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Student Readiness of Islamic Elementary Education for Problem-Based Flipped Learning Model in Higher Education

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Abstract

Innovating higher education teaching models is essential to meet the learning challenges of the 21st century. This research discusses the students' readiness and needs for the development and utilisation of the Problem-Based Flipped Learning (PBFL) model in the Islamic Elementary Education Department (PGMI) at the State Islamic University of Maulana Malik Ibrahim Malang. Using a quantitative descriptive survey method with 216 respondents from the 2022 and 2023 cohorts, the research focused on technological readiness, preference for learning styles, and perception toward PBFL. Findings indicated that the device ownership and preference of learning styles were facial in relation to visual/ self-directed, which suggested the practicality of the PBFL application. There was a moderate positive correlation between the availability of devices and readiness towards PBFL; however, limited access to the internet continues to be an obstacle. The current work adds value by incorporating Islamic principles in the design of PBFL, thereby providing a culturally sensitive framework for Islamic education. Furthermore, implementation options are developed around offline materials, student orientation programs, and institutional policies. These results could serve as a foundation for developing adaptive and creative teacher education programs that focus on educational and religious competencies, ultimately paving the way for the integration of PBFL into the PGMI curriculum in the long term.

INTRODUCTION

Innovation in higher education teaching pedagogies is necessary to meet 21st-century challenges (AlAli, 2024; Goldman et al., 2020; Laar, 2020). With the rapid developments happening in technology and the changing trends of educational requirements, it is clear that traditional teacher-centered approaches may be insufficient for promoting high-level reasoning, collaboration, and individual autonomy among students in a digital era. In particular, the Department of PGMI faces the challenge of reforming curricula to support student teachers with the pedagogical and religious knowledge required in the classroom (Rahimi & Oh, 2024). Meanwhile, new teaching models, such as Problem-Based Learning (PBL) and flipped classrooms (FC), have been widely acknowledged in education literature over the years as ways to increase learners' engagement and understanding (Bishop & Verleger, 2013; Hung, 2015). To prepare new teachers for the digital future, successful teaching strategies are required (Müller & Mildenberger, 2021).

PBL focuses on solving real problems that promote critical thinking and problem-solving abilities (Salvador et al., 2023; Seibert, 2021; Sungur & Tekkaya, 2006). Meanwhile, FC enables students to learn beforehand using their teaching materials, which are provided outside of class (Sugiri, 2018); this way, face-to-face time can be used for more in-depth and interactive discussions (Chen et al., 2017). Integrating Problem-Based Learning (PBL) with the Flipped Classroom (FC) model creates a learning model that maximizes the strengths of the two methods. PBL immerses students in problematic and meaningful situations of learning in which they must use knowledge and skills to problem-solve real-world issues (Supriatna et al., 2024). This promotes higher-level thinking, cooperation, and profound learning (Çakıroğlu & Öztürk, 2017; Hmelo-Silver, 2004). Instead, FC flips the traditional classroom model by pushing direct instruction delivery out of class and using face-to-face time for more active and applied experiences (Ariani et al., 2022; Bishop & Verleger, 2013; Chen et al., 2017).

Previous studies have also demonstrated that combining PBL and FC supports a comprehensive learning experience that is more effective than a single approach. For instance, O'Flaherty and Phillips (2015) showed that students who were engaged in this model achieved significantly higher results in terms of conceptual understanding and hands-on practical skills. Furthermore, Abeysekera and Dawson (2015) found that adopting this model can lead to improvements in student motivation and engagement because students perceive themselves as being more confident and prepared when engaging in class discussions and problem-solving exercises.

Although the effectiveness of PBL and FC as two separate active learning interventions has been evaluated in many studies, there is still a paucity of integrative approaches, especially in PGMI. Many of the available research studies

have examined the use of PBL in medical and engineering education, while FC appears more frequently in science and technology (Bishop & Verleger, 2013; Chen et al., 2017). At the same time, there is an increasing demand to make teachers' tasks in the digital age (Dixit et al., 2024; Rahimi & Oh, 2024; Yan, 2023) complex and dynamic and to provide a more adaptive and student-centered learning experience within teacher education programs.

