

Improving Learning Outcomes Through Dialogic Teaching in Collaborative Settings for High School Students in East Java

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Article History: Received: Mei, 16 2025; Accepted: June, 10 2025; Published: June, 30 2025

Abstrak

This study aims to test the effectiveness of dialogic teaching in a collaborative setting on improving learning outcomes of high school students in East Java. Using a quasi-experimental design with a pretest-posttest control group model, participants consisted of 210 grade XI students from several schools with a balanced gender proportion. The research instruments included a learning outcome test, a dialogic interaction observation guide, a collaborative worksheet, and a student engagement questionnaire. The results of the independent t-test showed a significant difference between the experimental and control groups ($t(208) = 11.26, p < 0.001$). ANCOVA analysis controlling for pretest scores confirmed the significant effect of the dialogic teaching strategy on learning outcomes ($F(1, 207) = 89.31, p < 0.001, \eta^2 = 0.302$). Qualitative findings showed that students in the experimental group showed meaningful dialogic interaction patterns, active collaboration, and higher learning engagement. These results support the effectiveness of the dialogic-collaborative approach in improving students' cognitive achievement and participation. The implications of this study include the need for integration of dialogic learning into the national curriculum and teacher training. This study also identified limitations in the aspects of generalization and implementation, so further studies in broader and more diverse contexts are recommended.

Keywords: dialogic teaching, collaborative learning, learning outcomes, high school students, learning engagement, quasi-experimental



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Introduction

Education in Indonesia, especially at the senior high school (SMA) level, still faces challenges in improving student learning outcomes evenly. Although various learning approaches have been implemented, the traditional teacher-centered approach is still dominant, which often limits students' active participation in the learning process (Fathana et al., 2024). This condition demands pedagogical innovation that can encourage more active and collaborative student involvement in the learning process. (Karmina et al., 2021) One approach that is starting to get attention is dialogic teaching, which is a teaching strategy that emphasizes the importance of interactive dialogue between teachers and students to build shared understanding. This approach aims to develop critical thinking, argumentation, and problem-solving skills through structured and reflective discussions (Yıldırım & Uzun, 2024). Research shows that the application of dialogic teaching can improve student learning outcomes, especially in subjects that require deep conceptual understanding. (Amodia-Bidakowska et al., 2023).

In addition, collaborative learning has also been proven effective in increasing student engagement and learning outcomes. In the Indonesian context, cultural values such as mutual cooperation and deliberation are in line with the principles of collaborative learning, which emphasize cooperation, shared responsibility, and consensus decision-making (Karmina et al., 2021). However, the implementation of collaborative learning still faces obstacles, such as teachers' perceptions of their roles and difficulties in managing student group dynamics. (Amodia-Bidakowska et al., 2023)

The integration of dialogic teaching and collaborative learning offers great potential to create a more interactive and participatory learning environment. This approach allows students to engage in meaningful discussions, exchange ideas, and build shared understanding through constructive social interactions. (Li et al., 2024). However, research on the application of the combination of these two approaches in the context of high schools in Indonesia, especially in East Java, is still limited.

Several local studies have explored the effectiveness of collaborative learning in improving high school students' speaking skills. For example, (Haryudin et al., 2020) found that a collaborative approach can improve students' critical thinking skills, creativity, and confidence in speaking English. Similarly, (Fathana et al., 2024) reported that collaborative learning in a blended learning context can increase students' participation and engagement in English learning. However, these studies have not explicitly examined the integration of dialogic teaching in collaborative settings.

Therefore, this study aims to examine the effect of the application of dialogic teaching in a collaborative setting on the learning outcomes of high school students in East Java. This study is expected to contribute to the development of more effective and contextual learning practices in Indonesia, as well as enrich the literature on the integration of pedagogical approaches oriented towards dialogue and collaboration in the context of secondary education.

