Implementation of Project Based Learning Based Local Wisdom to Enhance Students' Critical Thinking in Higher Education

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Abstract

Islamic Religious Education (IRE) contributes to the realization of quality education in line with the Sustainable Development Goals. Optimizing the learning of prospective IRE teachers is crucial in producing superior human resources to create inclusive characters in the 21st century. This study aims to analyze the implementation of Project-Based Learning (PjBL) based on local wisdom on the critical thinking abilities of prospective IRE teachers. A triangulation mixed-method research design was used with the integration of quantitative and qualitative data to obtain comprehensive research results. The research subjects were students of the IRE study program at UIN Sultan Syarif Kasim Riau. Data collection was carried out through critical thinking ability tests and interviews of students' learning experiences. Data analysis techniques used descriptive and inferential statistical methods with the help of SPSS software to analyze quantitative data. Qualitative data analysis used the interactive model of Miles and Huberman, consisting of data collection, data reduction, data presentation, and conclusion drawing. The results showed a significant difference in the average critical thinking abilities of students between the experimental and control classes (p<0.00). The application of PjBL-based local wisdom in Islamic religious learning can improve students' critical thinking abilities. The integration of Riau Malay local culture in learning shows a positive response and becomes a learning innovation for prospective IRE teachers.

INTRODUCTION

Islamic religious education (IRE) contributes to the realization of education for sustainable development (ESD). The principle of Freedom of religion or belief (FoRB) is the basis of the contribution of religious-based learning by integrating the principles of SDGs to form an open and inclusive generation (Freston, 2019; Petersen, 2021). The noble values taught in IRE are in line with the principles of the Sustainable Development Goals (SDGs), such as justice, social care, and environmental preservation. Instilling these values from an early age can shape a young generation that is environmentally conscious and committed

to creating a better future. IRE not only teaches about faith and worship but also forms the character of individuals who are faithful and pious. A strong character is an important foundation in building a generation that is adaptive in a global and heterogeneous society. Through IRE learning, students can develop the soft skills needed to collaborate, innovate, and overcome various global challenges related to the SDGs. Strengthening critical thinking skills in the 21st century is the foundation for forming an educated mindset that values human diversity (Batliwala, 2022).

Critical thinking is a high-level cognitive skill that is a primary need in the development of 21st-century skills. This ability is needed by every individual to successfully overcome challenges and solve problems in difficult situations. Critical thinking skills allow everyone to analyze and evaluate situations, assisting in making important decisions for personal and professional development (Rahardhian, 2022). Critical thinking is crucial as a fundamental goal in learning. Moon, (2007) Critical thinking is an effort to expand the concept of knowledge by incorporating an attitude of scientific discipline. The ability to think critically is related to rational intelligence which must be applied in efforts to understand and preserve culture (Heard et al., 2020).

Indonesia is known for its heterogeneous society, with diverse religions, ethnicities, and cultures. Culture plays a central role in the dynamics of global development (UNESCO, 2015)The integration of religion, culture, and science is the main driving force in supporting quality education. Riau Province is one of the areas that has a wealth of local wisdom (Ilhami & Yasnel, 2022). Riau Malay culture is identical to Islamic values because it has a philosophy of customs based on Islamic law. Studies analyzing Islamic values in the context of Riau Malay culture are very important. On the other hand, Riau has the potential to be a target for exposure to terrorist networks due to its strategic location as a gateway to world trade and its direct border with two countries (Yudi Rusmanto et al., 2023). This certainly requires preventive action and the role of stakeholders in preparing prospective teachers with an understanding of religious moderation and anti-violence (Fuad & Arifuddin, 2021; Muhammad & Muryono, 2021). Students can be a potential and strategic target for radicalism (Darni et al., 2019). Stakeholders have a responsibility to produce human resources that are inclusive and have a rational mindset in the educational aspect. Learning that is oriented towards the conservation of local culture can be carried out by exploring Islamic values scientifically. Thus, Islamic Religious Education (IRE) can contribute to producing prospective educators who think critically and are culturally literate.