Existing literature indicates that PBL and FC have great potential for improving students' learning engagement and performance (Hallinger & Lu, 2011). Nevertheless, there have been few inquiries into how these two approaches can be comprehensively combined to realize their full potential in teacher education. According to O'Flaherty and Phillips (2015), these models offer a more rounded learning experience. However, they emphasized the need for further studies to explore how these models can be tailored to meet the specific needs of various fields.

Although there is potential for educational models like problem-based learning (PBL) and flipped classroom (FC) in different contexts (Bishop & Verleger, 2013; Hung, 2015), their implementation in Islamic education, particularly PGMI, has not been studied well. Previous studies have concentrated mostly on such models in technical disciplines, including medical science and engineering, while a serious dearth exists in the use of the aforementioned models in teacher training programs, especially when Islamic conditions are taken into consideration (Chen et al., 2017; O'Flaherty & Phillips, 2015).

The present study fills an important void in that it explores the special characteristics of PGMI students who are required to integrate academic and religious learning. This study provides an innovation by customizing the PBFL model to meet the specific needs of PGMI, combining their advantages in PBL and FC, and accommodating Islamic educational culture and pedagogy. Although numerous studies are available on both PBL and FC, there is a lack of research on their integration, particularly in Islamic teacher education, where integrating religious values with teaching is considered significant. This study offers fresh perspectives on how PBFL can support students in addressing challenges in PGMI, thereby fostering not only pedagogical competence but also the religious insight required for teaching in Islamic primary schools.

This research adds to the literature supporting PBL and FC as culturally appropriate and pedagogically sound approaches to PGMI by contextualizing and combining them. This paper presents a model for enhancing the quality of teaching and learning in Islamic primary school teacher education, enabling students to develop the skills necessary to succeed as teachers in Islamic contexts. Practical implications. This study proves that the PBFL model is an effective approach to reform PGMI education towards more interactive, student-centered learning that meets the requirements of the digitally driven era.

METHODS

The research applied a quantitative approach with a descriptive survey method to analyze the need for developing a Problem-Based Flipped Learning (PBFL) model for PGMI students at Universitas Islam Negeri (UIN) Maulana Malik Ibrahim Malang. This design was selected because it allows for obtaining an overview of the situation and condition of the population using numerical data, which is suitable for gathering extensive, generalized information about students' technology readiness, learning styles, and PBFL model perceptions (Creswell & Creswell, 2017).

The sample comprised 216 PGMI students from the 2022 and 2023 intakes who voluntarily completed the questionnaire. These cohorts were selected purposively because they represented students in the early stages of their academic journey, a phase in which the PBFL model would have its most significant impact. To ensure diversity and reduce sampling bias, the questionnaire was distributed through various channels, including official class groups and academic platforms. According to Krejcie and Morgan (1970) (in Bukhari, 2021), the sample size table indicates that this number is sufficient for a population of approximately 300–400 students, meeting the minimum threshold for a 95% confidence level with a 5% margin of error.

The questionnaire was developed using Google Forms and structured into four sections: (1) respondent demographics, (2) availability of learning devices, (3) learning preferences, and (4) specific needs related to PBFL. While online distribution may present limitations, such as uneven Internet access or user discomfort, preliminary findings showed that over 90% of students owned smartphones or laptops, supporting the feasibility of this approach. To minimize response bias, the survey was anonymous, neutral language was used, and leading questions were avoided. Additionally, the instrument underwent face and content validation by two educational technology experts, and a pilot test involving 20 students was conducted to refine the clarity of the questions. While a full-scale reliability analysis (Cronbach's alpha) will be reported in subsequent studies, the initial internal consistency was deemed acceptable based on expert review and pre-test feedback.

For data analysis, descriptive statistics were used to present trends in students' technological access, learning styles, and perceptions of PBFL implementation. Specifically, percentage calculations were used to identify the dominant tendencies within the sample. In addition to descriptive analysis, Spearman's correlation test was conducted to explore the association between device availability and students' perceived readiness for PBFL implementation. Although the focus remains on mapping general needs and readiness, this

correlational analysis provides an initial indication of the relationships between key variables. Future studies should integrate broader inferential statistics, such as chi-square tests or multivariate analyses, to deepen our understanding of how technological access, learning styles, and PBFL engagement are interconnected.