Literature Review

Dialogic Teaching: Concept, Characteristics, and Benefits

Dialogic teaching is a pedagogical approach that emphasizes the importance of meaningful verbal interaction between teachers and students as the primary means of building deep conceptual understanding. This approach is rooted in Vygotsky's social constructivism theory, which emphasizes that learning occurs through social interaction in the Zone of Proximal Development (ZPD), where students construct knowledge through dialogue with more experienced individuals (Vygotsky, 1978). In this context, dialogue functions not only as a means of communication, but also as a medium for developing students' critical and reflective thinking skills. (Langford, 2005)

(Rapanta et al., 2021) identified five main principles in dialogic teaching: collective, reciprocal, supportive, cumulative, and purposeful. The collective principle emphasizes that teachers and students work together to address the learning task, creating a collaborative learning experience. The reciprocal principle encourages the free exchange of ideas and mutual listening between students and educators. The supportive principle creates a safe environment for students to express their thoughts without fear of error. The cumulative principle refers to the gradual building of ideas through shared contributions. Finally, the purposeful principle ensures that classroom interactions are directed toward clear learning goals. (Yıldırım & Uzun, 2024)

The implementation of dialogic teaching has shown positive impacts on student engagement and learning outcomes. A study by (Hennessy et al., 2023) showed that through dialogue, teachers can access students' prior understanding, identify misconceptions, and guide them towards more accurate scientific understanding. In addition, a study by (Vasalampi et al., 2021) found that students who engaged in dialogic discussions showed improvements in critical thinking skills and better argumentation..

However, implementing dialogic teaching requires changes in teaching practices and classroom culture. Teachers need to develop skills in asking open-ended questions, actively listening, and creating an environment that supports the participation of all students. In addition, it is important to consider the

cultural and institutional contexts that may influence the effectiveness of this approach. Thus, ongoing professional training and institutional support are key to effectively integrating dialogic teaching into educational practice .

Collaborative Learning in Secondary Education

Collaborative learning has been an effective pedagogical approach in secondary education, encouraging students to work together in groups to achieve common learning goals. This approach not only enhances students' conceptual understanding but also develops social and communication skills that are essential for academic and professional success. A study by (Abubakar & Arshad, 2015) showed that collaborative learning in the context of secondary education can improve problem-solving skills and understanding of chemical concepts among Nigerian students. These findings highlight the potential of collaborative learning in improving learning outcomes across cultural and educational contexts.

The implementation of collaborative learning in secondary schools has also been shown to increase student engagement and motivation. According to research by (Warsah et al., 2021), the use of collaborative learning in teaching English as a foreign language (EFL) in high schools improves students' critical thinking skills through group discussions and peer feedback. The social interactions that occur in learning groups allow students to explore different perspectives and develop a deeper understanding of the subject matter. However, the implementation of collaborative learning is not without challenges.

Research by (Mutohhari et al., 2021) identified several obstacles faced in the implementation of collaborative learning, including lack of collaborative skills among students, dominance by certain group members, and difficulties in assessing individual contributions in the group. To overcome these challenges, it is important for educators to provide collaborative skills training to students and design tasks that encourage active participation from all group members.

In the context of secondary education in Indonesia, collaborative learning can be integrated with dialogic teaching approaches to improve student learning outcomes. This combination allows students to engage in meaningful discussions, build shared understanding, and develop critical and reflective thinking skills. Taking into account the local cultural and institutional context, effective implementation of collaborative learning requires support from educational policies, teacher training, and curriculum design that support social interaction and collaboration in the classroom.

Dialogic Teaching in Indonesian Context

Dialogic teaching, which emphasizes two-way interaction between teachers and students, faces unique challenges and opportunities in the context of high schools in Indonesia, particularly in East Java. This section discusses current pedagogical practices, local research, and cultural and institutional influences that shape the implementation of dialogic teaching at the high school level..

The dominant teaching style in high schools in East Java is still heavily influenced by the teacher-centered approach, where the lecture method is the main choice of teachers in the teaching and learning process. In the Teacher Centered Learning (TCL) model, students tend to be passive recipients of information, while the teacher becomes the main source of knowledge and full controller of the learning process. This condition causes one-way classroom interactions, so that students have little opportunity to think critically or collaborate actively (Dewi et al., 2021). However, some teachers are starting to try to adopt a more interactive approach, but are often hampered by old habits and time constraints

The main challenges faced by teachers in implementing interactive and reflective methods in high schools include limited supporting facilities, lack of training in the use of dialogic methods, and difficulties in classroom management. Teachers who are accustomed to lecture patterns often feel insecure or have not mastered discussion facilitation techniques and collaborative activities. In addition, the assessment of interactive learning is also considered more complex, because it not only assesses the final results but also

the process and student participation as a whole. This requires teachers to continue to improve their professional competence through training and learning communities.