Optimizing Islamic Religious Education (IRE) in higher education is very important to form a rational attitude towards diversity (Lutfiyatun et al., 2023). The implementation of IRE learning in universities becomes a solution by applying the Project Based Learning (PjBL) model. This learning design can combine the concept of a contextual approach that connects learning materials with everyday issues (Hastuti & Alanis, 2022). This project-oriented learning design can train critical thinking skills because students can be trained to independently identify contemporary issues, determine core issues, and formulate algorithms to solve problems in a measurable way. The learning design that is applied will influence the stimulation of prospective teachers to think critically during the learning process (Lombardi et al., 2022; Purnamawati et al., 2022).

Teacher Training Colleges (LPTK) have a responsibility to produce prospective IRE teachers who are in accordance with the demands of the times. Strengthening critical thinking is very important in the education of prospective teachers to face the challenges of

the 21st century. Roudlo, (2020) states that critical thinking encourages teachers to think more deeply about something for themselves and to decide what to do. This ability will give birth to prospective educators who have a selective character in identifying, analyzing, and processing information (Niza, 2022).

The implementation of local wisdom-based Project-Based Learning (PjBL) remains underexplored in higher education, particularly for prospective Islamic Religious Education (IRE) teachers. Previous studies have demonstrated the potential of PjBL to enhance critical thinking, albeit in varying contexts. For instance, Issa & Khataibeh (2021) examined PjBL's effectiveness in improving critical thinking skills from the perspective of teachers using a questionnaire-based method, emphasizing general pedagogical outcomes without focusing on cultural integration. Similarly, Nailasariy, Habibi, Kubro, Nurhaliza, & Setyaningrum (2023) adopted a Design for Change (DFC) approach within PjBL to foster soft skills among prospective IRE teachers but did not specifically incorporate local wisdom elements. Most research on PjBL has concentrated on primary and secondary education, such as its application in Islamic Religious Education at the high school level (MA) (Nurcahyani et al., 2024) and at the Islamic junior high school level (MTs) (Habiburrahman et al., 2024), primarily aiming to improve critical thinking skills in younger learners.

In contrast, the present study fills a critical gap by focusing on the integration of local wisdom into PjBL at the higher education level, specifically tailored for prospective IRE teachers. Unlike prior studies, this research highlights how local cultural elements, such as Riau Malay traditions, can be seamlessly embedded into the learning process to enhance critical thinking. By providing students with opportunities to analyze, evaluate, and make decisions on religious and cultural issues within their socio-cultural context, this study not only strengthens critical thinking skills but also fosters a deeper understanding of cultural relevance in education. This integration of local wisdom distinguishes the current research and underscores its importance as a novel contribution to the field of Islamic religious education. The use of local wisdom in Islamic Religious Education (IRE) plays a crucial role in improving the critical thinking skills of prospective IRE teachers. By integrating the values and practices of local wisdom into the learning process, prospective teachers are encouraged not only to understand religious teachings theoretically but also to be able to analyze and connect them with the socio-cultural context of the community. This encourages them to think critically, find solutions to problems relevant to the community, and develop an open attitude towards diversity. In addition, local wisdom can also be a source of inspiration for prospective teachers to create innovative learning methods that are relevant to the needs of students.

The integration of local wisdom in Islamic Religious Education (IRE) has the potential to improve the critical thinking skills of prospective IRE teachers. Prospective teachers are trained not only to understand religious teachings theoretically but also to be able to analyze and connect them with the socio-cultural context of the community. This encourages them to think critically, find solutions to problems relevant to the community, and develop an open attitude towards diversity. The use of local wisdom can also be a source of inspiration for prospective teachers to create innovative learning methods that are relevant to the needs of students. Furthermore, learning based on local wisdom contributes to raising Islamic values in the social and cultural practices of the community. This research will focus on exploring Islamic values in Riau Malay culture in IRE learning. The aim of the research is to

analyze the implementation of Project Based Learning (PjBL) based on local wisdom to improve the critical thinking skills of prospective IRE teacher students.

