challenges in modern education.*

INTRODUCTION

Education in elementary school is an important foundation for building students' character and basic skills. Learning outcomes are the main indicators during the learning process to measure the level of understanding and achievement of learning objectives. However, the facts show that students are still lagging behind in their studies. Several factors influencing this include students' difficulty in understanding concepts, lack of motivation to learn, non-variative teaching methods that do not actively involve students, limited use of learning media, lack of exposure to diversity in their surroundings, and lesson materials that are unattractive or not suitable for the students' level [1]. The current conditions demand the implementation of a creative learning model that can accommodate the diverse learning needs of students. It is imperative to adopt a pedagogical approach that can meet the heterogeneous needs of the student population.

Problem-Based Learning (PBL) promises to improve student learning outcomes. PBL is a learning methodology that utilizes real-life situations as a setting for students to build knowledge and problem-solving skills. This paradigm allows learners to actively participate in the learning process by involving them in collaborative, analytical, and problem-solving exploration activities. PBL allows students not only to explain scientific knowledge but also to foster critical thinking and independence [2].

To optimize the use of the PBL model, a differentiated approach must be included. With a differentiated approach, teachers can design instruction that is responsive to individual learners' differences in readiness, interest, and learning styles. By using this strategy, teachers can adjust the content, process, and products of learning according to each learner's characteristics. By introducing differentiated learning with teachers as mentors, it is intended that students can fully meet their learning needs. Thus, they are expected to become autonomous and independent individuals in developing their inherent potential according to their respective circumstances [3].

The use of the problem-based learning (PBL) model in relation to differentiated approaches has evolved in importance within modern education. Previous studies have proven that combining PBL with differentiated learning approaches can enhance student competencies such as critical thinking, creativity, communication, and collaboration, as well as academic achievement, critical thinking ability, motivation, and skills [4]. However, comprehensive studies are still needed to analyze its effectiveness and implementation at the elementary education level.

This study was conducted to review the relevant literature on the use of problem-based learning models with various methods to improve the learning outcomes of elementary education students. The aim of this research is to gain a better understanding of best practices, issues, and strategies for implementing this paradigm. This research is also expected to make a significant contribution to improving the education of elementary school students.

RESEARCH METHOD

This research uses the literature review method to analyze the application of the Problem Based Learning (PBL) model combined with a differentiated approach to improve the learning outcomes of elementary school students. The literature review was conducted by collecting, analyzing, and integrating relevant research findings from scientific journals, books, and related academic documents. Data sources were selected based on the following criteria: (1) relevance to the topic of PBL implementation and differentiated approaches; (2) research conducted in the context of primary education; and (3) publications released in the last five years to ensure the currency of information.

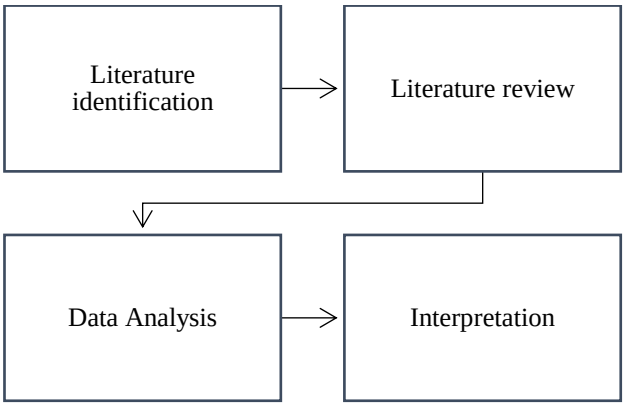

Figure 1. Steps of the literature review.

RESULTS AND DISCUSSION

The results of the search for previous research journals related to the effectiveness of the problem-based learning model with a differentiated approach in improving elementary education learning outcomes, totaling 15 articles, are presented in the table below:

Table 1. Research analysis results.

