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Development of a Problem-Based Learning Model in Islamic Religious Education to Enhance Students' Critical Thinking Skills

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ABSTRACT

This research aims to create a problem-based learning model for Islamic Religious Education (PAI) with the goal of enhancing students' critical thinking abilities. Critical thinking is an essential skill that enables students to successfully address the challenges they encounter in both their personal and social lives in the 21st century. The importance of critical reflection is also emphasized in Islamic teachings, particularly in the Qur'an and Hadith, where numerous passages encourage contemplation (ulul albab). To foster critical thinking, it is essential to implement a learning model that promotes this skill, and problem-based learning (PBL) is identified as an effective approach. This study was conducted across various departments at Medan State University using the Research and Development (R&D) methodology proposed by Borg and Gall. The research gathered data through observations and questionnaires, with the Mann-Whitney U test used for data analysis. The results demonstrate that the problem-based PAI learning model is successful in enhancing students' critical thinking skills. This conclusion is supported by the Mann-Whitney U test, which showed that the Asymp. Sig. (2-tailed) value was below α, leading to the rejection of the null hypothesis and the acceptance of the alternative hypothesis. Therefore, there is a statistically significant difference between the critical thinking abilities of students who participated in the problem-based PAI learning model and those who experienced traditional learning methods. The study contributes to the field of Islamic education by offering an empirically validated instructional model that integrates religious values with contemporary pedagogical strategies, thereby advancing efforts to equip students with both spiritual and intellectual competencies needed in the modern era.

Keywords: Critical Thinking Skills, Islamic Religious Education, Problem-Based Learning

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INTRODUCTION

Thinking is one of the characteristics of humans that distinguishes them from other creatures. With the ability to think, humans become creatures that are glorified by Allah SWT. In fact, the mandate of the caliphate that was only given by Allah to humans (Adam) was because of the thinking factor possessed by humans. Because, with the ability to think, humans will be able to absorb and store knowledge. Islam views thinking as a medium to get closer to

Allah SWT, realize their position as servants and understand their function as khalifatullah on earth. By thinking, humans also know how powerful Allah is in creating the universe with a very powerful power, and themselves as humans are very small and insignificant in the presence of Allah Almighty.

The concept of the Qur'an about thinking is very varied, which shows the importance of thinking for humans. The command to think to humans in the Qur'an is mentioned in various expressions, including: tatafakkaruun, ta'qiluun, ulil albaab, tatadzakkaruun, tubshiruun, tatadabbaruun and so on. Allah says in the Qur'an, Surah Ali Imran (3) verse 190

اِنَّ فِيْ خَلْقِ السَّمٰوٰتِ وَالْاَرْضِ وَاخْتِلَافِ الَّيْلِ وَالنَّهَارِ لَاٰيٰتٍ لِّاُولِى الْاَلْبَابِۚ

Meaning "Indeed, in the creation of the heavens and the earth, and the alternation of night and day there are signs (of the greatness of Allah) for people of understanding."

Through QS. Ali Imran verses 190 above, Allah SWT invites humans to optimize brain function to think about the creation of the heavens and the earth and utilize the potential of their minds to explore the signs of Allah's greatness so as to produce thoughts and knowledge. All of these are signs of Allah SWT's power for those who want to think about it, and they are called Uulul Albaab.

Critical thinking is one of the skills that students need to master in this 21st century (Priatna et al., 2020) especially so that they can face various problems in social and personal life (Nuryanti et al., 2018). Critical thinking skills include the ability to access, analyze, synthesize information that can be learned, practiced and mastered (Ibrahim et al., 2021; Maričić & Špijunović, 2015). From several studies that have been conducted on students' critical thinking skills, it was found that the critical thinking skills of Indonesian students are currently still in the weak category (Farib et al., 2019; Lestari & Annizar, 2020; Marudut et al., 2020). This can be seen from the results of the Program for International Student Assessment (OECD, 2019), where Indonesia's literacy score is 382, ranking 64th out of 65 countries. The facts in the field are that students still have difficulty solving problems related to critical thinking (Anugraheni, 2020). Such as defining mathematical problems, selecting relevant information to solve problems, developing and selecting relevant hypotheses, and drawing conclusions from problems.

In Islam, critical thinking is known as "tabayyun". Tabayyun is defined as an action taken to seek clarity of the essence or truth of a fact carefully, thoroughly and cautiously (Sulaiman & Syakarofath, 2018). This means that in Islam every human being is required and encouraged to always be careful, not to easily digest and take information obtained without first trying to prove its truth. The concept of tabayyun illustrates how critical thinking is a special concern in Islam and this is stated in the Qur'an, Al-Hujurat letter (49) verse 6:

يٰٓاَيُّهَا الَّذِيْنَ اٰمَنُوْٓا اِنْ جَاۤءَكُمْ فَاسِقٌۢ بِنَبَاٍ فَتَبَيَّنُوْٓا اَنْ تُصِيْبُوْا قَوْمًاۢ بِجَهَالَةٍ فَتُصْبِحُوْا عَلٰى مَا فَعَلْتُمْ نٰدِمِيْنَ

Meaning: "O you who believe! If someone who is wicked comes to you with news, then examine the truth, so that you do not harm a people because of (foolishness) that you end up regretting that action."