METHODS

This study adopts a convergent mixed methods design, integrating qualitative and quantitative data to provide a comprehensive understanding of the research subject, as recommended by Creswell and Guetterman (2019). The research involved 40 students from the Islamic Religious Education program at UIN Sultan Syarif Kasim Riau, enrolled in the Islam and Malay Civilization course. The participants were divided into two groups: an experimental class utilizing Project-Based Learning (PjBL) integrated with local wisdom and a control class employing a scientific approach.
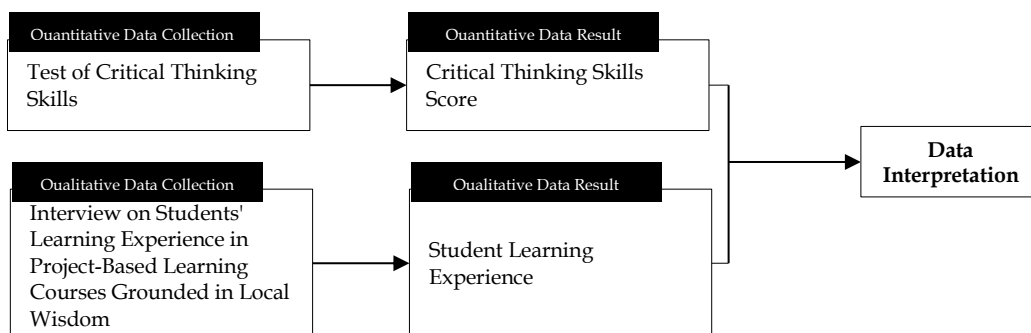

Figure 1. Convergent mixed methods design

Quantitative data were obtained through a critical thinking skills test based on Ennis's (1996) framework, which includes indicators such as providing elementary clarification, building basic support, making inferences, offering advanced clarifications, and setting strategies and tactics. The critical thinking test instrument underwent a validation process involving three experts in Islamic education, linguistics, and educational technology. This process ensured content validity and alignment with the research objectives. Furthermore, the instrument demonstrated a reliability coefficient of 0.7, indicating an acceptable level of internal consistency for measuring critical thinking skills. These validations enhance the credibility of the instrument and support the robustness of the findings.

Qualitative data were collected through interviews designed to explore students' experiences during the learning process, particularly in relation to the integration of local wisdom into instructional strategies. The interview data were analyzed using the Miles and Huberman interactive model, which involves systematic data collection, reduction, presentation, and conclusion drawing to ensure a thorough and reliable qualitative analysis.

Quantitative data analysis included descriptive statistics to calculate the mean using Microsoft Excel. An independent t-test was also conducted to compare the average critical thinking scores between the experimental and control groups. The combined qualitative and quantitative approaches ensure a comprehensive evaluation of the instructional

strategies implemented. The inclusion of a validated and reliable critical thinking test instrument strengthens the rigor of the research findings, providing greater confidence in their accuracy and relevance to the field of education.

