DIFFERENTIATED LEARNING WITH THE PROBLEM BASED LEARNING MODEL ASSISTED BY PADLET TO ENHANCE STUDENTS' CRITICAL THINKING SKILLS: A LITERATURE REVIEW

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ABSTRAK

Indonesia tengah menghadapi tantangan pembelajaran abad ke-21 yang menuntut pengembangan kualitas sumber daya manusia melalui pengembangan kemampuan berpikir tingkat tinggi, khususnya kemampuan berpikir kritis. Namun, fakta memperlihatkan bahwa kemampuan peserta didik di Indonesia dalam berpikir kritis masih tergolong rendah, sehingga diperlukan inovasi pembelajaran yang mampu mengakomodasi kebutuhan belajar peserta didik sekaligus meningkatkan keterampilan tersebut. Pembelajaran berdiferensiasi yang dipadukan dengan model *Problem-Based Learning* (PBL) serta dukungan media digital seperti Padlet menjadi suatu alternatif yang bisa diimplementasikan. Penelitian ini memiliki tujuan dalam mengkaji potensi peningkatan kemampuan berpikir kritis melalui penerapan PBL berdiferensiasi berbantuan Padlet. Metode yang diterapkan pada penelitian ini yaitu *literatur review* berpendekatan kualitatif. Data penelitian diperoleh dari berbagai artikel ilmiah yang relevan melalui penelusuran basis data, kemudian dianalisis melalui proses pengelompokan, pengkajian, dan sintesis untuk mengidentifikasi pola serta hubungan antarvariabel. Hasil kajian menunjukkan bahwa PBL terbukti efektif dalam peningkatan kemampuan berpikir kritis melalui aktivitas pemecahan permasalahan kontekstual dan analisis mendalam, sementara pembelajaran berdiferensiasi mendukung keberagaman kebutuhan belajar peserta didik. Penggunaan Padlet berperan sebagai media interaktif yang mendukung kolaborasi, refleksi, dan partisipasi aktif peserta didik. Sintesis hasil menunjukkan bahwa integrasi PBL berdiferensiasi berbantuan Padlet berpotensi untuk meningkatkan kemampuan peserta didik dalam berpikir kritis serta layak untuk dikembangkan dan diuji melalui penelitian empiris lebih lanjut.

Kata kunci *: Problem Based Learning,* Pembelajaran Berdiferensiasi, Padlet, Kemampuan Berpikir Kritis

ABSTRACT

Indonesia is currently facing the challenges of 21st-century learning, which require improving the quality of human resources through the mastery of higher-order thinking skills, especially critical thinking. However, evidence indicates that the level of students' critical thinking skills in Indonesia remains relatively low, thus requiring innovative learning approaches that can accommodate students' diverse learning needs while enhancing these skills. Differentiated learning combined

with the Problem-Based Learning (PBL) model and supported by digital tools such as Padlet is one alternative that can be implemented. This study aims to examine the potential for improving critical thinking skills through the implementation of differentiated PBL assisted by Padlet. This study used a literature review method with a qualitative approach. The data were obtained from various relevant scholarly articles through database searches, and were then analyzed through the processes of grouping, reviewing, and synthesis to identify patterns and relationships among variables. The results indicate that PBL is proven effective in improving critical thinking skills through contextual problem-solving activities and in-depth analysis, while differentiated learning accommodates diverse student learning needs. The use of Padlet serves as an interactive medium that supports collaboration, reflection, and active student participation. The synthesis results show that the integration of differentiated PBL assisted by Padlet has strong potential to significantly improve students' critical thinking skills and is feasible for further development and empirical research.
***Keywords**: Problem-Based Learning, Differentiated Learning, Padlet, Critical Thinking Skills*

INTRODUCTION

The rapid development of science and technology requires the application of 21st-century learning in the education system. This century has brought significant changes in many sectors, including education, where students need to master various essential skills to face increasingly complex life challenges. In this context, education plays a crucial role in equipping students with relevant competencies so they can adapt to a constantly changing world (Hanipah, 2023). One of the commonly used competency frameworks in 21st-century learning is the 4C skills, namely Critical Thinking, Creativity, Collaboration, and Communication (Kemdikbud, 2019).

