

Conference Name: 2025 EdTec – International Conference on Education & Learning Technology, 08-09 September, Rome  
Conference Dates: 08-Sep- 2025 to 09-Sep- 2025  
Conference Venue: Courtyard by Marriott Rome Central Park, Via Moscatti 7 •00168 Rome • Italy  
Appears in: PUPIL: International Journal of Teaching, Education and Learning (ISSN 2457-0648)  
Publication year: 2025

Maria Goreti Halim, 2025

Volume 2025, pp. 447-448

DOI- <https://doi.org/10.20319/ictel.2025.447448>

This paper can be cited as: Goreti Halim, M.(2025). Systematic Literature Review: What do the Studies Reveal about Problem-Based Learning in Physics Education? 2025 EdTec – International Conference on Education & Learning Technology, 08-09 September, Rome. Proceedings of Teaching & Education Research Association (TERA), 2025, 447-448

## **SYSTEMATIC LITERATURE REVIEW: WHAT DO THE STUDIES REVEAL ABOUT PROBLEM-BASED LEARNING IN PHYSICS EDUCATION?**

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### **Abstract**

*Twenty-first century education demands the development of higher-order thinking skills (HOTS) such as critical thinking, creative thinking, and problem-solving. However, physics education often faces challenges due to its abstract nature and lack of visualization, which are worsened by the continued dominance of conventional teaching methods. Problem-Based Learning (PBL) emerges as a potential solution, especially when integrated with technology. This study is a Systematic Literature Review (SLR) of 57 selected articles from Scopus, Web of Science, and Google Scholar, aiming to analyze trends, effectiveness, challenges, and recommendations for the implementation of PBL in physics education. The findings reveal that PBL consistently enhances students' HOTS, with technological support such as Augmented Reality (AR), digital simulations, and e-scaffolding strengthening the understanding of abstract concepts. However, the implementation of PBL faces*

*pedagogical challenges (lack of teacher training), technological challenges (limited infrastructure), and institutional challenges (rigid curricula). Practical recommendations include the development of interactive digital teaching materials, teacher training, the combination of PBL with STEM or blended learning approaches, and the use of performance-based authentic assessments. These findings underscore the need for a holistic approach to optimizing technology-enhanced PBL in preparing students for 21st-century challenges.*

**Keywords:**

Problem-Based Learning, Physics Education, HOTS, Technology Integration, Systematic Literature Review