RESULTS AND DISCUSSION
The Impact of AI on the Learning Paradigm

Local wisdom-based Project Based Learning (PjBL) focuses on encouraging students to explore knowledge in depth through projects relevant to real-life contexts. The learning process begins by inviting students to formulate questions or contextual religious issues that exist in the surrounding environment. Students are divided into small groups to explore these issues through predetermined projects. During the project process, lecturers provide intensive guidance, both in terms of technical and cultural aspects. Students are also given the opportunity to enrich their literacy and knowledge through various relevant learning resources. After completing the project, each group of students presents their work in the form of presentations and scientific reports. Lecturers and students will strengthen concepts, conclusions, and learning reflections. The research uses two classes consisting of an experimental group with the application of local wisdom-based PjBL learning and a control class with expository-based learning.
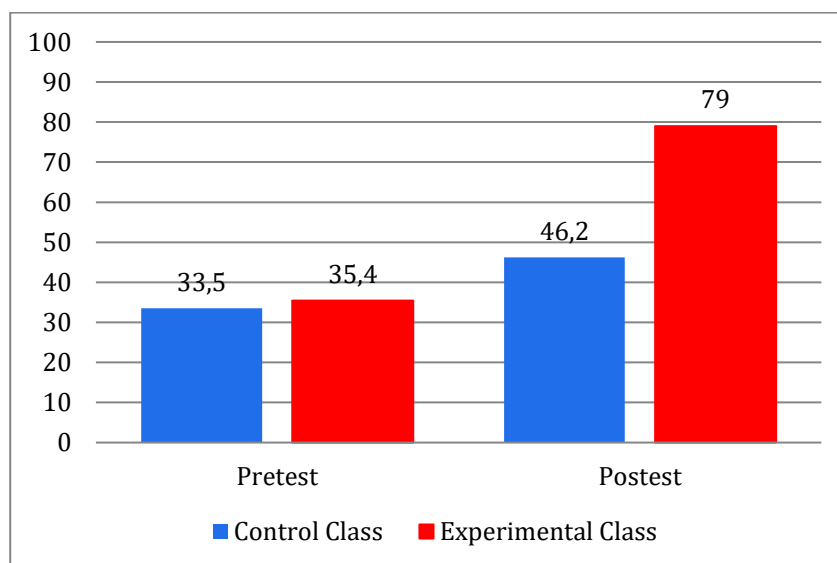

Figure 2. The Mean of Pretest and Posttest Critical Thinking Skills
in Control and Experimental Classes

The results of this study indicate a difference in the average critical thinking skills of students between the experimental and control classes during the learning process, namely the pretest and posttest. The average pretest score for both classes was relatively low with an insignificant difference: the average for the control class was 33.5 and for the experimental class was 35.4. A significant difference was found in the experimental class, which had a posttest score of 79 compared to the control class score of 46.1. This difference

in results indicates that the experimental treatment, namely the application of local wisdom-based PjBL learning, contributes to strengthening critical thinking. This is likely because PjBL activates the students' learning process more optimally, which has an impact on increasing their understanding of concepts and problem-solving abilities. The difference in the average posttest scores is used as an indication of the effect of implementing the learning design on students' critical thinking skills.

Prerequisite tests were carried out, namely a normality test using the Kolmogorov test and a homogeneity test using the Levene test. The normality test for critical thinking skills data shows that the data from the control and experimental groups are normally distributed. The control group has a statistical value of 0.130 with a significance of 0.200, while the experimental group shows a statistical value of 0.196 with a significance of 0.083. Both of these values are greater than 0.05, meaning the data is normally distributed. The Levene homogeneity test shows that the variance in critical thinking skills between the control and experimental groups is categorized as homogeneous. The significance value is 0.0683 which is greater than 0.05. Based on the results of the normality and homogeneity tests, the requirements for the independent t-test are met.

Table 1. Results of Normality and Homogeneity Tests

Test	df	Sign.	Description
Normality Test (Kolmogorov Smirnov test)			
a. Control Class	17	0.200	P > 0.05; Ho accepted Data is normally distributed
b. Experimental Class	17	0.08	P > 0.05; Ho accepted Data is normally distributed
Homogeneity Test (Levene Test)	32	0.683	P > 0.05; Ho accepted Data is homogeneously distributed

The results of the independent t-test show a significant difference in critical thinking skills between the control and experimental groups. The Levene's test F value of 0.169 with a significance of 0.683 confirms the homogeneity of variance. The t-value of -7.703 with degrees of freedom (df) of 32 and a significance (2-tailed) of 0.000 indicates that the difference between the two groups is statistically very significant ($p < 0.05$). This finding provides strong evidence that local wisdom-based PjBL learning can effectively improve students' critical thinking skills compared to the conventional expository method used in the control group.

