

## A Quasi-Experimental Study: Integrating To'dopuli Mandar into Debate Camp for the Development of Senior High School Students' Critical Thinking Skills

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### ABSTRACT

*Critical thinking is a core twenty-first-century competency essential for addressing complex global challenges. However, PISA 2022 results indicate that Indonesian students' critical thinking skills remain relatively low, partly due to teacher-centered and less contextualized learning practices. This study examines the effectiveness of a To'dopuli Mandar-based Debate Camp model in enhancing students' critical thinking skills. A quantitative approach was employed using a quasi-experimental pretest–posttest nonequivalent control group design involving two eleventh-grade classes at SMAN 2 Majene. Data were collected through a validated critical thinking test and analyzed using the Shapiro–Wilk test, Mann–Whitney U test, and N-Gain analysis. The results show a statistically significant difference between the experimental and control groups ( $p < 0.001$ ), with an N-Gain score of 0.49, indicating a moderate level of improvement. These findings suggest that while the model effectively enhances critical thinking development, the development of higher-order thinking skills remains gradual and requires sustained instructional support. This study highlights that the effectiveness of debate-based learning should be understood not only in terms of measurable improvement but also in relation to the depth and progression of cognitive*

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### 1. Introduction

The persistent failure to develop students' critical thinking skills has become a pressing concern in contemporary education, particularly in systems striving to meet the demands of twenty-first-century learning. In Indonesia, this issue is not only evident but increasingly alarming. The 2022 Programme for International Student Assessment (PISA) reported that Indonesian students achieved a mean score of 385, significantly below the OECD average of 472 (OECD, 2023). This gap reflects not merely a disparity in performance but a structural limitation in how learning environments are designed, where students are insufficiently engaged in analytical reasoning, argumentation, and reflective thinking. If left unaddressed, this condition risks producing learners who are unable to critically engage with complex information in both academic and real-world contexts.

One of the underlying causes of this condition lies in the persistence of teacher-centered instructional practices that continue to dominate classroom interaction. Such approaches restrict students' opportunities to construct arguments, evaluate evidence, and participate in meaningful academic discourse, thereby positioning them as passive recipients rather than active constructors of knowledge (Weda et al., 2021; Prihandoko et al., 2021; Andini et al., 2026; Anggawirya et al., 2021). This highlights the urgent need for instructional models that shift learning from transmissive practices toward dialogic and student-centered engagement capable of fostering higher-order thinking.

Debate-based learning has been widely recognized as a promising pedagogical strategy for promoting critical thinking through structured argumentation and reflective dialogue. Empirical evidence indicates that debate enhances students' ability to analyze information, construct logical arguments, and engage in reasoned discussion (Rahman & Almazova, 2021; Dong et al., 2019). However, this body of research largely conceptualizes debate as a cognitive intervention, with limited attention to the socio-cultural conditions that shape students' participation and interaction in learning processes.

While prior studies consistently confirm the effectiveness of debate-based learning in enhancing critical thinking, they predominantly operate within cognitive frameworks that emphasize argumentation skills and logical reasoning. In contrast, research on culturally responsive pedagogy demonstrates that students' engagement is significantly influenced by socio-cultural norms, including patterns of interaction, authority relations, and communication styles (Zhou, 2023; Claramita et al., 2022). These two strands of research, however, have developed in parallel rather than in integration. Debate-based learning presupposes active participation and open argumentation, whereas cultural contexts—particularly those characterized by hierarchical interaction—may constrain such engagement. This reveals a conceptual gap in understanding how critical thinking is shaped not only by instructional strategies but also by the socio-cultural environments in which those strategies are enacted.

In the Indonesian context, hierarchical communication patterns often discourage students from expressing opinions, questioning ideas, or engaging in critical dialogue. As a result, even cognitively robust instructional strategies may not achieve optimal outcomes if they are not aligned with the cultural dynamics of the classroom. This indicates that enhancing critical thinking requires not only effective pedagogical techniques but also the integration of cultural frameworks that support student participation and interaction.

