



The Effectiveness of Ethno-Religious Based Jigsaw Model to Improve Critical Thinking of PAI in Indonesia

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Abstract

This study aims to determine the irrigators of ethno-religious based jigsaw models to improve students' critical thinking skills in learning Islamic religious education in Indonesia. This type of research is quantitative research with a meta-analysis approach. This study analyzed 27 effect sizes obtained from Google scholars, ERIC, Wiley, and Taylor of Francis from the 2021-2024 issue with 1034 students. The JASP application assists the data analysis in this study. Effect size analysis is calculated with a 95% confidence level. The study results concluded that the effect size value obtained through the random effect model was 1,952 (high effect size category). These findings explain that, on average, students who apply the ethno-religious-based jigsaw model are effective in improving students' critical thinking skills in learning Islam. This study provides important information on using the jigsaw model in the future.

Keywords: *Jigsaw Model; ethno-religious; Critical Thinking; Islamic Education*

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Introduction

Critical thinking skills are one of the essential competencies that must be possessed by students in the 21st century (Saputra et al., 2019; Zulkifli et al., 2022; Aybala & Emine, 2023). In an era characterized by the rapid development of technology and information, students are faced with various complex challenges, such as the ability to analyze abundant information, distinguish facts from opinions, and make decisions based on valid evidence (Nurlaila et al., 2021). Critical thinking skills allow students to think logically, deeply, and reflectively in dealing with everyday and academic problems. In addition, these skills are the basis for developing creativity, problem-solving skills, and adapting to change, all of which are very important in facing the demands of the world of work and social life (Farizi et al., 2019; Yefang et al., 2024).

In the context of education, critical thinking plays an important role in improving the quality of learning. The educational process not only aims to transfer knowledge, but also to form a critical and independent mindset in students (Asnur et al., 2024; Zulyusri et al., 2023).

Education that emphasizes the development of critical thinking skills helps students become active participants in learning, be able to evaluate arguments, and relate the concepts learned to real-life contexts. Thus, critical thinking skills are not only an individual need but also a foundation for the development of an intelligent, innovative, and competitive society (Ali et al., 2024; Wantu et al., 2024). Furthermore, critical thinking skills have a very important role in helping students face increasingly complex global challenges. In the midst of rapid changes triggered by globalization, students need to be able to analyze information in depth, evaluate various perspectives, and devise effective solutions. With critical thinking skills, students can confront issues such as climate change, social inequality, and technological developments with a rational and evidence-based approach (Fajri et al., 2023; Hariyanto et al., 2022). In addition, these skills help students to not only become passive recipients of information, but also as individuals capable of making ethical and sustainable decisions in the midst of ever-changing global dynamics (Liline et al., 2024).

In solving complex problems, critical thinking skills enable students to understand problems holistically and design innovative solutions (Muhfahroyin et al., 2023). This process involves problem identification, in-depth analysis, and synthesis of information from various sources. In the world of work and social life, this ability provides a competitive advantage for students, because they can become adaptive and visionary problem solvers (Balti H., 2016). Furthermore, critical thinking also supports the development of empathy and collaboration, where students are able to understand different viewpoints and work together to achieve a common goal. Thus, critical thinking skills are key in preparing students to become agents of change in the midst of increasingly complex global challenges (Saputra et al., 2019).

In the context of Islamic religious education (PAI) in Indonesia, which is a compulsory subject, critical thinking skills are very relevant to support meaningful learning. Islamic religious education not only aims to transfer spiritual and moral values, but also to train students to be able to understand and apply Islamic teachings in daily life contextually (Jariah & Aminatun, 2022). By thinking critically, students can explore Islamic values, relate them to global challenges, and solve complex problems with perspectives based on religious teachings (Akkuş & Doymuş, 2022). For example, students may be invited to analyze contemporary ethical issues, such as social justice or environmental conservation, through approaches that align with Islamic values. Thus, the integration of critical thinking skills in PAI learning not only improves religious understanding, but also prepares students to become individuals who are adaptive, have integrity, and are able to contribute at the global level.

