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Characteristics of Problem-Based Learning

[I]Agung Riadin, [I]Dwi Priyo Utomo, [I]Yuni Pantiwati
[I]Universitas Muhammadiyah Malang, East Java, Indonesia.

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ABSTRACT

This investigation sought to describe and critically evaluate the attributes of Problem-Based Learning (PBL) in the context of primary education through a comprehensive literature review methodology. The literature review approach was undertaken by scrutinising various scholarly works relating to the implementation of PBL, its defining characteristics, associated challenges, and its influence on students' academic performance at the primary school level. The results of the analytical process revealed that PBL in primary education has distinctive attributes that prioritise active student engagement, collaborative learning and authentic problem solving related to daily life. In addition, PBL pedagogy significantly contributes to the advancement of students' critical thinking skills, autonomy in learning, and social competence. Nevertheless, certain barriers such as inadequate teacher understanding, varying levels of student readiness, and insufficient support in terms of resources and infrastructure present major challenges that must be overcome for the successful implementation of PBL at the elementary stage. These insights are anticipated to inform the improvement of PBL frameworks that are more efficacious and congruent with the inherent educational characteristics of primary schools.

Keywords: Problem-Based Learning, Primary School, Learning Characteristics, Literature Review

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Corresponding Author:
Agung Riadin,
Doctoral Program in Education
Universitas Muhammadiyah Malang
Bendungan Sutami Road No. 188, Sumbersari, Lowokwaru District, Malang City, East Java 65145
Email: agungriadin29@gmail.com

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INTRODUCTION

Problem-Based Learning (PBL) is an educational approach that has gained significant attention in primary education because of its potential to enhance a range of student competencies. PBL is characterised by its student-centred nature, in which learners engage with real-world problems, encouraging critical thinking, problem solving, and active learning. This approach is increasingly being integrated into elementary school curricula across various subjects, including English, mathematics, and science, to improve learning outcomes and student engagement. The following section explores the characteristics of PBL in elementary schools, drawing insights from recent research. PBL emphasises student autonomy and choice, allowing learners to take responsibility for their educational journey by engaging with real-life problems. This approach encourages students to develop higher-order thinking skills and achieve their learning goals through active participation and exploration. (Anon 2023a)

In mathematics, PBL has been shown to improve students' problem-solving skills, mathematical communication, and reasoning abilities. This model encourages students to understand concepts deeply and apply them in various contexts, improving their overall mathematical competence (Panjaitan 2022). PBL plays an important role in developing critical thinking skills, an essential component of 21st-century expertise. By engaging students in problem-solving activities, PBL fosters lateral and systematic thinking, which is essential for addressing complex problems (Yulianti 2021).

Research shows that PBL significantly improves students' critical thinking skills, as evidenced by improved performance in science learning activities. This improvement is indicated by an increase in students' critical thinking scores over successive learning cycles (Yati, Mudjiran, and Fitria 2020). PBL promotes active learning by engaging students in cognitive, affective, and psychomotor activities. This engagement leads to improved learning outcomes, as students are more motivated and engaged in the learning process. (Hidayat, Hamdu, and Riyanti 2023)

This model has been shown to increase student motivation, as it shifts from conventional teaching methods to more innovative and interactive learning experiences. This change results in higher student engagement and better academic performance. (Roni Hamdani et al. 2022). In line with modern education curricula, PBL is effectively integrated into thematic learning approaches, where subjects are taught through interconnected themes. This integration has been shown to improve learning outcomes in subjects such as Pancasila and Civic Education, as well as in thematic areas such

as diversity and energy conservation. (Utama and Muhammadi 2023)

PBL is applied across various disciplines, and its effectiveness is often compared with other educational strategies. Recent research highlights the importance of teacher and student assessment in evaluating the success of PBL, as well as the exploration of hybrid models that combine PBL with other teaching methods. These approaches are also supported by technology, which enhances the learning experience and provides new avenues for implementing PBL in various educational settings. (Ceker and Ozdamli 2021)

While PBL offers many benefits, it is important to consider the challenges associated with its implementation. Teachers need adequate training and resources to facilitate PBL effectively, and there may be resistance to change from traditional teaching methods. In addition, the success of PBL depends on careful problem design and the ability to accurately assess student progress. Despite these challenges, a growing body of research supports the positive impact of PBL on primary education, making it a valuable approach for fostering important skills in young learners.