RESULTS

This study found several important findings, including respondent identity, device availability, learning style preferences, perceptions of learning methods, and further analysis of factors influencing PBFL readiness.

1. Respondent Identity

This study involved 216 students from the Islamic Elementary Education Department (PGMI) at UIN Maulana Malik Ibrahim Malang from cohorts 2022 (n = 101) and 2023 (n = 115). The average age of the patients was 20.5 years. Detailed data on respondents' years of birth are presented in Table 1.

Table 1 Respondent Birth

Year	Total of respondent	Age per 2024
2001	4 (1,9%)	23 Years old
2002	8 (3,7%)	22 Years old
2003	47 (21,7%)	21 Years old
2004	99 (45,8%)	20 Years old
2005	55 (25%)	19 Years old
2006	3 (1,4%)	18 Years old

Source: Researcher

2. Device Availability

Survey data indicate that students have access to the necessary supporting devices for implementing the PBFL model, as evidenced by their hardware and software. The results showed that most respondents had access to devices relevant to the technology-based learning process, such as laptops, tablets, and smartphones. In addition, most respondents had adequate access to the Internet, although a small number reported limited access or less than optimal support devices.

However, these data indicate that the supporting infrastructure for implementing the PBFL model is available. This is important to support the implementation of flipped classroom learning, which requires access to videos, online materials, and interaction through digital platforms.

Survey data showed that most respondents possessed supporting devices, such as laptops (90.3%) and smartphones (99.5%), which are crucial for implementing the PBFL model. However, approximately 10.2% of respondents faced difficulties with stable Internet access, often relying on free Wi-Fi or hotspots.

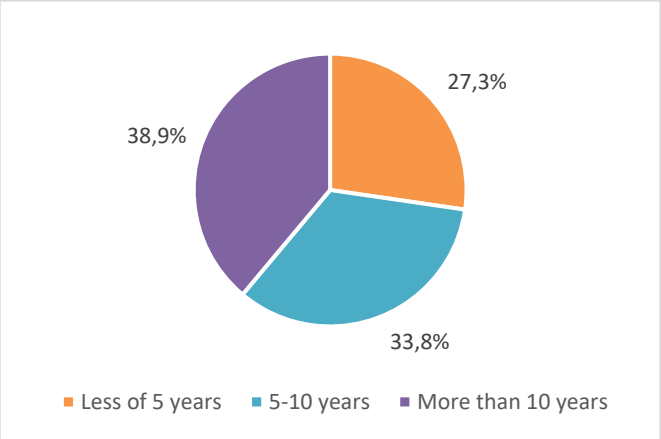

Figure 1. Time span of gadget ownership

Source: Researcher

Further analysis using Spearman's correlation revealed a moderately positive relationship between device availability (laptop ownership) and perceived readiness for PBFL ($r = 0.42$, $p < 0.01$). This indicates that students with better technological access feel more confident in engaging in PBFL activities.

Students with a stable Internet reported 25% higher engagement scores than students with unstable connections. Limited Internet access negatively impacted their ability to complete pre-class assignments and actively participate in problem-solving discussions, which could hinder the success of the implementation of the PBFL.

3. Learning Style

The majority (91.2%) preferred visual learning, while 8.8% leaned towards auditory learning. Additionally, 62.5% of the participants preferred self-directed learning, while 37.5% favored group study. Students with visual learning preferences demonstrated 30% higher enthusiasm for adopting PBFL than auditory learners. This finding aligns with those of Bishop and Verleger (2013) and Hung (2015), who emphasized that visual materials, such as videos and infographics, significantly enhance engagement in flipped classroom environments.

