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The Concept of Collaborative Learning in Developing Students' Critical Thinking Skills

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ABSTRACT

This study aims to explore the concept of collaborative learning as one of the effective strategies in developing students' critical thinking skills. Through a qualitative literature study approach, this study collects and analyzes data from various sources of scientific literature, such as academic journals, reference books, and relevant previous research results. The results of the study indicate that collaborative learning has great potential in improving critical thinking skills through social interaction, group discussions, and joint problem solving, which allow students to exchange ideas and perspectives. This study also found that the success of implementing collaborative learning is influenced by several main factors, such as the role of the teacher as a facilitator, group dynamics, and a conducive learning environment. The urgency of this study lies in the urgent need to present an innovative learning model that not only focuses on achieving academic grades but also on developing 21st-century skills, including critical thinking, which are very necessary in today's information era. Thus, these findings provide an important contribution to the world of education, both theoretically and practically, in an effort to improve the quality of learning.

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1. INTRODUCTION

Collaborative learning has become a key focus in modern education due to its ability to integrate social and cognitive skills into the learning process (Febrian & Nasution, 2024). This learning model emphasizes the importance of interaction among students in small groups to solve problems, share ideas, and create solutions together, ultimately enhancing critical thinking skills. In the 21st century, where global challenges are increasingly complex and technology is rapidly advancing, the world of work demands individuals who are not only knowledgeable but also able to collaborate effectively and think analytically (Baroya, 2018). Critical thinking skills have been identified as one of the core competencies needed in the information age, as they help individuals make decisions based on in-depth evaluation of available information (Uswatun & Santiani, 2015). Therefore, exploring the concept of collaborative learning is highly relevant, especially considering global trends that indicate the need for education system transformation to produce a generation that is adaptive, innovative, and ready to face change.

A statistical report released by the World Economic Forum (2020) shows that 65% of children entering primary school today are likely to work in jobs that do not yet exist, emphasising the importance of 21st-century skills such as critical thinking and collaboration (WEF, 2020). Consistent with this, the latest data from the OECD's Programme for International Student

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Assessment (PISA) indicate persistent challenges in students' higher-order thinking skills. According to the PISA 2022 assessment results (released in 2023–2024), which for the first time included a measure of creative thinking as a proxy for complex problem-solving and critical thinking skills, only about 27 % of students across OECD countries achieved the highest proficiency levels (Levels 5 and 6) in creative/complex thinking tasks, reflecting limited capacity to generate, evaluate, and improve ideas for novel problem contexts—an essential component of critical thinking in real-world situations. These findings suggest that the majority of students in OECD education systems are not yet demonstrating advanced critical and creative thinking competencies at expected levels. On the other hand, a study by the National Center for Education Statistics (NCES) in the United States found that students involved in collaborative learning models showed a 20% improvement in learning outcomes compared to those using conventional learning methods (NCES, 2021). These facts demonstrate the urgency of implementing collaborative learning to develop critical thinking skills, as global challenges are increasingly complex and the world of work requires individuals who are adaptive and able to work in teams (Isma & Jamin, 2022). These conditions form the basis for this research to further explore how collaborative learning can be optimized to address current and future educational needs.

In previous research, studies discussing collaborative learning and the development of critical thinking skills tended to focus on three key areas: the theoretical concept of collaborative learning, its impact on academic learning outcomes, and its technical implementation in the classroom. First, Akbar et al.'s (2023) research focused on theoretical aspects by exploring collaborative models such as Cooperative Learning or Problem-Based Learning, but lacked in-depth linking these to the development of critical thinking skills. Second, Basri's (2025) research highlighted the positive impact of collaborative learning on students' academic grades, but rarely measured critical thinking skills as a primary variable. Third, previous research often focused solely on technical implementation without considering contextual factors such as group dynamics, school culture, or the teacher's role as a facilitator (Rahayu & Fathoni, 2022). Integrating collaborative learning with the development of critical thinking skills requires a holistic approach that encompasses all of these elements. Furthermore, previous research tends to be descriptive and lacks practical recommendations for educators (Agbi & Yuangsoi, 2022). Thus, this study needs to address gaps in its research to produce more comprehensive, applicable, and relevant findings to address the challenges of modern education.