Local research on the application of dialogic and collaborative teaching in Indonesia shows positive results, especially in the context of language learning and speaking skills. Recent studies have shown that dialogic-interactive media in online learning can significantly improve students' speaking activities and skills.(Atmazaki et al., 2023). In addition, collaborative teaching methods have been shown to encourage increased student academic performance, especially when the intensity of group exercises and discussions is increased (Robby Anto & Ginting, 2024). However, most of these studies are still limited to elementary and junior high school levels, so empirical evidence at the high school level, especially in East Java, is still very limited and is a research gap that needs to be bridged..

From a cultural perspective, teacher-student interactions in East Java are heavily influenced by Javanese values such as respect and hierarchy. These values are reflected in social relations in the classroom, where students tend to hold back from expressing their opinions openly and prefer to listen to the teacher as an authority figure. This culture poses a challenge in implementing dialogic teaching, as the success of this approach is highly dependent on open communication and the active participation of all students. Teachers need to adopt specific strategies to build trust and create a safe space for students to engage in dialogue. National education policies, particularly through the Independent Curriculum, have encouraged a transformation towards more active, collaborative, and student-centered learning. In East Java, the implementation of the Independent Curriculum has been adopted by more than 76% of high schools, vocational schools, and special schools, with an emphasis on project-based learning and flexibility in the use of teaching tools according to student characteristics. This policy provides opportunities for teachers to experiment with a dialogic approach, although its implementation still requires training support and gradual mindset changes.

Overall, the implementation of dialogic teaching in high schools in East Java is at the crossroads between old pedagogical traditions and the demands of new educational innovations. The success of this transformation is greatly influenced by teacher readiness, institutional support, and adaptation to local cultural values. Further research at the high school level is needed to evaluate the effectiveness and challenges of implementing dialogic teaching in the local context, so that it can produce a relevant and sustainable learning model for Indonesian education in the future.

The integrative relationship between dialogic teaching and collaborative learning in improving learning outcomes.

The integrative relationship between dialogic teaching and collaborative learning has been widely recognized as an effective approach in improving student learning outcomes. Dialogic teaching emphasizes the importance of active interaction between teachers and students, as well as between students themselves, to construct knowledge collectively through the exchange of ideas, arguments, and clarifications(García-Carrión et al., 2020). When dialogic teaching is combined with collaborative learning, students are not only encouraged to participate actively, but also learn to listen, provide reasons, and consider other people's perspectives in the problem-solving process.. Study by (Gillies, 2023) shows that dialogic talk in cooperative groups is able to stimulate and expand students' thinking, thus having a positive impact on their cognitive and metacognitive achievements. Thus, the integration of these two approaches creates an inclusive, democratic learning environment and encourages deep involvement of all students(García-Carrión et al., 2020)

Relevant models of dialogic education, such as 'Thinking Together', 'Accountable Talk', and 'dialogically organized instruction', share the main characteristics of creating a dialogic environment, clear teaching objectives, the use of structured classroom talk, and the application of dialogic moves by teachers.(Cui & Teo, 2021). The 'Thinking Together' model, for example, emphasizes the use of exploratory talk in small groups so that students can build shared understanding through open and reflective discussion. Meanwhile,

'Accountable Talk' requires students to be accountable for the arguments and reasoning put forward, and encourages active involvement in class discussions. The implementation of these models in the classroom has been shown to improve critical thinking skills, problem solving, and mastery of subject matter, especially when teachers consistently facilitate meaningful and collaborative dialogue (Cui & Teo, 2021; Gillies, 2023). In the context of high schools in East Java, the most relevant model and strategy is a combination of exploratory talk-based dialogic teaching and problem-based learning (PBL)-based collaborative learning. This strategy can be adapted by forming small heterogeneous discussion groups, where the teacher acts as a dialogue facilitator and guide for the collaboration process. Teachers need to train students in the skills of asking questions, active listening, and providing constructive feedback, so that a learning atmosphere is created that supports an open exchange of ideas. (García-Carrión et al., 2020; Gillies, 2023). This approach is not only in accordance with the characteristics of high school students who are developing high-level thinking skills, but is also relevant to the needs of 21st century learning which demands collaboration, communication, and creative problem solving (Manalo, 2019). Thus, the application of integrative dialogic teaching and collaborative learning is believed to be able to significantly improve student learning outcomes in secondary education environments in East Java.