Researcher/Year	Title	Result
[5]/2024	The Influence of Implementing a Differentiated Approach Based on the Problem-Based Learning Model on the Mathematics Learning Outcomes of 4th Grade Elementary School Students in Rao Selatan District, Pasaman Regency	From the study findings, using differentiated learning with the Problem-Based Learning (PBL) paradigm in the 4th-grade Mathematics class produced positive results. This technique takes into account students' learning styles and needs, allowing them to absorb information through real-world problem-solving based on their abilities and interests. Additionally, the PBL paradigm encourages meaningful, long-term learning and enhances students' ability to think logically, collaborate, and work independently. The findings of the formative evaluation revealed an average student score of 85 (extraordinary category). With the guidance of a teacher, this learning has the potential to offer an inclusive and adaptable learning environment.
[6]/2023	The Influence Of Differentiated Learning Using The Problem-Based Learning Model On Science Learning Outcomes In Elementary School Students	The relationship between pretest and posttest data has a significance value of 0.002, which is less than 0.05, according to the findings of the data analysis with the paired sample T-test (marked-2 animals). Showing that students' science learning outcomes varied significantly before and after applying problem-based learning methodology. The average pretest score of the students was 69.46, while their posttest

		score increased to 78.04. As a result, it has been proven that using a problem-based differentiated learning methodology improves students' science learning outcomes.
[7]/2024	Analysis of the Implementation of Differentiated Learning with the Problem-Based Learning Model on IPAS Material in Elementary Schools	This study reveals that the adoption of a differentiated approach with the Problem-Based Learning (PBL) model in the VIPAS class topic has beneficial effects. The combination of the two efficiently enhances students' understanding and learning motivation, with an average formative evaluation score of 90 (very good category) and learning motivation reaching 87.63% (very high category). Differentiated learning adjusts information, processes, and products to students' learning styles, while the PBL approach provides student-centered learning experiences through real-world problem-solving. This combination creates an effective learning atmosphere, encourages active engagement, and motivates students.
[8]/2024	The Influence of Differentiated Problem-Based Learning and Learning Motivation on Mathematics Learning Outcomes	Based on the research results, the average score is 80.50, while the control group is 61.50. The findings show significant variation in mathematics learning outcomes between the experimental group using standard PBL and the experimental group using differentiated PBL. In addition, there are many gaps in student learning outcomes and motivation between high and low. Students with strong learning motivation in the experimental class achieved an average score of 86.00, while students with poor learning motivation received an average score of

		75.00. In the control class, students with strong learning motivation scored an average of 66.00, while students with low learning motivation scored an average of 57. However, there is no relationship between using the Learning model and motivation to learn arithmetic.
[9]/2024	Implementation Of Differentiated Learning With Pbl Model In The Ipas Subject For 4th Grade At Sdn 2 Banyuurip Temanggung	The findings of the study revealed that object learning in the fourth grade at SDN Banyuurip 2 Temanggung differs from the problem-based learning paradigm. This investigation has proven to be very effective. proven by the students' active participation in learning and their ability to learn. These various learning methods can meet the diverse learning demands of students, including visual, auditory, and kinesthetic. Students can gain learning experiences that are relevant to their interests and learning profiles by differentiating between content, process, and product. Learning can also help students improve their problem-solving skills, teamwork, and critical thinking.
[10]/2024	Differentiated Learning Using The Problem-Based Learning Model To Improve Students' Mathematics Learning Outcomes	Based on the research findings, problem-based differentiated learning can improve the arithmetic performance of grade IVA students at SDN 01 Nambangan Lor. At the beginning of the cycle, only 33.33%, or nine students, completed the tasks. However, when differentiated learning was used during the first cycle, the percentage of students who completed the tasks increased to 70.38%, or 19 students. In the second cycle, the completion rate rose to 88.89%, or 24