Therefore, this study aims to examine in more depth the concept of collaborative learning as a strategy for developing critical thinking skills, with a focus on the integration of theory and practice that can be applied in the context of modern education. In addition, this study also aims to identify contextual factors that influence the successful implementation of collaborative learning, such as the role of teachers, group dynamics, and the learning environment. The urgency of this research lies in the need for innovative learning models that not only improve academic outcomes but also equip students with 21st-century skills, including critical thinking skills, which are increasingly needed in today's workplace. Amid increasingly complex global challenges, education must be able to produce individuals who are adaptive, collaborative, and able to critically evaluate information. This research is important because it provides new insights that can be used as a basis for developing more effective curricula and learning practices, thus answering the needs of the ever-evolving world of education.

2. METHOD

This research employed a qualitative literature review method to explore the concept of collaborative learning in developing critical thinking skills. A qualitative approach was chosen because the research aimed to explore and deeply understand the phenomenon under study through data analysis from relevant literature sources. Data were collected from various credible sources, such as indexed scientific journals, academic reference books, previous research results, statistical reports, and official documents from international educational institutions such as the World Economic Forum (WEF) and the Programme for International Student Assessment (PISA).

The data collection process was conducted systematically using a purposive sampling technique, selecting literature with high relevance to the research topic (Creswell, 2014).

Next, the data were analyzed using content analysis, categorizing information from various sources based on key themes, such as the concept of collaborative learning, its success factors, and its relationship to the development of critical thinking skills (Bryman, 2016). Data validity was strengthened through source triangulation, which involves comparing information from various literature sources to ensure the accuracy and consistency of the findings (Denzin & Lincoln, 2018). The analysis results were then synthesized to generate new insights that could answer the research problem formulation. This method was chosen because it aligns with the research objectives of producing theoretical and applicable findings, as well as making a significant contribution to the development of collaborative learning practices in the context of modern education.

3. RESULTS AND DISCUSSION

3.1 Basic Concepts of Collaborative Learning

Collaborative learning is an innovative approach in education that emphasizes active interaction between students in a group to achieve a common goal. According to Johnson and Johnson in Rofiudin (2024), collaborative learning involves not only cooperation but also creating an environment where each individual supports each other to achieve deeper understanding. In developing critical thinking skills, collaborative learning is an ideal medium because it encourages students to engage in discussions, ask reflective questions, and consider alternative perspectives. This process allows students to go beyond their individual knowledge and develop the ability to analyze, evaluate, and synthesize information systematically. Furthermore, this concept aligns with the constructivist theory proposed by Vygotsky, as cited by Dewi & Fauziati (2021), which emphasizes that learning is a social process in which individuals construct knowledge through interactions with others. Collaborative learning serves not only as a method of knowledge transfer but also as a tool for developing more critical and analytical thinking.

Integrating critical thinking skills into collaborative learning requires careful planning and an appropriate implementation strategy. This can be achieved through designing assignments that challenge students to think deeply and critically, such as complex case studies, collaborative problem-solving, or interdisciplinary projects (Davidi & Supardi, 2021). For example, in the Problem-Based Learning (PBL) model, students are presented with real-world scenarios that require multidimensional analysis and creative solutions. Through group discussions, they learn not only from their own perspectives but also from those of their peers, broadening their perspectives on a problem. Furthermore, teachers play a crucial role as facilitators, guiding students to formulate reflective questions and ensuring that each group member actively contributes. Collaborative learning is an effective tool for integrating critical thinking skills into educational practice (Leal & Laa, 2012).

Collaborative learning patterns that can be implemented in schools include several key strategies designed to maximize interaction between students and effectively develop critical thinking skills. One concept that can be used is Collaborative Inquiry Learning (CIL), in which students work in small groups to investigate real-life problems or contextual issues relevant to everyday life. In CIL, teachers begin by posing an open-ended question or challenge that requires in-depth exploration. Students are then encouraged to formulate hypotheses, collect data, and analyze the information collaboratively. This strategy can be combined with techniques such as Think-Pair-Share, where students first think independently, then discuss with a partner, and finally share their findings with the larger group. Alternatively, the Jigsaw Classroom approach can be applied, where each group member is responsible for a specific portion of the material, and the entire group must work together to integrate the pieces of information into a coherent understanding. To ensure the success of this model, teachers need to establish clear rules for task distribution, effective communication, and evaluation of group work through a transparent rubric. Collaborative learning can be an effective tool for enhancing conceptual understanding and fostering deep and sustained critical thinking skills. Some strategies that can be implemented are shown in the following table.

