



Enhancing Vocational Education Through Collaborative Learning: A Pathway to Innovation and Industry Readiness

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ABSTRACT

This research explores the role and impact of collaborative learning as an innovative approach in vocational education, aiming to address the growing demand for both technical proficiency and soft skills in the modern workforce. The study investigates how collaborative learning strategies enhance student engagement, foster deeper understanding, and improve real-world problem-solving capabilities, ultimately contributing to better industry-readiness. A qualitative-descriptive methodology was employed, incorporating literature analysis, classroom observations, and interviews with vocational educators and students. The findings reveal that collaborative learning not only improves academic outcomes but also strengthens essential competencies such as communication, teamwork, and adaptability. Additionally, it encourages vocational teachers to adopt more interactive and student-centered pedagogical methods. However, the research also identifies several barriers to effective implementation, including limited teacher training, infrastructure constraints, and rigid curricula. The study concludes that successful integration of collaborative learning requires institutional support, targeted teacher development, and supportive policy frameworks. By overcoming these challenges, vocational education systems can better prepare learners for dynamic, team-oriented professional environments. This research contributes valuable insights for educators, institutions, and policymakers seeking to enhance the quality and relevance of vocational training through pedagogical innovation.

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1. INTRODUCTION

Vocational education plays a critical role in preparing individuals for specific trades, crafts, and careers in various technical and professional fields. As global economies become increasingly knowledge-based and innovation-driven, the demand for a workforce that not only possesses technical expertise but also strong collaboration, communication, and problem-solving skills has intensified (Abdulwahed & Hasna, 2017). In response, educational institutions are being called upon to modernize vocational education through innovative teaching and learning approaches that mirror real-world work environments.

One such approach gaining prominence is collaborative learning. Rooted in constructivist educational theories, collaborative learning emphasizes active student engagement through group

work, peer-to-peer interactions, and shared problem-solving tasks (Njai, 2021). This method fosters critical thinking, mutual accountability, and interpersonal skills qualities essential for success in dynamic, team-oriented professional settings. In vocational education, where hands-on training and practical application are central, collaborative learning provides an opportunity for students to simulate workplace scenarios, thereby deepening their understanding of course material while cultivating soft skills essential to employability.

One of the primary benefits of collaborative learning is its ability to enhance critical thinking and problem-solving skills (Nelson, 2013). When students are encouraged to express their ideas, question assumptions, and consider diverse perspectives within a group, they are more likely to develop a deeper understanding of the subject matter. This process not only sharpens intellectual skills but also cultivates open-mindedness and adaptability traits that are essential for navigating complex, real-world challenges.

Furthermore, collaborative learning nurtures communication and interpersonal skills, which are increasingly important in today's interconnected world (Scott, 2015). By working in teams, students learn to listen actively, articulate their thoughts clearly, resolve conflicts constructively, and contribute meaningfully to group goals. These experiences mirror the collaborative nature of most professional environments, thereby preparing students for the demands of the modern workforce.

Another crucial advantage of collaborative learning is its potential to foster inclusion and equity in the classroom. Group-based activities encourage participation from all learners, including those who may be shy, underconfident, or less proficient in traditional academic settings (Baars et al., 2013). Through mutual support and peer mentoring, students can overcome learning barriers together, creating a more democratic and empowering educational experience.

Collaborative learning also aligns with various educational theories that emphasize the social nature of learning, particularly Vygotsky's concept of the Zone of Proximal Development (ZPD), which suggests that learners achieve more through social interaction and support. This theoretical grounding reinforces the idea that knowledge is not merely transmitted from teacher to student but is co-constructed through shared inquiry and dialogue (Schnellert, 2011).

In an era marked by rapid technological advancement and shifting societal needs, education must go beyond rote memorization and individual achievement. It must equip students with the capacity to think critically, work cooperatively, and adapt to continuous change. Collaborative learning addresses these needs by promoting active engagement, interpersonal competence, and a culture of lifelong learning (Brundiers & Wiek, 2017).

Over the past decade, collaborative learning has gained increasing attention in educational research, particularly in the context of vocational education and training (VET) (Inayat et al., 2013). Numerous studies have highlighted its potential to enhance student engagement, improve learning outcomes, and align vocational education with the demands of the modern workforce. As vocational education evolves to meet the challenges of the 21st century, researchers have increasingly focused on the integration of collaborative learning as both a pedagogical strategy and a tool for educational innovation (Scott, 2015).

