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# Collaborative Learning in Higher Education: Review

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## ABSTRAK

Meskipun pembelajaran kolaboratif telah banyak digunakan dalam pendidikan tinggi, sebagian besar penelitian tentang topik ini masih mengkaji hasilnya secara terpisah, dengan sedikit perhatian terhadap bagaimana literasi digital, komunikasi, dan berpikir kritis berkembang secara bersamaan dalam lingkungan berbasis teknologi. Fragmentasi ini menghambat pemahaman terhadap dampak terintegrasi pembelajaran kolaboratif terhadap kompetensi abad ke-21 yang saling terkait, terutama dalam konteks pascapandemi di mana keterlibatan digital menjadi sangat penting. Untuk menjembatani kesenjangan tersebut, penelitian ini mensintesis data empiris mengenai manfaat multidimensional pembelajaran kolaboratif melalui tinjauan literatur sistematis. Tinjauan ini menganalisis 11 artikel jurnal peer-review yang dipilih dari total awal 112 studi yang terindeks di Scopus dengan menggunakan kerangka PRISMA. Kriteria inklusi meliputi: (1) publikasi antara tahun 2014 hingga 2023; (2) artikel berbahasa Inggris; (3) relevansi dengan pembelajaran kolaboratif di pendidikan tinggi; (4) ketersediaan teks lengkap dan abstrak; serta (5) studi empiris dengan desain metode campuran, kuantitatif, atau kualitatif. Hasil penelitian menunjukkan bahwa lingkungan pembelajaran kolaboratif yang terstruktur dengan baik secara signifikan meningkatkan kemampuan mahasiswa dalam menggunakan teknologi digital, penalaran analitis, dan keterampilan komunikasi. Hasil ini terutama terlihat ketika desain pembelajaran mencakup integrasi teknologi yang bermakna, dialog reflektif, dan tugas kelompok yang terstruktur. Namun demikian, masih terdapat tantangan, khususnya dalam mempertahankan keterlibatan aktif dan memastikan kolaborasi yang bermakna dalam lingkungan virtual. Secara keseluruhan, studi ini memberikan wawasan teoretis dan praktis untuk mengoptimalkan pembelajaran kolaboratif guna mendorong pengembangan keterampilan terintegrasi dalam pendidikan tinggi modern.

**KATA KUNCI:** pembelajaran kolaborati; pendidikan tinggi; tinjauan literatur sistematis

## ABSTRACT

This study explores the potential of collaborative learning in higher education as a means of strengthening students' critical thinking, communication, and digital literacy skills—three competencies widely regarded as essential for success in the twenty-first century. Although collaborative approaches have long been discussed in educational theory, less attention has been given to how they simultaneously cultivate these interconnected skills in technology-rich environments. To address this gap, a systematic literature review was conducted following the PRISMA framework, examining peer-reviewed studies published between 2014 and 2023. The findings consistently indicate that well-designed collaborative learning environments foster deeper analytical reasoning,

clearer communication, and more purposeful engagement with digital tools. These outcomes are most evident when collaboration is supported by structured group tasks, reflective dialogue, and meaningful integration of technology. Approaches such as team-based learning, shared virtual workspaces, and online discussion platforms enable students to negotiate ideas, evaluate evidence, and co-construct knowledge in ways that extend beyond traditional lecture formats. At the same time, the review highlights ongoing challenges, particularly in sustaining active participation in virtual settings and ensuring that collaboration remains substantive rather than superficial. In post-pandemic educational contexts, where blended and online learning have become commonplace, these issues are especially pressing. Overall, this study contributes practical insights for educators and curriculum designers seeking to develop targeted instructional strategies that not only promote academic achievement but also prepare students for the complex communicative and digital demands of contemporary professional life.