Table 2. Preferences for learning media

Type of learning media	Percentage
Video	39,4% (n= 85)
Interactive digital teaching materials	23,6% (n= 51)
PowerPoint/Canva slides	21,8% (n= 47)
Podcast	8,8% (n= 19)
Text book	6,5% (n= 14)

Source: Researcher

The survey results showed that PGMI students have diverse learning styles regarding their media preferences and approaches to complex materials. The development of the PBFL model needs to consider these learning preferences to

facilitate all student characteristics, especially in providing varied materials (videos, modules, and interactive media) and spaces for discussion and direct practice. Lecturer guidance at the beginning of the independent learning process is also expected to help students adapt to the flipped classroom model, enabling the learning process to run more effectively according to student needs.

4. Perception of Learning Methods

Approximately 71% of the students agreed that class presentations helped them identify and solve problems effectively. In contrast, 29% felt that presentations alone were insufficient without a deeper group discussion. Moreover, 80% stated that contextual problem-solving activities helped build their knowledge base, and 90% believed that their knowledge could be applied to solve real-world problems. However, 11.1% expressed discomfort with self-directed activities, indicating the need for initial assistance with adaptation.

Based on the analysis, the PGMI students had adequate equipment availability, a learning style that matched the PBL-FC model, and a positive perception of this method. However, the implementation of this model needs to be supported by mentoring or orientation regarding the use of technology so that all students can adapt effectively.

The data presented in the diagrams show good readiness of PGMI students in terms of the availability of learning devices and enthusiasm for the PBFL model. The fairly even variation in learning styles allows this model to be applied with flexible adjustments, particularly with diverse materials (visual, auditory, and kinesthetic). The obstacles that need to be considered are related to Internet access for some respondents and the need for provision or adjustment in the full implementation of the PBFL model in the future.

5. Impact Analysis on PBFL Readiness

Descriptive and correlation analyses suggest that technological readiness (device and Internet access), visual learning preferences, and independent learning attitudes are critical success factors for PBFL implementation. Students with limited Internet access face barriers in consistently accessing pre-class materials, leading to fragmented learning experiences. Without proper scaffolding, students unfamiliar with self-directed learning models may experience lower levels of engagement. Thus, successful PBFL deployment in PGMI requires strategies to mitigate technological barriers and structured support to enhance independent learning capabilities.

There are at least several summaries of key findings, including: (a) Technological readiness, high device ownership but moderate challenges with stable Internet access; (b) Learning preferences, strong inclination towards visual and independent learning, aligning well with PBFL characteristics; (c) Influencing factors, device ownership, and visual learning preference positively correlate with

PBFL readiness, while Internet instability poses a significant challenge; and (d) Adaptation needs, some students require orientation sessions to transition effectively into PBFL environments. These findings underscore the importance of aligning technological infrastructure, learning material design, and support mechanisms to optimize the implementation of PBFL for PGMI students.

DISCUSSION

The purpose of this research was to describe the readiness and needs of PGMI students at UIN Maulana Malik Ibrahim Malang for using the Problem-Based Flipped Learning (PBFL) model. These results offer valuable information about technical readiness, learning styles, and critical aspects of PBFL adoption in Islamic education.

1. Interpretation of Results

The high penetration of technological devices among students, particularly laptops (90.3%) and smartphones (99.5%), suggests that there is a sound footing for the implementation of PBFL. Spearman's correlation analysis also revealed a direct correlation between device ownership and PBFL readiness ($r = 0.42$, $p < 0.01$). This is consistent with previous studies (Bishop & Verleger, 2013; Hung, 2015), thus indicating that technology-based access has an important effect on student engagement in flipped learning. On the other hand, roughly 10.2% also mentioned unreliable Internet access, which influenced their access to materials in pre-class and intra-class discussions. Those with poor Internet access had lower PBFL readiness indicator scores (25% less), highlighting the demand for blended learning and the provision of offline resources.

In terms of learning preferences, a significant majority (91.2%) favored visual learning, which corresponds well with the PBFL model, which relies heavily on visual materials such as videos and infographics. Additionally, the preference for self-directed learning (62.5%) suggests a cultural shift towards greater autonomy among PGMI students, supporting the feasibility of flipped learning environments. This supports prior research (Lee & Martin, 2020), indicating that students with strong independent learning habits adapt more effectively to flipped classrooms. Nevertheless, 11.1% of the students expressed discomfort with the self-directed nature of the flipped classroom. This highlights the need for scaffolding and structured orientation programs during the initial phases of PBFL implementation to help all students transition smoothly to a more autonomous learning model.

