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Optimization of problem-based learning model in thematic learning in elementary schools

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ABSTRACT

Implementing problem-based learning in elementary schools is challenging, as it requires a lack of teacher understanding and training and time and technology constraints. A dense curriculum also limits the effectiveness of PBL. Nevertheless, PBL can improve students' critical, collaborative, and analytical thinking skills. The purpose of this study is to optimize the problem-based learning model in thematic learning at elementary schools to enhance student engagement, critical thinking, creativity, and overall learning outcomes. This study used a qualitative descriptive design to explore Problem-Based Learning in thematic learning, focusing on stages, challenges, and success factors through observation, interviews, document analysis, and triangulation. The results of this study indicate that implementing Problem-Based Learning in Islamic elementary schools, including elementary school, strengthens student competencies through active, collaborative, and problem-based learning. This method enhances students' social skills, teamwork, critical thinking, and independence while motivating them through interactive media. Educators are facilitators, assisting students in organizing information and developing creative solutions. Although challenges such as high costs and longer implementation times pose obstacles, adequate infrastructure support and positive student responses make PBL effective in equipping them with essential life skills for the future. This study's contribution is to illustrate that the application of the Problem-Based Learning model in Islamic elementary schools is effective in improving student competencies through active, collaborative, and problem-oriented learning activities. This study also shows that PBL can improve students' social skills, teamwork, critical thinking, and independence and motivate them with the use of interactive media.

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INTRODUCTION

One of the main challenges in optimizing the Problem-based Learning (PBL) model in thematic learning at the elementary school level lies in the limited understanding teachers have regarding effective PBL implementation. Cardenas and Inga (2021), along with Yang et al. (2021), argue that many educators are still unfamiliar with the correct ways to apply PBL in the classroom. Similarly, Imbaquingo and Cárdenas (2023) emphasize that the success of the learning process is strongly influenced by how well teachers grasp the method. Yew and Goh (2016), as well as Alreshidi and Lally (2024), highlight that most teachers have not received sufficient training in PBL implementation, which affects the overall quality of teaching and learning. In line with this, Finkelstein et al. (2012), Markula and Aksela (2022), and Zhou (2023) point out that limited resources such as time constraints, a lack of relevant teaching materials, and inadequate technological infrastructure also hinder the optimal application of PBL. Trullàs et al. (2022) report that in 65% of cases, teachers struggle to integrate PBL within a tight curriculum schedule, which often results in learning objectives not being fully achieved. Commenting on these issues, Meng et al. (2023) and Acosta et al. (2024) believe that while PBL holds great potential to enhance students' critical thinking, collaboration, and analytical skills, its effective implementation is difficult without focused teacher training, curriculum alignment, and adequate resources. Therefore, a holistic strategy is essential to overcome these barriers and ensure that PBL can be implemented effectively to positively impact the quality of thematic learning in elementary schools.

Based on several previous studies discussing the application of Problem-Based Learning (PBL) in thematic learning in elementary schools, it is known that PBL has a significant impact. Almulla (2020) and Arantes do Amaral et al. (2023) revealed that thematic-integrative modules based on PBL effectively improve students' learning independence and academic achievement by linking learning materials to real-world problems. Research by Chen et al. (2020) and Gou et al. (2020) shows that PBL can improve critical thinking skills and student learning outcomes in subjects through active participation and group collaboration. Meanwhile, Markula and Aksela (2022) and Chueh and Kao (2024) highlight the role of PBL in encouraging students' problem-solving abilities and increasing their involvement through analysis of real problems integrated with learning. Triwoelandari et al. (2023) successfully developed PBL-based thematic teaching materials that have proven effective in strengthening student understanding and increasing group collaboration. In addition, Ghani et al. (2021) and Hussein (2021) showed that PBL can connect theory with actual practice, thereby increasing motivation and deepening students' learning process. The current study focuses on how PBL can improve students' overall competence and its impact on students' abilities in thematic learning.

This study aims to comprehensively describe the implementation of the Problem-Based Learning (PBL) model in thematic learning in elementary schools. The main objective is understanding how PBL can help students identify, analyze, and solve real-world problems effectively, thereby improving students' critical thinking skills, creativity, and collaboration. In addition, this study also aims to explore the optimal implementation steps of PBL, the challenges faced during its implementation, and the supporting factors for its success. The benefits of this study are not only limited to contributing to educational innovation but also providing practical guidance for educators in adopting more relevant and creative learning strategies to the demands of 21st-century education. By integrating a problem-based approach in thematic learning, this study is likely to improve the effectiveness of the teaching and learning process, especially in building student competencies needed to face global challenges. In addition, the results of this study can be an important reference for policymakers and educational institutions in designing a curriculum oriented towards 21st-century skills-based learning, such as critical thinking, communication, collaboration, and creativity.