***KEYWORD:*** *collaborative learning; higher education; systematic literature review*

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## INTRODUCTION

Higher education today faces a significant challenge in preparing graduates who excel academically and possess 21st-century skills. Skills such as critical thinking, effective communication, collaboration, and digital literacy are now recognized as essential for students to navigate rapid change in a dynamic work environment. The ability to adapt to technological advancements and interpersonal skills is increasingly crucial in a global environment. In this context, higher education plays a vital role in developing these skills to enhance students' competitiveness in a professional world that demands innovation, complex problem-solving, and the ability to work in cross-disciplinary teams (Goulart et al., 2022). One widely acknowledged approach for developing these skills is collaborative learning. Collaborative learning is an instructional method that encourages active student interaction through structured group work, such as discussions, problem-solving, or joint projects "(Sotto, 2021; Syamsuarni et al., 2021). This approach aims to overcome the limitations of traditional learning methods, which often position students as passive recipients of information. Through collaborative learning, students are exposed to active learning experiences in which they share ideas and develop critical thinking skills by engaging with perspectives that may differ from their own (Eskiyurt, 2024).

Critical thinking, in particular, is one of the most necessary skills for students. Through critical thinking, students can analyze information deeply, evaluate evidence, and make better decisions (Mohamed Nor & Sihes, 2021; Putro & Tejaningrum, 2022). In collaborative learning, students are invited to identify problems, discuss them, and formulate solutions collectively. This situation encourages students to engage in deeper thought processes, helping them develop logical arguments and train their ability to question and evaluate the ideas of others

constructively (Murad et al., 2021). In addition to critical thinking, effective communication is a priority in higher education, as this skill is among the most sought after by companies across industries (Dias-oliveira et al., 2024). In collaborative learning contexts, students learn to express their ideas clearly and precisely, orally and in writing. They are also trained to listen to others' opinions, provide relevant feedback, and work harmoniously in groups (Zhang, 2023). Thus, collaborative learning enhances speaking skills and trains active listening abilities, which are essential in diverse work environments.

Digital literacy, the third crucial skill, is increasingly important in this era of digital transformation. The ability to understand and use technology effectively not only supports more interactive learning but also becomes a valuable asset for students in the professional world (Reichert et al., 2022). Technology-supported collaborative learning enables students to interact in virtual environments, develop their abilities to use technological tools and build digital literacy skills relevant to modern needs (Cherbonnier et al., 2025; Forsström et al., 2025). By utilizing digital platforms such as online discussion boards, virtual group projects, and collaborative document editing tools, students can enhance their technological adaptability directly in collaborative contexts. The implementation of collaborative learning in higher education offers many benefits, especially in building these essential skills simultaneously. Not only does it foster a deeper understanding of learning material, but this model also helps students build a sense of responsibility, critical thinking skills, communication skills, and technological literacy in an integrated manner (Werth et al., 2022). In collaborative groups, students actively participate as team members, working together to achieve common goals, ultimately supporting the development of character and social skills needed in the workplace (Liang & Fung, 2020).

However, although numerous studies highlight the benefits of collaborative learning, research exploring its specific impact on critical thinking, communication, and digital literacy skills in higher education contexts remains limited. Most studies focus on general aspects of collaborative learning, such as improved understanding of the material or student satisfaction with this learning method, yet lack a detailed explanation of its impact on building these skills in a contextual and practical context. Filling this gap in the literature is essential to ensure that collaborative learning models can be implemented with greater targeted effectiveness.

This study aims to bridge this gap by exploring how collaborative learning in higher education can be optimized to support the development of critical thinking, communication, and digital literacy skills. With a more specific approach, this study not only aims to contribute theoretically but also provides practical insights that can be useful for educators and policymakers in designing learning strategies that align with the needs of 21st-century skills. Additionally, this research seeks to understand more deeply

how students can be encouraged to apply these skills in various situations relevant to their future professional contexts. Through this study, effective collaborative techniques are expected to be identified for building 21st-century skills and addressing potential challenges in classroom implementation. In an era of rapid technological advancement, the need for digital literacy, critical thinking, and effective communication becomes increasingly urgent. Therefore, this study also aims to provide insights into how higher education institutions can integrate technology into collaborative learning to enhance students' digital skills.