In Tafsir Al-Muyassar it is explained that if a wicked person comes to you with news, then check the truth of the news before believing it and quoting it until you know the truth, because it is feared that you will inflict on an innocent people a crime from you so that you regret that action (Basyir, 2012).

Critical thinking is one of the skills that students need to master in this 21st century becauses as a human being, students will certainly face various problems in their lives, both problems that come from within themselves, as well as problems from outside themselves such as in family, friendship, society and the environment. The large number of cases involving students currently also shows the lack of students' ability to deal with problems appropriately and logically. Based on this, it is clear that the ability to think critically and solve problems accurately and logically is very important for students to master (Rosy & Pahlevi, 2015). This is in line with Ennis (2011), who stated that critical thinking is a reasonable and reflective thinking

focused on deciding what to believe or do. Supporting this, Facione (2011), emphasized that critical thinking is not innate but must be taught, practiced, and reinforced through appropriate strategies and learning environments. However, it should be understood that students' critical thinking skills and their ability to solve problems accurately and logically cannot develop by themselves along with their physical development. Students' critical thinking skills will be able to develop if given the right training and stimulus.

The Islamic Religious Education (PAI) course actually plays a strategic role in developing students' critical thinking skills. The PAI course aims to develop students' personalities as a whole so that students become scientists who believe in and fear Allah SWT, have noble morals and are able to devote their knowledge to the welfare of humanity. PAI is oriented to the formation of life values and devotion to Allah SWT and noble character (Siregar et al., 2020; Umamı et al., 2019). To be able to achieve this goal, the learning of Islamic Religious Education must be able to present the deepest meaning within students. If we look at PAI learning in universities today, it appears that PAI lecturers have not fully developed students' critical thinking skills. In PAI learning, lecturers apparently pay more attention to the development of students' cognitive (religious knowledge), PAI learning is still limited to memorization and understanding (Dian et al., 2023; Mulyana, 2018; Siregar & Nurmayani, 2022), is still indoctrinative (Nurudin, 2007) and the implementation of PAI has not fully developed strong rational thinking skills and independence (Siregar & Ramli, 2020; C. Tan, 2012). Based on all the explanations above, it is clear that the development of critical thinking and problem-solving skills is still neglected in PAI courses.

Critical thinking skills can be developed through the selection of the right learning model, namely the problem-based learning model (Satwika et al., 2018; Wynn Sr et al., 2014). A model refers to a set of sequential procedures that serve as a guideline for executing an activity process, illustrating the key elements and their structure (Tibahary & Muliana, 2018). A learning model is a well-planned pattern designed to organize the curriculum, materials, and programs, implement the learning process, foster engagement, and stimulate interactions that promote student learning, knowledge building, value development, and the acquisition of competencies and skills (Joyce et al., 2009). Problem-based learning is a learning model that requires students to learn problems based on predetermined planning and principles and at the same time have the skills to solve problems (Murniati & Hermawan, 2017). Problem-based learning is learner-centered or student-centered learning (Snyder & Wiles, 2015).

This study is an effort to research and develop a problem-based PAI learning model. The problem-based learning model developed in this study is an approach applied within Islamic Religious Education (PAI), where students are actively involved in identifying, analyzing, and addressing real-world issues in their surroundings. This model facilitates the acquisition of knowledge and conceptual understanding by enhancing students' critical thinking and problem-solving abilities. By encouraging students to critically analyze and propose logical solutions to real-life challenges, the model seeks to foster higher-order thinking skills. The development of this problem-based PAI learning model is particularly significant as critical thinking skills have traditionally been insufficiently emphasized and developed in the context of Islamic Religious Education courses (Siregar, 2024).

METHOD

This research is a development research or Research and Development (R&D) from Borg & Gall (Sugiyono, 2013). There are three main stages in this research, namely (1) preliminary study, (2) development study and (3) model trial (experimental study). In the preliminary study, theoretical studies or previous studies related to the research being conducted are sought. Furthermore, a design of a problem-based PAI learning model is prepared that is able to develop students' critical thinking skills. The development study stage involved a Forum Group Discussion (FGD) with a panel of experts to validate the initial draft of the problem-based PAI learning model (Creswell, 2013; Rashid, 2022; Yusuf, 2023). The panel consisted of three experts: (1) a senior lecturer in Islamic Religious Education with specialization in curriculum and instruction; (2) an educational technology expert with expertise in innovative

instructional models; (3) a specialist in educational measurement and evaluation with expertise in the development and validation of learning instruments and models. They reviewed the model's theoretical soundness, pedagogical structure, integration of Islamic values, and alignment with principles of problem-based learning, also the learning instruments. Based on their feedback, revisions and improvements were made to enhance the model's validity and practicality. In the model trial stage (experimental study), the problem-based PAI learning model was practiced and analyzed to see the effectiveness of this problem-based PAI learning model in developing students' critical thinking skills.

