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Enhancing Critical Thinking and Collaboration Skills Through Interactive Teaching Methods: A Qualitative Study in Higher Education

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Abstract

Critical thinking and collaboration are essential skills for university students facing rapidly evolving academic and professional landscapes. This qualitative exploratory study investigates several factors that contribute significantly to critical thinking and collaboration skills through interactive teaching. Ten students and five lecturers from urban, middle-class backgrounds participated in four sessions of semi-structured interviews and focus group discussions. Data were validated by triangulation and analyzed thematically. Three primary factors emerged: (1) interactive modalities Socratic questioning, peer education, structured project-based tasks, and digital simulations which enhance active engagement, cognitive exploration, and peer interaction; (2) inclusive, psychologically safe classroom climates that encourage open communication, risk-taking, and mutual respect; and (3) lecturers' facilitative roles, including guided discourse, timely constructive feedback, and promotion of independent inquiry. Limitations involve variability from individual differences and institutional contexts. The findings underscore the importance of integrating interactive pedagogies with supportive environments and facilitator-led guidance to cultivate higher-order thinking and collaborative competencies. Practical implications for educators and policymakers include designing holistic, context-sensitive instructional strategies to prepare students for complex challenges, and the need to align course design with Bloom's Taxonomy and social constructivist principles. Future research should assess the scalability and adaptability of these practices across diverse settings such as high schools, vocational training, and online platforms, and evaluate their long-term impact on student outcomes.

Keywords: Collaboration Skills, Critical Thinking, Higher Education, Interactive Teaching Methods, Learning Environment, Lecturer Role.

Introduction

The increasing complexity of the global landscape, driven by globalization and the Fourth Industrial Revolution, has positioned critical thinking and collaboration skills as essential competencies for university students. Higher education institutions are expected to develop these skills through innovative instructional models that go beyond traditional rote learning and promote active engagement (1). This educational shift reflects a growing recognition that the capacity to think critically and collaborate effectively is vital for succeeding in a rapidly evolving workforce and society (2, 3). Various pedagogical approaches have been investigated to enhance these skills in higher education settings. Among these, Project-Based Learning (PBL) is widely recognized for fostering critical thinking and problem-solving abilities through student engagement and autonomy (4, 5). PBL also supports collaboration by requiring students to address real-world problems, thereby enhancing both cognitive and interpersonal competencies. Additionally, blended learning models and the integration of digital platforms have been identified as effective in enriching interactive learning and delivering personalized feedback, which is crucial for deep cognitive engagement (6). Technological integration offers access to diverse resources and interactive learning opportunities, contributing to the development of critical thinking and collaboration skills. Debate and collaborative learning methods have also proven effective in enhancing critical thinking by encouraging constructive dialogue and the critical analysis of complex issues (7–9). Furthermore, experiential learning techniques, including case studies and real-world simulations, have demonstrated the ability to facilitate the practical application of

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critical thinking in contextually rich scenarios (10, 11). Collectively, these pedagogical strategies offer a comprehensive framework for fostering critical thinking in higher education. Despite these advancements, important gaps remain in understanding how specific factors enhance critical thinking and collaboration in university settings (12, 13). Although structured frameworks such as PBL and case-based learning have been widely implemented, their effectiveness varies across disciplines and institutions. Moreover, the integration of digital tools does not always align with strategies for promoting critical engagement (14, 15). Recent developments in pedagogy, such as gamification and simulation-based learning, have shown potential for enhancing critical thinking by offering students interactive problem-solving scenarios that stimulate innovative application of knowledge (16–18). When combined with constructive feedback and collaborative activities, these methods contribute to a more holistic model of skill development. Nonetheless, optimizing their application to strengthen both critical thinking and collaboration requires further empirical exploration. Collaborative learning environments that incorporate digital technologies and peer-to-peer interactions have also been found effective in promoting critical thinking. These environments enable students to explore diverse perspectives, engage in peer assessment, and participate in meaningful academic discourse (19–21). However, designing such environments to consistently produce optimal learning outcomes remains an ongoing challenge.