Initial observations indicate that teachers have implemented the Problem-Based Learning (PBL) model according to the recommended stages, starting from presenting relevant real problems to guiding students in formulating solutions. Although this initial implementation seems promising,

further evaluation is needed to determine the overall effectiveness of the PBL model in elementary schools, especially in improving students' learning outcomes, critical thinking skills, and collaboration skills. The initial hypothesis of this study states that implementing the Problem-Based Learning model can significantly increase student engagement, deepen understanding of learning materials, and develop 21st-century skills, such as critical thinking, creativity, communication, and collaboration. In addition, this hypothesis also indicates that PBL can create an interactive and student-centered learning environment, which improves academic achievement and builds students' independence, problem-solving skills, and social skills.

RESEARCH METHOD

This study employs a qualitative descriptive research design, a method considered appropriate by Doyle et al. (2020) and Nassaji (2015) for exploring educational practices in depth. According to them, this approach allows researchers to examine phenomena within their natural settings, making it ideal for gaining meaningful insights into the application of the Problem-Based Learning (PBL) model in thematic learning. Babchuk (2017) and Agazu et al. (2022) also support the use of this design in education, asserting that it enables a comprehensive understanding of how educational strategies function in real classroom environments.

The main objective of this research is to investigate three crucial aspects: the implementation stages of PBL, the challenges faced during its application, and the key factors that support its successful integration. This research focus reflects the perspective of Wang (2021), who underscores the importance of thoroughly analyzing these elements in order to enhance the effectiveness of PBL in educational contexts. In this study, the researcher assumes the pivotal role of the primary instrument for data collection, interpretation, and analysis. Immersion in the study environment is central to this approach, enabling the researcher to collect nuanced, detailed data that reflect the complexities of the PBL model as implemented in practice. This process enhances the depth and comprehensiveness of the research findings, as highlighted by Busetto et al. (2020). By employing this methodological framework, the study aims to provide valuable insights into the practical application of PBL, addressing the existing gaps in understanding its effective implementation in thematic learning contexts.

The data in this study were gathered using a combination of classroom observations, teacher interviews, and document analysis, following a triangulated method to strengthen the reliability of the findings. El-Sabaa et al. (2017) and Oranga and Matere (2023) advocate for triangulation in educational research, noting that the use of multiple data sources and diverse collection techniques such as interviews, observations, and documentation enhances the depth and trustworthiness of the results. According to these experts, this method allows for a more thorough and accurate representation of the research context. In analyzing the data, the study followed a three-stage process as proposed by Suter (2012). He outlines that the analysis begins with data reduction, where non-essential information is eliminated; continues with data presentation, where the core findings are organized systematically; and concludes with interpretation, where final insights are drawn to address the research questions. This structured approach is essential for producing valid and meaningful conclusions.

Moreover, ethical principles were strictly upheld throughout the research process to maintain compliance with established ethical guidelines. Subedi et al. (2021) and Masoud and Basahal (2023) emphasize the importance of ethical integrity in educational research, highlighting key practices such as securing informed consent from all participants, safeguarding the confidentiality of personal data, and ensuring that participation was entirely voluntary. According to these scholars, such ethical precautions play a crucial role in enhancing the trustworthiness and credibility of research outcomes. By adhering to this ethical and methodological framework, the study not only generates reliable and valid findings but also offers meaningful insights into the practical implementation of the Problem-Based Learning (PBL) model in thematic instruction at the elementary school level.

RESULTS AND DISCUSSION

Results

Implementation of problem based learning model in madrasah ibtidaiyah

In examining research data on the application of problem-based learning (PBL) in elementary schools, it is clear that this approach significantly influences both teaching practices and student learning outcomes. The structured stages of PBL encourage active participation, enabling students to engage with the curriculum more meaningfully. Beyond content mastery, PBL fosters essential skills such as critical thinking, creativity, and collaborative problem-solving, which are vital for lifelong learning. Teachers also benefit from adopting PBL, as it provides opportunities to design lessons that connect theoretical knowledge with real-world contexts. This alignment not only makes learning more relevant but also motivates students to explore, analyze, and reflect. Overall, the integration of PBL into thematic learning illustrates a strong commitment to developing a holistic educational process that prepares students to face complex challenges while nurturing independence, responsibility, and innovative thinking in their academic journey.