Islamic Religious Education (PAI) learning in Indonesia faces significant challenges, one of which is the low critical thinking ability of students. Many PAI learning processes are still dominated by conventional approaches such as lectures and memorization, which tend to focus on knowledge transfer rather than the development of analytical, evaluative, and problem-solving skills (Mahfudz & Sukarno, 2023). As a result, students often only understand religious teachings textually without being able to relate them to real-life contexts. This leads to a lack of students' ability to think reflectively and critically in the face of contemporary issues, such as social justice, diversity, or ethical issues in technology.

The low ability to think critically is also influenced by the lack of use of interactive and collaborative learning methods. Students are often not given the opportunity to discuss, explore different points of view, or analyze issues based on Islamic teachings. In addition, PAI teachers often face limited time and resources to develop innovative learning strategies (Ismawati et al., 2024). In fact, the development of critical thinking requires a learning environment that encourages students to actively ask questions, discuss, and solve problems. If these challenges are not overcome, then the learning goals of PAI to form spiritually, intellectually, and socially intelligent students will be difficult to achieve optimally. In addition, ethno-religious values have high relevance in Islamic Religious Education (PAI) learning because they can help build a deeper and contextual understanding in students. Through the integration of local cultural values that are in harmony with religious teachings,

PAI learning can become more meaningful and close to students' daily lives. This approach allows students to understand Islam not only as a universal teaching, but also as a guide that can be applied in their cultural context. For example, local traditions such as gotong royong or environmental wisdom can be associated with Islamic teachings about ukhuwah (brotherhood) and responsibility for nature (Akihary et al., 2024; Chusni et al., 2022). By prioritizing ethno-religious values, students not only learn about religion textually, but also gain a more holistic and relevant perspective to face social and cultural challenges in the era of globalization. This approach can also increase the love for local culture while strengthening an inclusive and tolerant Islamic identity. Therefore, there is a need for a model that can encourage students' critical thinking skills in learning Islamic religious education, one of which is through the jigsaw model.

The Jigsaw model is one of the effective cooperative learning methods in encouraging students' critical thinking skills. In this model, students work in small groups and each member is responsible for learning as well as teaching a specific part of the material to the other members of the group (Elsaid, 2015; Silva et al., 2023). This process forces students to understand the material in depth, analyze the information, and relay their knowledge in a clear and structured way. This activity trains students to think critically in evaluating material, asking questions, and connecting relevant concepts. Through group discussions, students are also encouraged to consider various perspectives, solve problems together, and develop logical arguments (Tamur et al., 2021). The advantage of the Jigsaw model in improving critical thinking skills also lies in the process of social interaction that occurs in the group. When students discuss, they learn not only from the material they are learning, but also from the input and perspectives of their peers. This process creates a learning environment that supports the free and systematic exploration of ideas. In addition, the individual's responsibility to deliver the material to the group encourages students to think deeper and prepare well. This helps them develop the skills of analysis, evaluation, and synthesis of information that are at the core of critical thinking (Suzanti et al., 2023; Akkuş & Doymuş, 2022; Net, 2023; Oktarina et al., 2021). By using the Jigsaw model, learning becomes more collaborative and challenging, so that students not only receive information passively, but also become active participants who are able to think critically in solving problems and comprehensively understanding the material.

The jigsaw model is effective in improving students' critical thinking skills in learning (Tamur et al., 2021; Fitriana et al., 2023; Silva et al., 2023; Zubaidah et al., 2018), jigsaw model in encouraging creative thinking skills and student learning outcomes (Suzanti et al., 2023; Basyah et al., 2018; Nurmalia et al., 2020). The jigsaw learning model is very well applied in Islamic religious learning (Nurlaila et al., 2021; Atmowidjoyo et al., 2024). However, many studies related to the jigsaw model have not been found related to ethno-religious jigsaw models in the learning of Islamic religious education. Therefore, it is necessary to conduct a meta-analysis to determine the influence of ethno-religious-based jigsaw models in learning Islamic religious education in Indonesia. Based on this, this study aims to determine the influence of ethno-religious-based jigsaw models to improve students' critical thinking skills in learning Islamic religious education in Indonesia through meta-analysis.