Culturally responsive pedagogy provides a relevant framework for addressing this issue by integrating local cultural values into instructional design. This approach conceptualizes learning as both a cognitive and socio-cultural process shaped by interaction, identity, and context (Zhou, 2023). Within the Mandar cultural context, the concept of *To'dopuli Mandar* is not merely a set of cultural values but a pedagogically reconstructed framework derived from core social principles, namely *sipamandaq* (respect for differences), *sipakatau* (humanizing others), and *siwaliparri'* (collaborative responsibility).

In this study, these values are systematically operationalized within the Debate Camp structure, encompassing pre-debate exploration, structured argumentation during debate sessions, and post-debate reflective activities. Through this design, *To'dopuli Mandar* functions as an interactional and pedagogical mechanism that regulates how students construct arguments, engage with opposing viewpoints, and collaborate in knowledge-building processes. Specifically, *sipamandaq* guides respectful argumentation, *siwaliparri'* structures collaborative reasoning within teams, and *sipakatau* shapes empathetic and ethical engagement in responding to opposing arguments. By embedding these values into the learning process, the model facilitates the development of critical thinking as both a cognitive and socially situated practice.

Despite the theoretical compatibility between debate-based learning and culturally grounded pedagogy, empirical research integrating these dimensions remains limited. Existing studies have examined debate as a cognitive strategy and local culture as a contextual enhancer of engagement, but few have systematically investigated how cultural values can be operationalized as functional components of instructional design to influence critical thinking outcomes. This indicates a gap in the literature concerning the integration of cognitive and socio-cultural dimensions within structured pedagogical models.

Based on this gap, the problem addressed in this study is the limited effectiveness of debate-based learning when implemented without integrating the cultural context that shapes students' interaction and engagement in the classroom. To address this problem, this study proposes a Debate Camp Based–*To'dopuli Mandar* model as an instructional approach that integrates structured debate activities with Mandar cultural values. The study employs a quantitative quasi-experimental design with a pretest–posttest nonequivalent control group to examine the effectiveness of the model.

This study aims to examine the effect of the *To'dopuli Mandar* Debate Camp on students' critical thinking skills. Accordingly, it is guided by the following research question: to what extent does the *To'dopuli Mandar* Debate Camp significantly improve students' critical thinking skills?. The novelty of this study lies in its systematic integration of local cultural values into a structured debate-based instructional model, thereby extending existing research by positioning critical thinking not only as a cognitive outcome but also as a process shaped by socio-cultural interaction.

## 2. Methodology

This study employed a quantitative approach using a quasi-experimental pretest–posttest nonequivalent control group design to examine the effectiveness of the *To'dopuli Mandar* Debate Camp in enhancing Grade 11 students' critical thinking skills. The quasi-experimental design was selected because the study was conducted in intact classroom settings where random assignment of individual students was not feasible; however, this design still enabled comparison between experimental and control groups to determine the causal impact of the intervention. The research was conducted at a public senior high school in West Sulawesi, Indonesia, with institutional anonymity maintained. The population consisted

of all Grade 11 students enrolled in the academic year. Two intact classes were selected through simple random sampling at the class level, resulting in an experimental group ( $n = 30$ ) and a control group ( $n = 30$ ), for a total of 60 participants. The inclusion criteria required students to be actively enrolled in Grade 11 and regularly participating in classroom activities. Prior academic records and preliminary classroom observations indicated that both groups possessed comparable academic characteristics before the intervention.

Data were collected using three instruments aligned with the cognitive and cultural objectives of the study. The first instrument was a critical thinking test adapted from Hildenbrand and Schultz (2012), designed to measure students' abilities in analysis, reasoning, and evaluation. Content validity was established through expert judgment involving specialists in educational assessment and English language education to ensure alignment with critical thinking indicators and curriculum standards. Reliability was examined using internal consistency analysis prior to implementation, yielding a Cronbach's Alpha coefficient exceeding the acceptable threshold ( $\alpha > 0.70$ ), indicating satisfactory reliability. The second instrument was an observation checklist used to assess the enactment of To'dopuli Mandar values, *sipamandaq* (mutual respect), *siwaliparri* (collaboration), and *sipakatau* (empathy and courtesy) during debate activities. Construct validity of the checklist was confirmed through expert review to ensure that each indicator accurately represented the intended cultural dimensions. The third instrument was a student perception questionnaire adapted from Pelarca et al. (2024) to measure engagement, perceived learning benefits, and cultural relevance of the instructional model. This instrument also underwent content validation and reliability testing, demonstrating acceptable internal consistency ( $\alpha > 0.70$ ).

