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Experience of PPL Students in Managing Problem-Based Mathematics Learning at MAN 1 Ternate

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ABSTRACT

An abstract in a scientific journal should succinctly summarize the key elements of the research conducted. It should begin with a brief background that highlights the relevance or importance of the research topic. Next, the main objective or research question addressed in the study should be clearly stated. The Methods section should concisely describe the approach, techniques, and data used. The abstract should then present the key findings of the study, emphasizing significant results without excessive detail. Finally, the implications or contributions of the research to the relevant field or practice should be discussed. The entire abstract should be written in a single, coherent paragraph, avoiding overly technical terms to ensure accessibility for readers from various disciplines.

Keywords: Problem-Based Learning, PPL Students

I. Introduction

Mathematics learning in madrasas is ideally directed not only at mastering concepts and arithmetic skills but also at developing students' critical, logical, and systematic thinking skills. Mathematics plays a crucial role in shaping rational thinking, which forms the basis for understanding the phenomena of everyday life. Therefore, mathematics learning in madrasas should provide an active, meaningful, and contextual learning process. (Damayanti et al., 2024). In addition to cognitive aspects, mathematics learning in madrasas should also ideally align with Islamic values that emphasize discipline, honesty, and responsibility. The integration of these values can be reflected through a learning process that fosters cooperation, perseverance in problem-solving, and an awareness of the importance of knowledge. Thus, mathematics learning in madrasas is not only oriented toward final results but also focuses on the process of character development in students (Anugrah et al., 2025). Mathematics learning is ideally implemented using a student-centered approach within the context of the applicable curriculum. Teachers act as facilitators, capable of creating challenging learning situations and encouraging students to actively explore mathematical concepts through various problem-solving activities relevant to real life situations. (Siregar, Hapni Laila, Nurmayani, 2025) Although the ideal conditions for mathematics learning have been widely formulated, practice in the field demonstrates that various challenges persist, particularly in State Islamic Senior High Schools (MAN).

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Mathematics learning still tends to be oriented towards one-way material delivery, with the teacher as the center of learning. As a result, active student engagement in the learning process is relatively limited, and learning becomes less meaningful to students. Another challenge faced in mathematics learning at MAN is the students' low ability to solve contextual problems that require high-level reasoning. Many students can solve routine problems but struggle when faced with problems that require in-depth analysis and understanding. This indicates that the learning process has not fully developed students' critical thinking and problem-solving skills. Furthermore, heterogeneity in student abilities, limited learning time, and educators' readiness to implement innovative learning models also contribute to these obstacles. This situation demands efforts to reform learning, both theoretical and practical, aligned with the realities of the madrasah classroom. Students in the Field Experience Program (PPL) play a crucial role in supporting the learning process in madrasas. PPL provides a platform for prospective teachers to implement the pedagogical knowledge and skills they have acquired during their studies. Through this activity, students have the opportunity to be directly involved in the planning, implementation, and evaluation of classroom learning (Damayanti et al. 2024).

In practical learning, PPL students function as teachers and learners, adapting to classroom dynamics and student characteristics. Experience managing classes, interacting with students, and collaborating with mentor teachers are crucial in developing prospective teachers' professional competencies. Therefore, the experience of PPL students should be viewed as an integral part of the learning process in madrasah. Furthermore, PPL students have the potential to become agents of learning innovation by implementing varied learning approaches and models. Students' courage in trying new learning strategies, including problem-based learning, can add a unique color to the mathematics learning process in madrasas (Li et al., 2025). Problem-Based Learning (PBL) is a learning model that uses real-world problems as the starting point of the learning process. In mathematics learning, PBL encourages students to understand concepts through problem solving rather than simply memorizing formulas. This model requires active student involvement in analyzing, formulating strategies, and drawing conclusions based on problems encountered. (Jean Sangmin Lee, 2021)

The urgency of implementing PBL in mathematics learning is increasing in line with the demands of 21st-century learning, which emphasizes higher-order thinking skills (HOTS). PBL can train students to think critically, creatively, and collaboratively, and develop their mathematical communication skills. Thus, mathematics learning is no longer abstract but becomes more contextual and relevant to students' lives (Himmi et al., 2025). Furthermore, PBL aligns with the educational policy directions that emphasize active learning. and student-centered. Through PBL, teachers and student teachers can create a challenging learning environment and motivate students to actively engage in the mathematics learning process (Azizah 2022).