Methodology

This study uses a meta-analysis approach to determine the The Effectiveness of Ethno-Religious Based Jigsaw Model to Improve Critical Thinking Skill of Islamic Religious Education Students in Indonesia. Meta-analysis is a research approach that evaluates previous research statistically to reach a conclusion (Tamur et al., 2020; Badawi et al., 2023; Nurtamam et al., 2023; Zulyusri et al., 2023). The meta-analysis research procedure is 1) determining the research inclusion criteria, 2) collecting data and coding, 3) analyzing the data statistically can be seen in Figure 1.

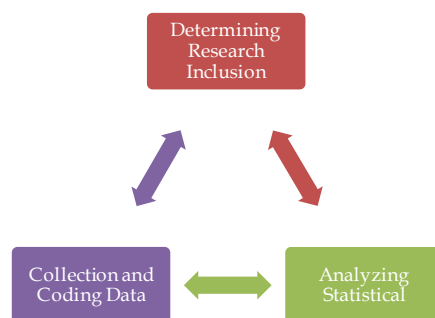


Figure 1. Meta-analysis Research Stages

Eligibility Criteria

In the process of searching for data through the Google Scholar, ScienceDirect, Wiley, ERIC, ProQuest, Fronteins and Web of Science databases, the research must meet several inclusion criteria, namely 1) the research is published in the 2021-2024 range, 2) the research is published in a journal indexed by SINTA, Scopun or Web of Science, 3) The research must use experimental classes of Ethno-Physics-based problem-based learning models and other classes of conventional learning models, 4) All studies must have complete data to calculate the effect size value dan 5) Student Research Sample SD, SMP dan SMA. From the data search, 27 studies were obtained that met the inclusion criteria published in 2022-2024 which can be seen in Table 2.

Data Collection

To obtain valid research data related to the effectiveness of ethno- religious based jigsaw model to improve critical thinking skill of islamic religious education students in Indonesia collected from Google Scholar, ScienceDirect, Wiley, ERIC, ProQuest, Fronteins and Web of Science databases and frontenists. The keywords for data search are "Jigsaw Model", "Ethno-religious Based Jigsaw Model", "The Influence of ethno-religious Jigswa Model on Students' Critical Thinking Skills", "Islamic Religious Education Learning".

Statistical Analysis

Data analysis in this study calculates the effectiveness of ethno- religious based jigsaw model to improve critical thinking skill of islamic religious education students in indonesia. According to (Borenstein et al., 2007) The stages of data analysis in the meta-analysis can be seen in (Figure 1.). Furthermore, the criteria for the effect size value in the study can be seen in Table 1.

Table 1. Category Effect Size Value

Effect Size	Category
$0.0 \leq ES \leq 0.2$	Low
$0.2 \leq ES \leq 0.8$	Medium
$ES \geq 0.8$	High

Suorce: (Borenstein et al., 2007; Bachtiar et al., 2023; Tamur et al., 2020; Nurtamam et al., 2023; Solissa et al., 2023)

Result and Discussion

Based on the results of data search through the database, 27 studies/articles met the inclusion criteria. The effect size and error standard can be seen in Table 2.

Table 2. Effect Size and Standard Error Every Research

Code Jurnal	Years	Effect Size	Standard Error
PK 1	2021	0.78	0.28
PK 2	2021	1.06	0.40
PK 3	2023	2.15	0.33
PK 4	2023	1.19	0.37
PK 5	2024	0.48	0.20
PK 6	2024	0.93	0.30
PK 7	2022	0.83	0.36
PK 8	2024	1.09	0.38
PK 9	2023	1.18	0.42
PK 10	2024	1.25	0.44
PK 11	2024	0.91	0.39
PK 12	2024	0.73	0.28
PK 13	2022	0.66	0.19
PK 14	2022	0.47	0.20
PK 15	2022	0.31	0.16
PK 16	2021	0.27	0.10
PK 17	2023	0.94	0.40
PK 18	2023	1.90	0.45
PK 19	2023	1.73	0.42
PK 20	2024	0.52	0.36
PK 21	2022	0.85	0.30
PK 22	2022	0.77	0.30
PK 23	2023	0.48	0.19
PK 24	2024	1.04	0.29
PK 25	2023	1.59	0.44
PK 26	2024	1.95	0.39
PK 27	2023	1.84	0.40

Based on Table 2, the effect size value of the 27 studies ranged from 0.27 to 2.15. According to Borenstein et al., (2007) Of the 27 effect sizes, 9 studies (33%) had medium criteria effect sizes and 18 studies (77%) had high criteria effect size values. Furthermore, 27 studies were analyzed to determine an estimation model to calculate the mean effect size. The analysis of the fixed and random effect model estimation models can be seen in Table 3.