This research was conducted in several departments at the State University of Medan. For the experimental class, this study involved 157 students from the departments of Information and Communication Technology Education, Nutrition Science, Chemistry Education, Science Education, Mathematics Education and Economics Education. Meanwhile, for the control class, the study involved 145 students from the departments of Culinary Arts Education, Computer Science, Building Engineering Education, Physics Education, Chemistry Education and Accounting Education. The data collection technique for this study used questionnaires and observations and to analyze the research data, the Mann Whitney test was carried out. All quantitative data in this study were processed using SPSS version 22.

RESULT AND DISCUSSION

The initial step in developing this problem-based PAI learning model is to create a hypothetical model. A hypothetical model is an initial product design or product design whose effectiveness has not yet been proven, and will be known after undergoing testing in product trials which will be carried out later. The hypothetical model of this problem-based PAI learning model includes the definition of the problem-based PAI learning model, the theoretical basis for developing the learning model, the learning model syntax, teaching materials and the assessment/evaluation instrument. After the hypothetical model is complete, a Forum Group Discussion (FGD) sessions was held with selected subject matter experts to review the hypothetical model of this problem-based PAI learning model. Theese are some feedback obtained during the FGD sessions.

Figure 1. Summary of Expert Suggestions and Revisions from FGD

Aspect Reviewed	Expert Comments	Follow-up Revisions
Theoretical Foundation	Strengthen integration with Qur'anic concepts of critical thinking (*ulul albab*)	Added Qur'anic references in theoretical foundation
Learning Syntax	Clarify steps to promote student autonomy	Added detailed activities in Step 3–6 of the learning syntax
Teaching Material	Ensure relevance to Islamic values	Rubric aligned with Islamic values
Assessment Tools	Include both cognitive and affective aspects	Revised rubric to include reflective thinking

Based on the feedback above, revisions and improvements were made to enhance the model's validity and practicality. After the hypothetical model is complete, the next step is to test the product validity by experts. This step is very necessary to ensure the validity of the hypothetical model that has been developed. The results of the expert validation from the model expert can be seen in figure 2 below.

Figure 2. Expert Model Validation Results

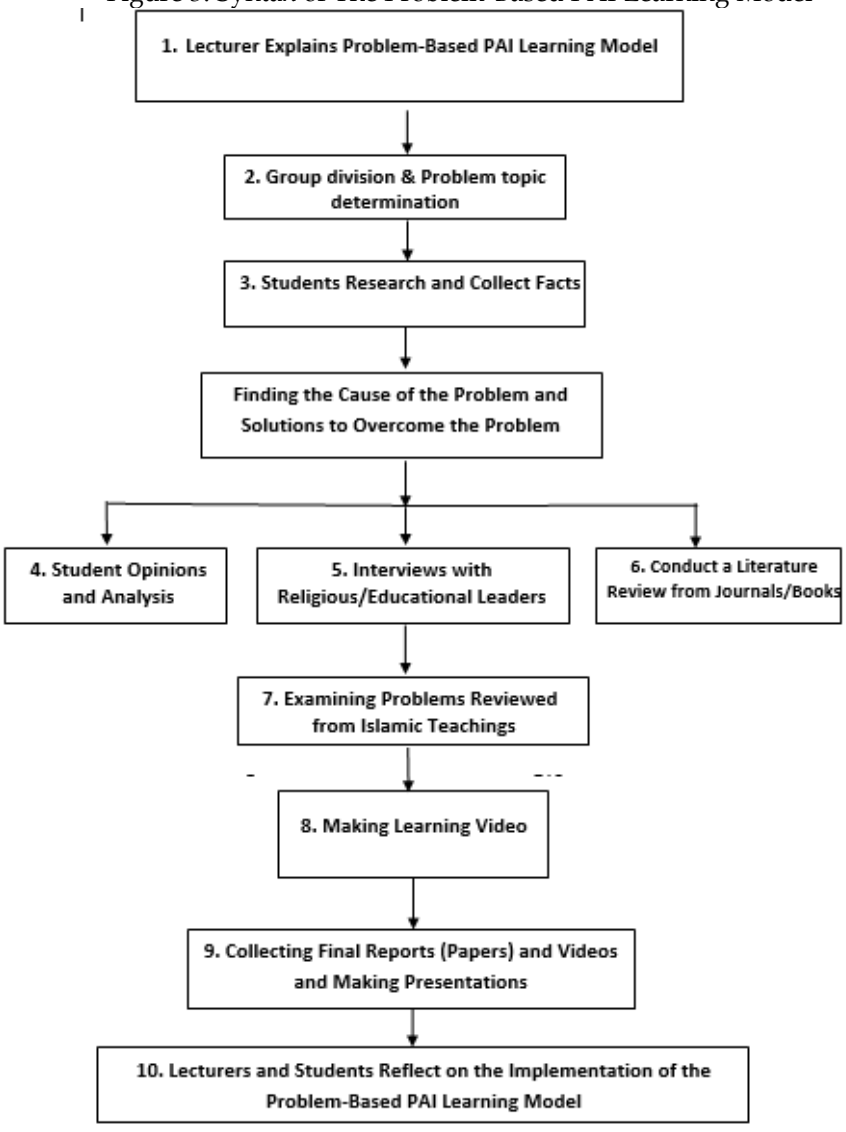
No	Assessed Indicators	Assessment Results	Validity Level
1	Theoretical Basis of Model Development	87	Very Valid
2	Learning Model Syntax	88	Very Valid