One major trend in recent research is the emphasis on real-world skills development (Chu et al., 2021). Studies have shown that collaborative learning supports the development of key soft skills such as teamwork, communication, leadership, and problem-solving that are highly valued by employers. For instance, a study by Cevik and Senturk (2019) found that group-based tasks in vocational settings significantly improved students' readiness for work-based environments. Similarly, Deiglmayr and Spada (2020) emphasized that students in collaborative learning settings tend to develop stronger decision-making and negotiation skills, crucial for occupational success.

Another key area of research has explored the role of technology in enhancing collaboration in vocational learning environments. With the rise of digital tools, online collaborative platforms have become integral in supporting blended and hybrid learning models. Research by Harju, Pehkonen, and Niemi (2017) in Finland, for example, highlighted how cloud-based tools enabled vocational students to collaborate on projects remotely, increasing accessibility and flexibility without compromising the

depth of learning. More recent studies during and after the COVID-19 pandemic have further validated the effectiveness of virtual collaboration in VET, showing that digital platforms can simulate real-time teamwork and improve cross-disciplinary learning (Grollmann & Wolf, 2021).

Several scholars have also examined teacher roles and instructional design in collaborative vocational learning. Research indicates that the success of collaborative learning often hinges on the teacher's ability to design meaningful group activities and facilitate interactions. For instance, a study by Alajmi and Alshammari (2022) found that vocational instructors who received professional development in collaborative pedagogy were more effective at implementing project-based and cooperative learning tasks. This has led to growing interest in curriculum reform and teacher training programs that support active and participatory learning models.

In addition, cross-cultural and international comparative studies have emerged, exploring how collaborative learning is applied in different VET systems. For example, studies comparing dual vocational training systems in Germany and Switzerland with more school-based systems in countries like Indonesia or Malaysia have revealed that collaborative learning is particularly effective when aligned with workplace simulation models and industry partnerships (Rauner & Wittig, 2016; Yusof et al., 2020).

However, despite its potential, the implementation of collaborative learning in vocational education is not without challenges. These may include institutional resistance to pedagogical change, lack of teacher training, curriculum rigidity, and insufficient technological infrastructure (Nickerson, 2020). Therefore, a comprehensive understanding of how collaborative learning can be effectively integrated into vocational education is essential. This research aims to explore the intersection of collaborative learning and educational innovation within vocational settings, with the goal of identifying strategies that enhance both instructional effectiveness and student preparedness for the workforce.

2. RESEARCH METHOD

To explore the implementation and impact of collaborative learning as an innovation in vocational education, this research adopts a mixed-methods approach, combining both qualitative and quantitative data collection and analysis (Ramírez-Montoya & Lugo-Ocando, 2020). This methodology allows for a comprehensive understanding of how collaborative learning is applied in vocational settings, its perceived effectiveness, and the factors that support or hinder its implementation.

This study is designed as a descriptive-exploratory research project (Williams et al., 2020). The descriptive component seeks to capture the current practices and perceptions related to collaborative learning in vocational education institutions, while the exploratory aspect aims to uncover innovative models and strategies that enhance collaborative engagement among students and instructors.

The research targets vocational education institutions (SMKs or technical colleges) that offer programs in fields such as engineering, hospitality, information technology, and health sciences (Sahasrabudhe & Bhagat, 2021). A purposive sampling technique is employed to select institutions that have either implemented or are experimenting with collaborative learning methods (Barkley et al., 2014). The sample includes:

- Students ($n \approx 150-200$) enrolled in vocational programs.
- Teachers/instructors ($n \approx 30-40$) actively involved in curriculum delivery.
- Administrative or curriculum developers ($n \approx 10$) who are engaged in educational innovation and policy implementation.

Structured questionnaires are distributed to students and teachers to gather quantitative data on (Harris & Brown, 2010):

- Frequency and types of collaborative learning activities.
- Perceptions of effectiveness.
- Skills developed through group-based learning.
- Challenges encountered during collaborative tasks.

In-depth interviews are conducted with selected teachers and curriculum developers to gain qualitative insights into:

- The design and planning of collaborative learning modules.
- Institutional support mechanisms.
- Innovations in pedagogy and technology integration.