Table 3. Fixed and Random effect

	Q	df	p
Omnibus test of Coefficients Model	87.713	1	< 0.001
Test of Residual Heterogeneity	254.092	26	< 0.001

Based on Table 3, a Q value of 254.092 was obtained higher than the value of 87.713 with a coefficient interval of 95% and a p value of 0.001 <. The findings can be concluded that the value of 24 effect sizes analyzed is heterogeneously distributed. Therefore, the model used to calculate the mean effect size is a random effect model. Furthermore, checking publication bias through funnel plot analysis and Rosenthal fail safe N (FSN) test (Tamur et al., 2020; Badawi et al., 2022; Ichsan et al., 2023b; Borenstein et al., 2007; Tamur et al., 2020). The results of checking publication bias with funnel plot can be seen in Figure 2.

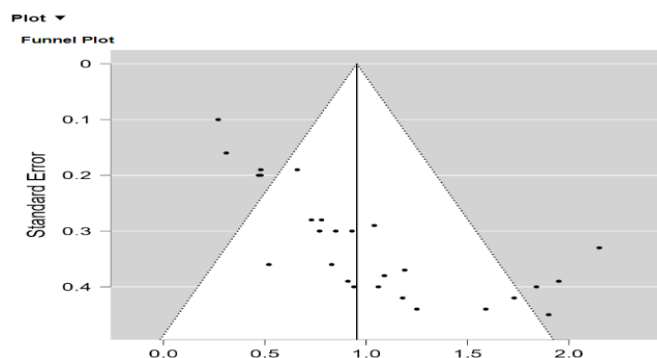


Figure 2. Funnel Plot

Based on Figure 2, the analysis of the funnel plot is not yet known whether it is symmetrical or asymmetrical, so it is necessary to conduct a Rosenthal Fail Safe N (FSN) test. The results of the Rosenthal Fail Safe N calculation can be seen in Table 4.

Tabel 4. Fail Safe N

File Drawer Analysis			
	Fail Safe N	Target Significance	Observed Significance
Rosenthal	2566	0.050	< 0.001

Based on Table 4, the Fail Safe N value of 2566 is greater than the value of $5k + 10 = 5(27) + 10 = 145$, so it can be concluded that the analysis of 27 effect sizes in this data is not biased by publication and can be scientifically accounted for. Next, calculate the p-value to test the hypothesis through the random effect model. The results of the summary effect model analysis with the random effect model can be seen in Table 5.

Tabel 5. Summary Effect Size

Coefficients						
	Estimates	Standard Error	z	p	95% Coefficient Interval	
					Lower	Upper
Intercept	0.954	0.102	9.352	< 0.01	0.754	1.540

Based on Table 5, the summary effect size value is 0.954 with a standard error of 0.102 and a 95% confidence level of 0.754 lower and 1.540 upper. This finding explains that the application of ethno-religious-based jigsaw model has a significant influence on students' critical thinking ability in learning Islamic religious education ($z = 9,352$; $p < 0.001$) with a high effect size category than conventional models.

This research is in line with Kusuma et al., (2023) The jigsaw model can encourage critical thinking skills in the learning process. These findings are in accordance with Saputra et al., (2019) The application of the jigsaw model can improve students' collaboration and critical thinking skills in learning Islamic religious education. The ethno-religious-based Jigsaw model is designed to blend the concept of cooperative learning with culturally and religiously relevant content. In this approach, students are divided into small groups that are each responsible for one piece of learning material. The use of ethno-religious values in this context provides an opportunity for students to explore the material in depth while connecting it to their everyday reality (Fitriana et al., 2023; Kusuma et al., 2023). This approach not only improves material understanding but also promotes intercultural dialogue, tolerance, and

respect for differences, all of which are essential elements in building critical thinking skills (Helmi et al., 2023).