Critical thinking is one of the key skills that needs to be fostered in 21st-century learning. This skill does not stand alone but also serves as a foundation for developing other competencies, such as creativity, problem-solving, communication, and collaboration (Halim, 2022). Through critical thinking, students are able to analyze information logically, identify weaknesses in a problem, and formulate innovative and well-directed solutions (Rendi et al., 2024). Therefore, critical thinking can be seen as a core competency that supports the development of various other competencies in 21st-century education.

Critical thinking skills are essential to develop, but facts in the field show that students' level of critical thinking in Indonesia are still relatively low. This is supported by the results of PISA (Programme for International Student Assessment) in 2022, which show that Indonesian students' performance is still below the international average across several domains, with scores of around 366 in mathematics (ranked 70th out of 81 countries), 359 in reading (ranked 71st out of 81 countries), and 383 in science (ranked 67th out of 81 countries) (OECD, 2023). These differences in ranking indicate that students' abilities vary across domains, but overall they remain in the lower group. The PISA results reflect that students' level of critical thinking are still low, as the test requires students to analyze, generalize, and provide reasoning when solving the given problems (Hakim, 2024).

The low level of critical thinking skills among students indicates the need for innovation in the course of learning that can better accommodate students' needs. One relevant approach is differentiated learning, which allows teachers to adjust learning strategies based on students' readiness, interests, and learning profiles (Amri & Adifa, 2024). This approach is important because students have diverse characteristics, so uniform teaching methods tend to be less effective in developing higher-order thinking skills (Fitri, 2025). On the other hand, the Problem Based Learning (PBL) model can also be applied, as it emphasizes students' active involvement in solving contextual problems through processes of analysis, discussion, and reflection (Kusasih et al., 2024). Integrating differentiated learning with the PBL model supports the development of a learning environment that is not only adaptive to individual differences but also able to support the enhancement of critical thinking skills more effectively.

The use of digital media is an important aspect in optimizing the implementation of differentiated learning with the PBL model. One relevant tool to support this process is Padlet. This platform allows students to actively participate by expressing arguments, providing feedback, and reflecting on problem-solving results collaboratively in a flexible virtual space (Dania, 2026). Through Padlet, teachers can facilitate differentiated learning by providing various types of tasks and learning resources that can be accessed according to students' needs and characteristics (Retika & Huda, 2025). Thus, the integration of Padlet in learning

not only supports more dynamic interaction but also contributes to a more structured and participatory development of students' critical thinking skills.

Based on this background, the integration of differentiated learning with the PBL model supported by Padlet can be a relevant strategy for enhancing students' critical thinking skills. However, studies that integrate differentiated learning, the Problem-Based Learning (PBL) model, and the use of Padlet in a comprehensive manner are still limited. Further analysis is needed to examine their combined contribution to enhancing students' critical thinking skills in the context of 21st-century learning. Therefore, the aim of this study is to analyze and synthesize findings from previous studies related to the implementation of differentiated learning with the Problem Based Learning model supported by Padlet in improving students' critical thinking skills. This study adopts a qualitative approach through a literature review method, where data are collected through a search of relevant scientific articles based on certain criteria, then analyzed through processes of categorization, review, and synthesis to identify patterns, trends, and research gaps.

METHOD

This study employs a literature review method with a qualitative approach aimed at identifying, examining, and synthesizing research findings related to differentiated learning, the Problem Based Learning (PBL) model, the use of Padlet, and critical thinking skills. Data were collected through a search of scientific articles in the Google Scholar database using a combination of the keywords "differentiation," "problem-based learning," "padlet," and "critical thinking". The collected articles were filtered based on predefined inclusion and exclusion criteria. The inclusion criteria included scientific articles published between 2017 and 2026, relevant to the research variables, available in full text, and written in Bahasa or English. Meanwhile, the exclusion criteria included articles that were not relevant, not fully accessible, or duplicated. From this selection process, a total of 10 articles were identified as the most relevant for further analysis. The collected data were then analyzed through processes of categorization, review, and synthesis to identify patterns, trends, and relationships among the research variables. This process provided a comprehensive insight into the effectiveness of integrating differentiated

learning, the PBL model, and the use of Padlet in enhancing students' critical thinking skills.