At the primary school level, the implementation of PBL presents an opportunity to improve students' problem-solving skills and stimulate their interest in science. However, the implementation of PBL at this level is also faced with challenges, including teacher readiness, limited resources, and the need to adapt this approach to the level of students' cognitive development. Therefore, it is important to identify the specific characteristics of PBL in elementary schools in order to optimise its implementation and overcome various obstacles that may arise.

This study aims to explore the characteristics of PBL at the primary school level through a comprehensive literature review. By understanding various aspects, such as student engagement, the role of teachers, and the impact of PBL learning on the development of student skills, this research is expected to provide insights for educators and researchers to design a more effective PBL model that suits the needs of primary education. Through a literature review approach, this study will analyse various existing studies related to the implementation of PBL in elementary schools, focusing on identifying characteristics, benefits, and challenges in its implementation.

METHOD

The purpose of this research is to identify and explain the characteristics of Problem-Based Learning (PBL) at the elementary school level. The method employed is a literature review, which involves seeking theoretical references related to a specific phenomenon or issue by consulting previously published sources. A literature review encompasses an overview of theoretical insights and other research materials derived from references that serve as the foundation for the study. In the context of this article, the literature review method is used to gather information from prior research concerning the characteristics of Problem-Based Learning (PBL) at the elementary school level.

RESULTS AND DISCUSSION

Problem-Based Learning (PBL) in elementary schools is characterised by a student-centred approach, which emphasises real-world problem solving and critical thinking. This educational strategy is designed to engage students actively, fostering skills essential for lifelong learning. PBL is implemented across various subjects, including English, social studies, science, and mathematics, and is supported by theoretical foundations in constructivism and collaborative learning. The following section details the characteristics, impacts, and challenges of PBL in primary education, drawn from the research literature provided.

1. Characteristics of Problem-Based Learning (PBL) in Primary Schools

Problem-Based Learning (PBL) is an educational model that develops skills based on problem solving, teaching materials, and arrangements by using problem-focused learning (Ramadhani and Farhurohman 2024). Problem-based learning (PBL) is a contextual approach in which learning is student-centred. Problem-Based Learning (PBL) is one of the learning models used in solving real-world problems through scientific methods so that students can acquire knowledge and skills in solving problems. From this explanation, it can be concluded that Problem-Based Learning (PBL) is a learning model that involves students in solving problems contextually (Husna 2023).

The Problem-Based Learning (PBL) model is one of the tools for students to develop critical thinking skills, learn more actively, recognise the problems they face and be able to solve problems, and can improve students' understanding in depth. PBL is also a tool to help students by referring to real problems in their daily lives, so that students can learn to be able to solve problems in their daily lives by thinking critically and it is expected that students acquire knowledge and learning that is beneficial for their future (Siregar and Rozi 2024).

PBL places students at the centre of the learning process, encouraging them to take responsibility for their own learning. This approach allows students to explore and solve real-life problems, which helps in developing autonomy and decision-making skills (Anon 2023b). The teacher's role shifts from being a provider of knowledge to a facilitator, guiding students through the problem-solving process and supporting their learning journey (Ribas 2004).

PBL is very effective in improving students' critical thinking skills. It involves engagement with unstructured problems that require interpretation, analysis, evaluation, and conclusion, thus empowering students to develop these skills (Palennari n.d.). In subjects such as biology and mathematics, PBL has been proven to improve problem-solving heuristic

abilities and students' mathematical attitudes, compared with traditional teaching methods (Ruchaedi, Suryadi, and Herman 2016).