This study aims to address these gaps by exploring the factors that contribute to the enhancement of critical thinking and collaboration skills among university students. The novelty of this research lies in its qualitative examination of specific influencing factors, as perceived by students and lecturers. By investigating the roles of interactive teaching methods, supportive learning environments, and lecturers as facilitators, the study offers practical insights for developing integrated and effective instructional strategies suited to contemporary educational demands.

Methodology

Research Design

This section outlines the qualitative research methodology employed to explore factors that support the enhancement of critical thinking and collaboration skills among university students. The approach was designed to ensure systematic data collection, transparent analysis, and academic rigor consistent with standards for high-quality qualitative research. A qualitative exploratory design was adopted to gain in-depth insights into the experiences, perceptions, and perspectives of students and lecturers regarding the development of critical thinking and collaboration skills (22). Interactive teaching methods explicitly investigated included Socratic questioning, peer education, problem-based learning, and digital tools**.** This research design is particularly well-suited for examining complex, context-specific phenomena and allows researchers to collect rich, descriptive data through flexible and interactive methods (4,23). It was selected to develop a nuanced understanding of how interactive teaching methods and supportive learning environments contribute to the development of essential academic skills (24, 25).

Participants

Participants in the study consisted of university students and lecturers affiliated with selected higher education programs that explicitly incorporated pedagogical approaches aimed at enhancing critical thinking and collaboration. Purposive sampling was used to recruit individuals who had either participated in or facilitated such programs, ensuring relevance to the research objectives (26, 27). Individuals not involved in these learning processes were excluded. The study targeted approximately 10 students and 5 lecturers, with the final number determined by the principle of data saturation, when no new insights emerged. Participants came predominantly from urban middle-class socioeconomic backgrounds, reflecting the general demographic profile of the university, thus contextualizing findings within this cultural and economic environment. This purposive sampling strategy ensured the credibility and transferability of findings by focusing on information-rich cases.

Data Collection Technique

Data collection involved semi-structured, in-depth interviews and focus group discussions, both of which are effective for eliciting detailed accounts of participant experiences and views (23, 28). The interview and discussion guides were carefully developed to align with the research objectives and to encourage open reflection on factors supporting the enhancement of critical thinking and collaboration skills. The study involved four interview sessions (approximately 45 minutes each) and two focus group discussions (approximately 60 minutes each). The lecturer's role during sessions included guiding discussions, facilitating critical inquiry through Socratic questioning, and ensuring active participation through digital collaborative tools. To ensure authenticity and reliability, the interview and discussion guides were reviewed by two experts in education and pedagogy. Revisions were made based on their feedback. Furthermore, reliability was reinforced through coder calibration and inter-coder consistency checks during the analysis process. All interviews and discussions were recorded with informed consent and transcribed verbatim to ensure data accuracy and completeness. Reliability was further enhanced through peer debriefing and periodic reviews of coding consistency. Triangulation of data from different sources—individual interviews and group discussions—added further depth and dependability to the analysis (29, 30). The combination of individual interviews and focus group discussions facilitated data triangulation, which strengthened the credibility and dependability of the findings (31).

Ethical Considerations

Ethical considerations were strictly upheld throughout the research. Participants provided informed consent, and their anonymity and confidentiality were maintained at all times. This comprehensive protocol ensured the quality and reliability of the collected data, forming a strong foundation for analysis.

Data Analysis

Thematic analysis was used to identify, organize, and interpret themes emerging from the transcribed data. This method is particularly effective for uncovering recurring patterns in qualitative research, especially in studies focused on perceptions and skill development (32,33). The coding process began with the generation of initial codes based on recurring ideas related to critical thinking and collaboration. These were subsequently refined and grouped into broader themes. A detailed thematic coding flowchart illustrating each step from initial coding to theme identification is provided in Figure 1. The analysis was iterative and involved ongoing adjustments to ensure conceptual clarity and coherence. Identified themes were compared with existing literature to enhance interpretive credibility and to contextualize the findings within the broader academic discourse.