3	Learning Model Design	88	Very valid
4	Teaching materials	87	Very Valid
5	Assessment/Evaluation Instruments	90	Very Valid
Average		88	
Category		Very Valid	

Based on figure 2 above, it can be seen that the overall average value of the hypothetical model that has been developed is 88 with the category of "very valid". So that the results obtained that the hypothetical model is ready to be practiced in the actual field, namely in Islamic Religious Education learning activities.

The next step of this research is to practice the problem-based PAI learning model in experimental classes. For the experimental class, this study involved 157 students from several departments at the State University of Medan. They are departments of Information and Communication Technology Education, Nutrition Science, Chemistry Education, Science Education, Mathematics Education and Economics Education. In practicing this learning model, the model syntax is used as a guide. Below is the syntax of the problem-based PAI learning model.

Figure 3. Syntax of The Problem-Based PAI Learning Model



The learning syntax of the problem-based Islamic Religious Education (PAI) model consists of ten structured steps aimed at enhancing students' critical thinking skills.

1. Step 1: Introduction to the Problem-Based PAI Model: The lecturer introduces the problem-based PAI learning model to students by explaining its definition, the rationale behind its development, and the expected benefits for learners. Additionally, the lecturer highlights the critical thinking skills that are targeted through this model. This foundational understanding is intended to foster student enthusiasm and commitment throughout the learning process.
2. Step 2: Group Formation and Problem Identification: Students are divided into small groups consisting of 4–6 members. Within their groups, students engage in discussions to identify and analyze current social issues prevalent in Indonesian society, such as the child-free phenomenon, LGBT issues, or the rise of online gambling among youth. Each group selects one social issue to serve as the focus of their research.
3. Step 3: Problem Investigation and Data Collection: Students conduct independent research to gather factual information related to their selected social problem. Through this process, students deepen their knowledge and develop a comprehensive understanding of the chosen issue.
4. Step 4: Individual Analysis of Problem Causes and Solutions: Each student independently analyzes the root causes of the problem and proposes potential solutions. This stage aims to train students in critical identification, analysis, and problem-solving independently.
5. Step 5: Expert Interviews: Students conduct interviews with religious or educational figures to gather expert insights regarding the causes and solutions of the identified problem. This step strengthens students' analytical perspectives by incorporating professional viewpoints.
6. Step 6: Literature Review: Students conduct a systematic review of academic literature, including journals and scholarly books, to further examine the causes and solutions associated with the problem. They then triangulate data from their own analysis, expert interviews, and literature findings to formulate a logical and evidence-based understanding.
7. Step 7: Islamic Perspective Analysis: Students critically examine the selected problem through the lens of Islamic teachings by referencing Quranic verses, Hadiths of the Prophet Muhammad, and scholarly opinions. This step ensures that students' problem analysis aligns with Islamic values and principles.
8. Step 8: Development of Educational Videos: Students synthesize the findings from the previous steps and present them creatively by producing informative and engaging educational videos. These videos document the learning process and highlight key findings.
9. Step 9: Submission and Presentation of Reports and Videos: Students submit a written report (paper) along with their educational videos. They also present their work to the class, showcasing their findings and the creative outputs they have developed.
10. Step 10: Reflection and Evaluation: The lecturer and students collaboratively reflect on the entire learning process. This reflection focuses on evaluating the effectiveness of the problem-based PAI learning model in developing students' critical thinking abilities and identifying areas for improvement.

After the hypothetical model, namely the problem-based PAI learning model, is implemented in experimental classes, at the end of learning process, a questionnaire was given to students to get an overview of students' critical thinking skills after the learning was completed. All quantitative data in this study were processed using SPSS version 22. While to analyze the research data, the Mann Whitney test was carried out. The descriptive statistics regarding the critical thinking skills of students who apply the problem-based PAI learning model and students who do not apply the problem-based PAI learning model can be seen in the tables below:

Figure 4. Data Normality Test Results

Class	Kolmogorov-Smirnova			Meaning
	Statistic	df	Sig.	
Experimental class	.088	157	.004	abnormally distributed
Control class	.169	145	.000	abnormally distributed

The normality test in this study was conducted using the Kolmogorov-Smirnov Test. Data are considered normally distributed if the Asymp. Sig. (2-tailed) value is greater than the alpha level of 0.05 (5%). Based on Table 2, the Asymp. Sig. values for both the experimental and control groups were found to be less than 0.05, indicating that the data do not follow a normal distribution. Consequently, due to the non-normal distribution of the data in both groups, the Mann-Whitney U test was employed for further analysis.