The intervention was conducted over eight weeks and followed a structured procedure. The study began with preliminary classroom observations and the administration of a pretest to both groups. The experimental group then participated in six structured Debate Camp sessions grounded in To'dopuli Mandar principles, while the control group received conventional instruction during the same period. At the conclusion of the intervention, a posttest was administered to both groups, followed by distribution of the perception questionnaire to the experimental group. To ensure consistency and methodological rigor, standardized lesson plans were implemented, and classroom procedures were documented systematically throughout the research process.

Data analysis was conducted in several stages. Descriptive statistics, including mean, minimum, maximum, and standard deviation, were calculated to summarize students' performance and perceptions. The Shapiro–Wilk test was used to assess the normality of the data distribution. Because several datasets did not meet parametric assumptions ( $p < 0.05$ ), the non-parametric Mann–Whitney U test was applied to compare posttest scores between the experimental and control groups. Learning gains were calculated using the N-Gain formula (Hake, 1999) to determine the magnitude of improvement in students' critical thinking skills. Questionnaire responses were analyzed using mean score interpretation based on predetermined perception categories. All statistical analyses were performed using SPSS software with a significance level set at 0.05.

Ethical considerations were strictly observed throughout the study. Ethical approval was obtained from the school administration prior to data collection. Students participated voluntarily and provided informed consent after receiving a clear explanation of the research objectives, procedures, and their rights as participants. They were informed of their right to withdraw from the study at any time without penalty. Confidentiality and anonymity were maintained by coding participant data and securely storing research records. The intervention was conducted in a culturally respectful manner, ensuring fairness, inclusivity, and the well-being of all participants.

### 3. Results and Discussion

#### 3.1 Findings

##### 3.1.1. Students' Critical Thinking Performance

To examine the effectiveness of the Debate Camp Based–To'dopuli Mandar, students' critical thinking performance was analyzed using pretest and posttest scores, followed by N-Gain analysis.

**Table 1. Mean Scores of Pretest and Posttest**

| Group        | Pretest Mean | Posttest Mean | Gain   |
|--------------|--------------|---------------|--------|
| Experimental | 17.27        | 57.57         | +40.30 |
| Control      | 17.13        | 18.60         | +1.47  |

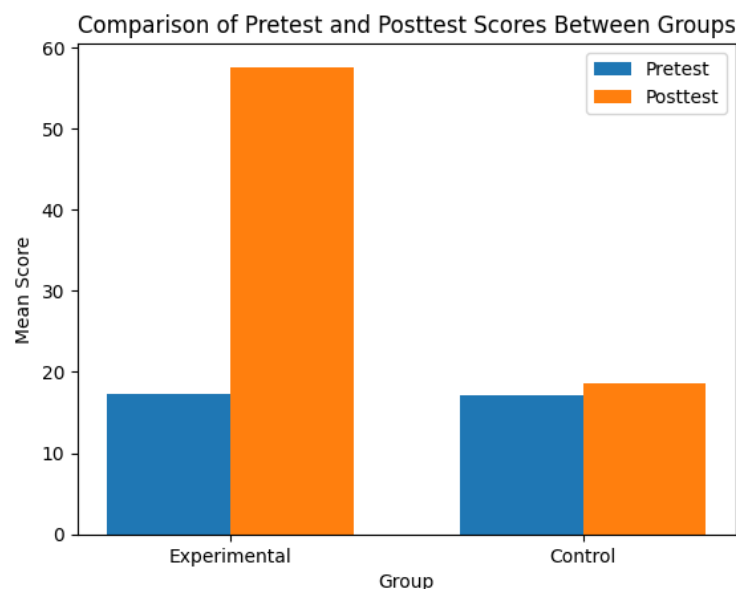
As presented in Table 1, both the experimental and control groups demonstrated comparable baseline performance, indicating that the initial levels of students' critical thinking were relatively equivalent. This comparability provides a valid basis for examining the impact of the instructional intervention on subsequent learning outcomes.

