Jurnal Inovasi Pendidikan Agama Islam
ISSN : 2809-1345 (Print)
ISSN : 2809-5359 (Online)
Program Studi Pendidikan Agama Islam
Pascasarjana UIN Sunan Gunung Djati Bandung
https://journal.uinsgd.ac.id/index.php/jipai jpai.uinsgd.ac.id

Comparative Effects of Think Pair Share and Think Pair Square on Critical Thinking in Qur'an-Hadith Education: The Role of Prior Islamic Schooling Background

Salsabila Mustopa[1]
[1,2,3,4,5]UIN Sunan Gunung Djati Bandung, Indonesia
Email: salsabilamustopa12@gmail.com
Tryana Hafilda[2]
Email: tryana.filda@gmail.com
Wati Susilawati[3]
Email: wati85@uinsgd.ac.id
Adam Malik[4]
Email: adammalik@uinsgd.ac.id
Andewi Suhartini[5]
Email: andewi.suhartini@uinsgd.ac.id

Abstract: Critical thinking is an essential competency in Islamic education, particularly in Qur'an-Hadith learning, as it supports students in interpreting religious texts reflectively and analytically. However, limited empirical studies have compared cooperative learning models while considering students' diverse prior educational backgrounds. This study aimed to examine the effects of Think Pair Share (TPS), Think Pair Square (TPSq), and conventional instruction on students' critical thinking skills, as well as the influence of prior educational backgrounds, including SMP, MTs, and Diniyah pesantren. A quantitative quasi-experimental design with a 3 × 3 factorial arrangement was applied to 62 eleventh-grade students from three intact classes at SMA Negeri 1 Kalijati. Critical thinking was measured using a validated 30-item instrument based on Ennis's framework (α = 0.899), and data were analyzed using two-way ANOVA and Bonferroni tests. The results showed that instructional model significantly affected critical thinking, with TPSq yielding the highest mean score, followed by TPS and conventional instruction. Prior educational background also had a significant effect, with Diniyah pesantren students outperforming MTs and SMP students. However, no interaction effect was found, indicating that TPSq was consistently effective across all groups. These findings contribute to Islamic education by demonstrating that structured cooperative learning enhances critical thinking in Qur'an-Hadith instruction regardless of students' prior educational experiences.

Keywords: Critical Thinking Skills; Prior Educational Background; Qur'an-Hadith Education; Think Pair Share; Think Pair Square.
DOI: https://doi.org/10.15575/jipai.v6i1.55829
Received: 02, 2026. Accepted: 05, 2026. Published: 06, 2026.

INTRODUCTION

Critical thinking is a fundamental competency that education should cultivate across subject areas, including religious instruction. In Qur'an-Hadith learning, it enables students not only to recognize verses and hadiths, but also to interpret their contextual meanings, evaluate religious arguments, and construct evidence-based conclusions (Fitriya et al., 2025). Ennis (2011) defines critical thinking as reflective and rational judgment about what to believe or do, which closely corresponds to the interpretive demands of Qur'anic and Hadith studies. Structured discussion-based learning can foster these capacities by promoting cognitive engagement, dialogue, and analytical participation (Lyman, 1981; Silva et al., 2022). In Islamic education, critical thinking supports deeper engagement with religious texts, while dialogic strategies improve the quality of student reasoning (Dalimunthe & Siregar, 2024; Ismail et al., 2024). Vygotsky (1978) additionally underscore the centrality of cognitive engagement in developing students' analytical dispositions within educational contexts.

Empirical evidence from international assessments and classroom-based studies consistently reveals that students in many school contexts continue to demonstrate limited critical thinking capacities, particularly in domains requiring interpretation and evidence-based argumentation (Inda, 2024). In Indonesian Qur'an-Hadith classrooms, learning often remains centered on teacher explanation, note-taking, and individual exercises, limiting opportunities to compare interpretations, evaluate claims, and formulate reasoned judgments. This condition highlights the need for more responsive and intellectually engaging instructional models in Islamic Religious Education (Hapriadi & Zain, 2024). Cooperative learning is particularly relevant because it promotes sustained analytical engagement beyond transmission-based instruction (Gillies, 2016). Interactive and inquiry-oriented strategies have also been shown to encourage analytical participation, contextual understanding, learning engagement, and conceptual reasoning in Islamic education (Gusrizal et al., 2024; Khoirunnisa et al., 2025; Tadesse et al., 2024).