The Mann Whitney test is used to test the mean difference of two groups of mutually free samples if one or both sample groups are not normally distributed (Sundayana, 2018). The results of the Mann Whitney test can be seen in table 3 below:

Table 3. Mann Whitney Test Results

	Class	N	Mean Rank	Sum of Ranks
Critical Thinking Skills	Experimental Class	157	194.27	30501.00
	Control Class	145	105.19	15252.00
	Total	302		

Table 3. Test Statistic

	Critical Thinking Skills
Mann-Whitney U	4667.000
Wilcoxon W	15252.000
Z	-8.865
A Symp. Sig. (2-tailed)	.000

Based on the output from the Mann-Whitney Test shown above, the Asymp. Sig. (2-tailed) value is 0.000, which is less than 0.05. Therefore, in line with the decision rule for the Mann-Whitney test, the null hypothesis (Ho) is rejected, and the alternative hypothesis (H_1) is accepted. This indicates that there is a statistically significant difference in the critical thinking skills between students who implemented the problem-based PAI learning model and those who applied other learning models.

DISCUSSION

This study aims to develop a problem-based learning model for Islamic Religious Education (PAI) in university to enhance students' critical thinking skills such as the skills to identify problems, select and evaluate problems, organize problems, and find good solutions to these problems appropriately and logically. The findings in this study show that the implementation of a Problem-Based Learning (PBL) model in Islamic Religious Education (PAI) significantly enhances students' critical thinking skills. Using a Research and Development (R&D) design grounded in the Borg and Gall model, the research proceeded through a three-stage process: a preliminary study, development and validation by experts, and a model trial (quasi-experimental). The Mann-Whitney U test results showed a statistically significant difference in critical thinking skills between students exposed to the PBL model and those engaged in conventional instruction, with an Asymp. Sig. (2-tailed) value of 0.000 ($p < .05$), indicating higher critical thinking skills among the experimental group. The findings of this study align with the research conducted by Jarmer (2025), that also explores the critical thinking in religious education. Both studies recognize critical thinking as a fundamental goal in religious education and emphasize the importance of pedagogical strategies that move beyond rote learning.

This result is also supported by Prince & Felder (2006), who highlighted that active learning methods, such as PBL, significantly improve students' higher-order thinking skills compared to traditional methods. Furthermore, Hmelo-Silver (2004), emphasized that PBL helps students construct knowledge through collaborative problem solving. Schmidt et al. (2011), found that students in PBL environments demonstrate stronger critical thinking and self-directed learning skills. Similarly, Yew & Goh (2016), showed that PBL facilitates deeper understanding and critical analysis among students. Savery (2015), also noted that PBL contexts encourage students to develop critical thinking by engaging with real-world problems, while Dochy et al. (2003), confirmed that PBL contributes positively to students' cognitive skills and motivation. The differences my study focuses on designing and testing a Problem-Based Learning (PBL) model tailored to Islamic Religious Education, aimed at equipping students with critical thinking skills through problem-solving and media-based engagement, while Jarmer investigates the use of religious critique to foster intellectual independence and normative judgment.

Critical thinking and problem-solving are essential skills that students must develop to navigate both academic and real-world challenges. However, it is important to recognize that these abilities do not naturally evolve with physical maturation alone. Instead, critical thinking skills require proper guidance and stimulation, which can be effectively provided through education (Pedraja-Rejas et al., 2025). The Islamic Religious Education (PAI) course plays a pivotal role in fostering these skills among students.

Critical thinking in PAI can be nurtured through the application of an appropriate learning model, specifically the problem-based learning model. In the development of this model, several key considerations must be addressed, beginning with understanding the characteristics of students. As learners whose cognitive abilities have matured, students benefit from a learning model that aligns with their developmental stage. Additional considerations in creating this learning model include: 1) teachers should not be viewed solely as information providers, but rather as facilitators who manage the learning process; 2) learning should extend beyond rote memorization to include the application of acquired knowledge to enhance critical thinking; and 3) students should be regarded as active agents in their learning, taking responsibility for constructing their own knowledge rather than merely receiving it (Kristanto & Susilo, 2015).

The development of critical thinking skills in Islamic Religious Education (PAI) is an essential demand in shaping a generation of learners who can adapt to the complexity of modern life. These skills are crucial not only in academic contexts but also in navigating social, spiritual, and technological challenges. In this regard, the problem-based learning (PBL) model emerges as a highly promising approach to be implemented in PAI instruction. PBL provides opportunities for students to engage actively in the learning process by analyzing information, constructing arguments, evaluating evidence, and making decisions—all of which are core components of critical thinking (Verawati et al., 2019). This model has been proven effective in enhancing pre-service teachers' critical thinking skills through exploration, hypothesis formulation, and conclusion drawing within inquiry-based learning frameworks.