The use of student-centered learning designs has become imperative to train adaptable and creative future teachers for the 21st century. PBL promotes students' work in problem-solving groups, thereby enhancing their critical thinking skills and higher-order constructs. Both are important abilities for teachers to develop (Hmelo-Silver, 2004; Tan, 2021). The so-called flipped classroom (FC) further facilitates the implementation of PBL, as students are provided with content outside

the class to learn basic material, so that upon their return, time can be spent on practical applications and deep discussions (2018). This model is particularly interesting for PGMI students who will become primary school teachers, because it requires them to balance religious and educational values with the development of technology.

The PBL and FC models are interconnected to each other, which is expected to contribute to the quality of student learning (Oliveira et al., 2022). On the one hand, PBL, when it focuses on problem solving, promotes active participation and critical thinking skills (Amin et al., 2020), while FC also enables self-study, in which students can access learning materials according to their ability and at an individual pace (Bishop & Verleger, 2013; Hung, 2015). Several studies have indicated that the inclusion of PBL-FC provides a stimulating learning environment in which… learners are motivated and take more control over their own learning process, while preparing them to meet complex professional challenges (Çakıroğlu & Öztürk, 2017).

Several primary discoveries were identified in the assessment of the PGMI students' needs. The first is the issue of access to devices and the Internet. According to the findings, students generally have their own devices (e.g., laptops and smartphones), which are necessary for carrying out the flipped classroom process. However, a few students required assistance with Internet access, which could potentially limit the model's effectiveness. Second, the preference for learning style was considered. The majority of PGMI students appreciated the visual material and learning independently; therefore, this group of students has great potential for independent study in flipped classroom settings. Accordingly, the PBFL model can help to develop different types of digital learning resources, including videos, graphics, and interactive work that are customized to students' learning preferences (Lee & Martin, 2020). Third, cultural and religious considerations must be considered in the implementation of the PBFL. In the context of PGMI, Islamic elementary education requires an approach that considers both cultural and religious values. Therefore, the PBFL model needs to be adjusted so that the materials and problems provided are relevant to students' religious knowledge. For example, the problems provided can include relevant verses from the Qur'an or hadith, which helps students integrate religious values into their learning (Mardiyah & Sunarsi, 2024). This approach not only increases the relevance of the material but also enriches the student's learning process.

Based on the survey results, implementing the PBFL model presents several benefits and challenges. Integrating PBL with FC can increase student engagement and understanding of the material, because students have learned the theory beforehand and are ready to discuss and solve problems directly in class. Previous studies have also shown that PBL-FC integration can strengthen students' understanding and practical application skills (O'Flaherty & Phillips, 2015).

However, although most students are open to independent learning, some still need to adapt further to this model, especially those who are used to conventional learning methods. In addition, initial mentoring or orientation for students who are less accustomed to independent learning can increase their readiness to implement PBFL effectively.

The PBFL model is believed to support the development of important skills needed by PGMI students. In PBL, students are invited to work together to solve problems and develop their ability to collaborate, communicate, and interact effectively with others (Wyness & Dalton, 2018). This model allows students to learn the materials and apply teaching methods that can be used in future classes. This prepares students to face educational challenges, particularly the integration of academic and religious knowledge into their lives.

2. Contributions and Recommendations

This study contributes to the emerging body of research on PBFL by contextualizing it within Islamic primary teacher education, an area previously underexplored. While previous studies on PBFL have focused primarily on STEM and medical education (Chen et al., 2017; O'Flaherty & Phillips, 2015), this study provides new insights into integrating academic and religious educational needs into the flipped classroom model. In addition, this study proposes incorporating Islamic values into PBFL materials, such as embedding Quranic verses, hadiths, and Islamic ethics into pre-class videos and problem-based cases. This ensures that students not only develop pedagogical and critical thinking skills, but also strengthen their religious identity and values.