Table 2. Results of t-independent Tests

Variabel	t-test for Equality of Means		
	t	df	Sig. (2-tailed)	Description
Critical Thinking Skills	-7.703	32	.000	P < 0.00; Ha accepted There is a significant difference in critical thinking between control and experimental groups

Critical thinking skills are a fundamental aspect of students' intellectual development as they can equip learners with the skills and dispositions they possess to answer the challenges of everyday problems (Aswanti & Isnaeni, 2023). It is very important that critical thinking is trained, especially in the learning process of prospective teachers. Lecturers, as instructors in the learning process for prospective teachers, must be able to identify the strengths and weaknesses in students' thinking in order to maintain those strengths while also correcting their weaknesses (Raj et al., 2022). Critical thinking skills are important to train so that students can process circulating information, recognize biases, and prepare them to become more analytical and independent thinkers (Mubarok et al., 2023). These skills encompass a range of competencies such as analysis, interpretation, evaluation, inference, explanation, and self-regulation (Heard et al., 2020). The development of critical thinking in higher education is a major focus in producing prospective educators who are adaptive in the 21st century.

Learning design correlates with strengthening critical thinking skills in higher education. Local wisdom-based Project-Based Learning (PjBL) has proven effective in improving the critical thinking skills of Islamic Education students. This finding emphasizes the importance of innovation in learning models in Islamic higher education to prepare prospective religious teachers to face the challenges of the 21st century. Critical thinking skills not only help students analyze Islamic teachings and values more deeply but also equip them with the ability to identify reliable sources of information regarding contemporary religious issues. The implementation of learning strategies that encourage critical thinking should be a major focus in efforts to improve the quality of education for prospective Islamic Education teachers. Islamic universities can produce graduates who not only have strong religious knowledge but also critical thinking skills essential for answering the challenges of religious education in the modern era. This will be directly proportional to strengthening the quality of learning in schools so that students can understand and practice Islamic teachings comprehensively.

The positive response from students who participated in lectures with the local wisdom-based PjBL learning model strengthens the implementation of the learning process. Students are given the opportunity to analyze the local wisdom of the Riau Malay community and reconstruct local culture with Islamic principles and values. Based on the results of the interviews, it depicts the experiences of students who made them happy and comfortable in following the learning process. Students are more interested and enthusiastic about attending lectures because the material presented is closely related to the cultural context they know. They stated that the learning process became more contextual and relevant to everyday life. Then, students find it easier to understand and connect Islamic concepts with the reality they face when learning is linked to the local cultural context. This shows that the integration of local culture in Islamic Education learning can increase students' motivation and interest in learning.

"I think the learning is interesting; I gained experience in analyzing local traditions in my area. I took the topic of the marriage tradition in the Malay custom which I analyzed through fashion and its implementation process" (Interview with Islamic Education student Aditya, 2024)

In Malay culture, there is a close relationship between Islamic values and local culture. Islam has been an integral part of the lives of the Riau Malay community for centuries. The values of justice, brotherhood, tolerance, and mutual cooperation taught by Islam are reflected in various aspects of the lives of the Riau Malay people, such as customs, arts, and social systems. Islamic values can be demonstrated through protected forests with environmental care values (Matsna et al., 2023), the value of mutual cooperation in the Maauwo tradition (Ilhami et al., 2020), and traditional food (Ardana et al., 2023; Masyhuri & Ilhami, 2023). This shows that Islam is not just a religion, but also a guide to life and social glue for the Riau Malay community. Malay culture is essentially based on Islamic teachings, making it very relevant to use in exploring and understanding Islamic values more deeply. This close relationship between Riau Malay culture and Islamic values has enormous potential to be used as a source of learning for Islamic Education. By studying Riau Malay culture, students can gain a deeper understanding of the Islamic values that have been passed down by their ancestors. In addition, through a cultural approach, Islamic Education learning can become more interesting and relevant to students' daily lives. Riau Malay culture is not just a cultural heritage, but also a learning resource rich in religious values.