Think Pair Share (TPS) and Think Pair Square (TPSq) offer structured cooperative approaches to address these challenges. TPS guides students through individual reflection, paired discussion, and class sharing, thereby improving the quality of subsequent argumentation (Kurjum et al., 2020; Sinaga et al., 2025; Sriyanda & Priyana, 2024). TPSq extends this process by combining two pairs into a four-member group, allowing broader comparison of claims and further refinement of conclusions. Previous studies show that TPS and TPSq can improve critical thinking, argumentation, conceptual understanding, cooperation, evaluative thinking, and achievement in Islamic education and other learning contexts (Nurkanti et al., 2024; Öztürk, 2023; Purwaningsih et al., 2025; Warsah et al., 2021). Nevertheless, this literature largely examines one

cooperative model at a time or assumes relatively homogeneous student populations (Zhang et al., 2025).

An important but underexplored issue is students' heterogeneous prior educational backgrounds. Students entering senior high school from SMP, MTs, and Diniyah pesantren differ in their familiarity with Arabic-Islamic terminology, Qur'anic vocabulary, and traditions of religious textual reasoning. Such differences may influence critical thinking performance and learning equity in academically diverse classrooms (Meijie Bi & Katrien Struyven, 2023; Silva et al., 2022). Therefore, Qur'an-Hadith instruction should consider not only the learning model used but also students' different academic starting points (Yu & Zin, 2023). Although prior research has examined cooperative learning and student diversity separately, limited empirical attention has been given to whether the effects of TPS and TPSq vary across students' prior educational backgrounds (Zeb et al., 2022).

This study addresses this gap by simultaneously examining TPS, TPSq, and conventional instruction in Qur'an-Hadith learning while treating prior educational background as a second analytical factor. Its contribution lies in providing a more differentiated understanding of cooperative learning by connecting instructional configuration with students' foundational religious academic preparation, two dimensions that Islamic education research has often considered separately (Zarkasyi et al., 2024). Accordingly, this study investigates: (1) whether critical thinking differs across instructional models; (2) whether it differs across SMP, MTs, and Diniyah pesantren backgrounds; and (3) whether the effect of instructional model varies according to prior educational background. By addressing these questions, the study provides empirical evidence for designing Qur'an-Hadith instruction that is collaborative, textually grounded, and responsive to heterogeneous classrooms (Amrullah et al., 2026). This approach also clarifies which instructional model is most effective for students with different educational experiences.

RESEARCH METHOD

This study employed a quantitative quasi-experimental design with a 3 × 3 factorial arrangement to examine differences in students' critical thinking in Qur'an-Hadith learning across instructional models and prior educational backgrounds. The first factor was instructional model: Think Pair Share (TPS), Think Pair Square (TPSq), and conventional instruction. The second factor was prior educational background: general junior high school (SMP), Islamic junior high school (MTs), and Diniyah pesantren. Critical thinking competency served as the dependent variable. A quantitative approach is appropriate for testing differences among variables using systematically collected numerical data (Creswell & Creswell, 2018). The quasi-experimental design was selected

because the treatments were administered to intact classes, making random assignment impractical and potentially disruptive to regular school instruction (Johnson & Johnson, 2014). Such designs are widely used to evaluate structured learning interventions and their effects on critical thinking outcomes in educational settings (Keramati et al., 2023; Khoirunnisa et al., 2025; King, 1992).

The study was conducted at SMA Negeri 1 Kalijati during the even semester of the 2025/2026 academic year. The site was selected because it enrolled students from all three educational backgrounds and permitted the implementation of different learning conditions across parallel classes without disrupting the curriculum. Participants were 62 eleventh-grade students from three intact classes selected purposively based on the availability of comparable groups: XI MIPA A (n = 20) received TPS, XI MIPA B (n = 20) received TPSq, and XI MIPA C (n = 22) received conventional instruction. The sample size was determined by the availability of comparable intact classes and the requirement that each of the nine factorial cells include at least six participants to permit the planned ANOVA comparison. Although a formal a priori power analysis was not conducted, cell sizes ranged from six to eight students and were considered adequate for this exploratory quasi-experimental design. Purposive sampling is appropriate in quasi-experimental school-based studies when group selection depends on the availability of intact classes (Imam et al., 2024). Participant distribution is presented in Table 1.