Table 1
Results of Interviews on the Implementation of PBL

No	Informant	Description
1	WKS	We see the importance of bringing real context to learning so that students can be actively involved. Problem Based Learning provides them with the opportunity to face and solve problems that are relevant to everyday life.
2	GR	The PBL process in its implementation consists of five main stages. First, we orient students to the problems they will face. After that, we organize them to learn and find solutions in groups. The third stage is to guide them in investigations, where they gather information and develop their understanding.
3	GK II	The challenge is to ensure that the problems we present are challenging enough but still relevant to the students' experiences. We need to be creative in designing scenarios that encourage critical thinking and collaborative solutions.

Note: The data was obtained by the researcher from the results of interviews with the head of the madrasa and class teachers

In implementing Problem-Based Learning (PBL) at elementary school, the Vice Principal (WKS) emphasizes the importance of learning linked to real contexts to enhance active student engagement. At the same time, the Grade V Teacher (GR) outlines the structured process of PBL, consisting of five systematic stages, including problem orientation, group learning, and in-depth investigation. Although this structure reinforces the teachers' commitment to facilitating the practical application of knowledge, the Grade II Teacher (GK II) identifies challenges in designing problems that are sufficiently challenging yet still relevant to students' experiences, highlighting the need for creativity in teaching to encourage critical thinking and collaborative solutions. This approach reveals the efforts made to balance the complexity of tasks with students' adaptability, demonstrating the dynamics between pedagogical aspirations and operational realities in applying PBL. The success of this method depends on the extent to which teaching can adapt to changing learning needs and the socio-emotional environment of the students.

Syntax of problem-based learning model at elementary school

The findings of this study reveal that the syntax of the Problem-Based Learning (PBL) model in elementary schools is carefully structured to optimize the learning process. Implementation begins with presenting real-world problems closely related to students' daily lives, which immediately captures their attention and builds contextual relevance. Students are then guided to collaboratively explore potential solutions, creating an interactive and engaging classroom atmosphere. This process was found to significantly stimulate critical thinking and strengthen problem-solving skills, while also encouraging active participation and teamwork. Furthermore, the integration of practical applications into the learning process makes the acquisition of knowledge more meaningful and

impactful for students. Overall, the findings indicate that the PBL model not only enhances academic understanding but also supports the development of essential 21st-century skills, providing strong evidence of its effectiveness in elementary school thematic learning.

Table 2
PBL Syntax at Elementary School

Stages	Educator Activities
Stage 1 - Orient students to the problem	The educator explains the learning objectives, explains the logistics needed, proposes phenomena or stories to raise problems, motivates students to get involved in problem solving.
Stage 2 - Organizing students to learn	Educators help students to define and organize learning tasks related to the problem.
Stage 3 - guiding the investigation	Educators encourage students to gather appropriate information, conduct experiments, and seek explanations and solutions.
Stage 4 - Develop and present the problem	Educators help students in planning and preparing work that is in accordance with the report, and help students to share tasks with other students.
Stage 5 - analyze and evaluate the problem	Educators help students to reflect or evaluate their investigations and the processes they used.

Note: The data was obtained from the results of the researcher's interviews with class teachers

The Problem-Based Learning (PBL) approach at Elementary School is structured around five stages, each designed to progressively engage and empower students. Initially, educators lay the foundation by setting clear objectives and contextualizing the problem, which is crucial for stimulating student interest. As the process advances, students are guided to organize and take charge of their learning tasks, enhancing their autonomy. In the investigation phase, active engagement is promoted through information gathering and experimentation, key for developing analytical skills. The presentation stage allows students to apply and communicate their findings, fostering teamwork. Finally, the reflection stage encourages critical evaluation of their methods and outcomes, essential for continuous learning and improvement. This methodology not only enriches academic skills but also cultivates critical life skills like problem solving and collaboration.