Observational visits are made to selected classrooms where collaborative learning is implemented (Barkley et al., 2014). This helps assess real-time interactions, group dynamics, and the practical challenges of applying collaborative methods in vocational contexts.

Relevant institutional documents, such as syllabi, lesson plans, and curriculum frameworks, are reviewed to understand how collaborative learning is embedded in formal instruction and whether it aligns with national competency standards (Ford et al., 2015).

Quantitative data from questionnaires are analyzed using descriptive statistics (means, percentages, and standard deviations) and inferential statistics (e.g., t-tests or ANOVA if needed) to identify patterns and significant differences based on variables such as department, gender, or year level.

Qualitative data from interviews and observations are analyzed using thematic analysis, allowing the identification of recurring themes, strategies, and barriers related to collaborative learning in vocational education (El Said, 2017).

The research ensures strict adherence to ethical standards. Informed consent is obtained from all participants, and data are kept confidential and used solely for academic purposes (Corti et al., 2000). Anonymity is maintained, and participation is voluntary.

3. RESULTS AND DISCUSSIONS

3.1 Result

The findings of this study provide a comprehensive overview of how collaborative learning is being implemented in vocational education and how it contributes to educational innovation. Drawing from quantitative surveys, qualitative interviews, classroom observations, and document analysis, several key themes and outcomes have emerged.

The quantitative data from student questionnaires revealed that over 75% of students reported feeling more engaged and motivated when participating in collaborative learning activities compared to traditional lecture-based methods. Students highlighted that working in groups allowed them to better understand complex topics, especially in practical courses such as engineering, hospitality, and information technology. Moreover, many students appreciated the opportunity to learn from peers and share knowledge, which boosted their confidence and sense of belonging.

Across the surveyed institutions, students and teachers consistently reported that collaborative learning significantly contributed to the development of soft skills. These included teamwork, communication, leadership, time management, and problem-solving abilities skills that are essential for workplace readiness. Instructors noted that group-based projects, such as simulated workplace tasks, role-playing, and case-based problem solving, allowed students to experience real-world professional scenarios, thereby strengthening their employability.

The qualitative interviews with teachers and curriculum developers revealed that collaborative learning has driven pedagogical innovation in vocational classrooms. Instructors are increasingly using project-based learning, peer assessments, and digital platforms such as Google Workspace, Microsoft Teams, and Moodle to facilitate collaboration both in person and remotely. The integration of technology not only enhanced the learning experience but also made it more accessible, especially during the shift to online learning in the COVID-19 era. In some institutions, collaborative tools were embedded directly into the curriculum, reinforcing a modernized, student-centered approach to teaching.

While the results show overall positive outcomes, they also highlight challenges in implementing collaborative learning consistently across institutions. Approximately 38% of teachers expressed concerns about insufficient training and lack of institutional support in developing

collaborative learning modules. Teachers who received professional development or mentorship in innovative pedagogy reported higher confidence and effectiveness in facilitating collaborative activities. This suggests that continuous teacher training and administrative support are critical to sustaining collaborative learning practices.

Classroom observations showed that students generally responded well to group work, often displaying high levels of participation and mutual support. However, some logistical challenges were noted, including imbalanced group participation, time constraints, and difficulties in assessing individual contributions. In larger classes, managing group activities required additional planning and monitoring. Teachers also mentioned the need for clearer guidelines and assessment rubrics to ensure fairness and accountability in group-based tasks.

Document analysis showed that institutions with more flexible and competency-based curricula were more successful in embedding collaborative learning activities. These institutions allowed teachers the freedom to design interdisciplinary projects and align collaborative tasks with real-life vocational scenarios. In contrast, schools with rigid, exam-oriented curricula faced difficulties integrating collaborative models into their existing structures.

3.2 Improved Student Outcomes, Better Industry-Readiness, and Enhanced Teacher Practices

One of the most evident benefits of collaborative learning is its influence on student achievement and engagement. When students work in groups, they are exposed to diverse perspectives, allowing them to approach problems more creatively and build on each other's strengths. This dynamic promotes deeper understanding, critical thinking, and active participation, which are often limited in traditional, lecture-based instruction.