DISCUSSION

The literature selection process resulted in 10 articles that are aligned with the focus of this study. To make it easier to understand, the identities of the articles used in this review are presented in Table 1 below, which includes information on the authors, publishers, and research findings.

Table 1. Summary of Literature Search Analysis

No.	Author	Publisher	Research Finding
1.	Nur Hidayah, Imam Kusmaryono, Mochamad Abdul Basir	Cartesian: Jurnal Pendidikan Matematika	Differentiated learning contributes to the improvement of students' critical thinking skills.
2.	Nila Nurcahyaning Kusumawardani, Rusijono, Utari Dewi	JIME: Jurnal Ilmiah Mandala Education	The Problem-Based Learning (PBL) model influences students' mathematical critical thinking skills in mathematical problem-solving.
3.	Nova Nadila Saputri Sitompul	GAUSS: Jurnal Pendidikan Matematika	The Problem-Based Learning (PBL) model significantly improves students' mathematical critical thinking skills.
4.	Eko Wahyunanto Prihono, Fitriatun Khasanah	EDU-MAT: Jurnal Pendidikan Matematika	The Problem-Based Learning (PBL) model outperforms conventional learning models in enhancing students' mathematical critical thinking skills.
5.	Yuliana Muku Menge, Yasinta	JagoMIPA: Jurnal Pendidikan	Physics teaching materials supported by Padlet are effective in enhancing students' critical thinking skills.

	Embu Ika, Aloisius Harso	Matematika dan IPA	
6.	Venia Notalia, Dina Octaria, Edi Sumarno	Jurnal Sinar Edukasi	Combining the Problem-Based Learning (PBL) model with differentiated learning can increase students' learning results and learning activities.
7.	Dais Nursa'adah, Asep Tutun Usman, Ani Siti Anisah	Pendas: Jurnal Ilmiah Pendidikan Dasar	Differentiated learning with the PBL model significantly improves students' critical thinking skills.
8.	Reyke First Safitri, Sri Haryani	Jurnal Inovasi Pendidikan Kimia	The integration of differentiated learning with PBL can enhance students' critical thinking skills.
9.	Adif Fatus Syarofah, Ferina Agustini, Moch. Anshori	Jurnal Pendidikan Guru Profesional	The implementation of PBL supported by Padlet can enhance students' learning interest and cognitive outcomes.
10.	Olivia Jihan Fadella, Okta Purnawirawan, Prima Zulvarina	Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer	The PBL model supported by Padlet can facilitate student collaboration through digital interaction, idea sharing, and group discussion, leading to better conceptual understanding.

Critical Thinking Skills

Critical thinking is a key skill that enables students to face the challenges of learning and an ever-changing life. This skill is not only related to understanding concepts, but also involves logical, reflective, and systematic thinking processes in analyzing and evaluating information before making decisions (Kusumawardani et

al., 2022). Critical thinking is also understood as a disciplined intellectual process that involves activities such as conceptualizing, applying, analyzing, synthesizing, and evaluating information obtained from various sources, including experience, observation, and reasoning (Prihono & Khasanah, 2020). In the context of education, this ability helps students organize ideas logically, make rational decisions, and solve problems using appropriate strategies. In addition, students with strong critical thinking skills tend to provide objective judgments, compare different perspectives, and present arguments based on in-depth analysis (Safitri & Haryani, 2025). Therefore, critical thinking is a key foundation in developing higher-order thinking skills in the context of 21st-century learning.

Indicators of critical thinking skills can be identified through various frameworks developed by experts. One commonly used framework is the FRISCO model, which consists of Focus, Reason, Inference, Situation, Clarity, and Overview, describing stages of thinking from understanding problems to evaluating outcomes (Aminudin & Basir, 2019 in Hidayah et al., 2024). In addition, other indicators include elementary clarification, basic support, inference, advanced clarification, and strategy and tactics (Prihono & Khasanah, 2020). These indicators show that critical thinking is not only about the final result but also about a structured and in-depth thinking process. Another view states that critical thinking includes the ability to generalize, identify concepts, formulate models, apply principles deductively, and provide further explanations for a given problem (Paradesa, 2017 in Sitompul, 2021). Overall, these indicators share a common emphasis on analysis, evaluation, and logical conclusion-making. This shows that mastering critical thinking indicators is an important basis for assessing students' abilities comprehensively.