Moreover, the characteristics of students themselves are vital considerations in instructional design. As adult learners, university students possess more mature cognitive capabilities, requiring learning strategies that go beyond content delivery and foster higher-order thinking. This is supported by research from Indah (2022), which found a significant correlation between research competence and critical thinking among students in Islamic higher education. However, the relationship between technology use and critical thinking was not consistently strong, suggesting that technological engagement alone does not guarantee critical reflection.

In contrast, non-formal Islamic education—such as that conducted in mosques or through private tutors—often lacks dialogical and reflective pedagogy, which may hinder the development of critical faculties. A study by Altinyelken (2021), revealed that non-formal Islamic education in Europe is still dominated by memorization and authoritative approaches, limiting interaction and discouraging questioning, both of which are essential to cultivating

critical thinking . Thus, formal settings like schools and universities must take the lead in applying pedagogical models that promote intellectual autonomy and reflective thinking.

In Islamic character-based educational environments such as pesantren (Islamic boarding schools), learning that integrates moral values and critical thinking has also shown positive results. Hayah (2017), found that students who received character education within a pesantren system demonstrated moderate levels of critical thinking in biodiversity lessons. This confirms that a strong character can be cultivated through an educational system that emphasizes not only intellectual competence but also spiritual and moral excellence. Additionally, collaborative learning contributes significantly to the enhancement of students' critical thinking. Warsah et al. (2021), found that student interactions in collaborative settings fostered active discussion, exchange of ideas, and shared reasoning processes that strengthened their critical thinking abilities.

After the implementation of the problem-based PAI learning model in several experimental classes, the researchers identified numerous benefits and positive outcomes. Notably, the PAI learning process, which was previously limited to the transmission of information from lecturers to students, has transformed into an interactive process where students actively construct knowledge based on their understanding and experiences, both individually and collaboratively. Additionally, the role of lecturers has become more multifaceted. Rather than merely delivering information, lecturers now focus on employing strategies to assist students in achieving their learning objectives. This problem-based PAI learning model is inherently collaborative, as it encourages students to enhance their communication and teamwork skills. Furthermore, by addressing real-world issues that are relevant to their lives, students are equipped to resolve problems in a rational and effective manner. Ultimately, this approach aims to cultivate students' abilities to become problem solvers, empowering them to contribute actively to solving societal challenges (Siregar, 2018).

Another positive outcome observed after the implementation of the problem-based PAI learning model is the improvement in students' critical thinking skills. This improvement is evident from the results of the effectiveness test conducted, specifically the Mann Whitney test, which indicated that the application of the problem-based PAI learning model significantly enhanced students' critical thinking abilities. As outlined in the steps (syntax) of the problem-based PAI learning model presented above, it is clear that each phase of the process is designed to foster the development of critical thinking skills. Initially, students are encouraged to identify and formulate real-world problems in their environment, ensuring that the PAI learning process remains contextual and relevant. Subsequently, students deepen their understanding of the issues by defining the problem and distinguishing between facts and assumptions. They then explore information regarding the underlying causes of the problem and potential solutions, gathering data from three key sources: 1) their own perspectives; 2) interviews with community leaders or educational experts; and 3) a review of literature from books and academic journals. A crucial next step involves students analyzing the problem from an Islamic perspective. After compiling all relevant information, students critically evaluate the data and select the most appropriate and logical solutions. In the final stage, students produce a learning video that encapsulates the steps taken throughout the problem-based PAI learning model. To conclude the process, both lecturers and students engage in a reflective discussion to summarize and argue the outcomes.

From the syntax of the problem-based PAI learning model above, it is clear that each step in this problem-based PAI learning model builds students' critical thinking skills. As for classes that do not apply the problem-based PAI learning model, of course, at every stage of learning they do not train students to think critically. From the results of the questionnaire given to the control class, it was found that 35% of respondents stated that students' understanding and ability to analyze real problems around them was still low. Poor results were also seen in students' understanding and analysis of the factors causing social problems around them, where as many as 37% of respondents were still low.

These findings are consistent with the study by Rofik et al. (2022), which demonstrated that the Collaborative Problem Solving (CoLPS) model is more effective than conventional

project-based models in enhancing critical thinking and instructional design competencies among prospective Islamic Religious Education (PAI) teachers. Similarly, Murni & Anggraini (2018), found that the Problem-Based Learning (PBL) approach significantly improved mathematics learning outcomes among junior high school students compared to conventional methods. Additional support comes from Rubiah et al. (2024), who combined PBL with concept mapping, resulting in increased creativity in writing expository texts, particularly in identifying and systematically solving problems. Gani et al. (2021), also emphasized that PBL has a significant impact on improving information literacy skills among Islamic Education students, reinforcing the importance of integrating problem-based approaches to enhance students' critical and reflective thinking abilities.