Although student teachers are equipped with various innovative learning theories in higher education, including the concepts and steps of PBL, implementation in the field often faces challenges. Real-world conditions in schools do not always align with the ideal scenarios learned on campus; student teachers face limitations in time, learning resources, and diverse student characteristics. (Purwandari, 2023). This gap between theory and practice often presents challenges for student teachers in the optimal implementation of PBL. Students must adapt their learning strategies to suit classroom conditions without losing the essence of the learning model. This adaptation process is an important pedagogical experience, yet it has not been studied in depth (Crismono & Yakoh, 2025). Therefore, it is important to examine how student teachers manage PBL-based mathematics learning in real-world settings, such as madrasas. This study is expected to provide an empirical overview of the adaptation process of prospective teachers in bridging the theory learned on campus with practical learning in the field. Numerous studies have been conducted on problem-based learning (PBL) mathematics instruction, but most have focused on the effectiveness of learning models or the perceptions of full-time teachers. Research specifically examining the experiences of PPL students as learning implementers is still relatively limited, particularly in the context of madrasah.

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The novelty of this study lies in its focus on PPL students as the primary subjects. This research not only examines learning outcomes but also explores the experiences, strategies, and challenges faced by PPL students in managing problem-based mathematics instruction at the MAN 1 Ternate. By highlighting the experiences of PPL students, this study is expected to provide an empirical contribution to the development of PPL programs and improve the quality of mathematics instruction in madrasas. The findings can also serve as a reflection for LPTK (Institutions for Teacher Training and Education) in preparing more adaptive and professional prospective teachers in the future. Based on this background, this study aims to describe the experiences of PPL students in managing problem-based mathematics instruction at MAN 1 Ternate. This study focuses on the planning, implementation, and classroom management processes during the learning process. Furthermore, this study aims to identify the various obstacles faced by PPL students in implementing PBL and the strategies used to overcome them. Thus, this study is expected to provide a comprehensive overview of the dynamics of PBL implementation by PPL students in the madrasah environment. Practically, the results of this study are expected to provide evaluation material and recommendations for PPL students, supervising teachers, and educational institutions for educational personnel to improve the quality of mathematics learning practices in madrasahs.

II. Literature Review and Hypothesis Development

2.1. Field Experience Students' Experiences and the Role of Pedagogical Reflection in Mathematics Learning

The Field Experience Program (PPL) is a crucial stage in the education of prospective teachers, aiming to provide real-world experience in teaching and learning practices in schools. Through PPL, students not only implement the pedagogical knowledge gained in lectures but also develop professional, social, and personal competencies as educationalists. The PPL student experience encompasses the process of lesson planning, classroom management, interactions with students, and reflection on the teaching practices implemented (Anugrah et al., 2025). This experience is contextual and reflective because PPL students are exposed to diverse classroom dynamics that often differ from the ideal conditions learned on campus. In mathematics teaching practices, PPL students are required to adapt their learning strategies to student characteristics and real-life classroom conditions. Therefore, the PPL experience can be understood as a professional learning process that plays a crucial role in preparing prospective teachers to face the challenges of learning mathematics in schools. In the context of Problem-Based Learning (PBL) mathematics instruction, PPL students play a strategic role as practicing teachers, designing lessons, facilitating discussions, and providing scaffolding tailored to students' needs. This role demands a high level of pedagogical preparedness and adaptability, given that PBL positions students as active participants in the learning process. Therefore, pedagogical reflection is a crucial part of the PPL student experience, helping them evaluate the effectiveness of their learning and formulate improvements for future teaching practices (Damayanti et al. 2024). Pedagogical reflection helps PPL students develop professional awareness of the strengths and weaknesses of their teaching practice. Through reflection, PPL students not only improve the quality of their mathematics teaching practices, but also strengthen their professional identity as adaptive and reflective prospective teachers.