Differentiated Learning in Facilitating Diverse Student Learning Needs

Differentiated learning is an instructional approach that accommodates the varied characteristics of students during the learning process. This approach is based on the assumption that each student differs in terms of ability, interests, learning styles, and readiness, and therefore requires different learning strategies (Hidayah et al., 2024). For this reason, differentiated learning enables teachers to

adjust methods, materials, and learning activities to match students' individual needs (Nursa'adah et al., 2025). In addition, this approach is grounded in the view that students are dynamic and unique, so uniform instruction tends to be less effective in optimizing learning potential (Safitri & Haryani, 2025). By providing students with the opportunity to learn according to their abilities, differentiated learning can build a more inclusive and adaptive learning environment.

In practice, differentiated learning is implemented through several systematic strategies. One of the main approaches is the differentiation of content, process, and product, which allows students to access materials, engage in learning processes, and produce outcomes according to their individual characteristics (Safitri & Haryani, 2025). Furthermore, students' learning needs can be classified based on learning readiness, interests, and learning styles, which serve as the basis for designing effective instruction. Teachers can also apply steps such as selecting appropriate materials, grouping students based on their needs, using varied learning media, and providing guidance in producing learning products (Hidayah et al., 2024). The implementation of these strategies has been shown to increase students' active participation and help address diverse learning needs (Nursa'adah et al., 2025). Therefore, differentiated learning not only functions as a pedagogical approach but also as a solution to address student heterogeneity in the classroom.

Problem Based Learning (PBL) Model in Critical Thinking Skills

The Problem Based Learning (PBL) model is a student-centered approach where learning begins with real-world problems. PBL emphasizes that learning begins with a contextual problem that students must analyze and solve in order to gain new knowledge (Fadella et al., 2026). In this model, students are not passive recipients of information but actively construct their understanding through investigation and discussion (Prihono & Khasanah, 2020). In addition, PBL encourages students to improve higher-order thinking skills, especially critical thinking and problem-solving abilities (Syarofah et al., 2024). Therefore, PBL can be seen as a learning model that emphasizes not only outcomes but also meaningful and in-depth thinking processes.

The PBL syntax consists of several stages: problem orientation, organizing students to learn, guiding individual or grouping investigation, developing and presenting results, and analyzing and evaluating the problem-solving process (Arends, 2012). Through these stages, students are gradually guided to understand problems, collect and analyze information, and formulate appropriate solutions. During the investigation stage, students develop skills in analyzing and evaluating different possible solutions. In the presentation stage, they are trained to construct arguments logically and systematically. The evaluation stage encourages students to engage in reflection on their thought processes and assess the accuracy of their solutions. Therefore, the systematic implementation of PBL stages can improve students' critical thinking skills through an active, structured, and problem-oriented learning process.

Padlet as an Interactive Learning Media

Padlet is a web-based digital learning tool that functions as a virtual board (wall) for sharing information interactively. Through Padlet, students and teachers can upload various types of content such as text, images, videos, documents, and links in one shared space, which supports a flexible and collaborative learning process (Syarofah et al., 2024). As an interactive tool, Padlet allows students to discuss, exchange ideas, and provide responses in real time, encouraging active engagement in learning (Fadella et al., 2026). Additionally, Padlet can serve as a platform for collaboration, feedback, and documentation of students' learning outcomes. Its ease of access and diverse features help increase students' interest, creativity, and participation in the learning process (Menge et al., 2025). Therefore, Padlet is an effective interactive tool for supporting active, collaborative, and meaningful learning.