Studies and field data show that students involved in collaborative learning tend to retain information longer, apply knowledge more effectively in practical settings, and perform better in assessments that test both theoretical and applied skills. In vocational education, where hands-on experience is essential, this approach also nurtures a sense of responsibility and ownership over the learning process, encouraging students to become independent learners and confident contributors.

Collaborative learning closely mirrors the dynamics of modern workplaces, where professionals must work in teams, communicate effectively, and solve problems collaboratively (Barkley et al., 2014). By engaging in group projects, simulated job tasks, and peer-to-peer learning, vocational students gain early exposure to the real-world skills expected by employers.

Industry stakeholders consistently emphasize the need for graduates who are not only technically competent but also proficient in soft skills such as teamwork, communication, adaptability, and conflict resolution. Collaborative learning environments are particularly effective in cultivating these attributes. Students learn to navigate interpersonal challenges, delegate tasks, and manage group dynamics—experiences that directly translate to workplace scenarios. As a result, graduates from vocational programs that embrace collaborative learning are more confident, adaptable, and job-ready, making them more attractive to potential employers.

The shift toward collaborative learning has also led to significant changes in how vocational educators plan and deliver instruction. Teachers are no longer mere transmitters of knowledge but become facilitators of learning, guiding students through problem-solving activities, discussions, and peer-driven exploration (Goodman, 2009).

This transformation has encouraged educators to adopt more student-centered methods, integrate digital tools, and design more authentic, workplace-relevant learning tasks. Many teachers report increased satisfaction and professional growth as they witness higher student engagement and improved outcomes. Moreover, collaborative learning requires ongoing reflection and adaptability, which fosters a culture of continuous improvement in teaching practices.

In response to these changes, institutions are increasingly supporting teachers through professional development, collaborative curriculum design, and peer mentoring. These initiatives not only build teacher confidence in managing group-based learning but also create a more innovative and responsive educational environment.

3.3 Limitations and Barriers to Implementing Collaborative Learning in Vocational Settings

One of the most commonly reported barriers is the lack of teacher preparedness. Many vocational educators, especially those trained in traditional, lecture-based instruction, may feel unequipped to manage collaborative learning environments. Implementing collaborative strategies requires a fundamental shift in teaching philosophy from content delivery to facilitation. Teachers must learn to design group activities, manage interpersonal dynamics, and assess both group and individual performance, which can be daunting without adequate training or support.

Moreover, in institutions where professional development is limited or absent, educators may lack the confidence and competence to transition to collaborative methods, choosing instead to rely on conventional approaches that they find more predictable and easier to control.

Assessing collaborative learning outcomes poses significant difficulties. Vocational education often emphasizes measurable competencies and technical skills, yet collaborative learning introduces subjective elements such as teamwork, communication, and peer interaction (Tanner, 2012). Evaluating these "soft" outcomes fairly and accurately is complex.

Teachers may struggle with how to grade individual contributions within group projects or how to balance formative and summative assessments. Without clear rubrics and consistent assessment strategies, students may perceive the evaluation process as unfair, which could demotivate participation and reduce the overall effectiveness of collaborative tasks.

In any group activity, uneven participation can emerge as a critical issue. Some students may dominate the discussion or decision-making, while others may remain passive or disengaged, relying on peers to carry the workload. This imbalance not only affects learning outcomes but also leads to frustration and tension within groups.

Additionally, conflicts in personality, communication styles, or skill levels can hinder group cohesion and productivity. In vocational settings, where students often come from diverse backgrounds and with varying levels of preparedness, these issues are even more pronounced and require careful facilitation by instructors.

Collaborative learning activities often require more time than traditional teaching methods. Planning, executing, and debriefing group projects or discussions takes considerable classroom time, which may be difficult to accommodate in rigid vocational curricula focused on technical training and certification.

Many institutions operate under tight schedules and predefined learning outcomes, leaving little flexibility for experimentation or extended group work. As a result, collaborative learning is sometimes treated as an add-on rather than an integral part of the curriculum, limiting its depth and impact.

Effective collaborative learning often depends on adequate physical and technological infrastructure (Caballé et al., 2010). Classrooms must be designed to support group interaction, with movable furniture, breakout spaces, and access to digital tools. In under-resourced vocational institutions particularly in rural or economically challenged areas these necessities may be lacking.