This study is guided by three central research questions concerning the implementation of collaborative learning in higher education. First, it examines how collaborative learning influences the development of students' critical thinking skills, particularly their ability to analyze, evaluate, and reflect on information in a thoughtful and systematic manner. Second, it seeks to identify which collaborative learning techniques are most effective in strengthening students' communication skills, both oral and written, including their capacity to articulate ideas clearly and work productively within a team. Third, the study explores the challenges and opportunities educators encounter when implementing collaborative learning to foster critical thinking, communication, and digital literacy in an integrated way. Through these questions, the research aims to provide a comprehensive understanding of the effectiveness of collaborative approaches, the strategies that support successful implementation, and the contextual factors that shape their impact in preparing students for academic and professional demands in the digital era.

## METHODS

Using the PRISMA framework to conduct a systematic literature review (SLR) involves a structured approach to identifying, screening, and synthesizing relevant literature. This approach ensures transparency and thoroughness in the review process. Here's how PRISMA was applied in this SLR, which examined the Scopus database for literature on *collaborative learning in higher education* from 2014 to 2023.

The Identification stage began with a search on Scopus, using the keywords *"collaborative"*, *"learning"*, *"higher"*, and *"education"*. The search was filtered to include articles from journals ranked Q1 to Q4, published between 2014 and 2023, resulting in 112 articles. At this stage, duplicate records were reviewed, but none were identified, so no records needed to be removed for duplication. Automated screening tools then marked 20 records as ineligible based on the year range (2014-2023), while another 15 records were excluded because their ranking tiers fell outside the defined Q1 to Q4 range. Additionally, one record without an abstract was removed, as it could not be accurately screened without this information. After these preliminary exclusions, 76 records proceeded to the screening stage.

The Screening stage applied further eligibility criteria to the remaining 76 records. Through abstract and title

**Table 1. Inclusion and Exclusion criteria**

| Criteria | Inclusion | Exclusion |
|---|---|---|
| Publication Type | Peer-reviewed journal articles (Q1–Q4) indexed in Scopus | Conference papers, book chapters, dissertations, grey literature |
| Publication Date | Articles published between 2014 and 2023 | Studies published before 2014 or after 2023 |
| Language | Articles written in English | Articles in languages other than English |
| Topic Relevance | Studies focusing on collaborative learning in higher education | Studies unrelated to collaborative learning in higher education |
| Research Design | Quantitative, qualitative, and mixed-methods studies | Studies that do not fit the research scope |
| Full-Text Availability | Full text must be available | Articles without full-text access |
| Abstract Availability | Articles must include an abstract | Articles missing an abstract |
| Journal Ranking | Published in Scopus-indexed journals ranked Q1 to Q4 | Journals not classified within Q1–Q4 |
| Duplicate Records | Unique articles with no duplication | Duplicate studies identified during screening |