Critical thinking skills involve analyzing, evaluating, and reflecting on information or situations. In the context of Islamic religious education, critical thinking helps students to internalize religious values in a more profound and relevant way. The ethno-religious-based Jigsaw model allows students to explore various points of view through group discussions, formulate logical arguments, and solve problems collaboratively (Dewanto et al., 2023; Yusriadi et al., 2023). This process encourages students to be more analytical, reflective, and creative in understanding the teachings of Islam, thereby creating holistic and transformative learning. The multicultural and religious context in Indonesia is an ideal background for the application of ethno-religious based jigsaw models (Triansyah et al., 2023). The diversity of ethnicities and religious beliefs in Indonesia provides opportunities for students to learn to understand each other in an inclusive atmosphere. By incorporating elements of local culture and Islamic values into learning, this model can create a more engaging and relevant learning atmosphere. In addition, this approach helps students to better understand the interconnection between religion and culture in their daily lives, thus reinforcing their religious identity (Mavengano & Mhute, 2023).

Furthermore, ethno-religious based Jigsaw models experienced significant improvements in critical thinking abilities compared to students who learned using traditional methods. This improvement is mainly seen in the aspects of analysis, synthesis, and evaluation capabilities (Wenzing et al., 2024). These findings support the importance of innovation in Islamic religious teaching methods to produce a generation that not only understands the teachings of the religion but is also able to apply them in the context of complex modern life (Yolida & Marpaung, 2023; Acho et al., 2023). To increase the effectiveness of Islamic religious learning in Indonesia, teachers and educators are advised to adopt the ethno-religious-based Jigsaw model more broadly. Training for teachers is also needed to ensure proper and maximum implementation. Furthermore, further research may explore the influence of this model in other contexts, such as general education or interfaith learning (Chen & Huang, 2024; Biletska, 2024). With an innovative and relevant approach, Islamic religious education can be a strong foundation in building a generation that thinks critically, is tolerant, and contributes positively to society (Yusriadi et al., 2023).

Conclusion

From the results of this study, it can be concluded that the effect size value obtained through the random effect model is 1,952 (high effect size category). These findings explain that on average, students who apply the ethno-religious-based jigsaw model are effective in improving students' critical thinking skills in learning Islam. This study provides important information on the use of the jigsaw model in the future. The application of the Ethno-Religious Based Jigsaw Model significantly improves students' critical thinking skills in learning Islamic Religious Education. This model provides a more interactive, collaborative, and relevant learning experience to the student's cultural and religious context. By integrating ethnic and religious values in the learning process, students are not only able to understand the material in depth, but also be more reflective, analytical, and creative in relating religious teachings to daily life. This proves that a contextual and culture-based approach can be an effective solution to the challenges in 21st century skill development. In addition, the implementation of this model also strengthens tolerance, respect for diversity, and cooperation between students, which is very relevant in the multicultural context of Indonesia. Therefore, the Ethno-Religious Based Jigsaw Model can be recommended as an effective teaching method to improve the quality of Islamic religious learning. The application of this model is expected to be part of educational innovations that not only strengthen the academic aspect, but also the character of students as religious, critical, and tolerant individuals. Further research is

recommended to explore the application of this model to education levels and other subjects to expand its benefits

Islamic Religious Education (PAI) teachers are advised to apply ethno-religious-based jigsaw models with structured and contextual steps. First, choose relevant learning materials, such as the story of the prophet, Islamic moral values, or local religious traditions, that reflect the wisdom of the local culture. Second, divide the material into several subtopics that can be studied by each group member independently. After that, use an ethno-religious approach to provide context, such as connecting learning with local Islamic cultural traditions, such as the tradition of tahlilan, thanksgiving, or the Prophet's birthday. Third, facilitate discussions between groups to share information from the subtopics that have been studied, so that each student gains a complete understanding. To increase effectiveness, teachers can utilize visual media or relevant local cultural artifacts to support learning. This approach not only strengthens students' understanding of religious material, but also builds a sense of pride in their cultural identity and beliefs.

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