		students. Observation data also revealed that students were highly engaged in the problem-based learning approach that modifies information, processes, and products.
[11]/2024	Implementation of PBL Based on a Differentiated Approach in Efforts to Improve Learning Outcomes of Food Chain Material for Fifth Grade Students	Based on the research findings, applying an issue-based approach with differentiation can improve student learning outcomes in the IPAS subject on food chains in the fifth grade at SDN Kandangan. Based on the results of the average score increase from 55.90 to 78.18 on the posttest, representing a 16.62% improvement. Additionally, the number of students who completed the test increased from 27% before the test to 86% after the test. Thus, applying a differentiated approach-based issue model enhances learners' learning outcomes for food chain materials.
[12]/2023	Improvement of Mathematics Learning Outcomes through Differentiated Instruction with the Problem-Based Learning Model in 2nd Grade SDN Pedurungan Lor 02 Semarang	Based on the research findings, the use of differentiated learning with the Problem-Based Learning paradigm in Class II of SD Negeri Pedurungan Lor 02 Semarang has been proven to improve students' learning outcomes in Mathematics. In the pre-cycle, only 21.4% of students were able to complete their learning outcomes, with an average score of 63.2. After the introduction of differentiated learning using the Problem-Based Learning paradigm, the completion percentage increased to 53.5% and the average score to 71.8 in Cycle I, and further increased to 96.4% and an average score of 82.0 in Cycle 2. This implies that tailored instruction using problem-based instruction methodology can

		help second-grade students learn mathematics more effectively.
[13]/2023	The Effectiveness of Implementing Differentiated Instruction in the PPKn Subject for Elementary School Students	Based on the research findings, differentiated learning has shown benefits in improving the learning outcomes of first-grade students at SD Negeri Kalicari 01 Semarang in the PPKn subject. This is demonstrated by the achieved N-gain value, which is an average of 83.69%. This percentage is classified as "effective" in terms of N-gain value. Next, the paired sample t-test yielded a significance value (2-tailed) of less than 0.001, indicating a significant difference in pretest and posttest learning outcomes. Thus, differentiated learning is beneficial in teaching PPKn to 1B grade students at SDN Kalicari 01 Semarang.
[14]/2024	Analysis of Differentiated Learning Problem Based Learning (PBL) in the Science Subject for 4th Grade	BBased on the study findings, the analysis of differentiated learning through Problem-Based Learning (PBL) in the IPAS topic for the 4th grade at SDN Padasugih 03 produced several significant findings. To begin, lesson planning involves completing an initial diagnostic evaluation to determine students' readiness, interests, abilities, and preferred learning styles. Second, the implementation of learning is tailored to students' learning styles, such as visual, auditory, and kinesthetic, using various learning media and tactics. Third, the differentiated learning outcomes of PBL are measured using formative and summative assessments with three differentiations: content, process, and product. Students show strong enthusiasm for learning and improving

		their learning outcomes, as evidenced by their formative and summative assessment scores.
[15]/2024	The Application of the Problem-Based Learning Model in Differentiated Learning Based on Students' Learning Styles in Lessons	Based on the findings, the implementation of the Problem Based Learning model for differentiated learning based on learning styles in class VBSD Negeri Palebon 01 has a positive effect. As many as 36% of students have an auditorium learning style, while 32% are visual and kinesthetic. The learning process tailored to students' competencies shows high enthusiasm, proving that this approach can meet various learning needs of students.
[16]/2024	Implementation Of Differentiated Learning Content Through The Problem-Based Learning Model In Education	Based on the findings of the research, the implementation of differentiated content learning and the use of the Problem-Based Learning (PBL) paradigm in the IPAS class at VASDN Pedurungan Kidul 02 is proceeding well. Post-research interviews revealed that students are interested in their studies. The PBL paradigm promotes differentiation by enhancing critical thinking skills, as evidenced by an average evaluation score of 86.2, which is higher than the KKM of 75. This strategy is tailored to the diverse learning styles of the students.
[17]/2023	Implementation of Differentiated Learning with the PbI Model on the Subtheme of Class 3 SDN Sambirejo 02 to Improve	Based on the research findings, the implementation of differentiated learning using the PBL approach on the sub-theme of grade III at SDN Sambirejo 02 resulted in a significant improvement in student learning outcomes. Before differentiating instruction, the students' pretest scores