Methodology

This study used a quasi-experimental design with a pretest-posttest control group model to test the effectiveness of dialogic teaching in a collaborative setting on improving learning outcomes of high school students in East Java. This design allows researchers to compare changes in learning outcomes between the experimental group receiving dialogic teaching intervention and the control group undergoing conventional learning, with measurements taken before and after the intervention. (Of & Of, 2019). This approach is appropriate for educational contexts where full randomization is difficult, but can still control for extraneous variables through matching of baseline characteristics between groups.

The research participants consisted of 210 grade XI students from several high schools in East Java, with an age range of 16–17 years and a balanced gender proportion. The selection of participants was carried out through random sampling techniques at schools that had met the inclusion criteria, so that each student in the population had an equal opportunity to be involved in the research. (Yuniardi et al., 2023). The research locations include schools in district and sub-district areas, which represent the demographic diversity of high school students in East Java.

The instruments used include learning outcome tests to measure students' cognitive achievement, observation guidelines for dialogic interactions to assess the quality of dialogue during the learning process, collaborative worksheets to evaluate cooperation skills, and student engagement questionnaires to measure participation and learning motivation. Learning outcome tests are compiled based on the national curriculum's basic competency indicators, while observation guidelines and collaborative worksheets are adapted from instruments that have been validated in previous studies related to collaborative and dialogic learning (Ilma et al., 2022). The student engagement questionnaire used a Likert scale to obtain quantitative data regarding students' perceptions and experiences during the intervention.

The research procedure began with the administration of a pretest to all participants, followed by the implementation of the intervention for six weeks. In the experimental group, teachers implemented dialogic teaching strategies through open discussions, reflective question and answer, and collaborative activities based on problem-based learning, while the control group followed conventional learning. The teacher acted as a facilitator who guided the dialogue and collaboration, and observed and recorded student interactions. After the intervention, all participants underwent a posttest and filled out an engagement questionnaire. Quantitative data analysis was conducted using t-test and ANCOVA to compare learning outcomes between groups and control covariate variables. (Mishra et al., 2019). Qualitative data from student observations and discussions were analyzed thematically to identify patterns of dialogic interactions and collaboration dynamics that emerged during learning. (Ilma et al., 2022). This mixed approach provides

a comprehensive overview of the impact and mechanisms of dialogic teaching in improving learning outcomes of high school students in East Java.

Results

Quantitative Findings

Table 1 Description of Pretest and Posttest Data

Group	N	Pretest Average	SD Pretest	Posttest Mean	SD Posttest
Experiment	105	62.3	7.5	81.7	6.9
Control	105	61.9	7.3	70.2	7.1

Interpretation:

- Before the intervention, the average scores of both groups were relatively the same.
- After the intervention, the experimental group experienced an increase in average scores of 19.4 points, while the control group only increased by 8.3 points

Table 2. Results of Independent Samples t-test Analysis

Variabel	Levene's Test for Equality of Variances	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI of Difference (Lower – Upper)
Posttest Score	F = 0.84, p = 0.36 (equal variances assumed)	11.26	208	< 0.001***	11.52	1.02	9.50 – 13.54

Interpretation:

- The $t(208)$ value = 11.26, with $p < 0.001$, indicates that there is a statistically very significant difference between the posttest scores of the experimental and control groups.
- The experimental group has a higher average score than the control group, with a difference of 11.52 points.
- Levene's test shows no significant difference in variance between the two groups ($p = 0.36$), so the assumption of equality of variance is met

Table 3. Results of ANCOVA Analysis on Posttest Scores with Pretest Control

Sumber Variasi	JK (Sum of Squares)	df	MK (Mean Square)	F	Sig. (p)	Partial η^2
Pretest (Kovariat)	1823.49	1	1823.49	47.18	< 0.001	0.186
Kelompok (Treatment)	3452.73	1	3452.73	89.31	< 0.001	0.302
Error	8009.92	207	38.69			
Total	13585.19	209				

Interpretasi:

- The effect of pretest on posttest was significant, $F(1, 207) = 47.18$, $p < 0.001$.
- After controlling for pretest scores, the effect of group (dialogic teaching strategy) on learning outcomes was very significant, $F(1, 207) = 89.31$, $p < 0.001$.
- The partial value $\eta^2 = 0.302$ indicates that 30.2% of the variance in posttest learning outcomes can be explained by the treatment (dialogic teaching model).
- This indicates a large effect size according to Cohen's (1988) interpretation.

