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The Effect of the Jigsaw Cooperative Learning Model on Elementary Students' Learning Outcomes in Islamic Religious Education

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Abstract : This study aimed to examine the effect of the Jigsaw cooperative learning model on students' learning outcomes in Islamic Religious Education (PAI) at the elementary school level. The study employed a quantitative pre-experimental design using a one-group pretest–posttest approach. The sample consisted of 24 fourth-grade students selected through total sampling. Data were collected using a 20-item multiple-choice achievement test that had been validated through expert judgement and empirical testing. The instrument demonstrated high reliability with a Cronbach's Alpha coefficient of 0.82. Data were analysed using descriptive statistics, The Shapiro–Wilk normality test, the paired sample t-test, effect size (Cohen's d), and normalised gain (N-Gain). The results showed a significant improvement in students' learning outcomes, with the mean score increasing from 68.75 (SD = 7.11) in the pretest to 89.17 (SD = 7.76) in the posttest. The paired sample t-test revealed a statistically significant difference, $t(23) = 9.60$, $p < .001$. The effect size was enormous (Cohen's $d = 1.96$), indicating a strong practical impact of the intervention. Furthermore, the N-Gain score was 0.65, categorised as moderate-to-high improvement. These findings indicate that the Jigsaw cooperative learning model significantly and practically enhances students' cognitive learning outcomes and supports the implementation of student-centred learning in elementary Islamic Religious Education.

Keywords : Jigsaw Cooperative Learning Model, Learning Outcomes, Islamic Religious Education.

INTRODUCTION

Quality and inclusive education are a global agenda emphasised in the Sustainable Development Goals (SDGs), particularly in the fourth goal about Quality Education (Safitri et al., 2022). In the global context, various reports indicate that the main challenges of 21st-century education are not only access but also the quality of learning that can develop critical thinking, collaborative skills, and the character of learners. In Indonesia, the transformation of learning continues to be driven by the Merdeka Belajar policy, which emphasises active and student-centred learning (Awwaliyah & Baharun, 2019). However, classroom learning

practices are still largely dominated by conventional approaches focused on lectures and rote memorisation, resulting in low student engagement and learning outcomes (Yue, 2024).

Table 1. Comparison of Learning Paradigms

Learning Paradigm Comparison	**Conventional Model (Rote Learning)**	**Cooperative Model (Active Learning)**
Main Focus	Emphasis on knowledge transmission and content mastery (Awwaliyah & Baharun, 2019)	Emphasis on collaborative knowledge construction and shared understanding (Makhrus et al., 2024).
Student Role	Passive recipients of information with limited interaction (Fijriah et al., 2024).	Active participants and learning partners responsible for group outcomes (Jannah & Aisyah, 2021).
Interaction	Limited peer interaction; teacher-dominated communication (Adisel et al., 2022).	Positive interdependence and structured peer collaboration (Sari et al., 2024).
Learning Outcomes	Focus on memorization and short-term recall (Mahmudi et al., 2022).	Deep understanding and character development (Anjani, 2023).

In the learning of Islamic Religious Education (PAI), the challenge becomes more complex because PAI not only targets cognitive mastery but also the formation of religious character and noble morals. Research shows that learning outcomes in the cognitive domain according to Bloom's taxonomy require active learning strategies that can encourage analysis and synthesis (Mahmudi et al., 2022). However, several studies indicate that the learning outcomes of PAI in various educational institutions still fall into the moderate to low category due to a lack of innovative teaching models (Adisel et al., 2022; Taroh et al., 2023). This condition indicates the need for a pedagogical approach that can enhance interaction, individual responsibility, and collaboration among students.

The cooperative learning model, particularly the jigsaw type, is considered relevant to meet that need. The meta-analysis conducted by Nursalim et al. (2024) shows that the application of the Jigsaw model in PAI learning has a high effect size ($r = 1.952$) in enhancing students' critical thinking skills. This finding is supported by Makhrus et al. (2024), who reported that the Jigsaw model based on the flipped classroom significantly improves PAI students' critical thinking skills ($rRE = 1.026$; $p < 0.001$). Other empirical studies also show a significant improvement in PAI learning outcomes through quasi-experimental design, where the average score of the experimental class is higher than that of the control class (Santika & Sulaiman, 2023).

In addition to improving cognitive learning outcomes, the Jigsaw model also influences the social and emotional aspects of students. Research by Sari et al. (2024) shows that

cooperative learning in PAI contributes to the development of students' emotional intelligence and social interactions. In line with that, Taroh et al. (2023) found that the implementation of Jigsaw significantly increased students' active participation and learning completeness in PAI lessons. Theoretically, the framework of positive interdependence and individual accountability in Jigsaw enhances students' engagement, communication, and responsibility for their collective learning (Makhrus et al., 2024; Nursalim et al., 2024).