2.2. Problem-Based Learning and Mathematics Learning Management

Problem-Based Learning (PBL) is a learning model that uses contextual problems as the starting point of the learning process. This model emphasizes active student involvement in identifying problems, seeking information, discussing them, and developing solutions, both independently and collaboratively. In mathematics learning, PBL plays a crucial role in helping students understand concepts through meaningful

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and contextual problem-solving (Purwandari, 2023). The application of PBL in mathematics learning encourages the development of critical thinking, mathematical reasoning, and communication and collaboration skills in students. Through PBL, abstract mathematical concepts can be linked to real-life situations, making learning more relevant and meaningful. Therefore, PBL is seen as an appropriate approach to improving the quality of mathematics learning, particularly at the madrasah level (Peranginangin, 2025). The success of PBL implementation depends heavily on the learning management carried out by teachers or PPL students. Mathematics learning management includes the systematic planning, implementation, and evaluation of learning. Learning planning involves developing learning tools, selecting appropriate learning models, and preparing media and learning resources that support problem-based learning (Hidayah et al., 2024). At the implementation stage, learning management requires the ability to manage the classroom, time, and facilitate effective learning interactions. Learning evaluation serves to assess the achievement of learning objectives and reflect on the ongoing learning process. Therefore, sound learning management is a key factor in supporting the effectiveness of PBL implementation in mathematics.

2.3. Relevant Previous Research

Several previous studies have shown that implementing Problem-Based Learning (PBL) in mathematics learning can improve students' problem-solving skills and active engagement. Other research has also shown that PBL is effective in developing students' critical thinking and mathematical reasoning skills at the secondary school level. The first study, conducted by Sari and Widodo (2020), examined the implementation of Problem-Based Learning (PBL) in mathematics learning at the high school level. The results showed that PBL significantly improved students' problem-solving skills and learning engagement compared with conventional learning. PBL provides a space for students to discuss, express ideas, and connect mathematical concepts to contextual problems, thereby making learning more meaningful. The second study, conducted by Adiyono, Yulianti, Muhammad Azmi, Evy Fitriatun Nisa, Indah Savira Aurelita, and Zulva, 2022, examined the experiences of Field Experience Program (PPL) students in managing learning in secondary schools. The research findings indicate that PPL plays a crucial role in shaping students' pedagogical competencies, particularly in classroom management and the selection of learning strategies. However, this study did not specifically highlight a particular learning model but rather focused on the general experiences of PPL students during their teaching practice. The third study, conducted by Putri and Sudiyana (2024), examined the implementation of PBL in mathematics learning at Islamic senior high schools (madrasah aliyah). The results revealed that PBL was effective in improving critical thinking and mathematical reasoning skills among madrasah students. However, this study focused on the role of full-time teachers as learning implementers and did not examine the experiences of prospective teachers or PPL students in managing problem-based learning.

Similarly, the study by Jayanti Putri and Sudiyana (2024) shares similarities with this study regarding the use of Problem-Based Learning in mathematics learning. All three studies emphasized the importance of PBL in improving critical thinking, problem-solving, and student engagement. This strengthens the theoretical basis that PBL is a relevant learning model for mathematics learning at the secondary school level. Meanwhile, research by Adiyono, Yulianti, Muhammad Azmi, Evy Fitriatun Nisa, Indah Savira Aurelita, and Zulva (2022) shares similarities with this study in its focus on the experiences of field teachers in teaching practice. This similarity lies in the effort to understand how field practice contributes to the development of prospective teachers' pedagogical competence. However, this study did not specifically link the experiences of field teachers to the implementation of a specific learning model.

The main difference between this study and previous research lies in the integration of the focus of the study. This study simultaneously examines the experiences of field teachers and the application of Problem-Based Learning in mathematics learning in a madrasah context. Furthermore, this study was

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conducted at MAN 1 Ternate, addressing a unique local context that has not been widely explored in previous research. Therefore, this study fills a gap in the research by presenting prospective teachers' perspectives on managing problem-based mathematics learning in madrasahs, contributing to the research's novelty. Furthermore, research on the experiences of field teachers demonstrates that field practice contributes significantly to the development of prospective teachers' pedagogical competence. However, studies specifically integrating the experiences of PPL students with the application of PBL in mathematics learning in madrasas are limited. Therefore, this study plays a crucial role in filling this gap by examining the experiences of PPL students in managing problem-based mathematics learning at MAN 1 Ternate as a conceptual framework.