Table 1. Participant Distribution by Instructional Model and Educational Background

Instructional Model	Prior Educational Background	N
Think Pair Share	SMP	7
Think Pair Share	MTs	7
Think Pair Share	Pesantren Diniyah	6
Think Pair Square	SMP	7
Think Pair Square	MTs	6
Think Pair Square	Pesantren Diniyah	7
Konvensional	SMP	7
Konvensional	MTs	8
Konvensional	Pesantren Diniyah	7
Total		62

Source: Researcher-processed data, 2026.

The intervention was implemented using standardized lesson materials and procedures to maintain treatment fidelity. Before instruction, students' prior educational backgrounds were identified through school records, and the lesson materials and critical thinking test were developed based on Ennis's (2011) indicators. In the TPS class, students completed individual reflection,

paired discussion, and whole-class sharing. In the TPSq class, students completed individual reflection and paired discussion before two pairs were combined into a four-member group to compare, evaluate, and refine their responses. The conventional class received teacher explanation, question-and-answer activities, note-taking, and individual exercises. Following the treatment, all participants completed the same post-treatment critical thinking test.

The instrument was a 30-item critical thinking test on Qur'an-Hadith material designed to assess five sub-competencies: identifying problems, providing evidence-based reasons, analyzing arguments, drawing conclusions, and evaluating judgments (Ennis, 2011). Responses were scored using a four-level rubric: poor, fair, good, and very good. Content validity was reviewed by a qualified Qur'an-Hadith teacher and an Islamic education specialist. Empirical item validity was tested using Pearson Product-Moment correlation, producing item-total coefficients of 0.331–0.657, all above the critical value of 0.250 at $p < 0.05$. Internal consistency was high (Cronbach's alpha = 0.899), indicating that the instrument was reliable for comparative educational research (Hapriadi & Zain, 2024). The validity and reliability results are summarized in Table 2.

Table 2. Results of Instrument Validity and Reliability Testing

Testing Aspect	Result	Criterion	Decision
Item validity	item-total r = 0.331-0.657	r > critical r = 0.250	30 items valid
Validity significance	Sig. < 0.05	p < 0.05	All items significant
Reliability	Cronbach's alpha = 0.899	alpha > 0.70	Reliable and suitable
Number of items	30	-	All items used
Number of pilot respondents	62	-	Adequate for instrument testing

Source: Researcher-processed data, 2026.

Data were collected through the post-treatment critical thinking test and school documentation. Documentation provided information on class membership, student numbers, and prior educational backgrounds, while all student identities were anonymized. Data were analyzed using IBM SPSS Statistics version 26. Descriptive statistics summarized group means, standard deviations, and score distributions. Normality and homogeneity tests were conducted before inferential analysis. A two-way ANOVA was used to test the effects of instructional model, prior educational background, and their interaction on critical thinking scores. Factorial ANOVA is appropriate for examining mean differences across two factors and identifying interaction

effects (Field, 2018). Significant effects were followed by Bonferroni post hoc tests at the 0.05 significance level.

RESEARCH RESULT AND DISCUSSION

Research Result

This study examined differences in students' critical thinking according to instructional model and prior educational background. Before hypothesis testing, the data met the assumptions for two-way ANOVA. The Kolmogorov-Smirnov test yielded a significance value of 0.074, and the Shapiro-Wilk test yielded 0.129; both exceeded 0.05, indicating normally distributed residuals. Levene's test also produced significance values above 0.05 across the mean, median, adjusted median, and trimmed mean bases, indicating homogeneous variances. Therefore, the data were suitable for two-way ANOVA. Complete assumption-test results are presented in Table 3.