Following the implementation of the Debate Camp Based–To'dopuli Mandar, the experimental group showed a substantial increase in posttest scores. This pattern suggests that the learning model created conditions that facilitated deeper cognitive engagement, particularly in terms of analyzing arguments, evaluating evidence, and constructing reasoned responses.

The magnitude of improvement indicates that students were not merely engaging in surface-level learning, but were actively involved in higher-order thinking processes. The structured nature of the debate activities appears to have encouraged students to articulate ideas more systematically, respond to opposing viewpoints, and refine their reasoning through interaction.

This finding highlights the role of debate as an epistemic learning activity, in which students are positioned as active participants in knowledge construction rather than passive recipients of information. In this context, the integration of structured argumentation within the learning process supports the development of critical thinking as an analytical and reflective practice.

Taken together, the results presented in Table 1 indicate that the Debate Camp Based–To'dopuli Mandar provides an effective instructional environment for fostering students' critical thinking skills through active engagement and dialogic interaction.



**Figure 1. Comparison of Pretest and Posttest Mean Scores between Experimental and Control Groups**

Figure 1 visually illustrates the distribution of students' pretest and posttest scores across the experimental and control groups. As shown in the figure, both groups began with relatively similar mean pretest scores, with 17.27 for the experimental group and 17.13 for the control group, indicating comparable initial levels of critical thinking ability. Following the intervention, the experimental group demonstrated a substantial increase in the mean posttest score from 17.27 to 57.57, whereas the control group showed only a slight increase from 17.13 to 18.60. This contrast highlights the extent to which the instructional treatment was associated with improved critical thinking performance.

From an analytical perspective, the figure reinforces the descriptive findings presented in Table 1 by providing a visual representation of the magnitude and direction of change. The experimental group showed a mean increase of 40.30 points, compared with only 1.47 points in the control group. This substantial difference suggests that students in the experimental group experienced a meaningful improvement in their ability to engage in higher-order thinking tasks, including reasoning, argumentation, and evaluation.

Importantly, the difference between the pretest and posttest scores in the experimental group indicates a substantial pattern of improvement following the intervention. However, the extent to which this improvement reflects learning gains

is further examined through the N-Gain analysis. Overall, Figure 1 complements the statistical findings by visually demonstrating the difference in pretest and posttest performance between the two groups.

**Table 2. N-Gain Score Analysis**

| Indicator | Minimum | Maximum | Mean | Category |
|-----------|---------|---------|------|----------|
| N-Gain    | 0.19    | 0.80    | 0.49 | Moderate |

As presented in Table 2, the mean N-Gain score was 0.49, with individual scores ranging from 0.19 to 0.80. Based on the classification proposed by Hake (1999), the mean N-Gain of 0.49 falls within the moderate improvement category. This result is consistent with the increase in the experimental group's mean critical thinking score from 17.27 in the pretest to 57.57 in the posttest, representing a mean increase of 40.30 points. These findings indicate that the Debate Camp Based-To'dopuli Mandar was associated with a meaningful improvement in students' critical thinking performance, although the magnitude of improvement remained moderate.

Within the N-Gain framework, the observed mean gain of 0.49 suggests that students improved in key dimensions of critical thinking, such as analysis, evaluation, and reasoning, as measured by the adapted instrument. At the same time, the range of N-Gain scores (0.19–0.80) indicates variation in students' learning gains, suggesting that the intervention did not produce identical levels of improvement among all participants.

The moderate N-Gain also implies that the development of critical thinking skills remained partial and progressive. Therefore, although the experimental group demonstrated a substantial increase in mean scores, longer-term implementation and sustained engagement with cognitively demanding activities may be needed to further strengthen students' critical thinking skills.