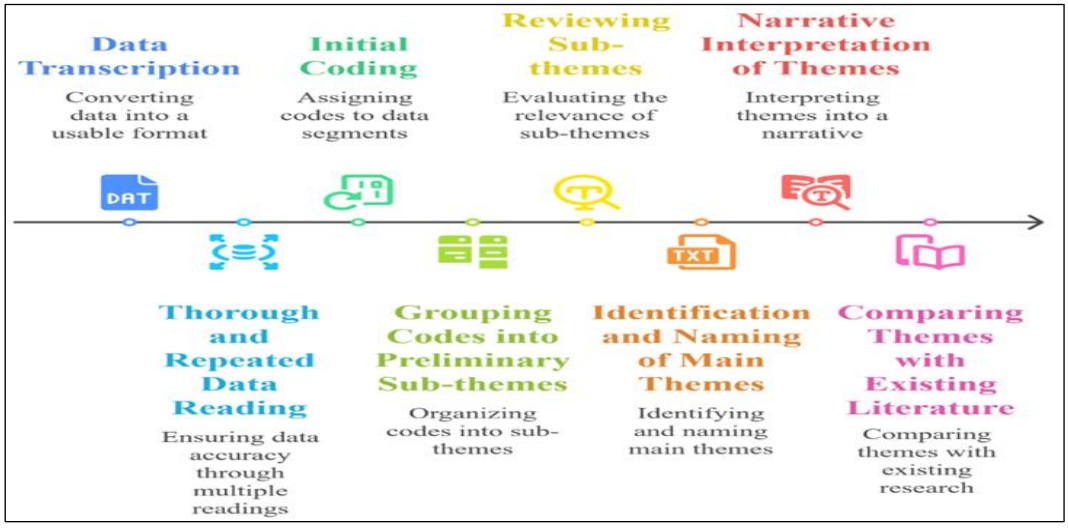

Figure 1: Thematic Analysis Flowchart

The research was conducted through a structured sequence beginning with the formulation of clear research objectives, followed by a comprehensive literature review. Subsequently, the interview and

focus group guidelines were developed, after which participant selection and data collections were carried out. Transcription and thematic analysis were performed rigorously, and the findings were interpreted in light of the study's aims. The process concluded with the composition of the final research report. This structured and rigorous approach enabled the extraction of meaningful insights into the key factors influencing the development of critical thinking and collaboration skills in higher education. The methodological framework employed in this study offers a replicable model for similar qualitative investigations and supports the broader credibility and applicability of the findings. However, the qualitative exploratory nature inherently limits the generalizability of findings to broader or significantly different educational contexts, such as high schools or vocational training settings. Potential variations in results may occur due to differences in institutional support, participant demographics, or resource availability.

Results

This section presents the findings obtained from in-depth interviews and focus group discussions with university students and lecturers. Using thematic analysis, the data were organized into three central themes that describe the key factors contributing to the development of critical thinking and collaboration skills: interactive teaching methods, supportive learning environments, and the role of lecturers as facilitators. Figure 2 summarizes the thematic analysis flow, clearly illustrating how each theme emerged from the initial coding process.