Although various studies have tested the effectiveness of the Jigsaw model in the context of PAI, most of the research was conducted at the junior high school and senior high school levels and used classroom action research (CAR) or quasi-experimental designs with a focus on improving the learning process (Santika & Sulaiman, 2023; Taroh et al., 2023). The existing meta-analytic studies predominantly emphasise critical thinking skills over cognitive learning outcomes, particularly at the elementary school level (Makhrus et al., 2024; Nursalim et al., 2024). There is still a limited amount of experimental quantitative research at the elementary school level, particularly in the fourth grade, that specifically tests the influence of the Jigsaw model on cognitive learning outcomes in Islamic Religious Education (PAI) using a comparative pretest-posttest design. This gap indicates the need for more focused research to examine the causal relationship between the use of the Jigsaw cooperative learning model and PAI learning outcomes in the context of elementary schools. Therefore, this study fills the empirical gap by examining the causal effect of the Jigsaw cooperative learning model on cognitive learning outcomes in Islamic Religious Education at the elementary school level using a quantitative pre-experimental design.

Based on this gap, this study aims to analyse the impact of using the Jigsaw cooperative learning model on the Islamic Religious Education learning outcomes of fourth-grade students at SDS Persis Matraman. Specifically, this study examines whether there is a significant difference in student learning outcomes before and after the implementation of the Jigsaw model. The proposed research hypothesis is H_0: there is no effect of using the Jigsaw cooperative learning model on PAI learning outcomes; and H_1: there is an effect of using the Jigsaw cooperative learning model on PAI learning outcomes. By referring to cooperative learning theory and cognitive learning outcome taxonomy, this research is expected to provide empirical contributions in strengthening the evidence of the Jigsaw model's effectiveness at the elementary school level, while also filling the gap in experimental quantitative research in the field of PAI. Additionally, the results of this study are expected to serve as a practical reference

for PAI teachers in developing more participatory learning strategies aimed at significantly improving students' learning outcomes.

RESEARCH METHOD

This research uses a quantitative approach with a pre-experimental design of the One Group Pretest–Posttest Design (O_1–X–O_2) type to test the effect of the Jigsaw type cooperative learning model on the Islamic Religious Education learning outcomes of elementary school students. The research population consists of all 24 students in the fourth grade of SDS Persis Matraman for the 2024/2025 academic year, and all of them were used as samples through saturated sampling techniques. The research was conducted in three stages: the administration of a pretest to measure students' initial abilities, the implementation of the Jigsaw learning model as the treatment, and the administration of a posttest to measure the improvement in learning outcomes after the intervention. The research instrument consisted of a multiple-choice test with 20 items based on the PAI curriculum competency indicators. The content validity was tested through expert judgment, while the empirical validity was analyzed using Pearson correlation, and all items were declared valid with r calculated > r table (0.404). The reliability test yielded a Cronbach's Alpha value of 0.82, indicating a high reliability category. The data were analyzed using descriptive statistics, the Shapiro–Wilk normality test, paired sample t-test at a significance level of 0.05, as well as effect size (Cohen's d) and normalized gain (N-Gain) calculations to measure the strength and effectiveness of learning outcome improvements.

RESULTS AND DISCUSSION

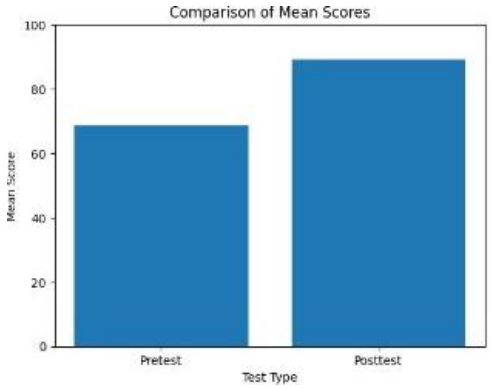
This research involves 24 fourth-grade students from SDS Persis Matraman. Data were obtained through pretests and posttests after the implementation of the Jigsaw-type cooperative learning model.

Table 2. Descriptive Statistics of Pretest and Posttest Scores

Description	Pretest	Posttest
Number of Students	24	24
Mean	68,75	89,17
Standard Deviation	7,11	7,76
Highest Score	75	100
Lowest Score	50	75

Table 2 shows an average increase of 20.42 points after the treatment. Additionally, the minimum score increased from 50 to 75, indicating that almost all students experienced an

improvement in their abilities. The relatively stable standard deviation indicates that the improvement occurred uniformly. The increase in the average pretest and posttest scores can be visualized in the following Graph 1.