III. Research Method

This study used a descriptive qualitative approach characterized by educational phenomenology to deeply understand the experiences of Field Experience Program (PPL) students in managing Problem-Based Learning (PBL)-based mathematics learning in madrasas. This approach was chosen to explore the meaning, processes, and dynamics of learning directly experienced by PPL students in a natural classroom context (Alhazmi and Alhazmi, 2022). The study was conducted at State Islamic Senior High School (MAN) 1 Ternate during the PPL semester of the current academic year. The primary subjects were PPL mathematics students, while supervising teachers and students served as supporting informants to enrich and validate the research findings. Data were collected through observations, semi-structured interviews, and documentation. (Daruhadi & Sopiati, 2024). Observations were used to directly observe the implementation of PBL-based mathematics learning in classrooms. Interviews were conducted with PPL students and supervising teachers to explore their experiences, perceptions, and reflections on learning practices. The documentation included learning tools, student reflection notes, and other supporting documents. Data analysis was conducted qualitatively by following the stages of data reduction, data presentation, and drawing conclusions. (Rijali, 2018) Data validity was guaranteed through source triangulation (PPL students, supervising teachers, and students) as well as technical triangulation (observation, interviews, and documentation) to increase the credibility of research findings.

IV. Result and Discussion

4.1. Analysis Result

This study involved three student interns (PPL) who were conducting mathematics teaching practices at MAN 1 Ternate as the primary subjects of the study. Additionally, one mathematics tutor and several students from their classes served as supporting informants to strengthen the research data. Data were collected through direct observation during the learning process, semi-structured interviews with the PPL students and tutors, and documentation in the form of learning tools and reflection notes. Observations were conducted during several Problem-Based Learning (PBL)-based mathematics learning sessions. Interviews were conducted after the learning sessions to explore the experiences, perceptions, and reflections of the PPL student participants. Documentation was used to track the alignment between learning planning and its implementation.

1. Planning and Implementation of Problem-Based Learning by PPL Students

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Based on the documentation of learning materials, PPL students developed a Lesson Implementation Plan (RPP) that adheres to the syntax of Problem-Based Learning (PBL). The RPP contains the main components of the lesson, including the formulation of contextual problems, learning objectives, steps for problem-based learning activities, and techniques for assessing the process and the student learning outcomes. The problems used in the lesson are generally related to everyday life situations relevant to mathematics, such as calculation problems, comparisons, and concept application in real-world contexts. The interview results indicated that PPL students had a theoretical understanding of the basic concepts of PBL, particularly regarding the role of problems as learning triggers. One PPL student stated:

> "In theory, we have learned about PBL on campus, so we know that learning must begin with problems that are relevant to students' lives" (Interview with PPL Student 1).

This statement indicates that PPL students have a conceptual understanding of the essence of PBL in mathematics. However, PPL students also expressed difficulty in formulating contextual problems appropriate to their students' ability levels. One PPL student stated:

> "Sometimes it's difficult to determine the right problem, because if it's too easy, students solve it quickly, but if it's too difficult, they get confused" (Interview with PPL Student 2).

Another PPL student added that PBL-based lesson plans often require adjustments based on actual classroom conditions:

> "The lesson plans we create often have to be revised based on student conditions in the classroom, because not all PBL steps can go according to plan" (Interview with PPL Student 3).

This view was reinforced by a mentor teacher, who stated:

> "PPL students have tried to develop PBL lesson plans, but adjustments are still needed to ensure the problems they are given truly match the students' abilities" (Interview with Mentor Teacher).

These findings indicate that PBL planning and implementation by PPL students is an adaptive process that involves continuous reflection on both theory and practice.

2. Classroom Management and Student Responses to Problem-Based Learning

Observations indicate that the PPL students attempted to implement PBL-based mathematics learning by beginning with the presentation of contextual problems to their students. Students were guided to read, understand, and discuss the problems in groups before seeking solutions to them. In this process, the PPL students acted as facilitators by providing provocative questions and gradual guidance (scaffolding). However, in the initial stages of the lesson, not all students immediately engaged in group discussions. One PPL student expressed this as follows:

> "At the beginning of the lesson, students were still confused about where to start, so I needed to frequently approach the group and provide guidance to encourage them to discuss" (Interview with PPL Student 1).

