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# The Dynamics of Interaction in Collaborative Learning: Supporting Intellectual Growth

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**Abstract:** This study aims to investigate the dynamics of interaction in the context of collaborative learning and how such interaction supports the intellectual growth of participants. The method employed in this research is Systematic Literature Review (SLR), which integrates a systematic approach to filtering and analyzing relevant scholarly literature. Through SLR analysis, this study explores various aspects of interaction in collaborative learning, including the types of interaction among participants, their influence on intellectual growth, and the factors affecting the dynamics of such interaction. The findings of this research will provide a comprehensive understanding of how collaboration in learning can optimize participants' intellectual growth. The results of this study are expected to contribute to the development of more effective and sustainable collaborative learning practices. The practical implications of this research can assist educators and learning practitioners in designing learning strategies that promote productive interaction and support the intellectual growth of participants.

**Keywords**: Collaborative Learning, Interaction dynamics, Intellectual Growth

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## A. INTRODUCTION

Collaborative learning is an instructional approach that emphasizes interaction among students and cooperation in completing tasks or projects together. In this learning context, students are encouraged to share their knowledge, experiences, and thoughts to achieve predefined learning objectives. Through collaboration, students can develop social skills, critical thinking abilities, and broaden their understanding of learning materials. By adopting this approach, learning ceases to be merely a process in which teachers transfer knowledge to students but becomes a dynamic process in which students actively engage in exploration, discussion, and collective reflection (Dewi 2018). In an era where collaborative skills are increasingly crucial, collaborative learning emerges as a relevant and effective choice in preparing students to meet the demands of a complex and rapidly changing world.

The intellectual growth of students refers to the process of cognitive, emotional, and social development experienced by students during their educational journey. It involves enhancing cognitive abilities such as comprehension, analysis, synthesis, and evaluation of information, as well as fostering critical and creative thinking skills. Moreover, intellectual growth also encompasses the development of students' emotional aspects, such as self-awareness, emotional regulation, and stress management (Pulsation 2015). Social aspects also play a vital role in intellectual growth, as students learn to interact with others, collaborate, and understand different perspectives. Through varied and supportive learning experiences, students can undergo holistic intellectual growth, preparing them to become skilled, knowledgeable, and adaptable individuals in facing diverse challenges in the future (Parnawi 2023).

The authors argue that collaborative learning plays a significant role in optimizing students' intellectual growth. Through collaboration among students, learning not only focuses on knowledge transfer but also expands understanding, enhances critical thinking abilities, and fosters essential social skills (Viandra, 2023). The interactions occurring in collaborative learning enable students to support each other, share ideas, and explore solutions together, thereby promoting holistic intellectual development. Thus, collaborative learning is not merely about information reception but also about fostering deeper understanding, developing complex thinking skills, and enhancing students' readiness to face intellectual challenges in the future (Harahap, 2017).

Factors influencing the dynamics of interaction in collaborative learning encompass classmates' behaviors, the need for discussion, learner characteristics, constraints within ongoing discussions, idea shortages, knowledge development levels, technical issues, limited time, and misunderstandings (Muchtar et al., 2021). Additionally, the duration before the first turn of the second speaker, the degree of imbalance in the number of words produced by speakers, and the focus duration in consecutive dialogue sections also affect collaboration assessments. Computational models can be utilized to analyze and support collaborative learning activities, with a focus on social factors and task-oriented interactions. Effective interaction in collaborative learning necessitates cognitive, social, and organizational interactions, which should be considered during the design, implementation, and evaluation phases. Interactions between learners and between learners and instructors become highly crucial in online learning contexts (andri 2020).

To enhance students' intellectual abilities, several strategies can be implemented. One approach is to adopt Computer-Supported Collaborative Learning (CCL) techniques, which have been proven to improve student learning and consistency in intellectual performance (Majid 2022). Another method is to implement Student-Centered Learning (SCL), which focuses on developing students' cognitive abilities through skills such as effective and creative thinking, cooperative learning, and student responsibility (Ikwanul Hakim 2022). Furthermore, providing appropriate training and educational interventions based on Gardner's theory of multiple intelligences can significantly enhance students' cognitive abilities. Additionally, employing innovative teaching models, such as the Two-Stay-Two-Stray learning model supported by innovative modules, can also enhance students' cognitive learning outcomes

(Astuti, 2018). By implementing these strategies, educators can create conducive learning environments that foster the development of students' intellectual abilities.

