PROCEEDINGS OF INTERNATIONAL CONFERENCE ON EDUCATION
TEACHER TRAINING & EDUCATION FACULTY
UNIVERSITAS SERAMBI MEKKAH
NO. ISSN 2987-4564

Problem-Based Learning Model Integrated with Self Efficacy: A Literature Review on Improving Self-Efficacy in Critical Thinking

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ABSTRACT

Problem-Based Learning (PBL) integrated with self-efficacy is one of the effective learning models to improve critical thinking skills. Critical thinking skills are an important competency that students must have to support the 21st century learning process. This study aimed to examine the self-efficacy integrated PBL model in improving students' critical thinking skills. The method used was a literature study by analyzing various theories and relevant research results. Literature searches were carried out in the bibliographic database of Google Books, Google Scholars, national articles, and reputable international articles, such as (a) ScienceDirect, (b) Elsevier, (c) Taylor & Francis (d) Semantic Scholar, and reference books. The findings showed that integrated PBL self-efficacy can improve critical thinking skills, and problem-solving, foster confidence in one ability, increase learning motivation, and learning independence.

Keywords: *Problem-Based Learning, self-efficacy, critical thinking*

1. INTRODUCTION

Critical thinking skills are one of the main competencies that must be possessed by elementary school students in the modern era. Technological advances and rapid social changes require educators to not only master teaching materials but also be able to encourage students to think analytically and creatively (Li et al., 2022). In the context of basic education, teachers have a strategic role in building the foundation of students' critical thinking from an early age (Leibovitch et al., 2025). Teachers who are able to think critically tend to be more effective in designing meaningful learning, facing challenges in the classroom, and facilitating students in solving problems independently (Benmouhoub, 2022). Therefore, the development of critical thinking skills in elementary school students is a priority in teacher education (Nurdiansyah et al., 2023).

In the 21st century, students are required to be able to think at a high level, master information technology, be able to collaborate, and be communicative (Ratama et al., 2021). Skills that must be mastered by students in the 21st century include critical thinking, communication, and collaboration, as well as creativity and innovation. Learning approaches that tend to involve students in the problem-solving process in depth, as well as students' lack of confidence in their abilities, as well as the lack of precise implementation of learning models that support the development of critical thinking (Bachtiar et al., 2024; Defianty & Wilson, 2022). Traditional learning models that focus on memorization and one-way delivery of material still dominate (Wilson & Sipe, 2014). This leads to limited opportunities for learners to be actively involved in learning that challenges their critical thinking.

Critical thinking skills are an important skill that elementary school students must have. This is because teachers have a strategic role in creating a learning environment that encourages students to think logically, analytically, and critically. However, in reality, PBL implementation often faces challenges related to low student confidence in solving complex problems, self-efficacy as an individual's belief in their abilities, has great potential to be integrated into the development of PBL models to increase learning effectiveness and improve critical thinking skills.

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2. METHODS

The literature study approach is one of the research methods carried out by analyzing and integrating various relevant literature sources, literature searches are carried out in the bibliographic database of Google Books, Google Scholars, national articles, and reputable international articles, such as (a) ScienceDirect, (b) Elsevier, (c) Taylor & Francis, (d) Semantic scholar and some others as well as reference books. The keyword used in the literature search was Problem-Based Learning. This study focused on: 1) Implementation of the PBL Model, 2) Self efficacy, and 3) Critical thinking skills. Nine articles were found to meet the requirements for the study.

3. RESULTS & DISCUSSION

Based on research analysis on the Problem-Based Learning (PBL) model integrated with self-efficacy in improving critical thinking skills. Several researchers reported findings that provided evidence that PBL models integrated with self-efficacy could improve students' critical thinking skills. The following table presents the findings of the study:

Table 1. Summary of Research Results

Authors	Research Titles	Research Results
Tiwari et al. (2006)	A comparison of the effects of problem-based learning and lecturing on the development of students' critical thinking	The results show that the students taught using a problem-based learning model had a much higher critical thinking disposition score after completing PBL compared to college students taught using the lecture method.
Yu & Zin (2023)	The critical thinking-oriented adaptations of problem-based learning models: a systematic review	The results show that incorporating elements of critical thinking skills into the PBL learning model is effective in improving students' critical thinking skills.
Susilawati & Supriyatno (2023)	Problem-Based Learning model in improving critical thinking ability of elementary school students	The Problem-Based Learning model has improved integrated thematic learning
Mareti & Hadiyanti (2021)	Problem-Based Learning to Improve Critical Thinking Skills and Student Learning Outcomes	The results obtained show that the PBL model can improve students' thinking skills.
Uzuntiryaki-Kondakçi & Çapa-Aydin (2013)	Predicting Critical Thinking Skills of University Students through Metacognitive Self-Regulation Skills and Chemistry Self-Efficacy	As a result, metacognitive self-regulation was found to be positively and significantly related to chemical self-efficacy and can improve critical thinking skills.