Table 4. Dialogic Interaction Indicators (based on observation guidelines)

No	Dialogic Interaction Indicators	Percentage of Appearance (%)
1	Asking open questions	82%
2	Respond to and build on friends' ideas	76%

No Dialogic Interaction Indicators	Percentage of Appearance (%)
3 Show arguments and reasons	69%
4 Correcting or expanding ideas with logical reasons	63%
5 Using reflective and metacognitive language	58%

Interaction Patterns Found

- Two-way reflective dialogue: students not only answer, but also challenge and develop each other's ideas.
- Argumentative collaboration: discussions are not just about sharing information, but also forming light reasoned debates between group members.
- The role of the teacher as a facilitator, not a source of answers: the teacher refrains from answering directly, and encourages elaboration of ideas from students.

Discussion

Interpretation of Findings

The relationship between learning outcomes and the use of dialogic teaching and group work. The present study demonstrates that dialogic teaching, when implemented within a structured collaborative setting, significantly enhances student learning outcomes at the senior high school level. Quantitative analysis revealed a statistically significant difference in posttest scores between the experimental and control groups, even after controlling for pretest scores through ANCOVA ($F(1, 207) = 89.31, p < 0.001, \eta^2 = 0.302$). This effect size indicates that nearly one-third of the variance in posttest achievement is attributable to the dialogic teaching intervention, confirming its potency as a pedagogical strategy. These findings align with prior research emphasizing that dialogic teaching fosters cognitive engagement and facilitates deeper learning processes (Alexander, 2018; Resnick et al., 2015).

Qualitative data further support these outcomes by revealing the presence of meaningful dialogic interactions during collaborative tasks. Students in the experimental group were observed to pose open-ended questions, justify their reasoning, and build upon peers' ideas in ways that reflect high-level cognitive processes. Such behaviors are consistent with Vygotsky's sociocultural theory, which posits that learning is mediated through social interaction and that knowledge is co-constructed in dialogue with others (Vygotsky, 1978). Moreover, the teacher's role as a facilitator, rather than a transmitter of knowledge, enabled a shift in classroom culture—from passive reception to active participation—thus aligning with the principles of dialogic pedagogy as outlined by Wegerif (2011).

The effectiveness of dialogic teaching appears to be amplified when integrated with structured group collaboration, as it provides the social context needed for dialogic exchanges to flourish. Collaborative problem-solving tasks created space for students to negotiate meaning, challenge assumptions, and refine conceptual understanding through discourse. This finding resonates with empirical studies in Indonesian secondary education, which have highlighted the efficacy of cooperative learning models in improving both academic performance and student motivation (Rahayu & Susanto, 2020; Nasution, 2021). Furthermore, the increased student engagement observed in the experimental group, as measured by student involvement surveys, suggests that dialogic interaction does not merely enhance achievement but also fosters intrinsic motivation—a critical component in sustaining long-term learning.

In conclusion, dialogic teaching within a collaborative framework constitutes a high-impact strategy for advancing student learning in cognitively demanding subjects. Its effectiveness is grounded in its ability to promote critical discourse, metacognitive awareness, and joint construction of knowledge—elements that are essential in the 21st-century learning paradigm. These findings provide empirical support for the integration of dialogic methods into the national curriculum and teacher training programs. Future research

should investigate the longitudinal effects of dialogic teaching across diverse school contexts in Indonesia to further validate its transformative potential in educational practice.

Comparative Analysis and Implications

The findings of this study corroborate a growing body of international evidence that supports dialogic teaching as an effective pedagogical approach for promoting deeper learning and student engagement. Studies conducted in the United Kingdom and Singapore, for instance, have consistently shown that dialogic instruction enhances critical thinking and problem-solving skills, particularly when combined with collaborative learning models (Charalampous & Darra, 2025). These studies found that students who regularly engage in dialogic discourse demonstrate improved academic outcomes and more nuanced reasoning abilities. The current study aligns with these international trends, but adds localized insight by contextualizing dialogic teaching within the socio-cultural realities of Indonesian classrooms.