The findings of this study align with the research conducted by Ulger (2018) and Yu & Zin (2023), which also demonstrated that the Problem-Based Learning (PBL) model effectively fosters the development of critical thinking skills. The enhancement of students' critical thinking abilities through this PBL model can be explained in several ways. Firstly, the students involved in this study were in their late teenage years, a stage where intellectual, moral, and cognitive development is already well advanced. This developmental stage makes them particularly suited to learning models that challenge their thinking through problems, case studies, and discussions, as seen in the PBL approach (Wynn Sr et al., 2014). Secondly, in the PBL model, the role of the lecturer shifts to that of a facilitator, allowing students to take a more active role in the learning process. Wynn Sr et al. (2014) noted that the learning environment in a PBL framework is more dynamic, as students are encouraged to engage actively in both thinking and expressing their thoughts. This active involvement fosters high levels of collaboration among students.

This finding is consistent with the research of Barrows & Tamblyn (1980), who first introduced PBL as a way to enhance diagnostic and analytical skills among medical students. Similarly, Albanese & Mitchell (1993), argued that students exposed to PBL develop stronger reasoning and problem-solving abilities than those taught with conventional methods. Strobel & Van Barneveld (2009), also demonstrated that PBL has a positive impact on long-term knowledge retention and the application of critical thinking. Loyens et al. (2008), emphasized that PBL environments promote self-regulation and critical inquiry. In the context of religious education, Jackson (2013), highlighted the importance of dialogical approaches that foster students' reflective thinking. O.-S. Tan & Tee (2003), underscored that PBL encourages active participation, which is crucial for building analytical skills. Schmidt & Moust (2000), showed that tutor-guided PBL discussions help students articulate and defend arguments critically. Kirschner et al. (2010), however, warned that minimally guided instruction like PBL must be structured well to avoid cognitive overload, reinforcing the need for clear syntax like in this PAI model. Savin-Baden (2007), discussed that PBL cultivates critical awareness through real-world problem engagement. Wood (2003), concluded that PBL enhances collaborative and critical thinking abilities. Lastly, Vernon & Blake (1993), confirmed through meta-analysis that students in PBL curricula outperform those in traditional settings in developing problem-solving and higher-order thinking skills.

This research also observed similar outcomes, with students' responses and the classroom atmosphere becoming more conducive to active learning. After the implementation of the PBL model, students consistently engaged in thinking and moving actively, thereby facilitating the improvement of their critical thinking skills. From the perspective of learning theory, the PBL model aligns with recommendations for active learning that engages students through multiple senses and hands-on activities. The more actively students participate, the more meaningful and impactful the learning experience becomes for them (Junaidi et al., 2025).

The effectiveness of the problem-based PAI learning model in enhancing students' critical thinking skills also aligns with the findings of several prior studies, which indicate that problem-based learning (PBL) can significantly improve critical thinking abilities (Bachtiar, 2014; Mulyanto et al., 2018). However, the success of implementing this problem-based PAI learning model is contingent upon the availability of necessary learning tools. Therefore, before applying the model in practice, it is crucial for lecturers to prepare essential learning materials,

step-by-step implementation guidelines, problem-solving schedules, and assessment or evaluation instruments for both individual students and groups. This preparation is important to ensures that the application of the problem-based PAI learning model is focused, efficient, and effective.

Based on the findings above, developing a PBL model in PAI courses is very appropriate. Viewed from the context of improving the quality of education, the PBL model is a learning strategy that teachers can use to develop students' abilities in dealing with problems, because so far this ability has received little attention. As a result, when students are faced with difficult problems, they are overwhelmed in solving them and it is not uncommon for students to become so desperate that they take shortcuts, for example consuming illegal drugs or committing suicide as a result of the problems they face.

This concern is reinforced by research findings that show how traditional pedagogies in Islamic education, often focused on rote memorization and passive learning, have failed to foster students' critical and independent thinking. This lack of intellectual stimulation leads to students being unprepared to face real-world challenges and social pressures (Hashim & Samsudin, 2020). Consequently, Islamic education institutions have faced criticism for producing graduates who are perceived as passive, rigid, and lacking the skills to adapt and integrate into modern society (Nawi & Zakaria, 2019; Rohman, 2022). The implementation of Problem-Based Learning (PBL) has been recognized as a vital shift toward addressing these shortcomings. Helaluddin et al. (2023), demonstrated that students who were taught using the PBL model showed significant improvement not only in critical and creative thinking skills but also in their motivation and ability to solve problems constructively . PBL's emphasis on real-world scenarios and active engagement equips learners to face life's challenges with logical reasoning and emotional resilience—qualities particularly essential for PAI students navigating complex moral and spiritual dilemmas.

From a psychological perspective, the Problem-Based Learning (PBL) model is grounded in cognitive psychology, which posits that learning is a process of behavioral change resulting from meaningful experiences. Through this process, students gradually develop holistically. This means that student development extends beyond cognitive aspects and also encompasses affective and psychomotor dimensions (Rusman, 2011).