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As the lesson progressed, the PPL students made adjustments by providing simpler examples and more intensive guidance, allowing the students to become accustomed to the problem-based learning model. Interviews with the students revealed generally positive responses to PBL-based mathematics learning. One student stated:

> "Usually, we just take notes and work on problems, but this way we can discuss and help each other understand the problems" (Interview with Student 1).

Other students also expressed that although PBL-based learning felt more challenging, this model helped them understand the material more deeply:

> "It was difficult at first because the questions were different from usual, but after discussing them with my friends and explaining them, I understood better" (Student Interview 2).

The supervising teacher assessed that the classroom management carried out by the internship students was quite good, especially in facilitating group discussions. The supervising teacher stated the following:

> "The internship students have tried to engage the students, although they still need to get used to it so the discussions are more focused" (Supervising Teacher Interview).

3. Obstacles and Adaptation Strategies of PPL Students in Implementing PBL

Based on interviews, PPL students faced various obstacles in implementing PBL in mathematics. The main obstacle expressed was the limited learning time. One PPL student stated:

> "The learning time feels inadequate, because from understanding the problem to discussion and presentation, it takes quite a long time" (Interview with PPL Student 1).

Furthermore, differences in students' academic abilities pose challenges in implementing PBL. A PPL student stated:

> "In one class, students' abilities vary, so some groups understand quickly, while others remain confused and require continuous guidance" (Interview with PPL Student 2).

The PPL students also revealed that they were not yet accustomed to problem-based learning, so at the beginning of the lesson, they tended to be passive and wait for the teacher's explanations.

> "Initially, students are more likely to remain silent and wait for explanations, because they are not used to learning through discussions and finding their own solutions" (Interview with PPL Student 3).

PPL students also experienced difficulties in managing group discussions, as expressed below:
"Sometimes group discussions don't run smoothly; only one or two students are active, while the others are less engaged" (Interview with PPL Student 1).

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To address these challenges, PPL students employed various adaptation strategies, such as simplifying problems, providing additional examples, and increasing the intensity of guidance for groups of students experiencing difficulties. Documentation in the form of reflection notes showed that the PPL students actively evaluated the learning implementation and planned improvements for future meetings. The supervising teacher emphasized that these obstacles were part of the learning process for prospective teachers and could be minimized through practical experience.

> "The PPL students still need time to adjust, especially in managing the learning rhythm and conditioning students to be more active" (Interview with the Supervising Teacher).

Overall, the research results indicate that the PPL students' experience in managing PBL-based mathematics learning provided meaningful pedagogical learning experiences. The PPL students gained hands-on experience in planning, implementing, and reflecting on innovative learning in real classrooms. This experience not only enhanced the PPL students' understanding of PBL implementation but also strengthened their preparedness as future mathematics teachers. These findings confirm that PPL practice provides an important platform for students to bridge the learning theories learned on campus with the realities of learning in the madrasahs.

4.2. Discussion

The research findings indicate that the PPL students at MAN 1 Ternate have attempted to systematically implement Problem-Based Learning (PBL)-based mathematics instruction, from the planning stage to classroom implementation. This is reflected in the development of Lesson Plans (RPPs) that adhere to the PBL syntax and the use of contextual problems as the starting point for learning. Theoretically, PBL positions real-world problems as the primary trigger for learning activities, encouraging students to construct knowledge through inquiry and discussion (Imam et al. 2024). These findings indicate that PPL students have a conceptual understanding of the essence of PBL, as learned in lectures. However, this study also revealed that PPL students still experience difficulties in formulating problems appropriate to their students' ability levels. This difficulty indicates a gap between theoretical understanding and practical pedagogical skill. Hmelo-Silver (2004) emphasized that problem design in PBL is both crucial and challenging, as problems must be complex enough to stimulate critical thinking while remaining within students' cognitive capabilities. In this context, the experiences of PPL students reflect a developing professional learning process, where the ability to design adaptive learning continues to be honed through direct classroom practices.