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Table 1. Several Models of Collaborative Learning Strategies

No.	Learning Strategy Model	Brief Description
1	Problem-Based Learning (PBL)	Students work in groups to solve real-world or complex problems through in-depth investigation. This model encourages critical thinking and innovative solutions.
2	Jigsaw Classroom	A large group is divided into smaller subgroups; each member learns a specific part of the material and then teaches it to other members. This strategy enhances responsibility and cooperation.
3	Think-Pair-Share	Students think individually, then discuss their ideas with a partner, and finally share the results with the whole class. It increases participation and supports gradual idea development.
4	Collaborative Inquiry Learning (CIL)	Students collaboratively investigate contextual problems through exploration, data collection, analysis, and presentation. This approach strengthens collaboration and critical thinking skills.
5	Project-Based Learning (PjBL)	Students work on long-term projects in teams, focusing on problem-solving and research activities. This model fosters practical and collaborative skills.

Collaborative learning is fundamentally grounded in the principle that knowledge is constructed through social interaction and shared meaning-making among learners. Rather than positioning students as passive recipients of information, this approach emphasizes collective inquiry, dialogue, and mutual engagement in the learning process (Muawiyah, 2024). Learners are encouraged to articulate their ideas, question assumptions, and negotiate understanding through interaction with peers. In this context, collaborative learning facilitates the development of critical thinking by exposing students to multiple perspectives and requiring them to justify, evaluate, and refine their reasoning. The exchange of ideas within a group setting allows students to move beyond surface-level understanding and engage in higher-order cognitive processes such as analysis, synthesis, and evaluation, which are central to critical thinking development.

The implementation of collaborative learning requires structured learning designs that intentionally promote interaction, interdependence, and shared responsibility among students. This can be achieved through learning activities that involve problem-solving tasks, case analyses, inquiry-based discussions, or project-oriented assignments that cannot be completed individually. In practice, students work together to explore issues, gather and analyze information, and construct collective solutions based on evidence and logical reasoning. Clear learning objectives, well-defined tasks, and explicit expectations for collaboration are essential to ensure that group activities remain focused and meaningful. Through consistent engagement in such collaborative processes, students gradually develop the ability to think critically, communicate effectively, and apply reasoning skills in diverse and complex learning situations (Haryono, et al., 2025).

Figure 1: Group Dynamics Influencing the Success of Collaborative Learning

In this digital era, technology plays a crucial role in supporting the effective implementation of collaborative learning. Online platforms such as Google Classroom, Microsoft Teams, or collaborative applications like Padlet and Miro enable students to interact and collaborate even when they are not in the same physical space (Sakhar & Goud, 2024). This technology also allows students to access a wider range of learning resources and participate in more inclusive discussions. To develop critical thinking skills, technology can be used to provide simulations, data visualizations, or analytical tools that help students better understand complex concepts. For example, students can use data visualization tools to analyze global trends and connect them to local issues, thus training their ability to think critically and holistically. This allows for the integration of technology into collaborative learning to increase efficiency and enrich students' learning experiences in developing critical thinking skills.

Collaborative learning offers substantial benefits for developing students' critical thinking skills; however, its implementation in educational practice presents several significant challenges. One major challenge is the gap in student abilities, which can lead to an imbalance in contributions within the group (Wibowo, 2022). Furthermore, some students may feel uncomfortable with this learning model due to a lack of interpersonal skills or low self-confidence. To address these challenges, teachers need to provide initial training in collaboration skills, such as effective communication, conflict management, and shared decision-making. Furthermore, ongoing formative evaluation can help teachers identify barriers students face and provide constructive feedback. An inclusive and supportive learning environment should also be created to ensure that all students feel valued and motivated to participate. By addressing these challenges, collaborative learning can be an effective tool for developing critical thinking skills, ultimately preparing students for future real-world challenges.

3.2 Identifying Key Factors in Collaborative Learning

The success of collaborative learning in developing critical thinking skills depends heavily on identifying key factors that influence the learning process and outcomes. According to research by Dillenbourg (1999), these factors include group dynamics, the teacher's role as a facilitator, a conducive learning environment, group heterogeneity, and technology and digital learning tools. Group dynamics, for example, are crucial because interactions between students can influence the level of participation and quality of discussions. Research by Johnson and Johnson in Sumianto (2025) shows that groups with open communication and mutual trust tend to be more effective in generating in-depth understanding and creative solutions. Furthermore, the teacher's role as a facilitator cannot be overlooked, as they are responsible for guiding students in formulating reflective questions and ensuring that each group member actively contributes. An inclusive and supportive learning environment is also crucial, as students must feel safe to voice their ideas

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without fear of judgment. Therefore, identifying these factors is an essential first step in ensuring the successful implementation of collaborative learning in developing critical thinking skills.