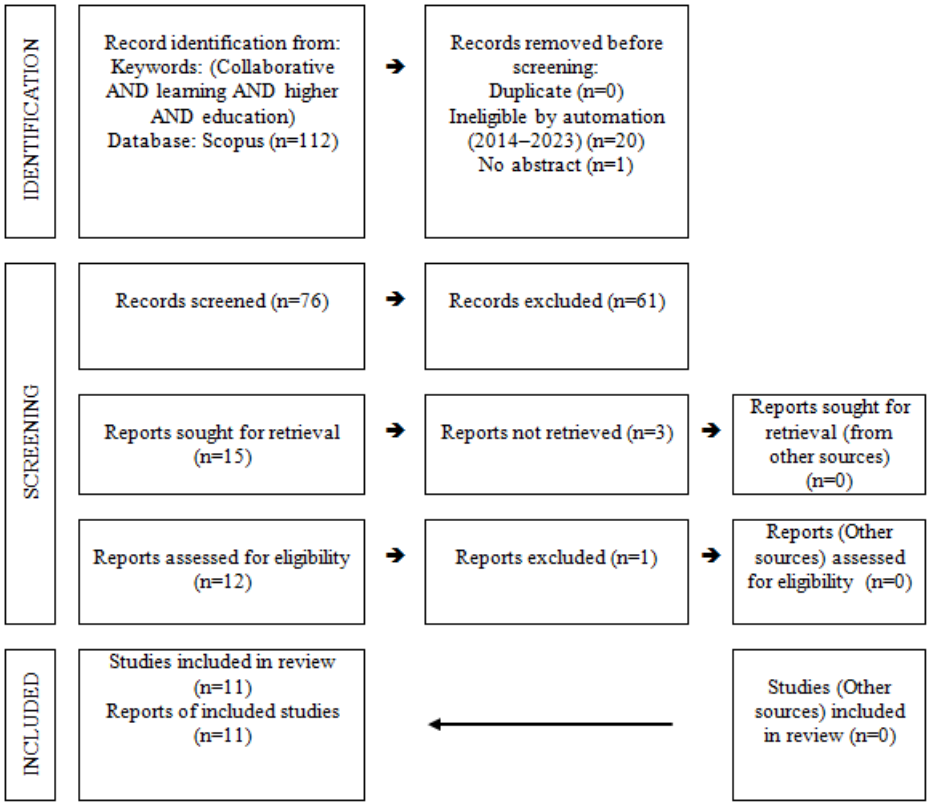


**Figure 1. Prisma Flow Diagram**

screening, 61 records were excluded for not meeting the criteria related to collaborative learning's impact on higher education. The remaining 15 records were identified for full-text retrieval. However, four reports could not be retrieved, leaving 11 reports to move to the eligibility assessment. These 11 articles were thoroughly reviewed during the Eligibility stage to determine their relevance and alignment with the research objectives. This involved assessing the articles for their focus on the impact of

collaborative learning on higher education outcomes. No further articles were excluded at this stage, meaning all 11 articles met the established criteria and were deemed suitable for inclusion.

The Inclusion stage represents the final phase, where 11 studies were confirmed and included in the review. The PRISMA process yielded a refined, targeted dataset of 11 studies, enabling a focused synthesis of how collaborative learning in higher education influences critical skill areas. This systematic process, guided by PRISMA, supports transparency, replicability, and depth in examining collaborative learning research in higher education from 2014 to 2023.

## RESULTS AND DISCUSSION

The PRISMA flow diagram illustrates the information flow through the stages of a systematic review. It displays how many records were found, including those that were not, along with the justifications for the exclusions. These are the eligible articles to review:

**Table 2. Eligible Articles to Review**

| Authors | Year | Title | Journal | Citation | Journal Rank* |
|---|---|---|---|---|---|
| Matee, Gloria Lihotetso; Motlohi, Nthabiseng; Nkiwane, Palesa | 2022 | Emerging perspectives and challenges for virtual collaborative learning in an institution of higher education a case of Lesotho | Interactive Technology and Smart Education | 9 | Q2 |
| Castillo-Cuesta, Luz; Ochoa-Cueva, Cesar; Cabrera-Solano, Paola | 2022 | Virtual Workspaces for Enhancing Collaborative Work in EFL Learning A Case Study in Higher Education | International Journal of Emerging Technologies in Learning (iJET) | 14 | Q1 |
| Tan, Chekfoung; Casanova, Diogo; Huet, Isabel; Alhammad, Muna | 2022 | Online Collaborative Learning Using Microsoft Teams in Higher Education Amid COVID-19 | International Journal of Mobile and Blended Learning | 6 | Q3 |
| Forbes, Melissa | 2020 | The value of collaborative learning for music practice in higher education | British Journal of Music Education | 16 | Q1 |
| Vlachopoulos, Panos; Jan, Shazia K; Buckton, Rodney | 2020 | A Case for Team-Based Learning as an Effective Collaborative Learning Methodology in Higher Education | College Teaching | 14 | Q3 |
| Rosenberg-Kima, Rinat B.; Koren, Yaacov; Gordon, Goren | 2020 | Robot-Supported Collaborative Learning (RSCL) Social Robots as Teaching Assistants for Higher Education Small Group Facilitation | Frontiers in Robotics and AI | 44 | Q2 |