Overall, the N-Gain results provide quantitative evidence of meaningful improvement in students' critical thinking performance, with a mean gain of 0.49 following the implementation of the Debate Camp Based-To'dopuli Mandar.

### 3.1.2. Inferential Analysis of Critical Thinking Performance

To determine whether the observed differences in posttest scores reflect a statistically meaningful effect, inferential analysis was conducted using the Mann–Whitney U test.

**Table 3. Mann–Whitney U Test Results**

| Test                | p-value | Interpretation            |
|---------------------|---------|---------------------------|
| Mann–Whitney U Test | <0.001  | Statistically significant |

As presented in Table 3, the test yielded a p-value of <0.001, which is below the significance level of 0.05, indicating a statistically significant difference between the two groups. The inferential result is consistent with the descriptive findings. The experimental group's mean score increased from 17.27 in the pretest to 57.57 in the posttest, representing a gain of 40.30 points. In contrast, the control group increased only from 17.13 to 18.60, with a gain of 1.47 points. The substantially larger increase in the experimental group, together with the Mann–Whitney U test result of  $p < 0.001$ , indicates that the difference in posttest performance between the two groups was statistically significant.

The use of the Mann–Whitney U test was appropriate because the Shapiro–Wilk test indicated that the data did not meet the assumptions for parametric analysis. The Mann–Whitney U test therefore provided a non-parametric comparison of posttest scores between the two groups.

However, statistical significance alone does not indicate the magnitude of learning improvement. Therefore, the inferential result should be interpreted alongside the N-Gain analysis. The experimental group obtained a mean N-Gain score of 0.49, categorized as moderate, with individual N-Gain scores ranging from 0.19 to 0.80. Taken together, the results show that the Debate Camp Based-To'dopuli Mandar was associated with a statistically significant difference in critical thinking performance, while the moderate N-Gain indicates that the magnitude of improvement remained partial and progressive.

## 3.2 Discussion

The quantitative findings of this study demonstrate that the To'dopuli Mandar Debate Camp produces a statistically significant improvement in students' critical thinking skills, as evidenced by the substantial increase in posttest scores and

the Mann–Whitney U test result ( $p < 0.001$ ). The equivalence of pretest scores between groups further strengthens the internal validity of this finding, indicating that the observed improvement can be attributed to the instructional intervention rather than initial differences in ability. However, the N-Gain score of 0.49, categorized as moderate, suggests that while the intervention was effective, the magnitude of improvement remains developmental rather than optimal. This distinction is crucial, as it shifts the interpretation of effectiveness from merely identifying statistical significance to evaluating the depth and quality of learning gains.

When positioned within the debate-based learning literature, these findings confirm but also qualify previous research. Studies such as Iman (2017) report a strong contribution of debate to critical thinking development, while Latif et al. (2018) highlight debate as particularly effective in expanding cognitive flexibility and opening new avenues of thinking. The present findings align with these studies in demonstrating significant post-intervention improvement. However, they also extend this body of research by showing that improvement is not uniformly distributed across learners, as reflected in the moderate N-Gain. This suggests that while debate is effective in initiating analytical reasoning, its impact on deeper cognitive internalization may be more limited than previously implied.

A more critical perspective emerges when these findings are compared with studies on problem-based learning (PBL), which similarly emphasize active and student-centered approaches. Research by Fadilla et al. (2021) and Kardoyo et al. (2020) consistently reports that PBL enhances critical thinking by engaging students in problem-solving and collaborative inquiry. The present findings support this perspective, as the observed improvement in posttest scores reflects increased engagement in reasoning processes. However, this study also aligns with meta-analytic evidence (Manuaba et al., 2022; Ge et al., 2025), which demonstrates that PBL does not always yield significant or optimal improvements in critical thinking. In this sense, the moderate N-Gain observed in this study provides empirical support for the argument that active learning strategies do not automatically guarantee deep cognitive outcomes, particularly when engagement is not accompanied by sufficient cognitive scaffolding.