PBL is versatile and can be integrated into various subjects. For example, in primary English education, PBL can be used to engage students with real-world problems, improving their language skills and understanding (Anon 2023b). In social studies, PBL helps instil cultural values and social norms, promoting a deeper understanding of social issues (Hartati 2021).

PBL encourages collaboration among students, building a learning environment where students work in small groups to discuss and solve problems. This collaborative approach helps build communication and teamwork skills. This process involves students exploring relevant facts and information independently, then sharing their understanding in groups, which enhances collective learning (Esema, Susari, and Kurniawan n.d.).

The integration of technology, such as VideoScribe and PowerPoint, in PBL can improve learning outcomes by providing an interactive and engaging learning experience. These tools support the visualisation of complex concepts and facilitate better understanding. The use of digital media in PBL also allows for a more flexible and accessible learning environment, accommodating diverse learning styles and needs (Rio Ananta and Luh Putu Sri Lestari 2023).

While PBL offers many benefits, it also presents challenges, such as the need for teachers to adapt to new roles and the requirement for adequate resources and training to implement PBL effectively. In addition, while PBL can improve critical thinking and problem-solving skills, some studies suggest that it may not always lead to immediate improvements in standardised test scores compared with traditional methods (Tibério, Atta, and Lichtenstein 2003). Nevertheless, the long-term benefits of PBL, such as improved knowledge retention and the development of essential life skills, make it a valuable educational approach in elementary schools.

2. Impact of Problem-Based Learning (PBL) on Learning Outcomes

Problem-Based Learning (PBL) has been widely studied for its impact on basic learning outcomes in various educational contexts. Research shows that PBL can significantly improve students' cognitive, affective, and psychomotor learning outcomes by fostering critical thinking, problem-solving skills, and motivation. This educational approach is particularly effective in creating a student-centred learning environment that reflects real-world scenarios, thereby enhancing engagement and understanding.

PBL has been shown to improve cognitive learning outcomes significantly. For example, in a study on the structure of plant and animal cells, the average student score increased from 74 to 82, with all students meeting the learning criteria at the second meeting (Kusmiyati, Wibawa, and Mulyanthi 2024). This model encourages active engagement and collaboration, which are essential for developing affective skills such as motivation and teamwork (Aprilita and Handican 2023).

PBL is very effective in developing critical thinking and problem-solving skills. It gives students the opportunity to engage in real-world problem solving, which improves their ability to think critically and creatively (Alves and Amaral Filho 2024). In a study on biology learning, PBL was found to significantly improve students' critical thinking skills, which are important for understanding complex biological concepts (Azura and Selaras 2023).

The PBL approach has been associated with increased student motivation and engagement. By engaging students in problem-solving activities relevant to their real-life experiences, PBL increases their intrinsic motivation to learn (Alves and Amaral Filho 2024). A study comparing PBL with the Teaching Games for Understanding (TGfU) model found that PBL was more effective for students with low learning motivation, indicating its potential to engage less motivated learners (Sugiarto et al. 2024).

While PBL has shown significant benefits in improving learning outcomes, it is important to consider the context and implementation strategies. The effectiveness of PBL can vary depending on factors such as student motivation, the complexity of the subject matter, and the support provided by educators. In addition, while PBL is effective for students with low motivation, other models such as TGfU may be more suitable for highly motivated students (Sugiarto et al. 2024). Therefore, educators should tailor their approaches to the specific needs and characteristics of their students to maximise the benefits of PBL.

3. Challenges of Implementing Problem-Based Learning (PBL) in Primary Schools

Implementing Problem-Based Learning (PBL) in elementary schools presents several challenges, despite its potential to improve critical thinking and problem-solving skills. PBL is a student-centred approach that encourages active learning through real-world problems, but its implementation in primary education is not without obstacles. These challenges range from inadequate teacher training to limited resources, which can hinder the effective implementation of PBL in elementary school environments. Below are the main challenges identified from the literature, along with insights into potential solutions and considerations.