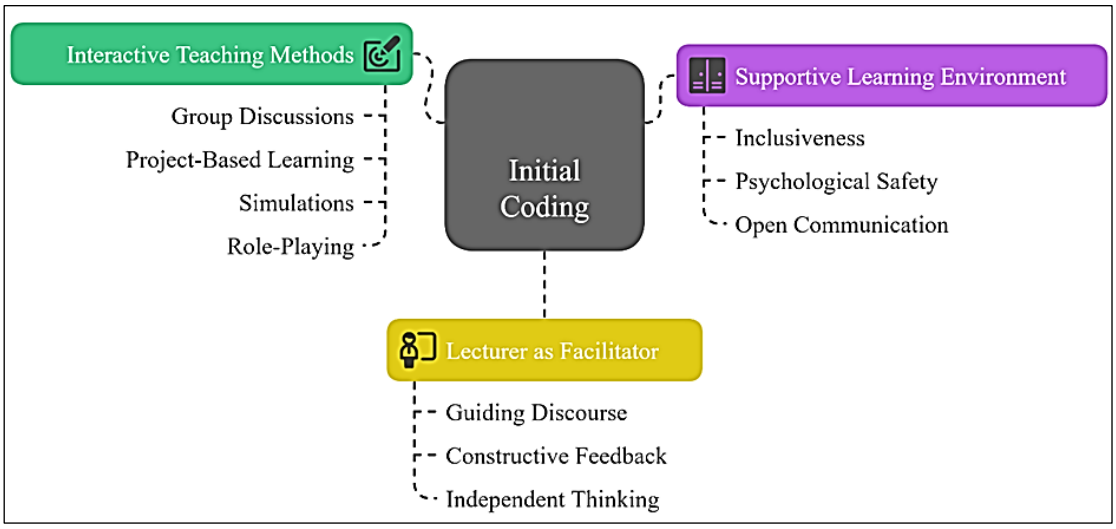

Figure 2: Thematic Analysis Flow: From Initial Coding to Theme Identification

Interactive Teaching Methods

The data revealed that interactive teaching methods—including group discussions, project-based learning, simulations, and role-playing—play a significant role in enhancing both critical thinking and collaborative learning among students. Interactive methods specifically tested in this study were Socratic questioning during group discussions, peer education activities, structured PBL tasks, and digital collaborative tools (e.g., interactive platforms). Group discussions were frequently mentioned by students as effective in helping them explore different viewpoints, enhance analytical thinking, and gain confidence in articulating ideas (34–36). One student shared, *"Group discussions encourage me to be more critical when analyzing issues because of diverse perspectives."* PBL asks, conducted over four structured sessions, and were recognized for promoting collaboration through shared decision-making and mutual responsibility, which also supported deeper analytical reasoning (37, 38). Lecturers reported that collaborative classroom activities were more effective than traditional lectures in engaging students and cultivating critical reflection. Additionally, simulation and role-playing activities conducted digitally through online collaborative tools enabled students to apply theoretical concepts in practical scenarios, thus strengthening critical thinking through experiential learning. As expressed by a student, *"Role-playing helps me and my friends learn to argue in realistic situations. This truly sharpens our*

critical thinking." These activities also encouraged teamwork, as students worked together to evaluate situations, provide feedback, and adjust their responses based on group input.

Supportive Learning Environment

The learning environment emerged as a crucial element in fostering students' critical thinking and collaboration. Many students emphasized the importance of an inclusive and non-judgmental classroom atmosphere, which made them more comfortable expressing opinions and participating in group discussions. One participant noted, *"When lecturers allow us to freely express opinions, we learn more from each other."* Such environments encourage open communication, enabling students to share ideas without fear of negative judgment.

Lecturers highlighted the need to create a respectful and open environment where all contributions are valued. One remarked, *"I always emphasize that there are no 'stupid' answers in my class. Everyone has the right to express their thoughts."* This emphasis on mutual respect and psychological safety across sessions helps students feel empowered to contribute, thereby enhancing their willingness to collaborate and engage critically.

Lecturer as Facilitator

The facilitative role of lecturers was consistently identified as a key factor supporting students' development of critical thinking and collaborative competencies. Students reported that lecturers who guided rather than dominated discussions created more meaningful learning experiences. Through constructive feedback, probing questions, and encouragement of independent inquiry, such lecturers cultivated environments where students felt comfortable engaging deeply with content and peers. One student reflected, *"Lecturers who not only teach but also guide us encourage us to express our opinions better."* Lecturers similarly described their pedagogical roles as balancing structure with autonomy. One explained, "*I try to keep a balance; I guide them when necessary but let them discover solutions independently*." This approach supports the growth of student autonomy and collaborative problem-solving, encouraging deeper analysis through peer interaction.