	Student Learning Outcomes	ranged from 63.46 to 78.85. However, after implementing differentiated instruction with the PBL paradigm, the students' post-test scores increased from 80.77 to 100. In addition, the analysis of the N-gain score showed a significant increase of 0.7159. Therefore, individual learning using the PBL approach is beneficial in improving the learning outcomes of third-grade students at SDN Sambirejo 02.
[18]/2023	The Influence of the PBL Model on the Cognitive Learning Outcomes of 5th Grade Elementary School Students in Mathematics Lessons Through Differentiated Instruction	From the study findings, it can be concluded that the Problem-Based Learning (PBL) model improves the cognitive learning outcomes of 5th-grade elementary school students in the subject of data presentation in mathematics. The findings of the statistical test show a good influence of the coefficient of determination (R Square) of 38.5%, with an F value of 14.40 and a significance level of 0.001 < 0.05. This shows that the use of the PBL approach has a significant impact on the cognitive learning outcomes of students. Therefore, it can be concluded that the PBL model has a good and effective impact on the cognitive learning outcomes of 5th-grade elementary school children using data presentation resources in mathematics learning.
[19]/2024	Analysis of Differentiated Learning with the PBL Model in Mathematics Lessons on Bar Graphs for 2nd	Based on the findings of the research, differentiated learning using the problem-based learning model in 2nd-grade Mathematics lessons has a positive impact on improving students' knowledge and learning motivation. The results of the formative test show that the students received an average

	Grade Elementary School	score of 90, categorized as very good. Furthermore, the questionnaire revealed that the learning motivation of the second-grade students was 87.05%, which is very high for that category. This shows that students are interested and actively participate in differentiated learning with the Problem-Based Learning paradigm. Learning becomes more attractive and meaningful for students when teaching methods are tailored to their needs and learning styles.

Based on research findings, the PBL model combined with the approach significantly improves the learning outcomes of elementary school students. This technique has been found to increase the average student grades for learning outcomes. Students enter the elite group with an average score of 85 percent [5]. Students in the group that learned using the differentiated PBL model achieved an average score of 80.50, much higher than the control group, which only reached 61.50 [8]. This model may increase student engagement and motivation to learn, in addition to improving learning outcomes. For example, students are highly motivated to learn with a percentage of 87.63% [7]. Students have a learning motivation percentage of 87.05%, indicating a high level of enthusiasm during the learning process [19].

Moreover, various techniques within the PBL paradigm allow educators to tailor their teaching methods to the learning styles of their students, which include kinesthetic, auditory, and visual. Learning can effectively meet the diverse needs of students by modifying content, methods, and products [9]. When differentiation methods are used, students with various learning styles show a significant level of interest [15]. In addition, this strategy promotes current competencies such as critical thinking, creativity, problem-solving, and teamwork. Students who adopt this technique show significant improvement in critical thinking skills [11].

Thorough preparation is very important for successfully implementing this model. Teachers must conduct an initial diagnostic test to understand their students' readiness, interests, and learning styles [14]. Additionally, effective implementation requires a planned differentiation strategy and the availability of adequate learning media. This model has proven effective in various subjects, such as mathematics, IPAS, and PPKn. In mathematics teaching, this model helps students solve real problems to understand abstract concepts [12]. In the IPAS subject, this method can enhance students' understanding of scientific concepts and encourage them to study harder [7]. This

method is effective in enhancing students' understanding of citizenship principles in the PPKn subject [13].