The impact of implementing problem-based learning (PBL) models on students

Based on the results of interviews with teachers, madrasah principals, and students elementary school, implementing the Problem-Based Learning (PBL) model significantly positively impacts the learning process. The following are four main aspects identified from the interviews:

Table 3
Impact of Problem-Based Learning (PBL) on students

No	Impact on students	Description
1	Student Activity	Students at elementary school have become more active in implementing the Problem-based Learning model. They participate through questions and answers, group discussions, and joint assignments. The fifth-grade teacher said this model motivates students to be more courageous in asking questions and expressing opinions. At the same time, the Head of the Madrasah emphasized that activeness is also seen in group presentations, which increases students' enthusiasm and self-confidence.
2	Fun Learning	Learning in elementary schoolbecomes more interesting using media such as teaching aids, videos, and worksheets based on actual problems. Students feel like they are playing while learning, so they are more enthusiastic about attending classes. The Head of Madrasah also emphasized that this interactive atmosphere supports good relationships between students and teachers.
3	Students' Collaboration Skills	The Problem-Based Learning Model at elementary school trains students to work in groups, listen to opinions, share tasks, and find solutions together. Teachers and the Head of the Madrasah noted an increase in collaboration, seen from the results of group work that was neater and more structured, as well as students who respected their friends' opinions more and actively contributed.

4	Development of Independence	The Problem-Based Learning Model at elementary school trains students to learn independently by trying to complete tasks before asking for help. This approach increases students' confidence in making decisions. Madrasah facilities such as libraries and digital media also support their independent learning.

Note: The data was obtained from the results of the researcher's interviews with class teachers

Based on the four main findings of implementing the Problem Based Learning (PBL) model at elementary school, this model significantly positively impacts the learning process. However, intensive efforts and support are required to overcome existing challenges. PBL has succeeded in increasing student activity, making learning more enjoyable, strengthening cooperation skills, and encouraging the development of independence. Students are more actively involved in learning and more enthusiastic, creative, and independent when facing learning challenges. In addition, the interactive learning atmosphere strengthens the relationship between students and teachers, creating a conducive learning environment. However, this success requires full support from teachers and madrasah facilities. PBL requires good time management, effective use of learning media, and solid cooperation between all parties, including students, teachers, and the madrasah environment. Thus, although PBL shows excellent potential to improve the quality of education, the sustainability of its impact depends on the readiness and support of an integrated system at the institutional level.

Discussion

Improving student competence through problem-based learning

The implementation of the Problem Based Learning (PBL) model in Islamic elementary schools emphasizes student empowerment and competency enhancement through innovative teaching methods. The findings of this study align with Desimone's (2009) and Hidayatullah & Setiawan's (2024) view that PBL is central to strengthening student centered learning and fostering essential skills. Observations and interviews also revealed that PBL promotes deeper cognitive engagement, supporting the development of both social and problem-solving abilities. These findings resonate with Hmelo Silver's (2004) and Pan et al.'s (2022) arguments that PBL cultivates higher-order thinking and social competencies by encouraging inquiry and application of knowledge in real-life contexts. Furthermore, Walker and Leary (2009) together with Secules (2023) emphasize the role of PBL in enhancing collaboration and critical thinking an aspect also evident in this study where students worked creatively and efficiently in groups. Le et al. (2017) and Nicholus et al. (2024) similarly highlight that such skills are crucial for navigating modern learning environments. In comparison, Martinez (2022) offers a broader perspective, asserting that PBL not only enriches learning experiences in Islamic elementary schools but also equips students with adaptive tools to face academic and real world challenges.

In Problem Based Learning (PBL), the integration of video as an instructional tool proved highly effective in capturing students' attention and sustaining engagement. This aligns with the findings of Wakat et al. (2023), Alsmadi et al. (2024), and Eusafzai & Suleman (2024), who interpret the use of video as a powerful medium for maintaining motivation across diverse learners. In line with this, Lavrischeva & Ostrovski (2013) and Al-Hasani & Elgazzar (2015) argue that videos help bridge abstract concepts into concrete understanding, a perspective that resonates with this study's evidence showing improved comprehension through visual clarity. Jonassen and Hung (2008) as well as Issa & Khataibeh (2021) provide an analytical lens by emphasizing that PBL, supported by such media, transforms learning into a student-centered process where knowledge is applied in real contexts an outcome also visible in classroom practices observed. Furthermore, Lomotey (2019) and Perets et al. (2023) highlight the collaborative dimension of PBL, which this study confirms through the emergence of stronger peer interaction and leadership skills. Comparatively, Bell (2010) and Maros et al. (2021) stress that the ultimate objective of PBL is preparing students for real-world challenges, a conclusion consistent with the present findings that demonstrate enhanced critical thinking and problem-solving skills extending beyond academic boundaries.