This comparison leads to a key theoretical insight: the effectiveness of debate-based learning lies not only in its ability to engage students, but in the extent to which it facilitates sustained and structured cognitive processing. While the significant Mann–Whitney result confirms that the intervention produced measurable change, the moderate level of gain indicates that students did not consistently achieve higher levels of analytical reasoning. This finding refines prior studies (Iman, 2017; Latif et al., 2018) by demonstrating that critical thinking development is inherently uneven, with certain components such as argument initiation developing more readily than others, such as evaluative judgment and reflective reasoning.

Furthermore, when compared with studies such as Latif et al. (2018), which show that different instructional strategies (e.g., debate vs. role play) enhance different dimensions of critical thinking, the present study provides additional evidence that no single instructional approach guarantees comprehensive cognitive development. Instead, the findings suggest that debate functions as a partial but foundational mechanism, capable of initiating critical thinking processes but requiring further instructional support to achieve higher-order mastery. This positions the present study not as contradictory to prior research, but as a refinement that specifies the conditions and limitations of debate-based effectiveness.

This pattern of significant improvement accompanied by moderate learning gain can be further interpreted by examining the comparative effectiveness of debate relative to other active learning strategies, particularly role play and problem-based learning. Latif et al. (2018) demonstrate that while debate is highly effective in “opening new avenues of thinking,” role play tends to be more effective in integrating knowledge and simulating real-life application. This distinction is important in interpreting the present findings. The significant improvement observed in this study supports the role of debate in stimulating analytical thinking and argument construction; however, the moderate N-Gain suggests that the intervention may have been less effective in fostering deeper integration and application of knowledge. Thus, the present study not only supports Latif et al. (2018), but also extends their findings by showing that different pedagogical strategies may develop different layers of critical thinking, and that debate alone may not be sufficient to achieve comprehensive cognitive mastery.

In addition, the findings can be critically situated within the broader debate on the effectiveness of student-centered learning approaches. While studies such as Fadilla et al. (2021) and Kardoyo et al. (2020) strongly advocate for the effectiveness of active learning in enhancing critical thinking, meta-analytic evidence (Manuaba et al., 2022; Ge et al., 2025) presents a more nuanced picture, showing that such approaches do not consistently yield significant improvements. The present study aligns more closely with this latter perspective. The statistically significant results confirm that the intervention had a measurable effect; however, the moderate level of gain indicates that the impact is conditional rather

than absolute. This suggests that the effectiveness of debate-based learning is highly dependent on factors such as instructional design, duration, and the extent of cognitive scaffolding provided. Therefore, this study refines the current understanding of active learning by demonstrating that engagement-oriented approaches must be accompanied by structured cognitive support to produce deeper and more consistent learning outcomes.

Beyond the measurable improvement identified in this study, the effectiveness of debate-based learning has also been consistently associated with students' engagement and interaction quality in prior research. Studies by Rodger and Stewart-Lord (2019), Zare and Othman (2015), and Cuong (2023) report that students perceive debate as a highly engaging instructional strategy that promotes active participation, reasoning, and communication. Similarly, research on collaborative learning emphasizes that interaction and peer discussion play a central role in facilitating knowledge construction and cognitive engagement (Ghavifekr, 2021; Chen, 2018; Appiah-Kubi & Nichwitz, 2020). These findings support the present study in demonstrating that debate-based learning creates conditions conducive to cognitive development.

However, while these studies strongly emphasize positive engagement and perceived learning benefits, they tend to assume a direct relationship between engagement and cognitive outcomes. The present findings provide a more critical perspective. Despite the significant improvement observed in posttest scores, the moderate N-Gain suggests that high levels of engagement do not automatically translate into optimal cognitive gains. This finding aligns with Scott (2008) and El Majidi et al. (2018), who argue that although debate enhances participation and interaction, the depth of critical thinking depends on how students process and internalize argumentative experiences. In this sense, the present study extends previous research by demonstrating that engagement is a necessary but not sufficient condition for deep critical thinking development, thereby highlighting the importance of cognitive structure and instructional support.