| | | | | | |
|---|---|---|---|---|---|
| Gaunt, Helena; Treacy, Danielle Shannon | 2019 | Ensemble practices in the arts A reflective matrix to enhance team work and collaborative learning in higher education | Arts and Humanities in Higher Education | 15 | Q1 |
| Lyon, Philippa; Letschka, Patrick; Ainsworth, Tom; Haq, Inam | 2016 | Drawing Pedagogies in Higher Education the Learning Impact of a Collaborative Cross-disciplinary Drawing Course | International Journal of Art & Design Education | 12 | Q1 |
| Scager, Karin; Boonstra, Johannes; Peeters, Ton; Vulperhorst, Jonne; Wiegant, Fred | 2016 | Collaborative Learning in Higher Education Evoking Positive Interdependence | CBE--Life Sciences Education | 161 | Q1 |
| Colomina, Rosa; Remesal, Ana | 2015 | Social presence and virtual collaborative learning processes in higher education | Infancia y Aprendizaje | 8 | Q3 |
| De Hei, Miranda Suzanna Angelique; Strijbos, Jan-Willem; Sjoer, Ellen; Admiraal, Wilfried | 2014 | Collaborative learning in higher education lecturers practices and beliefs | Research Papers in Education | 74 | Q1 |

The articles in this dataset reflect a diverse range of perspectives on collaborative learning in higher education, spanning various disciplines and contexts. Some studies highlight the use of technology to support collaborative learning, such as virtual workspaces and collaboration software (Interactive Technology and Smart Education and International Journal of Mobile and Blended Learning). Additionally, arts-based approaches, such as ensemble practices in music education (Forbes, 2020) and cross-disciplinary drawing courses (Wu et al., 2025), demonstrate how collaboration can enhance creative learning. On the other hand, studies such as team-based learning (Vlachopoulos et al., 2020) and robot-assisted collaboration (Rosenberg-Kima et al., 2020) showcase pedagogical innovations that improve learning effectiveness. This variety of research focus underscores the vast potential for applying collaborative learning in different educational settings.

Articles published in Q1-ranked journals demonstrate significant contributions to the academic literature on collaborative learning. For instance, Scager et al. (2016), published in CBE, Life Sciences Education, have the highest citation count (161) and focus on the importance of positive interdependence as a key element of collaborative learning. Similarly, De Hei et al. (2015) in Research Papers in Education examine lecturers' beliefs and practices in implementing collaborative learning, offering valuable

insights for pedagogical development. The quality of these Q1 journals ensures that the research provides profound methodological or theoretical contributions, making them key references for future studies. More recent studies, particularly during and after the COVID-19 pandemic, highlight the role of technology in collaborative learning in higher education. Articles like those by Matee et al. (2022) and Tan et al. (2022) describe how technologies such as Microsoft Teams support collaborative learning in online education contexts. These technologies enable students to collaborate despite physical barriers. However, these studies also highlight challenges, such as maintaining student engagement and fostering social presence in virtual spaces. These developments show that while technology expands access to collaborative learning, it also requires new strategies to ensure its success.

The data highlights a shift from traditional learning approaches toward innovative methods that emphasize collaboration as the core of learning. For example, Vlachopoulos et al. (2020) support team-based learning as a practical methodology for enhancing teamwork and conceptual understanding. Similarly, Rosenberg-Kima et al. (2020) introduce the use of robots as teaching assistants in small-group settings, thereby improving collaborative dynamics. These approaches reflect how higher education institutions are increasingly adapting to the demands of 21st-century learning, where collaborative skills and technology play a critical role. The citation counts in this dataset provide insights into each study's academic impact. The article by Scager et al. (2016) has the highest citation count (161), indicating its significant relevance and influence in the development of the collaborative learning literature. This study emphasizes the importance of positive interdependence as a foundational pedagogy for collaboration, making it a primary reference in this field. Similarly, De Hei et al. (2015), with 74 citations, underscore the importance of understanding lecturers' beliefs and practices in implementing collaborative learning. These high citation counts demonstrate that studies with strong methodological contributions or practical insights tend to impact the academic community more.

