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The effect of problem-based learning on critical reasoning in islamic education at SMAN 5 South Tangerang

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KEYWORDS

Problem Based Learning;
Critical Reasoning;
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ABSTRACT

This research aims to find out how problem-based learning influences students' critical reasoning abilities in PAI subjects at SMAN 5 South Tangerang. This research focused on class X students at SMAN 5 South Tangerang. The focus of this research is faith in angels using descriptive questions on critical thinking skills tests used in data collection procedures. Researchers conduct quantitative research using an experimental approach. The research used a pretest-posttest control group design. The samples used were 30 control group students (class X1) and 30 experimental group students (class X2). While analyzing the data, t test was used. The experimental class outperformed the control group in every category and in critical reasoning. The data is normally distributed and H0 is accepted with the Sig Kolmogorov-Smirnova test result for the data class which is 0.200. In the control class the proportion was 75.70%, but in the experimental class it was 85.50%. The critical reasoning skills of PAI subjects at SMAN 5 South Tangerang are influenced by the Problem Based Learning learning paradigm. Data analysis using the t test obtained a t-test value (Sig.) 0.000.

Introduction

One of the criteria for the success of a country is the progress in education. Progress in applied education can enhance human resources. Indonesia has renewed its curriculum, namely the Merdeka Curriculum, to achieve academic excellence (Gumilar et al., 2023). The Merdeka Curriculum learning process encourages student-centered learning and promotes active learning, problem-solving, and critical thinking skills (Ramadhany, 2023).

The Merdeka Curriculum is adaptable and emphasizes fundamental content, character development, and student competencies (Nisa, 2023). The curriculum includes the use of more participative and collaborative learning approaches (Apriansah et al., 2024). The Minister of Education and Culture's decision on the Pancasila Student Profile Dimensions and Sub-dimensions Number 009/H/KR/2022 in the Merdeka Curriculum states that this approach is based on noble ideals rooted in national culture, religion, educational goals, and Pancasila (Susanti & Darmansyah, 2023). The Pancasila student profile aims to strengthen character education by identifying six dimensions of character that students should possess: faith, autonomy, reciprocal assistance, global diversity, critical thinking, and creativity (Sadewa, 2022).

Observations at SMAN 5 South Tangerang have shown that the Merdeka curriculum is implemented, but the critical thinking dimension is not implemented in Islamic Religious Education (PAI) classes. Teachers still emphasize understanding the material, resulting in

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students receiving exercises that do not develop critical thinking skills. Islamic Religious Education (PAI) teachers at SMAN 5 South Tangerang still use monotonous and less varied teaching methods, leading to student boredom. Teachers, as facilitators, tend to be less inventive in implementing diverse learning methods.

In response to these challenges, an approach that supports students in acquiring critical thinking skills is needed (Rahmanto et al., 2023). Materials should emphasize collaboration and communication. Problem-Based Learning (PBL) is a method to enhance students' critical thinking skills (Abdullah & Munawwaroh, 2024).

Critical thinking is an activity that involves examining and evaluating evidence, recognizing issues, drawing logical conclusions, and understanding the consequences of arguments (Rahmawati et al., 2023). Learning activities, including models, approaches, procedures, and instructional media, increasingly incorporate strategies to help students improve their critical thinking skills.

Critical thinking skills help students acquire evaluative and analytical skills, enabling them to have a precise understanding of situations and make informed decisions (Wiratman et al., 2023) and (Kamilah et al., 2023). This aligns with (Hendi et al., 2020), stating that critical thinking is connected to the ability to discover, evaluate, and creatively solve problems while also thinking rationally to make choices and conclusions.

Problem-Based Learning is an instructional method that can engage students and respond to their information while also developing the knowledge they need to solve problems (Buhungo et al., 2023). The learning approach known as "problem-based learning" uses contextual problems and real-life student environments to encourage learning (Astuti et al., 2023).