Summary of Findings

The analysis identified three interrelated factors that significantly influence the enhancement of critical thinking and collaboration skills in higher education. Table 1 explicitly summarizes key findings. Interactive teaching methods (group discussions, structured PBL sessions, digital simulations, and role-playing), supportive learning environments (inclusive, psychologically safe classroom atmospheres), and lecturers acting as facilitators were consistently highlighted by participants.

Table 1: Summary of Key Findings on Enhancing Critical Thinking and Collaboration Skills

Theme	Key Findings
Interactive Teaching Methods	Group discussions, PBL, simulations, and role-playing promote critical thinking and collaborative skills.
Supportive Learning Environment	Inclusive and non-judgmental atmospheres enhance student participation and willingness to collaborate.
Lecturer as Facilitator	Facilitative roles promote independent learning, collaboration, and critical engagement.

These findings provide actionable insights for educators and curriculum developers seeking to strengthen critical thinking and collaboration among students. The results emphasize the importance of adopting a holistic approach that integrates interactive instructional methods, supportive learning settings, and facilitative teaching roles to optimize student development in higher education contexts.

Discussion

The findings of this study highlight several key factors that significantly contribute to the enhancement of critical thinking and collaboration skills among university students. These findings align with existing literature that emphasizes the value of interdisciplinary pedagogical approaches, particularly those integrating innovative teaching frameworks, collaborative methods, and digital literacy. The use of interactive teaching methods explicitly tested in this study (Socratic questioning,

peer education, structured PBL, digital simulations, and role-playing) is consistent with Bloom's Taxonomy, which supports the progression from lower-order to higher-order thinking, a necessary foundation for developing critical thinking (39). Digital literacy also plays a pivotal role, enabling students to critically evaluate information and participate in reflective thought processes (40–42). Innovative instructional frameworks that merge design thinking, cultural elements, and educational innovation have been found to improve both critical thinking and problem-solving skills (43). Another research underscores the importance of critical thinking, teamwork, and communication as core employability competencies (44). In addition, feminist pedagogy, which advocates for inclusivity and diversity through collaboration, is also recognized as a valuable mechanism for enhancing critical engagement (45–47). Support for collaborative learning environments that incorporate digital tools is evident throughout the literature. These environments facilitate the sharing of diverse perspectives, peer assessment, and meaningful dialogue, all of which are essential for strengthening both critical thinking and collaboration (19–21, 48, 49). Despite the potential of these approaches, several challenges and limitations hinder their widespread adoption. A key issue is the disconnect between academic preparation and the practical demands of the workplace, which may limit students' readiness to navigate real-world challenges (44). Moreover, the successful implementation of innovative pedagogical strategies often requires institutional support, which may not be readily available in all settings (43). Institutional resistance to inclusive pedagogies is another persistent barrier. Traditional academic structures and norms can obstruct the adoption of collaborative and critical thinking models. Additionally, the uneven distribution of digital literacy among students can impede effective engagement with technology-enhanced learning tools designed to foster critical and collaborative skills (41). Variations in results observed in this study may be attributed to individual student differences, the specific teaching contexts, and varying levels of institutional support, highlighting potential limitations in generalizing these findings.

The study's findings are grounded in several well-established theoretical frameworks. Vygotsky's Zone of Proximal Development and the 7C Skills Framework provide clear structures for supporting the development of critical thinking and collaboration. Social constructivist models, such as peer evaluation systems, contribute to cognitive growth through social interaction and collaboration (50). The 7C Skills Framework further integrates these competencies into a broader engagement theory, reinforcing the interconnected nature of skill development (51). Other relevant perspectives include symbolic interactionism, critical realism, and structuration theory. Symbolic interactionism highlights how students construct meaning through interaction, thereby deepening their comprehension of complex concepts (50). Critical realism emphasizes the influence of contextual and institutional structures on educational interventions aimed at developing collaboration and critical thinking (50). Structuration theory, as proposed by Giddens, underscores the dynamic interplay between students' agency and the institutional structures in which they operate (51). The findings suggest practical implications for pedagogical practice. Effective integration of teaching strategies, alongside the enhancement of students' digital literacy, can advance their ability to think critically and collaborate meaningfully (52, 53). Using Bloom's Taxonomy as a foundation for instructional design provides educators with a pathway to guide students through complex cognitive tasks (39). Strategic implementation of educational technologies further supports the creation of collaborative learning environments (54–56). These technologies facilitate interactive and reflective engagement with content, promote perspective-sharing, and support active learning through project-based tasks (41). Emerging pedagogical approaches such as gamification and simulation-based learning have also demonstrated their capacity to stimulate critical thinking and collaborative competencies (16–18). To address the aforementioned challenges, educational institutions must develop more inclusive and scalable pedagogical strategies. Institutional support, in terms of policy, resources, and professional development, is essential to facilitate innovation in teaching practices. Future research should focus on constructing adaptable teaching