The research also shows that the implementation of PBL by PPL students has an impact on increasing student engagement in mathematics learning. Although students initially tended to be passive and await direct instruction from the teacher, as learning progressed, they became accustomed to discussions and actively participated in problem-solving. This finding aligns with social constructivism theory, which emphasizes that effective learning occurs when students are actively involved in social interactions and collaborative knowledge-building processes. The role of PPL students as facilitators providing scaffolding also demonstrated appropriateness. This is in keeping with the characteristics of PBL, where the teacher serves as a facilitator in the learning process and not as the sole source of information.

Students' positive responses to PBL-based mathematics learning reinforce previous research findings that PBL can increase student engagement and motivation. Research by Dwi Oktaviana (2020) shows that problem-based learning can create a more active and meaningful learning environment in mathematics. The similarity of these findings with the results of this study indicates that PBL has the same potential when implemented in madrasah environments, although it requires an adaptation process in the initial stages of its implementation.

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Obstacles faced by PPL students, such as limited learning time, differences in students' academic ability, and difficulties in managing group discussions, are common challenges in implementing PBL. Arends (2012) states that PBL requires longer learning times and adequate classroom management skills for effective group discussions. The findings of this study indicate that these obstacles are not only technical in nature, but also related to student preparedness and the teaching experience of PPL students as prospective teachers. Interestingly, this study found that PPL students employed various adaptation strategies to overcome these obstacles, such as simplifying problems, providing additional examples, and increasing the intensity of guidance for students experiencing difficulties. Furthermore, the PPL students conducted post-learning reflections to evaluate the learning implementation and plan improvements for future meetings. This reflective process is an important indicator in the development of prospective teachers' pedagogical competence, as Schön (1983) stated that reflection on practice is at the heart of teacher professional learning.

These research findings align with those of Dwi Oktaviana (2020), who stated that the application of PBL in mathematics learning can increase student engagement and problem-solving skills, although it requires teacher preparedness in classroom management and learning time. Furthermore, Alhazmi and Alhazmi (2022) showed that PPL experiences contribute significantly to the development of pedagogical competence in mathematics education students. This study extends the existing literature by integrating PPL experiences specifically with the implementation of PBL in madrasahs, thus providing a new perspective on the role of PPL as a professional learning space for prospective teachers.

Overall, this discussion confirms that the experiences of PPL students in managing mathematics learning based on Problem Based Learning (PBL) provide an important contribution to the development of the pedagogical and professional competencies of prospective teachers. The implementation of PBL not only increases student engagement, but also serves as a reflective tool for PPL students in bridging the gap between learning theory on campus and pedagogical practice in madrasah. Thus, this study reinforces the urgency of strengthening PBL provision in PPL programs so that students are better prepared to face the complexities of mathematics learning in real-life classrooms.

V. Conclusion

Based on the research results and discussion, it can be concluded that the PPL students at MAN 1 Ternate have been able to manage Problem-Based Learning (PBL)-based mathematics learning quite well, both in the planning and implementation stages. The PPL students demonstrated a conceptual understanding of the basic principles of PBL, particularly in using contextual problems as the starting point for learning and facilitating students' active involvement in the problem-solving process. The PBL-based learning managed by the PPL students also received a positive response from the students, as indicated by increased student engagement in group discussions and a deeper understanding of the material. However, this study also found that PPL students still faced various obstacles in implementing PBL, such as limited learning time, differences in student academic ability, and difficulties in managing group discussions equitably. These obstacles indicate a gap between the theoretical understanding gained on campus and the reality of classroom learning in the field. However, the PPL students were able to employ adaptive strategies through problem simplification, scaffolding, and post-learning reflection, demonstrating the development of pedagogical competence and reflective skills as prospective teachers in the process.

The theoretical implications of this research confirm the relevance of Problem-Based Learning as a learning model aligned with a constructivist approach to mathematics instruction in madrasas. PBL serves not only as a learning strategy to increase student engagement but also as a professional learning tool for PPL students to develop contextual pedagogical skills. Practically, this research implies the need to strengthen PPL students' training in contextual problem design, time management, and group discussion management in PBL-based learning. Furthermore, support and mentoring from mentor teachers should be optimized to help

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PPL students adapt to real-life classroom dynamics. Thus, the PPL program is expected to become a more effective learning space, bridging the learning theory on campus with the pedagogical practice in madrasas.

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