Many elementary school teachers lack adequate training in PBL methodology, which can lead to confusion about when and how to implement PBL effectively. This lack of understanding can result in poor implementation of the PBL model, as teachers may struggle to adapt traditional teaching methods to a more student-centred approach (Syahlan, Hidayat, and Hidayat 2023). There is a need for comprehensive professional development programmes that equip teachers

with the skills and knowledge needed to facilitate PBL. Such programmes should focus on the principles of PBL, classroom management strategies, and the integration of PBL with the existing curriculum (Li and Sihes 2022).

The implementation of PBL requires adequate resources, including access to learning materials and technology, which are often lacking in elementary schools. This scarcity can limit the scope and effectiveness of PBL activities. In addition, time management is another significant challenge, as PBL activities can be time-consuming. Teachers may find it difficult to cover the required curriculum within the limited time available, leading to incomplete or rushed projects (Syahlan et al. 2023).

While PBL is designed to improve student engagement, it may be difficult to maintain motivation among younger students who may not fully understand the relevance of the problems being addressed. This can result in passive participation and reduced learning outcomes (Smith et al. 2023). To address this, teachers can incorporate real-life problems related to students' experiences, thereby increasing their interest and motivation to participate actively in PBL activities (Anon 2023a).

Traditional assessment methods may not adequately capture PBL learning outcomes, which emphasise critical thinking and problem solving rather than memorisation. This misalignment can make it difficult for teachers to evaluate student progress effectively. Developing alternative assessment strategies, such as project-based assessment and reflective journals, can provide a more comprehensive evaluation of student learning in PBL settings (Putra, Meirza Nanda Faradita, and Dewi Masyita Faradillah 2023).

Integrating PBL into the existing curriculum can be challenging, as it requires a shift from content-focused teaching to a process-oriented approach. Teachers may struggle to align PBL activities with curriculum standards and learning objectives (Anon 2023b). Collaborative planning and curriculum mapping can help teachers identify opportunities to incorporate PBL into various subjects, ensuring that learning objectives are met while engaging students in meaningful problem-solving activities (Li and Sihes 2022).

Although the challenges of implementing PBL in elementary schools are significant, they are not insurmountable. Addressing these challenges requires a concerted effort from educators, administrators, and policymakers to provide the necessary support and resources. By fostering a supportive environment and equipping teachers with the skills needed to implement PBL effectively, elementary schools can overcome these barriers and harness the full potential of PBL to improve student learning outcomes.

CONCLUSION

Problem-Based Learning (PBL) in primary education settings presents a pedagogical framework that has the capacity to stimulate students' active participation in the educational process through authentic problem-solving activities. According to the comprehensive literature review conducted, the fundamental attributes of PBL in primary education include a student-centred pedagogical approach, the integration of contextual challenges as a catalyst for learning, collaborative group work, and the facilitative role of the educator. Empirical evidence indicates that PBL positively influences the development of critical thinking abilities, promotes learning autonomy, and enhances cooperative skills among elementary school students. Nevertheless, the implementation of PBL in primary education is not without its many challenges, including educators' readiness to effectively utilise this methodology, constraints on available supporting resources, and the need to adapt the PBL framework to align with the cognitive and socio-emotional developmental stages of children in primary education. These observations underscore the necessity of professional development opportunities for teachers, as well as the allocation of sufficient resources to optimise the efficacy of PBL in primary education contexts. In summary, the findings of this investigation offer valuable insights for educators and researchers engaged in the formulation of PBL initiatives that are suited to the needs and characteristics of primary education. Additional recommendations call for the creation of pragmatic guidelines for PBL implementation, alongside ongoing research aimed at identifying effective strategies to address the obstacles encountered during practical application in educational settings. With proper implementation, PBL has the potential to serve as an innovative and efficacious educational methodology in equipping elementary school students for future academic challenges.

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