Table 3. Results of Normality and Homogeneity of Variance Tests

Type of Test	Variable/Basis of Test	Statistic/ Levene Statistic	df/df1	df2	Sig.
Kolmogorov-Smirnov normality test	Standardized residual for KBKr_QH score	0.107	62	-	0.074
Shapiro-Wilk normality test	Standardized residual for KBKr_QH score	0.970	62	-	0.129
Levene homogeneity test	Based on Mean	1.254	8	53	0.287
Levene homogeneity test	Based on Median	0.549	8	53	0.814
Levene homogeneity test	Based on Median with adjusted df	0.549	8	35.509	0.812
Levene homogeneity test	Based on trimmed mean	1.250	8	53	0.289

Source: Researcher-processed data, 2026.

Descriptive statistics showed differences in critical thinking scores across instructional models and prior educational backgrounds. TPSq produced the highest mean score (M = 70.05, N = 20), followed by TPS (M = 65.80, N = 20) and conventional instruction (M = 60.82, N = 22). By educational background, Diniyah pesantren students obtained the highest mean score (M = 70.35, N = 20), followed by MTs students (M = 65.24, N = 21) and SMP students (M = 60.86, N = 21). These results are summarized in Table 4 and illustrated in Figures 1 and 2.

Table 4. Critical Thinking Means by Model and Educational Background

Factor	Group	Mean	N
Instructional Model	Think Pair Square	70.05	20
Instructional Model	Think Pair Share	65.80	20
Instructional Model	Conventional instruction	60.82	22
Prior Educational Background	Diniyah pesantren	70.35	20
Prior Educational Background	MTs	65.24	21
Prior Educational Background	SMP	60.86	21

Source: Researcher-processed data, 2026.

Differences in mean scores by instructional model are illustrated in Figure 1. The figure clarifies the relative position of each instructional model: Think Pair Square shows the highest mean score, Think Pair Share occupies an intermediate position, and conventional instruction records the lowest mean score.

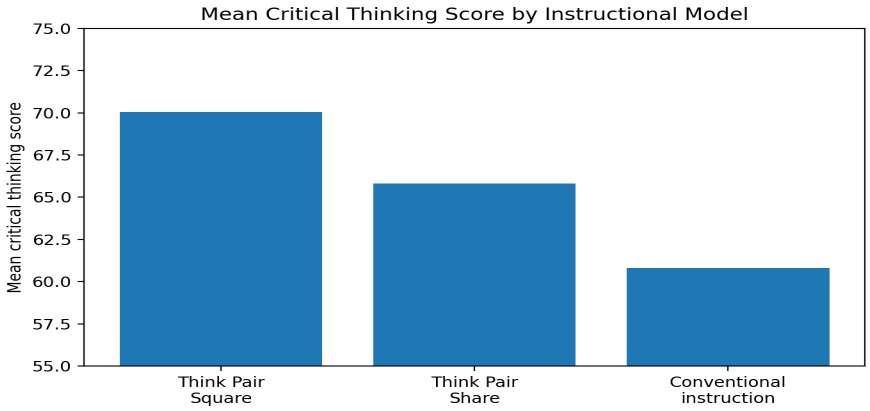


Figure 1. Mean Critical Thinking Scores by Instructional Model

Source: Researcher-processed data, 2026.

Descriptive findings suggest that prior educational background shapes readiness for Qur'an-Hadith learning. Higher scores among Diniyah pesantren students may reflect greater exposure to religious texts and dalil-based

discussion, whereas MTs students showed intermediate performance and SMP students may need more explicit scaffolding. These differences reflect prior learning opportunities rather than inherent critical-thinking ability.

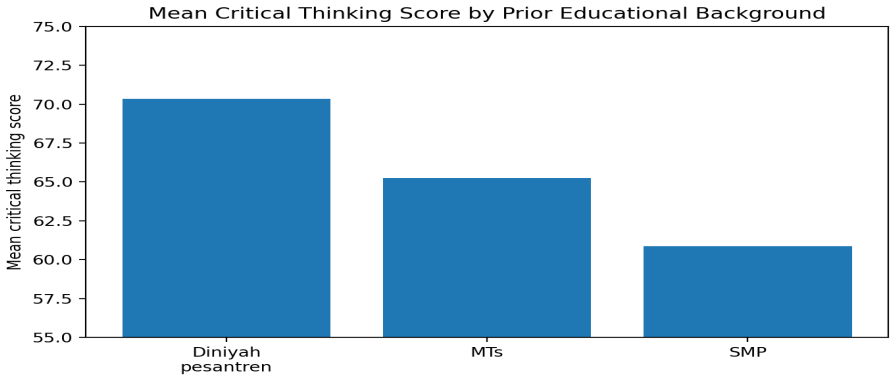


Figure 2. Mean Critical Thinking Scores by Prior Educational Background

Source: Researcher-processed data, 2026.