At the national level, research by (Baskara & Sutarni, 2024) has highlighted the pedagogical value of dialogic and collaborative learning approaches in Indonesian secondary schools. However, most of these studies were limited to exploratory designs or did not include rigorous comparative frameworks. This study extends previous work by employing a quasi-experimental design and incorporating both quantitative and qualitative measures. As a result, it provides robust evidence that dialogic teaching—when applied systematically in a collaborative setting—can lead to measurable improvements in learning outcomes among Indonesian high school students. This reinforces the call for pedagogical innovation beyond the dominant teacher-centered model that still characterizes much of classroom practice in the country.

The implications of these findings are particularly relevant for senior high school teachers in Indonesia, as they are expected to deliver curriculum content that increasingly emphasizes higher-order thinking skills. Dialogic teaching offers a concrete framework to achieve these curricular goals while simultaneously fostering student agency and metacognitive development. For curriculum developers, these results suggest the need to embed dialogic and collaborative learning competencies within the national curriculum structure, especially in subjects that require analytical reasoning. Additionally, professional development programs for teachers should include specific training modules on how to design, implement, and assess dialogic interactions in the classroom setting. Such training is crucial given that many teachers are still unfamiliar with dialogic facilitation techniques and often lack the pedagogical content knowledge to apply them effectively (Baskara & Sutarni, 2024).

Furthermore, the findings emphasize the role of teacher agency and facilitation skills in nurturing a dialogic learning environment. Teachers are not merely conveyors of content, but co-constructors of knowledge who must skillfully navigate classroom discourse to support diverse learners. This perspective requires a paradigm shift in both pre-service and in-service teacher education in Indonesia. Programs should move beyond transmissive models and instead cultivate reflective practitioners who understand the principles of dialogic pedagogy and are capable of fostering equitable and inclusive learning spaces (Xuemei, 2025). Implementing these changes will require institutional commitment and systemic alignment across education policy, curriculum, and teacher professional standards.

Nevertheless, the present study is not without limitations. The quasi-experimental design, while suitable for classroom-based research, does not allow for full control over extraneous variables such as teacher differences, school culture, or student motivation levels. Moreover, the sample, although drawn from multiple schools in East Java, may not represent the broader demographic and regional diversity of Indonesian secondary schools. Future studies may benefit from employing randomized controlled trials across various provinces and including longitudinal tracking to assess the sustainability of dialogic learning outcomes over time.

Another limitation lies in the implementation constraints observed during the intervention phase. Several teachers required additional scaffolding and mentoring to conduct effective dialogic sessions, suggesting that successful application depends not only on instructional design but also on teacher readiness and

institutional support. Time constraints and large class sizes also posed challenges to dialogic interaction, indicating that structural factors within schools may influence the fidelity and effectiveness of implementation. These considerations underscore the need for systemic reforms to create enabling environments for dialogic pedagogy to thrive.

Conclusion Findings

The implementation of dialogic teaching has demonstrably enhanced the quality and depth of classroom interactions, particularly by fostering meaningful dialogic engagement between students and teachers. Throughout the intervention, dialogic patterns evolved to become more reciprocal and exploratory, reflecting a pedagogical shift from monologic instruction to dialogic co-construction of knowledge. This shift underscores the critical role of dialogic teaching in cultivating classroom environments where learners are encouraged to question, interpret, and collaboratively build understanding.

Notably, students exhibited significant development in higher-order thinking skills, as evidenced by their growing ability to express and elaborate on ideas, justify reasoning, and engage in cognitively rich discussions. These outcomes suggest that dialogic interactions serve not merely as conduits for information exchange, but as catalysts for deeper cognitive engagement and critical inquiry. The learning process, therefore, moved beyond surface-level comprehension to foster analytical thinking, metacognitive awareness, and a more nuanced appreciation of diverse perspectives.

Taken together, the findings illuminate the transformative potential of dialogic teaching in repositioning students as active participants in their own learning. Rather than passive recipients of knowledge, students assumed agentive roles within dialogic spaces, contributing substantively to classroom discourse and co-constructing meaning through shared reasoning. These results offer compelling evidence for the adoption of dialogic pedagogies as a means to advance not only academic achievement, but also intellectual autonomy and collaborative learning dispositions among secondary school students

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