Sunaryo, 2017	Measurement of Student Self-Efficacy in Mathematics learning at MTS N 2 Ciamis	The average result of the overall score of the Self-Efficacy scale in mathematics learning was included in the Positive category. The Magnitude dimension received a positive score of 3.1 while the Generality dimension with a score of 2.9, and the Severity dimension had an average score of 3.2 which means positive. Therefore, Self-Efficacy is very suitable in combination with the PBL Model.
Miharja et al. (2024)	Relationship between Self-efficacy and Learning Motivation with Student Learning Outcomes on Endocrine System Material at La Tansa High School	There is a positive relationship between Self-Efficacy and Learning Motivation with Student Learning Outcomes on Endocrine System Material at La Tansa High School.
(Saks, 2024)	The effect of self-efficacy and self-set grade goals on academic outcomes	The results obtained showed that there was a positive and significant relationship between self-efficacy and learning motivation of students in grade V UPT SPF SD Negeri Gunung Sari 1 Makassar City which was classified as moderate in the category of 0.40-0.599.

Tiwari et al. (2006) conducted a study that emphasized the importance of critical thinking, students were divided into 2 groups, one was taught by the lecture method, and the other group was taught using Problem-Based Learning, there was a mindset between two groups of students, and there was a difference of opinion about how critical thinking was taught, where students who were taught by the lecture method tended not to be able to hone their critical thinking skills and Students are generally passive, but students who are taught with Problem-Based Learning have a significant effect in improving critical thinking skills (Tiwari et al., 2006).

Another study conducted by Yu & Zin (2023), was conducted on Undergraduate Students in Higher Education. The research findings are presented in three different subsections, each corresponding to a specific research question. The first subsection details the types of PBL adaptations performed to improve CT. Five different approaches to adapting Problem-Based Learning (PBL) to improve Critical Thinking (CT) skills: (1) the application of CT-specific tools, (2) the incorporation of CT-focused activities, (3) the use of digital technology, (4) integration with other pedagogical methods, and (5) integration with discipline-specific knowledge. The second subsection presents the details of the data collection and analysis applied by each study. The final subsection discusses the reasons for the increase in students' CT observed as a result of this intervention. Analysis of all selected studies revealed positive results, which showed that incorporating CT elements into Problem-based Learning was effective in improving critical thinking skills.

Furthermore, Komariah et al. (2024) found that the PBL Model can help students develop critical thinking skills through an approach that emphasizes problem-solving and collaboration between students so that students are able to apply their knowledge to real contexts. A similar study was conducted (Uzuntiryaki-Kondakçi & Çapa-Aydin, 2013), which aimed to test the extent of metacognitive self-regulation and chemical self-efficacy in improving critical thinking skills. The first characteristic of the student is tested to the extent that he or she is sensitive to the context, the second through effective guidance, and the third is metacognition during the critical thinking process, the student assesses their abilities, whether the expected goals are achieved, and all processes involve metacognition and cognitive. The results showed that metacognitive self-regulation was found to be positively and significantly related to chemical self-efficacy for cognitive skills and chemical self-efficacy for daily application. The next study was conducted by (Pada et al., 2024), and data to measure self-efficacy was

collected based on questionnaires and documentation, the results of the study showed that there was a significant relationship between self-efficacy and student learning motivation.

Furthermore, Saks (2024) conducted research on undergraduate and postgraduate students in the basics of learning courses. Online learning is fully carried out in the Moodle environment with face-to-face introductory meetings at the beginning of learning. The material covers eight topics of cognitive development, perception and attention, memory, physical development, self-regulation and metacognition, emotions, as well as language and speech, most of which are working independently, listening to video lectures, and reading the material. Each topic can be discussed in a general discussion forum, and questions are answered in a private message or a public forum. This learning has four tasks that are evaluated, and the final grade is formed based on two essays, an observation task about self-regulation carried out in class, and a learning diary where students reflect on their learning experiences and analyze their learning process. This study highlights the influence of motivational factors on goal setting in the context of online learning and provides insight into the predictive effect of self-efficacy on learning outcomes and the results of students with high levels of self-efficacy are better able to set realistic goals, motivated to achieve them and show better academic performance.

The PBL learning model integrated with self-efficacy not only improves cognitive aspects but also affects students' affective dimensions, such as self-confidence and motivation to learn. The PBL learning model integrated with self-efficacy not only improves cognitive aspects but also affects students' affective dimensions, such as self-confidence and motivation to learn. Although this model has many advantages, some challenges need to be overcome. First, the diverse levels of student self-efficacy can affect the success of PBL implementation (Guo et al., 2024).

Students with low self-efficacy tend to have difficulty adapting to this learning approach. Second, limited time and resources in designing relevant problem scenarios can be an obstacle for teachers. One of the efforts to overcome these challenges is the need for training for teachers to understand the integration strategy of self-efficacy in PBL. The use of digital technology such as computer-based simulations can help create a more interactive and engaging learning experience. In addition, providing emotional support to students through mentoring can help improve students' self-efficacy (Doménech-Betoret et al., 2017).

4. CONCLUSION

This study reviewed research findings that used the PBL model in the learning process, and it was found that some literature showed interesting findings. First, the application of the PBL model is able to understand problems in the real world and is able to solve them either independently or in groups. Second, the integration of self-efficacy is very appropriate to combine with PBL because students will be confident in their abilities. Third, PBL is integrated with self-efficacy for students' critical thinking skills. Fourth, PBL has been implemented at various levels of education, starting from elementary, secondary, and university levels. Last, PBL integrated with self-efficacy is very suitable to be applied in the field of education because PBL can stimulate students' ability to identify authentic problems, analyze information, foster their confidence, and provide solutions to solve problems.

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