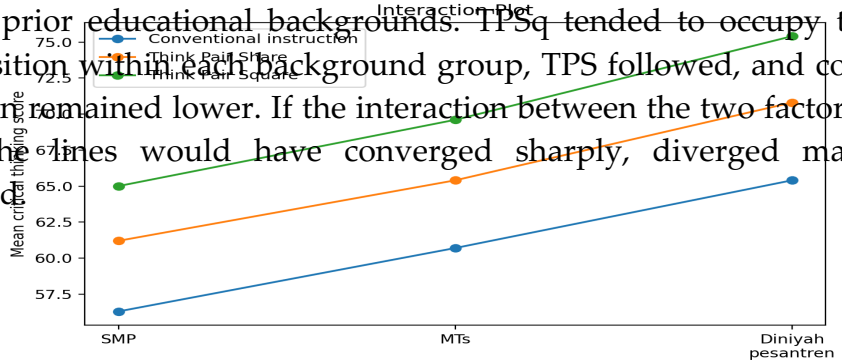
Two-way ANOVA revealed significant main effects of instructional model and prior educational background on critical thinking. Instructional model had a significant effect, $F = 68.786$, $p < 0.001$, partial $\eta^2 = 0.72$, indicating a large effect. Prior educational background was also significant, $F = 70.782$, $p < 0.001$, partial $\eta^2 = 0.73$, likewise indicating a large effect. However, the interaction between instructional model and prior educational background was not significant, $F = 0.006$, $p = 1.000$, partial $\eta^2 < 0.001$. Thus, the effect of instructional model did not differ significantly across educational-background groups. The ANOVA results are presented in Table 5 and Figure 3.

Table 5. Summary of Two-Way ANOVA Results

Source of Variation	F	Sig.	Decision
Instructional Model	68.786	<0.001	Significant
Prior Educational Background	70.782	<0.001	Significant
Instructional Model × Prior Educational Background	0.006	1.000	Not significant

Source: Researcher-processed data, 2026.

In the interaction graph, the lines representing the instructional models appear relatively parallel. This pattern indicates that there was no marked change in the effect of the instructional model when it was examined across different prior educational backgrounds. TPSq tended to occupy the highest mean position within each background group, TPS followed, and conventional instruction remained lower. If the interaction between the two factors had been strong, the lines would have converged sharply, diverged markedly, or intersected.



Source: Researcher-processed data, 2026.

Figure 3. Interaction between Instructional Model and Prior Educational Background

Bonferroni post hoc comparisons showed that TPSq significantly outperformed TPS (mean difference = 4.25, $p < 0.001$) and conventional instruction (mean difference = 9.23, $p < 0.001$). TPS also significantly outperformed conventional instruction (mean difference = 4.98, $p < 0.001$). For prior educational background, Diniyah pesantren students scored significantly higher than SMP students (mean difference = 9.49, $p < 0.001$) and MTs students (mean difference = 5.11, $p < 0.001$), while MTs students scored significantly higher than SMP students (mean difference = 4.38, $p < 0.001$). Detailed comparisons are reported in Table 6.

Table 6. Summary of Bonferroni Post Hoc Comparisons

Factor	Comparison	Mean Difference	Sig.	Decision
Instructional Model	TPSq - TPS	4.25	<0.001	Significantly different
Instructional Model	TPS - Conventional	4.98	<0.001	Significantly different
Instructional Model	TPSq - Conventional	9.23	<0.001	Significantly different
Prior Educational Background	MTs – SMP	4.38	<0.001	Significantly different
Prior Educational Background	Diniyah pesantren – SMP	9.49	<0.001	Significantly different
Prior Educational Background	Diniyah pesantren – MTs	5.11	<0.001	Significantly different

Source: Researcher-processed data, 2026.