**Rq1**: How does collaborative learning impact the development of critical thinking skills among higher education students?

Collaborative learning has proven to be a powerful instructional strategy in higher education, fostering critical thinking skills by emphasizing active engagement and social interaction. Studies highlight the effectiveness of virtual tools such as Microsoft Teams and Jamboard in creating interactive online environments, promoting diverse perspectives, and enhancing respectful discourse (Castillo-Cuesta et al., 2022; Tan et al., 2022). Success in collaborative learning also relies on elements like student autonomy and self-regulation, especially when tackling complex tasks, as they cultivate shared ownership and responsibility critical for critical thinking (Scager et al., 2016). Innovative methods, such as robot-supported collaborative learning, further illustrate technology's role in enriching

group interactions and learning outcomes (Rosenberg-Kima et al., 2020). These findings underline the importance of well-designed collaborative learning experiences in developing critical thinking skills.

The application of collaborative learning spans various disciplines, from music to the arts, demonstrating its versatility in enhancing both academic and practical skills. Forbes (2020) notes its value in music practice courses, where peer-to-peer interaction fosters skill development and reassessment of personal success metrics. This aligns with Vygotsky's social constructivism, which emphasizes social interaction's role in cognitive growth (Matee et al., 2022). While studies in Lesotho revealed challenges like resource constraints and internet connectivity, they also showcased the benefits of virtual collaborative learning. Reflective practices in arts education, as advocated by Gaunt & Treacy (2020), further bridge theoretical and practical learning, reinforcing teamwork's significance. Additionally, team-based learning approaches have demonstrated a strong correlation between collaboration and enhanced student engagement and performance (Vlachopoulos et al., 2020), advocating for its broader adoption.

Beyond practical skills, collaborative learning nurtures critical thinking through social presence and dialogic reflection. Colomina & Remesal (2015) highlight how affective expressions within teams deepen understanding and foster group cohesion, enhancing critical thinking. Similarly, a cross-disciplinary collaborative drawing course explored by De Hei et al. (2015) showed that shared experiences led students to challenge assumptions and engage in reflective dialogue. Such models emphasize the interplay between interaction and self-reflection, illustrating how collaborative environments facilitate both knowledge acquisition and essential critical thinking development. Together, these findings showcase collaborative learning's transformative potential across educational contexts.

**Rq2**: What specific collaborative learning techniques most effectively enhance communication skills in higher education students?

Research highlights the effectiveness of collaborative learning techniques in improving communication skills among higher education students. Tan et al. (2022) demonstrated the success of online collaborative learning via Microsoft Teams during the COVID-19 pandemic, promoting active engagement and communication. Similarly, Castillo-Cuesta et al. (2022) found virtual platforms like Jamboard to enhance collaborative and communication skills in EFL courses through open-minded discussions. Innovations such as robot-supported collaborative learning (Rosenberg-Kima et al., 2020) and task designs emphasizing autonomy and shared responsibility (Scager et al., 2016) further enrich communication experiences, underscoring the role of technology and well-structured tasks in fostering communication.

Additional studies reinforce the role of diverse collaborative techniques in enhancing communication. Forbes (2020) highlighted peer-to-peer learning in small

groups as transformative for skill development and success criteria, while Matee et al. (2022) emphasized the benefits of virtual collaboration despite challenges like limited resources. Reflective methodologies, as proposed by Gaunt & Treacy (2020), and structured approaches like team-based learning (TBL) (Vlachopoulos et al., 2020) have been shown to boost both engagement and communication, with TBL demonstrating positive correlations between collaboration, communication skills, and academic performance.