The implementation of local wisdom-based PjBL in lectures can contribute to helping students identify and appreciate the relationship between religion and culture in their local context. The use of this learning strategy makes students more active in the learning process through involvement in projects that integrate local culture and Islamic values. This active involvement increases their understanding of the learning material and helps them apply the concepts learned in a real-world context. Students also feel that this approach helps them see the relevance of Islamic teachings in their daily lives. By linking Islamic values with the local cultural context, they can more easily understand how Islamic principles can be applied in their lives. The local wisdom-based PjBL approach, which integrates Malay local culture in Islamic Education learning, certainly has a positive impact on the development of students' critical thinking skills in optimizing the learning process they will carry out. Rofiq (2019) explains that the richness of local culture in religious learning can stimulate students' ability to analyze and evaluate the relationship between religious teachings and cultural practices. Islamic religious education plays a crucial role in shaping religious identity in a diverse society (Mulyadi et al., 2023).

This aims to strengthen the Islamic identity of students while also having a comprehensive understanding of religion and having a tolerant character as well as appreciating diversity. Islamic Education plays a major role in creating Muslims who are strong in their faith but remain inclusive in community life. Thus, the implementation of

local wisdom-based PjBL learning can play a role as an effort to realize this vision to produce prospective Islamic Education educators who understand the complexity of the relationship between Islam and local culture.

The implementation of projects in the learning process provides opportunities for students to explore scientifically. The local wisdom-based PjBL learning that is applied requires students to conduct case studies on the phenomenon of Riau Malay local wisdom. Students in groups choose one theme of local wisdom and collect data through observation and interviews with local communities. The themes of wisdom analyzed include marriage traditions; the tradition of eating Bajambau; the Balimau bathing tradition; the Aghi Ayo Onam tradition; and the traditions of celebrating Eid al-Fitr and Eid al-Adha. The implementation of traditions and cultural practices of the local community has Islamic values that have the potential to be developed Suriaman et al. (2024) found that project-based learning that integrates cultural aspects can also improve students' collaboration and communication skills. This can be seen from the enthusiasm and active involvement of students in projects that integrate local culture and Islamic values.

Despite its significant findings, this study has several limitations that should be acknowledged. First, the sample size was relatively small, consisting of only 40 students from a single higher education institution. This limits the generalizability of the results to broader populations or different educational contexts. Additionally, the study focused exclusively on the integration of Riau Malay local wisdom, which may not fully represent other cultural contexts with distinct characteristics and educational needs. The study's reliance on self-reported qualitative data through interviews also introduces the potential for response bias, as students may have provided socially desirable answers rather than entirely objective reflections.

Future research should expand the scope of investigation by including larger and more diverse samples from various regions to increase the generalizability of findings. Comparative studies across different cultural settings could also provide a deeper understanding of how local wisdom from varying traditions influences critical thinking development in Islamic Religious Education. Moreover, longitudinal studies are recommended to assess the long-term impact of local wisdom-based PjBL on students' critical thinking skills and their applicability in professional teaching contexts. Finally, incorporating additional data collection methods, such as classroom observations or reflective journals, could enhance the reliability and depth of qualitative findings by providing more triangulated perspectives. These efforts would contribute to a more robust body of knowledge, further validating the integration of cultural wisdom in educational models to develop critical thinking and address the demands of 21st-century education.

CONCLUSION

The implementation of local wisdom-based Project-Based Learning (PjBL) in Islamic Religious Education (IRE) has demonstrated its effectiveness in improving students' critical

thinking skills. Quantitative data from the study highlight a significant improvement in critical thinking abilities among students in the experimental group. The pretest score for the experimental class was 35.4, which increased substantially to 79 in the posttest. In contrast, the control group, which utilized a conventional expository method, showed a smaller increase, from 33.5 in the pretest to 46.1 in the posttest. This data underscores the effectiveness of integrating Riau Malay local culture into PjBL as a means to foster critical thinking. The integration of Riau Malay local culture in learning elicited positive responses from students. This culturally relevant approach enhanced their ability to understand and critically evaluate the relationship between religious teachings and cultural practices. By engaging students in contextualized projects, this method developed their analytical and evaluative skills, essential for shaping a strong yet inclusive religious identity. The integration of Riau Malay culture into PjBL is an effective solution to enhance the quality of Islamic Religious Education at universities. This approach prepares prospective IRE teachers with strong faith and broad insights, equipping them to contribute positively to IRE learning in schools and to address the challenges of a culturally and religiously diverse society.

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