Discussion

TPSq produced the strongest critical thinking outcomes, followed by TPS and conventional instruction. By integrating individual reflection, paired discussion, and four-member group deliberation, TPSq enables students to

formulate initial responses, compare interpretations, evaluate reasons, and refine conclusions. This sequence reflects critical thinking as purposeful reflective judgment based on evaluating reasons and determining warranted conclusions (Alhaq et al., 2022). Meta-analytic evidence similarly indicates that collaborative learning promotes critical thinking by requiring learners to exchange ideas, evaluate arguments, and revise understanding through peer interaction (Ramdani et al., 2022; Yuliany et al., 2020).

In Qur'an-Hadith learning, this structure is particularly important because students must move beyond recalling texts to interpreting verses and hadiths, relating textual evidence to context, and constructing defensible conclusions. The present study extends previous evidence by demonstrating that TPSq supports not only classroom participation but also evidence-based religious reasoning in Islamic education (Gusrizal et al., 2024; Hasanah et al., 2024; Supena et al., 2021). Cooperative structures that combine individual preparation with layered peer interaction are more effective than conventional instruction in developing inference, analysis, and argumentation (Hamengkubuwono et al., 2022).

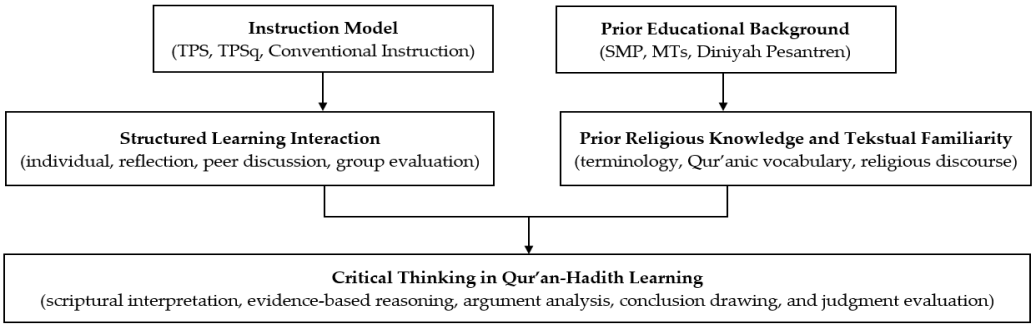
The finding can also be interpreted through sociocultural learning theory, which views knowledge construction as mediated through social interaction (Ary et al., 2018). In TPSq, students with different levels of familiarity with religious terminology and textual interpretation exchange perspectives, justify claims, and negotiate conclusions. This process reflects key cooperative-learning principles: individual accountability during the thinking stage, promotive interaction during discussion, and group processing during collective evaluation (Bostrom et al., 2024). Extended cooperative interaction may deepen reasoning by exposing students to a broader range of perspectives than pair discussion alone (Loes & Pascarella, 2017). Cooperative learning is particularly effective when it combines individual responsibility with shared knowledge construction among academically diverse learners (Zhou & Colomer, 2024).

TPS also produced significantly higher scores than conventional instruction, confirming that a simpler cooperative structure can strengthen critical thinking. Individual reflection allows students to organize preliminary ideas, while paired discussion provides a setting for testing and articulating them. However, TPSq yielded stronger outcomes because its additional small-group stage provides further opportunities to compare evidence and revise interpretations. This suggests that the depth of peer interaction, rather than participation alone, is important for Qur'an-Hadith tasks requiring interpretation and argument-based justification (Field, 2018; Fraenkel, 2019). The additional group-level review in TPSq appears to produce incremental analytical benefit when the learning task requires scriptural interpretation and

evidence-based justification. Conventional instruction produced the lowest mean score. This does not mean that teacher explanation is unimportant. Direct instruction remains necessary for introducing unfamiliar Qur'an-Hadith concepts, clarifying terminology, and reducing the risk of misinterpretation (Dwi & Utomo, 2022). However, when learning is dominated by explanation, note-taking, and individual exercises, students have fewer opportunities to generate, test, and revise their own arguments. Qur'an-Hadith instruction should therefore move beyond content retention toward contextually grounded and reflective analysis (Leung et al., 2023).