Problem-Based Learning has the ability to support learning goals, and students' critical thinking can be significantly improved (Lubis et al., 2022). Problem-Based Learning aims to enhance critical thinking skills produced by students (Ayunda et al., 2023). The Problem-Based Learning framework consists of: 1) Informing participants about an event by focusing their attention. Analyzing the problem; 2) Preparing educational exercises, arranging for students to ask questions about the learning problem in various ways; 3) Monitoring individuals and collectives; During this phase, students experiment (try) to gather information to respond to the faced problem; 4) In advancing and presenting their work, students connect data from experiments with data from other sources; 5) Assessment and analysis of the problem-solving process, after obtaining solutions, are further examined and assessed (Riyanto et al., 2024).

Research (Sianturi et al., 2018) states that the Problem-Based Learning approach has an impact on students' mathematical critical thinking abilities. Research (Ariani, 2020) states that the effective Problem-Based Learning (PBL) model improves the critical thinking skills of elementary school students in the Science subject because it is problem-based and explains and motivates students to solve problems. Research (Bambang et al., 2023) states that students' critical thinking capacity is enhanced by using the Problem-Based Learning (PBL) approach in the innovation of fiqh learning at MAN 3 Cianjur. Research (Habibah et al., 2022) states that Blended learning with a PBL-based method is superior to traditional teaching techniques in improving the critical thinking skills of grade XI IPA students at SMAN 2 Mataram. Finally, research (Sujalmo et al., 2024) states that 12th-grade students are developing their critical thinking skills in Aqidah Akhlak learning through the use of Problem-Based Learning.

Therefore, this research aims to determine the influence of Problem-Based Learning on students' critical thinking abilities in Islamic Religious Education at SMAN 5 South Tangerang..

Methodology

The researcher conducted a quantitative research using an experimental approach (Ardiansyah et al., 2023). According to Sugiyono (2019:110) cited in (Wulandari et al., 2021), the type of research used to determine how a specific event affects changing conditions is experimental research.

 ISSN 2747-089X

The study employed a pretest-posttest control group design, with the problem-based learning paradigm as the independent variable and students' critical thinking as the dependent variable. Five in-depth questions were used as essay questions for the critical thinking skills test during the data collection procedure. Evaluation was conducted using a critical thinking assessment rubric displaying five indicators of critical thinking ability according to Fisher's step strategy, namely: 1) Examining arguments; 2) Questioning and responding; 3) Determining terminology and checking definitions; 4) Selecting actions; 5) Drawing conclusions on the problem (Aprilianto & Sutarni, 2023).

The critical thinking test was administered before using the instrument. This test was given to students from other classes not part of the experimental or control groups. Validity and reliability tests were performed on the instrument. The validity test findings for the five critical thinking test questions used in the study were valid. Additionally, the reliability test for the critical thinking test produced a high category score of 0.768.

The research employed t-tests, and a Kolmogorov-Smirnov test was conducted previously for normality testing. Meanwhile, homogeneity testing used the Levene test. The PC running SPSS Windows version 26 was used to perform data analysis calculations.

Data were collected using critical thinking assessments. The critical thinking test approach assessed students' critical thinking abilities. Pre-tests and post-tests were distributed to each class in the experimental and control groups at the beginning and end of the intervention.

The study was conducted at SMA Negeri 5 South Tangerang, Pondok Aren Subdistrict, Tangsel City, Banten. The research took place from January 10 to January 22, 2024, at SMAN 5 South Tangerang. The entire tenth-grade classes (X1, X2, X3, and X4) at SMAN 5 South Tangerang were included in the research population. Random sampling was the sampling strategy used, with 30 students in each X1 control group and X2 experimental group.

Results and Discussion

1. Validation and Reliability Test of Test Instrument

After undergoing the initial trial phase, the critical thinking skills test instrument was examined using SPSS Windows 26 to ensure its validity and reliability. A sample size of N = 30 was used for the validity test. The analysis findings indicated that five questions were valid. Additionally, a Cronbach's Alpha value of 0.768 was found when assessing the test data's dependence on critical thinking skills.