Fostering social presence and reflective practices is another critical strategy for enhancing communication in collaborative learning. De Hei et al. (2015) highlighted the role of affective and relational expressions in improving group cohesion and individual competence. Colomina & Remesal (2015) showed that dialogic reflection in virtual collaborative learning promotes deeper interactions and improves communicative abilities. Cross-disciplinary collaboration, as explored by Lyon et al. (2016), encourages students to articulate diverse perspectives and further refine their communication skills. Collectively, these approaches illustrate the value of social presence, reflective dialogue, and interdisciplinary practices in fostering communication skills in higher education.

**Rq3**: What challenges and opportunities do educators face in implementing collaborative learning to develop critical thinking, communication, and digital literacy skills?

The implementation of collaborative learning in higher education offers a dual landscape of challenges and opportunities in fostering critical thinking, communication, and digital literacy skills. The shift to online learning during the COVID-19 pandemic underscored hurdles such as limited familiarity with digital tools like Microsoft Teams and connectivity issues, which impacted student engagement (Matee et al., 2022; Tan et al., 2022). Nevertheless, virtual platforms like Jamboard and team-based methodologies have demonstrated promise in enhancing collaborative skills and encouraging active participation (Castillo-Cuesta et al., 2022; Vlachopoulos et al., 2020). Effective collaboration also relies on factors like student autonomy, self-regulation, and well-designed tasks that encourage shared responsibility, highlighting the need for strategic planning to maximize the potential of collaborative learning environments (Scager et al., 2016).

Innovative tools and methods further contribute to the effectiveness of collaborative learning. Integrating social robots as teaching assistants has shown the potential to facilitate group activities and improve engagement (Rosenberg-Kima et al., 2020). Additionally, reflective practices in disciplines like arts education provide frameworks to bridge tacit knowledge and explicit understanding, promoting skill transfer and deeper learning (Gaunt & Treacy, 2020). Collaborative learning in music and other arts has also redefined success criteria by emphasizing peer interactions (Forbes, 2020). Such approaches illustrate how thoughtfully designed collaborative activities can foster

critical skills while addressing diverse student needs and disciplinary backgrounds.

Despite these advancements, challenges remain, particularly in virtual and cross-disciplinary settings. Establishing a strong social presence and addressing preconceived notions about collaboration is critical to fostering effective group dynamics (Colomina & Remesal, 2015). Educators must navigate these complexities while designing environments that encourage active participation, cooperation, and reflection. By leveraging structured frameworks and innovative tools, collaborative learning can not only enhance critical thinking and communication but also prepare students to meet the demands of a digital-first world (Colomina & Remesal, 2015; De Hei et al., 2015).

## CONCLUSION

To sum up, collaborative learning is a game-changing strategy in higher education that develops students' critical thinking, communication, and digital literacy. Its influence can be seen in a variety of settings, such as cross-disciplinary applications and virtual worlds, where carefully planned activities promote independence, shared accountability, and introspective discussion. Technology integration has further improved collaborative experiences by encouraging active engagement and interaction through the use of cutting-edge tools and online platforms. In addition to fostering cognitive growth, these techniques assist students in developing critical abilities necessary for success in the classroom and in the workplace.

However, there are obstacles to implementing collaborative learning, such as resource constraints and technological impediments, especially in virtual environments. In order to solve these problems, educators must provide fair access to digital resources and cultivate an inclusive atmosphere that celebrates a range of viewpoints. Furthermore, since it allows students to interact with peers in a meaningful way and cultivate higher-order thinking abilities, developing a strong social presence and group cohesion is essential for productive cooperation.

Despite these challenges, the opportunities presented by collaborative learning are immense. By leveraging structured methodologies and innovative practices, educators can create dynamic learning environments that prepare students for the demands of a rapidly evolving world. Through collaborative efforts, higher education institutions can cultivate critical thinkers, effective communicators, and digitally literate individuals who are equipped to thrive in a globalized, interconnected society.

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