models that emphasize inclusivity, engagement, and collaboration. It is also recommended that further studies investigate the practical integration of theoretical models, such as social constructivism, symbolic interactionism, and structuration theory, into instructional strategies aimed at enhancing critical thinking and collaborative skills in diverse educational contexts. Moreover, the scalability of the interactive teaching methods tested here including Socratic questioning, peer education, PBL, and digital tools to other contexts such as high schools, vocational education, and online learning environments should be explored, potentially requiring adaptations in delivery, facilitator roles, and institutional support.

Conclusion

This study underscores the essential role of interactive teaching methods, supportive learning environments, and facilitative lecturer engagement in enhancing university students' critical thinking and collaboration skills. Pedagogical approaches such as structured group discussions using Socratic questioning, peer education, project-based learning sessions, and digitally-supported simulations and role-playing were shown to foster active engagement, cognitive exploration, and meaningful peer collaboration—key components in the development of higher-order thinking skills. Inclusive and open classroom environments were identified as fundamental to promoting student participation, confidence, and motivation. These settings provide the psychological safety necessary for students to express ideas freely, engage in constructive dialogue, and collaborate effectively.

The findings further highlight the importance of lecturers adopting a facilitative rather than an authoritative role. By guiding discussions, offering feedback, and encouraging independent inquiry, lecturers create conditions that support critical engagement and foster student autonomy in learning processes. However, the implementation of these strategies is not without challenges. Persistent barriers such as unequal participation, resistance to pedagogical innovation, and limited institutional support hinder the full realization of these approaches. Structural constraints within educational institutions may further complicate efforts to cultivate critical and collaborative competencies. Additionally, variations in student outcomes due to individual differences and contextual factors highlight limitations in generalizability of the findings. To address these issues, future research should prioritize the development of inclusive, adaptable, and scalable teaching models that can respond to diverse

academic and cultural contexts. Strengthening institutional support systems and promoting a culture of pedagogical innovation will also be critical for scaling effective teaching practices. Specifically, future research should explore how the interactive teaching methods examined here such as Socratic questioning, peer education, PBL, and digital tools can be adapted or scaled effectively across different educational contexts including high schools, vocational training, and online learning platforms. Importantly, the interactive teaching techniques identified in this study have the potential to be scaled and modified for use beyond higher education. In high school settings, techniques like role-playing and problem-solving can be scaffold with increased guidance. For online learning, digital simulations, breakout room discussions, and collaborative tools can replicate many interactive dynamics effectively. In vocational education, role-playing and scenario-based activities can mirror real-world tasks, reinforcing both cognitive and practical competencies. The insights from this study offer practical implications for educators, administrators, and policymakers seeking to prepare students for the complexities of the contemporary workforce. By integrating interactive pedagogies, cultivating inclusive learning environments, and empowering lecturers as facilitators, higher education institutions can more effectively nurture the critical and collaborative capacities required in today's dynamic world.

Abbreviation

No abbreviations were used in this study.

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Author Contributions

All authors contributed equally to the conceptualization and design of the study, data collection, analysis, interpretation, manuscript

drafting, and critical revision for important intellectual content.

Conflict of Interest

Authors declare no conflicts of interest related to the publication of this manuscript.

Ethics Approval

This study did not involve human or animal participants. Therefore, ethics approval was not required.

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