Integration of Differentiated Learning, Problem Based Learning (PBL), and Padlet in Improving Critical Thinking Skills

The integration of differentiated learning, the Problem Based Learning (PBL) model, and the digital tool Padlet represents a complementary approach to enhancing students' critical thinking skills. Differentiated learning helps

accommodate diverse learning needs, allowing each student to develop according to their characteristics, which has been shown to significantly improve critical thinking skills (Hidayah et al., 2024). On the other hand, PBL places problems as the main trigger for learning, training students to identify, analyze, and evaluate solutions systematically (Kusumawardani et al., 2022). The use of Padlet as an interactive tool further strengthens this process through collaborative activities, discussions, and real-time idea exchange, encouraging students to think analytically and reflectively (Menge et al., 2025). Research findings also show that the combination of differentiated learning with PBL outperforms conventional learning in improving critical thinking skills due to students' active involvement (Nursa'adah et al., 2025). In addition, this integration can improve learning activities, learning outcomes, and students' problem-solving skills more optimally (Notalia et al., 2021; Safitri & Haryani, 2025). Therefore, these three components form a learning system that is adaptive, contextual, and interactive in developing critical thinking skills. To clarify the flow of integration between differentiated learning, the PBL model, and Padlet in enhancing critical thinking skills, the learning framework is presented in Figure 1 below.

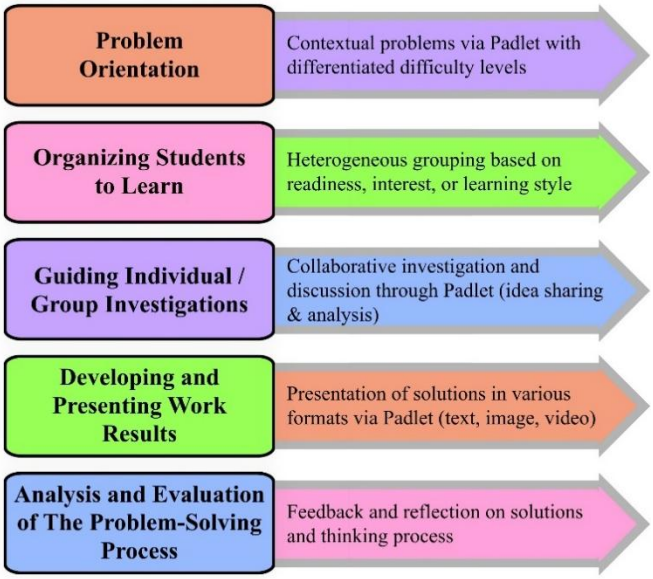

Figure 1. Learning Framework

This integrative learning framework can be designed by combining the principles of differentiation within the PBL syntax, supported by the integration of Padlet as a learning tool. In the problem orientation stage, the teacher presents contextual problems related to students' everyday lives through Padlet, with

varying levels of difficulty to match students' learning readiness. Next, in the organizing stage, students are grouped into heterogeneous teams based on their interests, abilities, or learning styles, allowing peer support within each group. During the investigation stage, students not only discuss but are also guided to search for information, analyze problems, and develop initial solutions by using Padlet as a space to share ideas and work. The teacher acts as a facilitator, providing guidance and prompting questions to keep students' thinking on track. In the development and presentation stage, students present their solutions in simple and realistic forms according to their group's ability, such as summaries, drawings, or brief explanations uploaded through Padlet. The final stage is evaluation and reflection, where feedback is given on students' work, and they are guided to reflect on their thinking process, including the difficulties they faced and the strategies they used. Through these stages, students are gradually trained to understand problems, analyze information, and evaluate solutions logically, facilitating the development of their critical thinking skills in a more structured and contextual way.

CONCLUSION

The analysis and synthesis of the 10 articles reviewed in this study indicate that the integration of differentiated learning, the PBL model, and the Padlet tool has strong potential to enhance students' critical thinking skills. Differentiated learning has been shown to accommodate diverse learning needs by adjusting strategies, materials, and learning activities, allowing each student to develop optimally. Meanwhile, the PBL model helps train critical thinking through contextual problem-solving activities that involve analysis, evaluation, and logical reasoning. The use of Padlet as an interactive tool further strengthens the learning process through collaboration, discussion, and real-time idea exchange, encouraging active student engagement. Therefore, the integration of these three components can build a learning environment that is adaptive, interactive, and student-centered, contributing significantly to the improvement of critical thinking skills.

This study has limitations as it uses a literature review approach without direct field implementation, and the number of articles analyzed is still limited. However, this study contributes by providing a synthesis of concepts and an integrative learning framework that can be used as a reference for instructional practice. Future research is recommended to test this model empirically in various learning contexts and to examine its impact on other 21st-century skills.

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