The success of collaborative learning depends heavily on the teacher's role as a facilitator who is able to create a conducive and supportive learning environment. According to Hattie (2012), teachers are no longer simply conveyors of information but learning partners who help students develop critical thinking skills through meaningful interactions. Teachers must be able to design activities that encourage students to discuss, exchange ideas, and solve problems collaboratively. Furthermore, teachers are also responsible for monitoring group dynamics, ensuring that each member has the opportunity to speak, and preventing domination by any single individual. To develop critical thinking skills, teachers can use techniques such as Socratic Questioning, which involves asking questions that invite in-depth reflection and encourage students to question their own assumptions. The teacher's role is not only to guide but also to inspire students to develop critical thinking patterns through collaborative learning.

The teacher's role as a facilitator is a key factor influencing the success of collaborative learning in developing critical thinking skills. According to Ali et al. (2024), teachers are not only guides but also motivators who are able to create a learning environment that supports intellectual exploration. Teachers must be able to design collaborative activities that challenge students to think critically, such as structured discussions or interdisciplinary projects. Furthermore, teachers are also responsible for monitoring group dynamics and providing constructive feedback to ensure that all students actively participate. Research by Gillies (2016) shows that teachers who are able to create a balance between guidance and freedom for students tend to produce better learning outcomes. For example, by using the Socratic Questioning technique, teachers can encourage students to question their own assumptions and develop more analytical thinking. Therefore, the teacher's role as an effective facilitator is key to ensuring that collaborative learning successfully develops critical thinking skills.

Group dynamics are a key factor influencing the success of collaborative learning in developing critical thinking skills. According to Slavin (2014), effective groups are characterized by open communication, mutual trust, and equitable distribution of responsibilities. When group members feel safe voicing their ideas, they are more likely to think critically and take intellectual risks. However, poor group dynamics, such as dominance by certain individuals or a lack of active participation, can hinder the development of critical thinking skills. This heterogeneity allows students to learn from diverse perspectives, which in turn enriches their ability to think critically. By addressing group dynamics, collaborative learning can achieve its goal of optimally developing critical thinking skills.

Group dynamics are one of the most significant factors influencing the success of collaborative learning. According to Agus (2018), effective groups are characterized by open communication, equitable distribution of responsibilities, and mutual trust among members. When group members feel comfortable sharing ideas, they are more likely to think critically and take intellectual risks. However, poor group dynamics, such as dominance by certain individuals or a lack of active participation, can hinder the development of critical thinking skills. To address this challenge, teachers can form heterogeneous groups, both in terms of academic ability and social background, so that students can learn from diverse perspectives. Research by Fanani & Yaqin (2024) shows that heterogeneous groups tend to be more successful in generating innovative solutions and improving critical thinking skills. By paying attention to group dynamics, collaborative learning can achieve its goal of optimally developing critical thinking skills.

A conducive learning environment plays a crucial role in determining the success of collaborative learning. According to Weinstein et al. (2006), a supportive learning environment encompasses physical aspects, such as a classroom layout that facilitates group interaction, as well as psychological aspects, such as a sense of safety and inclusivity. An inclusive environment allows students to feel valued and motivated to participate in group discussions. Furthermore, research by Afriadi (2024) shows that learning environments that support collaboration tend to improve the quality of interactions between students and encourage critical thinking. For example, the use of technology, such as online platforms, can create virtual spaces that enable students to collaborate even when they are not physically present. This technology also allows students to access a wider

range of learning resources and participate in more inclusive discussions. Thus, a conducive learning environment is a crucial factor influencing the success of collaborative learning in developing critical thinking skills.