Furthermore, when viewed in relation to Latif et al. (2018), who compare debate and role play, the present findings reinforce the idea that different instructional strategies contribute differently to aspects of critical thinking. While debate is particularly effective in stimulating analytical reasoning and argument generation, it may be less effective in fostering integrative and reflective thinking processes when implemented without sufficient scaffolding. This indicates that the moderate level of gain observed in this study is not a limitation of debate per se, but rather reflects the partial nature of its cognitive impact when used as a standalone strategy. Consequently, this study contributes to the literature by clarifying that the effectiveness of debate-based learning should be understood in relation to its role within a broader instructional ecosystem, rather than as a single, comprehensive solution.

From a theoretical standpoint, this study contributes to the development of a more differentiated framework for understanding instructional effectiveness in critical thinking. Rather than viewing effectiveness as a binary outcome (effective vs. ineffective), the findings demonstrate that effectiveness operates along two dimensions: statistical effectiveness (presence of measurable improvement) and cognitive depth (degree of internalization). While previous studies have largely focused on demonstrating improvement, this study shows that such improvement must be interpreted alongside its magnitude and distribution. The moderate N-Gain indicates that cognitive transformation remains partial, suggesting that critical thinking development is a progressive and iterative process, rather than an immediate outcome of instructional intervention.

From a practical perspective, these findings have several important implications. First, debate-based learning should not be implemented as a standalone strategy, but as part of a broader instructional design that includes explicit cognitive scaffolding. Second, educators should pay greater attention to ensuring that all students engage in deeper levels of reasoning, rather than assuming that participation alone leads to learning. Third, instructional strategies should be designed to strengthen higher-order processes such as evaluation, reflection, and argument refinement, as these appear to be the components that develop less consistently.

Despite these contributions, several limitations should be acknowledged. The quasi-experimental design limits the ability to fully control for external variables that may influence learning outcomes. Additionally, the relatively short duration of the intervention may have constrained the extent to which higher-order thinking skills could develop fully, which is reflected in the moderate N-Gain observed. Finally, while the study demonstrates measurable improvement, it does not capture long-term retention or transfer of critical thinking skills. Future research should therefore consider longitudinal designs and explore how sustained implementation of debate-based learning influences deeper and more consistent cognitive development.

In conclusion, this study demonstrates that the To'dopuli Mandar Debate Camp is effective in improving students' critical thinking skills, as evidenced by significant statistical gains. However, the findings also reveal that the depth of

cognitive development remains uneven, indicating that debate-based learning should be understood as a foundational and progressive instructional strategy rather than a complete solution. By situating these findings within both supportive and critical strands of existing literature, this study provides a more nuanced understanding of how critical thinking develops and offers clear directions for both theory and practice.

#### 4. Conclusion

This study provides empirical evidence that the To'dopuli Mandar Debate Camp contributes to the development of students' critical thinking skills. The results demonstrate that the intervention leads to measurable improvement; however, the magnitude of this improvement remains moderate, indicating that critical thinking development is gradual and requires sustained engagement beyond short-term instructional exposure.

The key contribution of this study lies in demonstrating that the effectiveness of debate-based learning should be understood not merely in terms of outcome improvement, but in relation to the quality and progression of cognitive development. The findings suggest that instructional success in fostering critical thinking depends on how learning activities support deeper reasoning processes rather than participation alone. This perspective advances existing literature by emphasizing that improvement in critical thinking is incremental, uneven, and dependent on instructional conditions.

From a practical standpoint, the study highlights the need for instructional designs that extend beyond the implementation of debate as a learning activity. Educators should incorporate structured support that strengthens analytical depth, particularly in evaluative reasoning and argument refinement, to ensure that learning gains are not only achieved but also sustained and deepened.

Several limitations should be acknowledged. The study was conducted within a quasi-experimental framework in a specific educational context, which may limit the generalizability of the findings. Additionally, the duration of the intervention may not have been sufficient to capture the full development of higher-order thinking skills. The study also focuses on immediate outcomes, without examining longer-term cognitive development.

Future research should explore extended and longitudinal implementations of debate-based learning to examine how critical thinking evolves over time. Further investigation is also needed to identify instructional conditions that can enhance the depth and consistency of learning gains, particularly through the integration of complementary pedagogical strategies.

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