Statistically, several studies, including those conducted by Anik Nawati and Yuyun Yulia in 2023, found significant differences in student learning outcomes before and after the approach was implemented, with a significance value exceeding 0.002. As a result, the combination of the Problem-Based Learning (PBL) model and the differentiation approach is not only effective in improving learning outcomes but also plays an important role in building an adaptive and inclusive learning environment at the elementary level. This finding underscores the importance of incorporating this paradigm to address the increasingly diverse challenges of modern education.

CONCLUSION

Fundamental Findings : The study highlights that Problem-Based Learning (PBL) models, when combined with differentiated instruction, significantly enhance students' academic performance, motivation, and engagement, especially in elementary school settings. **Implications :** This integrated approach fosters essential 21st-century skills, such as critical thinking, creativity, and collaboration, proving its applicability across various subjects, including mathematics, science, and civic education. **Limitations :** The success of this method depends on meticulous planning, early evaluations, and the availability of appropriate learning tools, which may pose challenges in implementation. **Future Research :** Further research should explore strategies to overcome these challenges and expand the application of PBL with differentiation in diverse educational contexts to enhance its scalability and effectiveness.

REFERENCES

[1] A. Mairiska, "Analisis Kesulitan Belajar dalam Keberagaman Karakteristik Individu di Masyarakat untuk Kelas 3 di SD Dharma Karya UT," no. Nunan 1992, pp. 502–509, 2024.

[2] D. A. Juhri, A. C. Ferdina, D. Safira, and D. Salsabila, "Penerapan Pembelajaran Berbasis Proyek Pada Mata Pelajaran Ipa Di Sd Membentuk Siswa Mandiri Dan Kritis," *Juni*, vol. 6, no. 2, p. 343, 2024.

[3] R. R. Yuli, K. Munandar, and I. M. Salma, "Keselarasan Implementasi Pembelajaran Berdiferensiasi dengan Visi Pedagogis Ki Hajar Dewantara dalam Mewujudkan Merdeka Belajar," *J. Teknol. Pendidik.*, vol. 1, no. 2, p. 10, 2023, doi: 10.47134/jtp.v1i2.80.

[4] A. S. Wahyuni, "Literature Review: Pendekatan Berdiferensiasi Dalam Pembelajaran IPA," *J. Pendidik. Mipa*, vol. 12, no. 2, pp. 118–126, 2022, doi: 10.37630/jpm.v12i2.562.

[5] L. Syiamfitri, "Pengaruh Penerapan Pendekatan Berdiferensiasi Berbasis Model Problem Based Learning Terhadap Hasil Belajar Matematika Siswa Kelas IV SD Kecamatan Rao Selatan Kabupaten Pasaman," vol. 4, pp. 1833–1841, 2024.

[6] A. Nawati, Y. Yulia, and B. H. C. Khosiyono, "Pengaruh Pembelajaran Berdiferensiasi Model Problem Based Learning Terhadap Hasil Belajar Ipa Pada Siswa Sekolah Dasar," vol. 08, pp. 6167–6180, 2023.

[7] E. Fitriana, A. F. Nisa, and B. H. Cahyani, "Analisis Penerapan Pembelajaran Berdiferensiasi

dengan Model Problem Based Learning Pada Materi IPAS di Sekolah Dasar," *Pendas J. Ilm. Pendidik. Dasar*, vol. 9, no. 1, pp. 5567–5580, 2024.

[8] F. H. Winahyu, L. Nulhakim, and M. Rumanta, "Pengaruh Pembelajaran Problem Based Learning Berdiferensiasi dan Motivasi Belajar terhadap Hasil Belajar Matematika," *Edukatif J. Ilmu Pendidik.*, vol. 6, no. 1, pp. 661–669, 2024, doi: 10.31004/edukatif.v6i1.6351.

[9] H. M. Z. Ridiyanto, Daimul Hasanah, "Implementasi Pembelajaran Berdiferensiasi Dengan Model Problem Based Learning Pada Mata Pelajaran IPAS Kelas IV SD Negeri 2 Banyuurip Temanggung," vol. 09, no. September, 2024.