Prior educational background also significantly influenced critical thinking. Students from Diniyah pesantren backgrounds obtained the highest scores, followed by MTs and SMP students. This pattern is consistent with meaningful learning theory, which emphasizes that prior knowledge shapes the quality of new learning (Cohen, 2018). Greater familiarity with dalil, Arabic-Islamic terminology, and religious discourse may provide stronger foundations for textual interpretation and normative argumentation. Educational background should therefore be understood as a proxy for differences in prior learning opportunities rather than as an indicator of fixed cognitive ability (Ausubel, 1968; Meijie Bi & Katrien Struyven, 2023).

The nonsignificant interaction indicates that instructional model and prior educational background contributed independently to critical thinking performance. TPSq remained the most effective model across SMP, MTs, and Diniyah pesantren groups, while background-related differences remained relatively stable across instructional conditions. This finding suggests that well-structured cooperative learning can support diverse learners without requiring homogeneous prior knowledge (Yu & Zin, 2023). Nevertheless, differentiated support remains important. Students from SMP backgrounds may benefit from explicit scaffolding in scriptural vocabulary, argument structure, and evidence-based reasoning, whereas those from MTs and Diniyah pesantren backgrounds can be challenged through more complex interpretive prompts. Differentiated instructional support aligned with students' prior learning profiles can improve equity in heterogeneous classrooms (Gebremariam et al., 2023; Goyibova et al., 2025). Figure 4 summarizes the conceptual relationship identified in this study. Instructional model and prior educational background independently contributed to critical thinking, while TPSq provided the strongest structured peer-reasoning process across all educational-background groups.



Note: Instructional model and prior educational background independently influenced critical thinking. The nonsignificant interaction indicates that the relative effectiveness of TPSq was consistent across educational-background groups.

Figure 4. Conceptual Relationship between Cooperative Learning, Prior Educational Background, and Critical Thinking in Qur'an-Hadith Learning

These findings should be interpreted cautiously because the study involved one school, intact classes, and post-treatment scores, limiting causal inference and generalizability. The absence of classroom discourse data also limits understanding of how reasoning developed during TPSq activities. Future research should involve larger multi-school samples, longitudinal and mixed-method designs, and analyses of student dialogue, written arguments, and teacher scaffolding.

CONCLUSION AND IMPLICATION

Conclusion

This study examined whether students' critical thinking in Qur'an-Hadith learning differed by instructional model, prior educational background, and the interaction between both factors. The findings show that TPSq provided stronger support for critical thinking than TPS and conventional instruction, with a large instructional effect (partial $\eta^2 = 0.72$). Prior educational background also influenced students' performance, whereas the nonsignificant interaction indicates that the effectiveness of TPSq was stable across students from SMP, MTs, and Diniyah pesantren backgrounds.

The study contributes to Qur'an-Hadith pedagogy by demonstrating that cooperative learning is most effective when it structures reasoning through individual reflection, paired discussion, and small-group evaluation. TPSq therefore supports more than classroom participation; it enables students to interpret scriptural texts, evaluate evidence, construct arguments, and formulate defensible conclusions. Although differences in prior religious learning shape students' initial readiness, they do not prevent learners from benefiting from carefully structured cooperative instruction. Thus, TPSq offers a meaningful pedagogical strategy for strengthening critical reasoning in heterogeneous Qur'an-Hadith classrooms.

Implication

Qur'an-Hadith teachers should implement TPSq as a structured reasoning strategy rather than merely as a group activity. Prompts should require scriptural interpretation, evidence evaluation, argument construction,

and justified conclusions. Students from SMP backgrounds may need scaffolding in religious vocabulary and argument structure, whereas those from MTs and Diniyah pesantren backgrounds can be challenged through more complex interpretive tasks. Teachers should also monitor discussions to ensure that students critically examine peers' arguments rather than exchange superficial responses.

These findings should be interpreted cautiously because the study involved one school, intact classes, and post-treatment scores without a pretest or longitudinal measurement. Future research should use larger multi-school samples, longitudinal and mixed-method designs, and analyses of student dialogue, written arguments, and teacher scaffolding. Overall, TPSq offers a meaningful cooperative-learning strategy for strengthening critical reasoning, scriptural interpretation, and evidence-based judgment in Islamic education.

ACKNOWLEDGMENTS

The author would like to thank SMA Negeri 1 Kalijati, the Islamic Religious Education teacher, and all participating eleventh-grade students for their support and cooperation during the research process.

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