Table 2. Key Factors Influencing the Success of Collaborative Learning in Developing Critical Thinking Skills

No.	Aspect	Brief Description
1	Teacher's Role as a Facilitator	The teacher guides students in reflective thinking, ensures active engagement, and provides constructive feedback to support the development of critical thinking skills.
2	Group Dynamics	Healthy interaction among students, open communication, and fair task distribution strengthen collaboration and collective critical thinking abilities.
3	Conducive Learning Environment	A comfortable classroom, supportive technology, and an inclusive atmosphere enable students to feel safe expressing ideas and engaging in deep thinking.
4	Group Heterogeneity	Groups diverse in abilities and backgrounds allow for the exchange of perspectives, encouraging students to think more critically and creatively.
5	Technology and Digital Learning Tools	Digital media such as Google Classroom or Padlet facilitate collaboration, discussion, and broad access to information to support students' critical thinking processes.

The table above identifies five key factors influencing the success of collaborative learning in developing critical thinking skills. First, the teacher's role as a facilitator is the primary foundation, guiding students to think reflectively and ensuring the active participation of each group member. Second, group dynamics emphasize the importance of open communication, equitable distribution of responsibilities, and mutual trust to foster effective collaboration. Third, a conducive learning environment, both physically and psychologically, provides a space for students to collaborate comfortably. Fourth, group heterogeneity allows students to learn from diverse perspectives, thus enriching their critical thinking. Finally, technology and digital tools support virtual interactions and access to a wider range of resources. These five factors complement each other and must be optimized simultaneously to maximize collaborative learning outcomes.

Key factors such as the teacher's role, group dynamics, and the learning environment have been identified as determinants of successful collaborative learning; nevertheless, the practical implementation of this approach frequently encounters various challenges. One major challenge is the gap in student abilities, which can lead to an imbalance in contributions within the group (Gillies, 2016). Furthermore, some students may feel uncomfortable with this learning model due to a lack of interpersonal skills or low self-confidence. To address these challenges, teachers need to provide initial training in collaboration skills, such as effective communication, conflict management, and shared decision-making. Continuous formative evaluation can also help teachers identify barriers students face and provide constructive feedback. Furthermore, creating an inclusive and supportive learning environment is key to ensuring that all students feel valued and motivated to participate. By addressing these challenges, key factors in collaborative learning can be optimized to effectively develop critical thinking skills.

As educators, the first step to maximize collaborative learning is to design activities relevant to the goal of developing critical thinking skills. For example, teachers can develop problem-based learning assignments or interdisciplinary projects that challenge students to think deeply and collaborate to find solutions. Furthermore, teachers need to ensure that groups are heterogeneous, both in terms of academic ability and social background, so that students can learn from diverse perspectives. During the learning process, teachers should act as active facilitators by asking reflective questions, providing constructive feedback, and monitoring group dynamics to prevent members from becoming dominant or inactive. The learning environment should also be

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inclusive, where every student feels safe to voice their ideas without fear of judgment. Technology can be leveraged to support collaboration, such as using online platforms for discussions or sharing resources. Finally, formative evaluations should be conducted periodically to identify barriers and provide guidance so that all students can contribute optimally. With this approach, collaborative learning can be an effective tool for developing critical thinking skills.

4. CONCLUSION

This research shows that collaborative learning has significant potential to develop students' critical thinking skills if implemented with the right strategies. Factors such as the teacher's role as a facilitator, group dynamics, a conducive learning environment, group heterogeneity, and technology integration are crucial for the successful implementation of this model. Teachers play a central role in designing collaborative activities that challenge and support students' analytical, reflective, and creative thinking. Meanwhile, positive group dynamics—characterized by open communication, equitable distribution of responsibilities, and mutual trust—ensure that all members can contribute optimally. An inclusive learning environment is also crucial for creating a safe atmosphere for students to voice their ideas. Furthermore, the use of technology can expand the space for collaboration, enabling students to work together even when they are not physically present. By combining all these factors, collaborative learning can be an effective tool for equipping students with critical thinking skills, much needed in today's information age.

This research makes a significant contribution to education by highlighting the importance of collaborative learning in developing critical thinking skills. These findings are beneficial for educators designing more innovative and contextual learning, and for educational institutions developing policies that support the implementation of collaborative models. Furthermore, the results of this study can be used as a reference for improving the quality of curricula oriented toward 21st-century skills. However, this study also has limitations, such as its focus on qualitative literature without involving empirical data from the field. Therefore, future research is recommended to combine quantitative and qualitative approaches through experiments or field surveys to test the effectiveness of collaborative learning models in real-world contexts. Further research could also explore the influence of other variables, such as school culture or students' socioeconomic backgrounds, on the success of collaborative learning.

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