[10] K. E. M. Yani1, J. Widiyanto, and S. Wahyuni, "Pembelajaran Berdiferensiasi Menggunakan Model Problem Based Learning Untuk Meningkatkan Hasil Belajar Matematika Siswa," vol. 8, no. 1, pp. 21–46, 2024.

[11] L. Amalia and P. D. Purwati, "Implementasi Problem Based Learning (PBL) Berbasis Pendekatan Berdiferensiasi dalam Upaya Peningkatkan Hasil Belajar Materi Rantai Makanan Peserta Didik Kelas V," vol. 2, no. 4, pp. 298–304, 2024.

[12] Z. Muna and J. Sulianto, "Peningkatan Hasil Belajar Matematika melalui Pembelajaran Berdiferensiasi dengan Model Problem Based Learning Kelas II SDN Pedurungan Lor 02 Semarang," no. November, pp. 1888–1896, 2023.

[13] M. Pramudianti, C. Huda, W. Kusumaningsih, and C. E. Wati, "Kefektifan Implementasi Pembelajaran Berdiferensiasi pada Muatan Pelajaran PPKn Siswa Sekolah Dasar," vol. 7, no. 2, pp. 1305–1312, 2023.

[14] M. D. Ma'ruf, Yasin, and F. S. Wahid, "Analisis Pembelajaran Berdiferensiasi Problem Based Learning (Pbl) Pada Mata Pelajaran Ipas Kelas Iv," *J. Rev. Pendidik. dan Pengajaran*, vol. 7, pp. 93–113, 2024.

[15] S. Ningrum, C. Huda, Q. Musyafanah, and J. H. Susanto, "Penerapan Model Problem Based Learning dalam Pembelajaran Berdiferensiasi berdasarakan Gaya Belajar Peserta Didik pada Pelajaran," *Educ. J.* , vol. 8, no. 2, 2024.

[16] S. Diltianingsih, S. Patonah, A. Suyitno, and N. A. Nyoman, "Implementasi Pembelajaran Berdiferensiasi Konten Melalui Model Problem Based Learning Pada Pembelajaran," vol. 7, no. September 2024, 2024.

[17] R. K. Rohmah, A. Wijayanti, and F. P. A, "Implementasi Pembelajaran Berdiferensiasi Dengan Model Pbl Pada Subtema Kelas Iii Sdn Sambirejo 02 Untuk Meningkatkan Hasil Belajar Siswa," *Didakt. J. Ilm. PGSD STKIP Subang*, vol. 9, no. 04, pp. 1722–1738, 2023, doi: 10.36989/didaktik.v9i04.1753.

[18] Manggalastawa, Suhirno, and S. Rahmawati, "Pengaruh Model Problem Based Learning Terhadap Hasil Belajar Kognitif Peserta Didik Kelas V Sd Mata Pelajaran Matematika Dalam Pembelajaran Berdiferensiasi," *J. Anal. Ilmu Pendidik. Dasar*, vol. 4, no. 2, p. 68, 2023.

[19] N. Rochminingtyas and S. Patonah, "Analisis Pembelajaran Berdiferensiasi Dengan Model Problem Base Learning Pada Mata Pelajaran Matematika Materi Diagram Turus Kelas II Sekolah Dasar," *Innov. J. …*, vol. 4, pp. 2949–2959, 2024.

***Muhammad Firdaus (Corresponding Author)**
Elementary School Teacher Education, FKIP, Lambung Mangkurat University, Indonesia
Email: 2210125210111@mhs.ulm.ac.id

Ahmad Suriansyah
Elementary School Teacher Education, FKIP, Lambung Mangkurat University, Indonesia

Wahdah Refia Rafianti
Elementary School Teacher Education, FKIP, Lambung Mangkurat University, Indonesia