The PBL approach in Islamic elementary schools emphasizes collaboration and organization, which this study found to significantly enrich both learning processes and outcomes. Finkelstein et al. (2013) interpret group formation in PBL as more than a pedagogical strategy it redistributes cognitive load by enabling students to collectively solve problems, a finding reflected in the improved comprehension observed here. Analytically, Gillies (2016) and Zhang et al. (2023) argue that such collaboration fosters accountability and motivates active contributions, perspectives that align with this study's evidence of heightened student responsibility and engagement during group tasks. Moreover, Chueh & Kao (2024) highlight the inclusivity dimension of group work, where diverse perspectives are valued and teamwork skills are cultivated. These insights are comparable with the present findings that show PBL not only strengthens academic achievement but also nurtures essential social and interpersonal competencies. Taken together, the literature and current evidence suggest that PBL in Islamic elementary schools develops a dual benefit: advancing cognitive mastery while equipping students with collaborative skills essential for future success.

In the Problem-Based Learning (PBL) model, educators function as facilitators and mediators rather than mere transmitters of knowledge. Almulla (2020) interprets this role as empowering students to explore knowledge and conduct experiments independently, a perspective reflected in this study where students demonstrated greater ownership of their learning. Pobiner (2016), together with Ericsson et al. (2023) and Twahirwa & Ntivuguruzwa (2024), argue that teachers' guidance in evaluating credible sources and structuring ideas is central to transforming theoretical concepts into applicable knowledge. This analytical view resonates with the findings here, where students effectively linked classroom discussions to real world contexts. Driskell et al. (2018) and Hidayatullah & Setiawan (2024) highlight the necessity of maintaining inclusive group dynamics, which this research confirms as essential in ensuring equitable student participation. Similarly, Sungur & Tekkaya (2006) and Xhaferi & Xhaferi (2017) stress reflection as a driver of critical and analytical thinking, findings that parallel this study's evidence of improved evaluative skills. Comparably, Hmelo Silver (2004) and Chan & Lee (2021) emphasize continuous evaluation as motivation for growth, while Gillies (2016) underscores that collaborative PBL settings foster essential life skills insights strongly affirmed in the present research context.

The adoption of Problem-Based Learning (PBL) in Islamic elementary schools represents a shift from conventional teaching toward a more integrative model that connects theory with real life applications. Reynolds & Kearns (2016) and Liao & Ringler (2023) interpret this transition as a move toward holistic education, where classroom knowledge gains meaning through its relevance to students' everyday experiences an interpretation consistent with this study's finding that learners became more engaged when lessons were contextualized. Similarly, McDaniel & Ingram (2023) and Mafarja et al. (2023) critically argue that PBL redefines students' roles, positioning them as investigators and problem-solvers rather than passive recipients. The present research affirms this view, showing that students actively sought solutions, collaborated with peers, and took responsibility for their own learning progress. When compared across these perspectives, it becomes clear that PBL does not merely enhance content mastery but also nurtures broader competencies, including critical thinking, adaptability, and effective problem-solving. These skills, as highlighted both in theory and practice, are vital for academic achievement and for preparing students to navigate the complexities of real-world challenges with confidence.

Dolmans et al. (2005) dan Ittycheria et al. (2024) menafsirkan bahwa Problem-Based Learning (PBL) meningkatkan motivasi dan keterlibatan siswa karena menempatkan mereka di pusat proses belajar. Temuan ini sejalan dengan hasil penelitian yang menunjukkan bahwa siswa lebih aktif dan bertanggung jawab terhadap proses pembelajaran ketika dihadapkan pada permasalahan nyata. Selaras dengan itu, Mikulski et al. (2023) serta Tran & Herzig (2023) menekankan bahwa PBL memperkuat keterampilan kolaboratif, seperti komunikasi yang jelas dan kerja sama yang efektif, yang juga teridentifikasi dalam studi ini melalui peningkatan kontribusi siswa dalam diskusi kelompok. Oldland (2023) menambahkan bahwa PBL membentuk kepercayaan diri siswa untuk menyampaikan ide dan bekerja secara produktif dalam tim. Sementara itu, Doblinger (2022) serta

Ates & Aktamis (2024) melihat PBL sebagai sarana untuk menumbuhkan fleksibilitas dan kreativitas dalam menghadapi tantangan kompleks. Dengan demikian, baik secara teoritis maupun empiris, PBL terbukti membekali siswa dengan kemampuan akademik, sosial, dan emosional yang relevan dengan tuntutan abad ke-21.