Table 1. Test Instrument Validity Test.

		B1	B2	B3	B4	B5	**Results**
B1	Pearson Correlation	1	.392*	.427*	.301	.429*	.717**
	Sig. (2-tailed)		.032	.019	.106	.018	.000
	N	30	30	30	30	30	30
B2	Pearson Correlation	.392*	1	.295	.606**	.559**	.755**
	Sig. (2-tailed)	.032		.113	.000	.001	.000
	N	30	30	30	30	30	30
B3	Pearson Correlation	.427*	.295	1	.456*	.205	.689**
	Sig. (2-tailed)	.019	.113		.011	.277	.000
	N	30	30	30	30	30	30

 ISSN 2747-089X

B4	Pearson Correlation	.301	.606**	.456*	1	.465**	.757**
	Sig. (2-tailed)	.106	.000	.011		.010	.000
	N	30	30	30	30	30	30
B5	Pearson Correlation	.429*	.559**	.205	.465**	1	.717**
	Sig. (2-tailed)	.018	.001	.277	.010		.000
	N	30	30	30	30	30	30
Results	Pearson Correlation	.717**	.755**	.689**	.757**	.717**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	30	30	30	30	30	30

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Tabel 1. Uji Reliabilitas

Cronbach's Alpha	N of Items
.768	5

2. Descriptive Analysis

The researcher aims to understand how students' reasoning abilities in Islamic Religious Education (PAI) classes at SMAN 5 South Tangerang are influenced by problem-based learning. Both the control and experimental classes consist of 30 students, with each student receiving pre-test and post-test questionnaires on faith in angels. The critical thinking skills of students in the experimental class were evaluated in this study using essay data on faith in angels. The analysis was conducted using SPSS Windows 26, and the pre-test and post-test results obtained from Table 3.

Table 3. Descriptive Statistics

	N	Range	Min	Max	Mean	Std. Deviation	Variance
Pretest Kontrol	30	21	56	77	68.33	5.803	33.678
Postest Kontrol	30	10	70	80	75.70	3.131	9.803
Pretest Eksperimen	30	27	47	74	61.40	6.371	40.593
Postest Eksperimen	30	12	80	92	85.50	3.422	11.707
Valid N (listwise)	30						

Table 3 indicates that in the experimental class, students have higher critical

 ISSN 2747-089X

thinking skills compared to students in the control group. The average score for the experimental group is 85.50%, while the average score for the control group is 75.70%. The experimental class then achieved a maximum score of 92, whereas the control class obtained a maximum score of 80. This demonstrates how students' critical thinking skills can improve through the use of the problem-based learning model.

The use of problem-based learning (PBL) in the experimental class resulted in an enhancement of critical thinking abilities compared to the conventional teaching method used in the control class (Aulia et al., 2023). The researcher found that the experimental class performed significantly better in the critical thinking skills test compared to the control class. This is because students are required to actively participate in the problem-based learning activities throughout the learning process in the experimental class, with the educator playing a limited role as a facilitator, assisting students in communicating what they understand. Additionally, students are given the opportunity to address a problem. As a result, they are inspired to consider, evaluate, and solve problems, thereby strengthening their capacity for critical thinking.

The findings from Aulia et al. (2023) illustrate that problem-based learning (PBL) significantly enhances critical thinking skills compared to conventional teaching methods. In the experimental class, students actively engaged in problem-solving activities, benefiting from a facilitator role of the educator, which encouraged deeper communication and understanding. In contrast, the control group, which relied on traditional lecturing, demonstrated lower critical thinking abilities in their post-tests. This method's focus on passive information delivery fails to foster critical analysis or problem-solving skills, underscoring the limitations of conventional approaches. To address these deficiencies, integrating PBL into curricula, as noted by Sari et al. (2022), can effectively cultivate critical thinking in students.