Given the findings, several strategies are recommended to enhance PBFL implementation in PGMI settings: (a) blended access materials, development of downloadable, offline-accessible video modules to accommodate students with limited Internet access; (b) orientation and training, conducting structured orientation sessions for students unfamiliar with self-directed learning to build readiness for PBFL models; (c) Islamic integration, designing problem-based tasks that incorporate Islamic teachings, fostering both academic and spiritual growth; (d) lecturer support programs, providing professional development for lecturers focusing on blended learning strategies and the integration of Islamic values into digital learning content; and (e) institutional policies, encouraging institutional investment in infrastructure such as campus-wide high-speed Internet, and formal policies mandating blended or flipped learning strategies in PGMI curricula.

3. Limitations

This study had several methodological limitations that should be considered. First, the descriptive survey approach used in this study can only provide an overview of student needs without exploring the causal relationship between the Problem-Based Flipped Learning Flipped Classroom (PBFL) model and student

learning outcomes. In addition, the limited sample, which only included PGMI students from one university, can reduce the generalizability of the findings to a wider context, given the variation in student characteristics in other study programs and universities. Learning style preferences and technology readiness, as measured through self-reports, can also yield less accurate data because of the influence of students' perception bias.

Another limitation is the reliance on quantitative data, which does not explore qualitative aspects, such as in-depth perceptions or students' subjective experiences related to the PBFL model. In addition, because this study only analyzed needs without involving the direct implementation of the PBFL model, the effectiveness of this model cannot be evaluated comprehensively. Future research that includes direct implementation and evaluation of the model and involves qualitative methods such as interviews or Focus Group Discussions can provide more comprehensive and relevant results for the context of Islamic education in PGMI. To sustain the effectiveness of PBFL, embedding continuous feedback mechanisms is critical. Students and lecturers should regularly evaluate their PBFL experiences through structured surveys and focus groups. The insights gained can lead to iterative improvements, ensuring that the PBFL model remains responsive to the evolving educational needs.

Finally, the PBFL model can be systematically integrated into the PGMI curriculum through modular designs, where flipped activities become a standardized part of the course syllabi. Future studies could explore the longitudinal impact of PBFL on student outcomes in Islamic educational contexts, thus strengthening the evidence for its broader adoption.

CONCLUSION

This study comprehensively explored the readiness and needs of students in the Department of Teacher Education for Islamic Primary School (PGMI) at UIN Maulana Malik Ibrahim Malang using a problem-based flipped learning (PBFL) model. This study aims to fill a critical gap in the educational literature by examining the feasibility of integrating Problem-Based Learning (PBL) and the Flipped Classroom (FC), specifically within the context of Islamic teacher education. The findings indicate that most students possess the necessary technological resources and learning preferences to support PBFL, thus providing a solid foundation for its implementation.

The results of a quantitative descriptive survey of 216 students from the 2022 and 2023 cohorts revealed high ownership of learning devices, with 90.3% of students owning laptops and 99.5% owning smartphones. A moderate positive correlation was found between device availability and students' perceived readiness for PBFL, suggesting that better technological access increases confidence

in engaging in this model. The study also identified a strong preference for visual learning (91.2%) and self-directed learning (62.5%), which are learning styles that are well aligned with the characteristics of PBFL. However, the research also uncovered significant challenges, notably that 10.2% of respondents reported difficulties with stable Internet access and 11.1% expressed discomfort with self-directed activities, indicating a need for structured support during the initial phases of implementation.

The primary contribution of this study is its novel approach to contextualizing PBFL in Islamic education, which proposes the integration of Islamic values directly into pre-class and in-class activities. This ensured that the model was culturally responsive and relevant, fostering both academic and spiritual growth. These findings have several practical implications, including recommendations to develop offline-accessible materials to mitigate technological barriers, conduct structured orientation programs to prepare students for self-directed learning, and establish institutional policies to support infrastructure development and lecturer training. By addressing these technological, pedagogical, and religious dimensions, the PBFL model has the potential to revolutionize Islamic teacher education, producing future educators who are technologically adept, spiritually grounded, and pedagogically innovative.

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