The impact of the implementation of the problem-based learning model

The implementation of the Problem-Based Learning (PBL) model in elementary schools has shown transformative effects on students' learning and development. Hmelo Silver (2004) and Roche et al. (2016) interpret that students' involvement in solving authentic, real-world problems allows them to develop a deeper understanding of academic conceptsa finding also reflected in this study through the improvement of students' comprehension. Similarly, Kozlowski and Ilgen (2006) emphasize that the interactive structure of PBL fosters enthusiasm and engagement, as seen in the way students actively participate in group discussions and collaborative tasks. This perspective is reinforced by Guo et al. (2020) and Huerta et al. (2024), who argue that PBL not only contributes to academic mastery but also cultivates essential life skills such as communication, teamwork, and problem-solving. Thus, both theoretically and empirically, PBL can be regarded as a holistic approach that integrates cognitive understanding with the development of life skills relevant to future demands.

A notable outcome of implementing the Problem-Based Learning (PBL) model is the significant increase in student engagement throughout the learning process. Hite et al. (2024) and Clancy et al. (2024) interpret this as evidence that PBL transforms classroom dynamics, moving students from passive receivers of information to active contributors in their own learning. Findings in this study similarly indicate that students participated more frequently and meaningfully during lessons. Baucal et al. (2023) and Alismail (2023) argue that this engagement is reflected not only in asking thoughtful questions but also in students' ability to sustain deeper discussions and work collaboratively in small groups, which parallels observations in Islamic elementary schools. Sutton and Knuth (2017) view this interaction as a pathway for cultivating critical thinking, as learners are challenged to analyze and generate solutions. Extending this, Grossman et al. (2019) highlight that engagement nurtures curiosity and motivates students to move beyond surface-level comprehension. Taken together, these perspectives demonstrate that PBL fosters an intellectually stimulating environment that enhances both cognitive and social learning outcomes.

Furthermore, Problem-Based Learning (PBL) redefines the educational experience by making it more dynamic and enjoyable. Ates and Aktamis (2024) and Mou (2024) interpret the interactive nature of PBL often supported by creative media and hands-on activities as a way to break the monotony of conventional instruction. Findings from this study also indicate that students feel more engaged when learning activities are framed as meaningful problem-solving tasks. Abichandani et al. (2023) and Radu et al. (2023) critically argue that connecting academic content with real-life contexts sustains student interest and strengthens their intrinsic motivation, which is consistent with observed outcomes in Islamic elementary schools. Wahbeh et al. (2021) further emphasize that participatory and context-driven instruction not only enhances academic mastery but also fosters positive learning attitudes, making students more enthusiastic and confident. Taken together, these perspectives highlight that PBL's strength lies not merely in improving knowledge acquisition but also in transforming classroom culture into an engaging, motivating, and student-centered environment.

The application of Problem-Based Learning (PBL) at the elementary level has been shown to play a pivotal role in strengthening both collaboration and learner autonomy. Le et al. (2017) and Wolk (2022) interpret PBL as a framework that positions students within authentic group dynamics, where exchanging ideas, dividing responsibilities, and solving problems collectively are central practices. These interactions not only foster mutual respect but also embed essential teamwork competencies, echoing Bell's (2010) view that collaborative learning environments prepare students for both academic success and future professional demands. At the same time, PBL distinguishes itself from traditional teacher centered models by emphasizing student independence. Stefanou et al. (2013) and Boardman et al. (2024) highlight that PBL nurtures autonomy by encouraging students to

investigate solutions independently before seeking external guidance. This shift cultivates confidence, self-directed learning, and analytical thinking qualities that are indispensable in adapting to real-world complexities. Collectively, these perspectives suggest that PBL balances cooperation with independence, producing learners who are both collaborative and self-reliant.

Despite its transformative benefits, the implementation of Problem-Based Learning (PBL) is not without challenges. Ertmer and Simons (2006) interpret the difficulty as rooted in the substantial resources required, noting that effective PBL demands both diverse instructional media and intensive teacher training. For schools with limited budgets, this creates structural barriers that may hinder sustainability. Tong et al. (2022) and Timotheou et al. (2023) further argue that PBL is also constrained by time, as its inquiry driven and collaborative processes typically require longer durations than conventional methods. This aligns with Loyens et al. (2008), who emphasize the tension between maintaining curricular efficiency and providing meaningful learning experiences. Pan et al. (2022) extend this analysis by suggesting that without careful resource and time management, PBL risks overburdening both educators and learners. Collectively, these perspectives reveal that while PBL cultivates collaboration, autonomy, and problem-solving, its success relies on institutional strategies that balance innovation with feasibility.