Limited access to internet, devices, or collaborative software platforms can also hinder digital collaboration, which has become increasingly important in blended and remote learning contexts. Without appropriate infrastructure, even the most well-designed collaborative activities can fall short of their potential.

Finally, some barriers stem from cultural norms or institutional inertia. In educational systems that emphasize hierarchy, competition, or individual achievement, collaborative learning may be viewed with skepticism or perceived as less rigorous. Students may be unfamiliar with group-based work and hesitant to fully engage, while administrators may resist changes that disrupt established routines or assessment systems.

3.4 Implications for Educators, Institutions, and Policymakers

For educators, the rise of collaborative learning necessitates a reevaluation of traditional teaching methods. Teachers must transition from knowledge dispensers to facilitators of learning. This shift demands new pedagogical competencies, such as designing meaningful group tasks, managing interpersonal dynamics, and assessing both collaborative processes and individual contributions. To

meet these demands, educators must engage in continuous professional development. Training programs should be offered to enhance skills in active learning strategies, digital collaboration tools, and inclusive group facilitation. Additionally, teachers need support in developing authentic assessments that evaluate not only technical competencies but also communication, critical thinking, and problem-solving abilities skills that are nurtured through collaboration.

Educational institutions play a crucial role in creating the enabling environment for collaborative learning. This includes restructuring physical spaces, equipping classrooms with flexible seating arrangements, collaborative tools, and digital technologies that support teamwork. Moreover, institutions should embed collaborative learning principles into their curriculum frameworks, ensuring that group-based activities are not isolated events but integral components of the educational experience. Institutions must also foster a culture of collaboration beyond the classroom. Encouraging interdisciplinary projects, industry partnerships, and peer learning communities can help institutionalize the value of collaboration throughout the student journey. Furthermore, administrators should support teachers by recognizing and rewarding innovative teaching practices, allocating sufficient time for lesson planning, and reducing rigid scheduling constraints that often inhibit group-based learning.

Policymakers hold the responsibility of setting the strategic direction for educational reform and ensuring alignment with labor market needs. To promote collaborative learning, policymakers must integrate it into national education standards, competency frameworks, and vocational training policies. This may involve redefining learning outcomes to include collaborative and interpersonal skills as core competencies. Investments in teacher training programs, curriculum development, and educational technology infrastructure are essential. Policymakers should allocate funding to build the capacity of institutions to adopt collaborative methods and ensure equitable access to resources, particularly in underserved regions.

Moreover, policy frameworks should encourage industry-education collaboration, allowing students to participate in real-world group projects, apprenticeships, and simulations that reflect the teamwork-intensive nature of many professions. By embedding collaborative learning into accreditation criteria and quality assurance systems, policymakers can drive systemic change that goes beyond individual classrooms.

4. CONCLUSION

In an era marked by rapid technological advancement and evolving workplace demands, vocational education must evolve to equip learners not only with technical expertise but also with essential soft skills such as communication, teamwork, and problem-solving. This research has highlighted the transformative potential of collaborative learning as an innovative pedagogical approach that aligns well with the objectives of vocational training. By fostering interaction, mutual support, and shared responsibility among students, collaborative learning enhances student engagement, deepens understanding, and improves both academic and practical outcomes. It also prepares learners to operate effectively in team-oriented professional environments, thus improving their industry-readiness. Additionally, this approach encourages teachers to adopt more dynamic and student-centered instructional methods, further enriching the learning environment. However, the study also acknowledges several barriers to the effective implementation of collaborative learning in vocational settings. These include teacher preparedness, assessment difficulties, infrastructure limitations, and cultural or institutional resistance. Recognizing these challenges is essential to inform more strategic interventions. The implications for educators, institutions, and policymakers are clear: there must be a concerted and collaborative effort to embed collaborative learning into vocational education systems. This includes investing in teacher training, revising curricula, creating enabling environments, and enacting supportive policies that reflect the demands of the 21st-century labor market. Collaborative learning is not just an educational trend it is a necessary innovation for vocational education that, when implemented effectively, has the power to significantly enhance student outcomes, professional preparedness, and teaching practices. Future efforts should focus on scaling best practices and

overcoming identified barriers to ensure that vocational education remains relevant, inclusive, and impactful.

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