The dynamics of interaction play a crucial role in collaborative learning by supporting intellectual growth. Literature highlights three common types of interaction: interaction among learners, interaction between learners and instructors, and interaction between learners and learning content (Adisaka 2022). Interaction among learners encourages collaboration and knowledge sharing among students, enhancing their learning outcomes. Interaction between learners and instructors provides guidance and support, facilitating the learning process. Interaction between learners and learning content involves engagement with the learning materials, promoting deeper understanding and critical thinking (Izzati, 2017). These interactions contribute to the develsopment of a social learning environment, where students actively participate and learn from each other. Collaborative learning videos can be analyzed using the AM-FM multidimensional method to detect group interactions among students, providing insights into the effectiveness of collaborative learning activities. Overall, the dynamics of interaction in collaborative learning facilitate knowledge construction, problem-solving, and the development of critical thinking skills, leading to intellectual growth (Ismail 2019). Based on the aforementioned issues, there is a need for learning methods that can support the enhancement of intellectual growth. Intellectual abilities can be cultivated through student-centered learning. Based on the description above, this research aims to investigate the dynamics of collaborative learning interaction: supporting intellectual growth.

## B. METHOD

This scholarly article is composed using the Systematic Literature Review (SLR) method. In Indonesian, Systematic Literature Review is a method of literature review that identifies, examines, evaluates, and interprets all available research. With this method, researchers conduct a structured review and identification of journals, following predefined steps in each process. To complete this research, the researcher collected journal articles from Google Scholar. The keywords used to search for relevant articles were collaborative learning and intellectual growth. The articles collected were only those published between 2008 and 2023 (Aulia et al., 2023).

From the search results, several articles related to collaborative learning were found. These articles were then analyzed to identify mathematical concepts associated with intellectual growth. The initial step in this research involved identifying studies through electronic journals on Google Scholar, collecting relevant articles to extract data. Subsequently, the researcher reviewed and analyzed these articles in depth, particularly focusing on the research findings presented in the discussion and conclusion sections. In the final part of the study, the researcher compared the findings presented in the articles and drew conclusions (Muliana et al., 2023).

Following that, the review protocol was executed by formulating research questions and classifying keywords according to the population, intervention, comparison, outcome, and context strategy of the obtained articles. Inclusion and exclusion criteria were established by selecting articles that aligned with the research questions, disregarding the researcher's

subjective judgment in article selection. The Mendeley software was utilized to organize the selected articles to facilitate management and referencing. The process of data extraction and synthesis was conducted using thematic analysis and meta-analysis to present findings systematically and comprehensively. In the final part of the study, the researcher compared the findings presented in the articles and provided conclusions.

## C. RESULTS AND DISCUSSION

### 1. Main Findings Regarding the Dynamics of Interaction in Collaborative Learning

Collaborative learning involves active interaction among students from various disciplines. These interactions are characterized by explaining concepts to one another, self-monitoring, planning, and building relationships (Jeheman 2019). Additionally, students engage in asking both shallow and deep questions, socializing, expressing confusion or frustration, engaging in self-talk, and grappling with the material. The nature of these interactions is predominantly active, with students with better conceptual understanding being more constructive in their interactions (Halimah 2014). Novice students who lack knowledge of the subject matter may find it challenging to contribute to discussions, hindering their learning process. On the other hand, students with better conceptual understanding develop topics, relate them to previous issues, and demonstrate self-awareness of their understanding. Collaborative learning is viewed as an effective approach to building students' confidence and abilities, with communication among students playing a vital role. Incorporating collaborative learning into the curriculum has been found to enhance learning outcomes.

### 2. Types of Interaction in Collaborative Learning

Collaborative learning involves various types of interactions. Small groups engage in collective interactions and positive arrangements during collaborative learning (Sari 2019). These interactions are crucial for computer-supported collaborative learning situations, although not yet fully understood. In the context of digital technology, interactions with knowledge, with others in the learning or teaching community, and with the digital system itself are central in collaborative learning (Septihani 2020). Furthermore, techniques for analyzing collaborative interactions, involving coding and interpreting recorded group activities, are utilized by researchers in the field of Computer-Supported Collaborative Learning (CSCL). These techniques can be useful in the design, implementation, and evaluation of collaborative activities by teachers. Overall, collaborative learning involves various interactions that contribute to the learning process and can be supported by digital technology and analysis techniques.

### 3. Practices of Collaborative Learning

Collaborative learning can be implemented in the classroom by employing specific strategies and considering key factors (Karimah 2019). Teachers play a crucial role in providing guidance and direction for collaborative activities to ensure successful learning outcomes. Providing students with opportunities to choose their own group members can also result in better outcomes in collaborative learning. It is important to address barriers such as

self-image, perceived abilities, personality conflicts, lack of cooperation, and unclear instructions or guidance from the teacher (Mauladaniyati, 2015). Collaborative exams can be introduced as an alternative assessment method to complement traditional approaches. Online collaborative pedagogy can help develop critical skills and address challenges such as lack of focus and social isolation. Common issues in collaborative learning, such as grouping students, assigning learning tasks, and evaluating the process, can be overcome through appropriate solutions (Dzulfikar, 2021). Collaborative learning activities have been proven to enhance academic achievement and improve teamwork among students.