Despite the challenges, the implementation of Problem-Based Learning (PBL) continues to receive positive recognition, particularly from students who view it as both engaging and relevant. Strobel and van Barneveld (2009) interpret this effectiveness as stemming from the contextualized nature of PBL, which allows learners to engage actively and express creativity while solving authentic problems. This aligns with Igbokwe (2023), who argues that such participatory learning nurtures innovation and critical thinking skills essential for adapting to complex environments. However, as Kamalov et al. (2023) emphasize, these outcomes are not achieved in isolation; adequate infrastructure plays a pivotal role. Schools with access to learning materials, technological tools, and conducive classroom environments are more capable of maximizing PBL's potential. Radu et al. (2023) and Supriatna et al. (2024) further demonstrate that at the elementary level, infrastructure not only supports lesson delivery but also empowers teachers to create interactive and problem solving oriented activities. Collectively, these perspectives suggest that PBL's success depends on balancing pedagogical innovation with institutional readiness.

Problem-Based Learning (PBL) is increasingly recognized as a powerful approach to enhance student engagement and learning outcomes. Yu (2024) highlights that by situating students in authentic problem solving contexts, PBL fosters not only academic mastery but also the development of transferable life skills such as collaboration, critical thinking, and adaptability. This view aligns with Chueh and Kao (2024), who argue that teamwork and innovation within PBL are crucial in preparing students for the complexities of modern society. However, successful implementation requires more than pedagogical reform. Scholars such as Strobel and van Barneveld (2009) stress that teacher preparation and institutional support are essential for PBL to function effectively. Adequate resources, infrastructure, and professional development opportunities ensure that educators can facilitate inquiry-driven learning rather than defaulting to traditional methods. Comparatively, while critics like Ertmer and Simons (2006) note the resource-intensive nature of PBL, proponents emphasize that its long term benefits ranging from enhanced creativity to problem solving readiness significantly outweigh these challenges, particularly in madrasah contexts where holistic education is prioritized.

CONCLUSION

Implementing Problem-Based Learning (PBL) in Islamic elementary schools (Madrasah Ibtidaiyah) has proven effective in enriching the learning process while fostering essential skills such as problem-solving, critical thinking, and teamwork. By emphasizing the practical application of knowledge, PBL not only increases student engagement but also improves the overall quality of learning outcomes. Nevertheless, its implementation is not without challenges. High infrastructure demands, the need for intensive teacher training, and time management issues require careful

strategies to address. With adequate institutional support, proper investment, and positive student responses, these obstacles can be overcome. Ultimately, PBL equips students with the competencies necessary for academic achievement as well as the adaptability and life skills needed to succeed in real-world contexts.

The implementation of Problem-Based Learning (PBL) in Islamic elementary schools carries both theoretical and practical significance. From a theoretical perspective, PBL aligns with constructivist learning theory, emphasizing that active student participation in addressing real world problems promotes deeper understanding, critical thinking, and the ability to transfer knowledge into practice. Practically, however, effective PBL requires sufficient infrastructure, well prepared learning resources, and comprehensive teacher training. Collaboration among teachers, students, and institutions becomes essential to ensure that the learning process is not only effective but also sustainable. By integrating academic content with real life applications, PBL strengthens critical, collaborative, and adaptive skills. Thus, PBL emerges as a highly relevant instructional strategy for improving learning quality and equipping students with the competencies needed to meet contemporary educational and societal challenges.

Future research on Problem-Based Learning (PBL) should examine its broader impact across different educational levels, identifying how this approach can be effectively tailored to diverse contexts. Particular attention is needed to explore strategies for managing instructional time, assessing the effectiveness of various learning media, and adapting PBL to support inclusive education. In addition, comparative studies with other instructional models would provide valuable insights into the relative strengths and limitations of PBL in fostering academic and non-academic outcomes. Longitudinal research is also essential to evaluate the long-term effects of PBL on students' life skills, including critical thinking, collaboration, and problem-solving. Such investigations could generate practical solutions for optimizing PBL implementation across a wide range of educational settings.

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