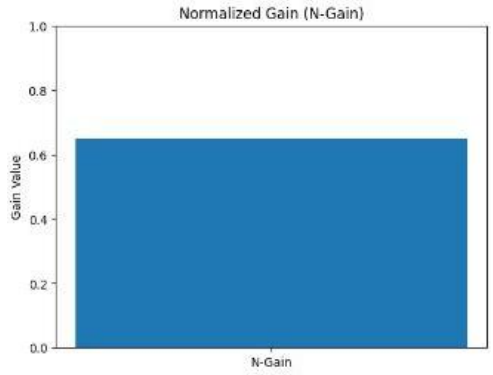
Graph 1. Comparison of Average Pretest and Posttest Scores

Graph 1 shows a significant increase from an average of 68.75 to 89.17 after the implementation of the Jigsaw model.

Table 3. Paired t-test Results

Description	Value
Sample Size (n)	24
Mean Difference	20,42
Standard Deviation of the Difference	10,42
t- value	9,60
Sig. (2-tailed)	0,000
Significance Level (α)	0,05

The test results show a significance value of 0.000 < 0.05, so H_0 is rejected and H_1 is accepted. This means that there is a significant effect of using the Jigsaw type cooperative learning model on students' PAI learning outcomes. The paired sample t-test resulted in t(23) = 9.60, p < .001, indicating a statistically significant difference between the pretest and posttest scores. The N-Gain value of 0.65 falls into the medium-high category. The visualization of the improvement is presented in Graph 2.



Graph 2. Normalized Gain Value (N-Gain)

Graph 2 shows the effectiveness of substantial learning improvement after the treatment was given. The research results show that the implementation of the jigsaw-type cooperative learning model significantly improves students' learning outcomes. The increase in the average score from 68.75 to 89.17 indicates a substantial improvement in conceptual understanding after the treatment was given. Theoretically, these findings support the concept of cooperative learning, which emphasises the importance of social interaction, individual responsibility, and positive interdependence within groups as the main factors in improving learning outcomes (Slavin, 2015). The jigsaw model allows students to become "experts" on certain parts of the material and then teach it back to their groupmates, resulting in a cognitive elaboration process that deepens understanding.

The findings of this study are also in line with the research results (Fachri & Rozi, 2023), which state that the one-group pretest–posttest design shows a significant improvement in literacy through an integrated learning approach. Similarly, Hayati et al. (2025) found that collaborative-based active learning significantly improved concept understanding among elementary school students. The similarity of these findings reinforces that student-centred learning strategies contribute positively to the improvement of learning outcomes. The relatively high improvement in this study may also be influenced by the relatively small number of students (24 students), allowing for optimal Jigsaw group division and easier control of discussion dynamics by the teacher. This study different from research conducted in large classes, where the effectiveness of the cooperative model is greatly influenced by classroom management and student readiness. The significance of the improvement in learning outcomes reflects that the Jigsaw instructional structure, through peer discourse activities, is capable of stimulating the internalisation of concepts at a deeper cognitive level. These findings provide empirical support for Slavin's (2015) theoretical framework, which positions positive interdependence among group members and individual accountability as fundamental pillars in achieving educational targets.

Practically, the results of this study imply that Islamic Religious Education teachers can integrate the Jigsaw model as an alternative learning strategy to improve student learning outcomes and engagement. From the theoretical contribution side, this research strengthens empirical evidence that cooperative learning is effectively applied at the elementary school level, particularly in the context of Islamic Religious Education (PAI) learning. The limitation of this study is the absence of a control group, making it impossible to directly compare it with other learning methods. In addition, the sample size was limited to one class, so the

generalisation of the results is still restricted. Therefore, subsequent research is recommended to use a quasi-experimental or pure experimental design with a control group and a larger sample size to strengthen the external validity of the study.

CONCLUSION

Based on the results of the data analysis, it can be concluded that the Jigsaw-type cooperative learning model has a significant impact on improving the Islamic Religious Education learning outcomes of fourth-grade elementary school students. The increase in the average score from 68.75 on the pretest to 89.17 on the posttest indicates a substantial improvement in cognitive abilities after the implementation of the learning model. The results of the paired sample t-test showed a statistically significant difference, $t(23) = 9.60$, $p < 0.001$; thus, the null hypothesis was rejected. In addition to being statistically significant, the strength of the effect is also classified as very large with a Cohen's d value of 1.96, indicating a strong practical impact of the learning intervention. The normalised gain (N-Gain) value of 0.65, which falls into the medium-high category, further confirms the effectiveness of the Jigsaw model in improving student learning outcomes. Practically, these findings support the implementation of student-centred learning in Islamic Religious Education at elementary schools. However, the limitations of the pre-experimental design without a control group and the small sample size necessitate careful interpretation of the results and encourage further research with a more robust experimental design.

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