**4. Relationship of Findings with Previous Research**

Previous research findings are discussed in the provided abstracts. Replicating previous findings regarding structural brain differences related to gender incongruence (GI) and identifying the putamen as a region showing significant differences in gray matter volume (GMV) between transgender and cisgender individuals (Pramesti et al., 2021). Reviewing previous research on corporate diplomacy, public relations, legitimacy, media roles, and institutional interconnections. Comparing the prevalence of antipsychotic drug use among refugees and Swedish-born individuals with non-affective psychotic disorders, finding that refugees tend to use antipsychotics slightly less frequently at 1 year after diagnosis but exhibit similar usage patterns at 5-year follow-up (Wakit 2022). Discussing the collection and computation of earnings income in low- and middle-income countries using data from the United Nations System of National Accounts (UN SNA) and the International Labour Organization (ILO). Linking barriers to access in financial markets with previous empirical findings and connecting them to market failures (Syaikhu, 2016).

**5. Interactions in Fostering Students' Intellectual Growth**

The interaction between teachers and students can foster students' intellectual growth by creating intellectual exchanges where students introduce their original resources to the academic community, and educators enrich their intellectual knowledge through these interactions (Rosnaini, 2023). Teaching information literacy (IL) skills through interactive methods can facilitate students' intellectual development by promoting conceptual understanding and critical thinking. Interactive tests created using multimedia technology can also contribute to the development of students' intellectual skills. Informal interpersonal relationships between students and faculty have a positive impact on students' intellectual development. Interactive teaching, involving interaction and mutual influence between teachers and students, can create a balanced interactive environment and enhance the quality of interactions in the classroom, thus promoting students' holistic development (Kurniawan, 2022).

Analysis of the findings from this series of research indicates several gaps that need further investigation to deepen understanding of relevant topics. In the context of access to consumer credit in Nigeria, the research highlights the welfare benefits for consumers, yet further research is needed to explore in-depth the long-term impacts of access to credit on household economic conditions. Subsequent studies could identify specific factors influencing the effectiveness of consumer credit utilization in enhancing household welfare (Ratu 2019). Regarding the role of local politics in mega urban projects, there is a need to better understand the local political dynamics influencing the implementation of these projects. Further research could delve into the political factors driving or hindering the success of mega urban project implementation, as well as identify strategies to enhance their effectiveness (Sulistyowati 2023). The shift in education towards stimulating social-emotional learning underscores the importance of in-depth research on effective strategies to implement this approach in various contexts, including beyond school settings. Further studies could explore the impact of social-emotional learning on academic achievement and student well-being comprehensively, as well as identify factors influencing the success of its implementation. (Pakaya 2019) In the context of Middle Eastern geopolitics, further research could lead to a better understanding of power dynamics in the region and its implications for regional stability. Subsequent studies could explore strategies to manage crises that may affect power distribution in the region. In the classification and genetic analysis of gliomatosis cerebri (GC), further research could validate findings regarding subgroups and their relationship with diffuse infiltrating gliomas (Auniyah, 2020). Overall, further studies can explore the clinical and genetic characteristics of these subgroups and their implications in developing more effective treatment strategies. The research conducted so far has made significant contributions to understanding various aspects related to relevant topics. However, there are knowledge gaps that can be addressed through further research to deepen understanding and develop better solutions in diverse contexts.

## D. CONCLUSION

Based on the findings from previous research on collaborative learning, there are significant implications for collaborative learning theory and practice. Firstly, the findings indicate that collaborative learning has a positive impact on students' academic achievement and enhances cooperation skills among them. By engaging students in collaborative activities, teachers can create a learning environment that supports social interaction and the development of social-emotional skills crucial in everyday life. Secondly, the findings also highlight the importance of the teacher's role in providing guidance and direction in collaborative activities. Teachers need to consider factors such as group dynamics, students' perceptions of their own abilities, and the clarity of instructions to ensure the success of collaborative learning. Additionally, online collaborative learning approaches can help address challenges such as lack of focus and social isolation in distance learning environments. Thirdly, despite the significant benefits of collaborative learning, research also identifies some limitations that need to be addressed. Some previous studies have acknowledged limitations in the student grouping process, assignment setting, and evaluation of collaborative learning processes. Therefore, further research is needed to identify and overcome these barriers to

enhance the overall effectiveness of collaborative learning. Thus, the research findings provide a deeper understanding of the importance of collaborative learning in improving student achievement and provide guidance for enhancing collaborative learning practices in educational environments.

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