Compared to the experimental class, the post-test results for the control group indicate lower critical thinking abilities. The use of conventional teaching methods or lecturing in the control group is likely the cause. The approach mainly involves the teacher delivering auditory information; as a result, students are not taught to think critically or solve problems, thus diminishing their critical thinking abilities. One application of a learning paradigm that helps address the deficiency in critical thinking skills is Problem-Based Learning (Sari et al., 2022).

Integrating problem-based learning (PBL) into educational practices can transform the way students engage with content and develop critical thinking skills. Unlike traditional methods that often rely on passive listening, PBL encourages active participation and collaboration among students. By presenting real-world problems, educators can create an environment where learners are motivated to investigate, hypothesize, and devise solutions. This hands-on approach not only fosters critical thinking but also helps students develop essential skills such as teamwork, communication, and adaptability. As educational frameworks increasingly recognize the importance of these competencies, PBL emerges as a vital strategy for preparing students for complex challenges in their academic and professional lives.

3. Normality and Homogeneity Test

The t-test using SPSS Windows version 26 is the statistical test employed in the data analysis for this research. Before conducting the t-test, it is essential to ensure homogeneity and normality testing has been performed. This study analyzes values both before and after treatment from the control group and the experimental group before and after treatment (Sasmita & Harjono, 2021).

SPSS Windows, version 26, is used to calculate the normality test. The normality of the study is indicated in Table 4, displaying the results of the normality test calculations.

Tabel 4. Hasil Tes Uji Normalitas

Kelas	Kolmogorov-Smirnov[a]

 ISSN 2747-089X

	Statistic	df	Sig.
Postest Kontrol	.115	30	.200*
Postest Eksperimen	.131	30	.200*

*. This is a lower bound of the true significance.

The data indicates the results of the Kolmogorov-Smirnov Significance Test for class data, which is 0.200 for both the control and experimental groups. If the significance value is greater than 0.05 (0.200 > 0.05), it indicates that the data is normally distributed, and H0 is accepted based on the testing criteria.

Following the normality test, the homogeneity test determines whether the same research sample from the population is homogeneous or varied. SPSS version 26 is used to calculate the homogeneity test. Table 5 shows the results of these calculations.

Table 5. Homogeneity Test Results

Post Test Results

Levene Statistic	df1	df2	Sig.
.138	1	58	.711

4. Hypothesis Test

Hypothesis Testing The hypothesis is tested using the t-test. The purpose of hypothesis testing is to ascertain whether the experimental and control groups have different average critical thinking abilities (Mujahidah et al., 2023). The calculations for hypothesis testing are presented in the findings of Table 6.

Table 6. Hypothesis Test Results

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Hasil bernalar kritis	Equal variances assumed	.131	.718	11.573	58	.000
	Equal variances not assumed			11.573	57.549	.000

The t-test value (Sig.) in Table 4 is less than 0.05 (0.000 < 0.05), indicating that H0 is rejected, and H1 is accepted. If the test result is less than 0.05, it suggests how the critical thinking of SMAN 5 Tangsel students is influenced by problem-based learning (PBL) in Islamic Religious Education (PAI) learning.

Conclusion

The critical thinking skills of students at SMAN 5 South Tangerang are influenced by Problem-Based Learning, as indicated by the research results of the t-test, which yielded a significance level of 0.000. This is demonstrated by students in the experimental group outperforming students in the control group in terms of average scores in the post-test for critical thinking abilities.

This research indicates that the implementation of problem-based learning has a positive impact on students' critical reasoning abilities in the subject of Islamic Education at SMAN 5

 ISSN 2747-089X

South Tangerang. The findings reveal that students who undergo problem-based learning demonstrate a significant improvement in critical reasoning skills compared to those subjected to conventional teaching methods. These findings affirm that the problem-based learning paradigm holds the potential to enhance students' understanding of religious materials as well as their abilities to analyze, evaluate, and make critical decisions.

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