Viewed from a philosophical aspect, related to the function of the school as an arena or forum for preparing students to live in society, with the implementation of PBL, students will be ready to face any problems in their lives and this is very important because facing problems is an inevitability that cannot be avoided by every human being. Therefore, the exercises given to students regarding problem solving will train them to think critically and systematically in dealing with problems and solving them. Research confirms that the PBL model enhances students' critical and creative thinking abilities, particularly through collaborative learning and problem exploration rooted in real-world contexts (Mahadi & Ariska, 2022). Furthermore, PBL is proven to increase students' social competence and motivation, as it encourages active engagement, reflective inquiry, and interaction—skills that are essential for holistic development and participation in society (Tambak et al., 2023). This constructivist approach also aligns with the broader educational goal of preparing students to function effectively in a complex, ever-changing world. In particular, the integration of PBL in both online and classroom settings has been shown to significantly improve students' academic outcomes, engagement, and self-directed learning capabilities (Aldayel et al., 2019; Ibnian, 2023).

In response to the need for transformative learning approaches in Islamic Religious Education (IRE), recent studies have emphasized the importance of integrating innovative models such as Problem-Based Learning (PBL) to foster students' higher-order thinking skills (Prayogi & Asy'ari, 2021; Tambak et al., 2022). Previous research confirms that conventional teacher-centered approaches often fail to develop students' problem-solving and critical thinking skills adequately, highlighting the urgency for contextual, student-centered learning strategies (Fadli, 2020). Furthermore, embedding local wisdom and Islamic values within PBL frameworks has proven effective in enhancing learners' reflective inquiry and communication skills (Syazali et al., 2019). Supporting this, Sayyah et al. (2017), demonstrated that the PBL

model significantly improves academic achievement and critical competencies across various disciplines, reinforcing its relevance for Islamic education contexts.

The novelty of this research is the development of Problem-Based Learning (PBL) model specifically designed for Islamic Religious Education to enhance students' critical thinking skills. This study uniquely integrates contextual Islamic problems with digital learning media, fostering reflective inquiry and higher-order thinking within a religious framework. The resulting output—a structured, media-supported PBL model—provides both theoretical innovation and practical tools for transforming traditional Islamic Religious Education into a more interactive, student-centered, and critical thinking-oriented learning experience.

Despite its significant contributions, this study has several limitations that should be acknowledged. First, the scope of the research was limited to students from selected departments within Universitas Negeri Medan. As a result, the generalizability of the findings is constrained, and the developed Problem-Based Learning (PBL) model may not fully reflect the learning dynamics of students from other disciplines, institutions, or cultural contexts. Second, the duration of the intervention was relatively short, thus the long-term effects of the PBL model on students' critical thinking development remain unexplored. Third, although the study incorporated media-based learning components, the assessment did not specifically isolate the contribution of digital media tools from other instructional variables, making it difficult to measure their individual impact. Lastly, the study relied primarily on quantitative indicators of critical thinking improvement, while more nuanced qualitative insights—such as students' reflective narratives or in-depth classroom interactions—were not systematically analyzed.

Based on the findings and limitations of this study, it is recommended that future research expand the scope by involving students from various faculties and institutions beyond Universitas Negeri Medan to enhance the generalizability of the developed model. Second, long-term experimental designs should be employed to evaluate the sustained impact of the PBL model in Islamic Religious Education on students' critical thinking and other higher-order cognitive skills. Third, future studies should assess the specific contribution of digital media components integrated within the model to better understand their pedagogical effectiveness. In addition, mixed-method approaches are highly recommended, including in-depth interviews, classroom observations, and student learning reflections, to obtain richer qualitative insights, particularly regarding students' learning experiences and cognitive engagement. These steps will not only strengthen the empirical foundation of the model but also support its theoretical refinement and broader application across diverse educational contexts.

CONCLUSION

The problem-based PAI (Islamic Religious Education) learning model is an instructional approach where students are tasked with identifying, analyzing, and solving real-world problems they encounter in their environment. This model serves as a foundation for acquiring knowledge and concepts through the development of critical thinking and problem-solving skills. In this model, students are encouraged to engage with real issues around them, enabling them to generate precise and logical solutions. The findings of this study show that the implementation of the problem-based PAI learning model significantly enhances students' critical thinking abilities. This is evident from the notable difference in critical thinking skills between students who engage with the problem-based PAI learning model and those who do not. The application of this model equips students to better understand real-world problems and generate creative, accurate, and logical solutions. To ensure the effective implementation of the problem-based PAI learning model, it is essential for lecturers to prepare all the necessary learning materials. These include the learning syntax, teaching resources, instructional media, problem-solving schedules, and assessment tools. To facilitate the smooth integration of this model into PAI courses, it is highly recommended that training sessions and workshops be conducted for PAI lecturers, particularly for those who have not yet implemented this approach in their teaching practice.

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AUTHOR CONTRIBUTION STATEMENT

HLS led the study's design and implementation, formulated the research questions and hypotheses, supervised the processes of data collection and analysis, and was responsible for writing and revising the final manuscript. N conducted the literature review and developed the theoretical framework, supported the data analysis and interpretation, and offered critical insights regarding the implications of the findings. HLS also managed the logistics of data collection, administered surveys and interviews, and contributed to data entry and initial analysis.

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