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Use of Collaborative Technologies for Teaching and Learning in Academic Communities: Benefits, Barriers and Possible Solutions

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Abstract

This paper discussed the use of collaborative technologies for teaching and learning in academic institutions, their benefits, barriers and possible solutions within academic environments. The use of collaborative technologies has transformed teaching and learning in academic communities by facilitating communication, knowledge sharing, interaction and collaborative engagement among librarians, lecturers, students, researchers and other academic stakeholders. Technologies such as Google Workspace, Microsoft Teams, Zoom, Moodle, WhatsApp, and online discussion forums provide platforms through which academic communities can communicate, share learning resources, conduct virtual classes, collaborate on assignments and research projects, and provide timely feedback. The benefits of these technologies include improved student engagement, enhanced communication, flexible and remote learning, increased access to academic resources, teamwork, knowledge sharing and improved teaching effectiveness. However, in developing countries like Nigeria, their adoption is constrained by several barriers, including inadequate digital infrastructure, poor internet connectivity, high cost of data and devices, limited digital literacy among users, inadequate technical support, resistance to technological change, privacy and security concerns, and unequal access to technology. To address these challenges, academic institutions should invest in reliable digital infrastructure and internet services, provide continuous digital literacy training for librarians, lecturers and students, strengthen technical support services, develop clear technology-use policies, and promote equitable access to digital devices and learning platforms. Institutions should also encourage blended learning approaches and provide appropriate funding for the sustainable adoption of collaborative technologies. The effective integration of collaborative technologies can therefore contribute significantly to creating more interactive, inclusive, flexible, and learner-centred academic communities.

Keyword: Collaborative Technologies, Teaching, Learning, Academic Community

I. Introduction

Technology has significantly transformed education and communication in recent years. It has enabled new ways of learning and teaching, making education more accessible and interactive. It has also revolutionized communication, allowing for instant and seamless exchange of information across various channels. This has facilitated better collaboration among educators, students and parents, improving educational outcomes. In Fasola and Abimbola (2023) technology in this era of the internet and the World Wide Web have turned academic communities to places where users and information are only few steps apart, creating opportunities for better participation by information seekers in the gathering, organising and sharing of information. Wiche et al,. (2022) report that academic staff are taking advantage of these technological advancements in the computer and telecommunications fields to improve their delivery and also to collaborate with scholars in different field from all over the world. The Web provides a variety of useful tools for users to interact and communicate with others by organising information, store records, disseminate and retrieve or share information. Academic collaboration is more crucial than ever in this digital world than before. The rate of scientific advancement is quickening and societal problems are getting more complicated. Some academics staff use collaborative technologies in order to share ideas, pool resources and build on another scholars' research in order to overcome many issues (Hassandoust & Kazerouni, 2011).

On this note, collaborative technologies are digital platforms and tools used in academic institutions to facilitate communication, knowledge sharing, information exchange, group work,

teaching, learning and research collaboration among members of the academic community. According to Indeed (2026) collaborative technologies are tools or software designed to facilitate working in groups and holding real-time meetings in the office and remotely. Yevheniia (2025) also defines collaborative technologies as suite of digital tools that lets individuals and teams unite efforts, even when they're located in different places. These technologies are designed to enable and support teamwork.

Collaborative technologies can therefore support teaching and learning, research collaboration and institutional teamwork. Mansori et al (2024) affirm that collaborative technologies are not meant to facilitate communication between students and lecturers only, but also to foster more inclusive and collaborative learning environment. Tools such as discussion platforms, instant messaging, miro, slack, padlet, google workspace, video conferencing and so on, enable quick communication among students, lecturers and administrators in academic environment (Pamela, 2025). These tools enable students to work together on assignments, projects, presentation and group discussions even when they are not physically together. Academic staff and researchers can share articles, lecture materials, research findings, databases and other educational resources. These technologies also increase academic engagement, in the sense that interactive platforms can encourage students to participate in discussions and contribute ideas beyond traditional classrooms. In academic environment, many ICT tools support collaborative learning, notably Google Workspace, Microsoft Teams, and Padlet. These platforms let students work together at the same time, share files and talk with each other easily.

Moreover, some academic libraries also use tools like Google workspace, Microsoft teams and Cloud storage to improve group research, manage internal projects and deliver fast virtual reference services. Besides, librarians can use collaborative technologies to promote library resources, conduct information literacy training and communicate with users to support library services (Fasola & Abimbola, 2023). So also, these tools enable lecturers to distribute learning materials, conduct virtual classes, provide feedback and monitor student's participation. Not only these, but multiple users can also work on the same document or project simultaneously, reducing delays and making academic work more efficient. By considering several positive and negative influences of collaborative technologies on the academic community, including students, lecturers, researchers and librarians. Therefore, this study sought to examine the trends, benefits, barriers and possible solutions to the use of collaborative technologies in academic communities.

A. Objectives of the study

1. To overview the current trends in collaborative technologies in academic community
2. To identify the benefits of using collaborative technologies for teaching and learning in higher institutions.
3. To discuss barriers to the use of collaborative technologies for teaching and learning in academic community
4. To highlight the possible solutions to the barrier facing the use of collaborative technologies in academic communities.

II. Literature Review

Current Trends on Collaborative Technologies in Academic Community

Emerging trends on uses of collaborative technologies in academic community refer to the current ways digital tools are being used by students, lecturers, researchers, librarians and university administrators to communicate, share knowledge, create content and work together. Today's collaborative efforts among people in academic environment have become preponderantly technology-mediated. According to Consoltech (2019), collaborative technology refers to tools and systems designed to enable group of people to communicate, share information, work together and create knowledge, whether they are physically together or working remotely. Most of the popularly used collaborative tools are widely known to function with a combination of text, video and graphics while some are either text oriented or video oriented in their features (Samuel & Esther, 2020). Academic

institutions are rapidly adopting collaborative technologies, such as AI-driven platforms, cloud-based ecosystems and immersive virtual work-spaces to enhance remote and cross institutional team-works. Based on current high-education development, some important trends which include Google workspace, Microsoft team, Zoom, Moodle, WhatsApp, Discussion fora amongst others will be discussed as follows:

The google workspace provides tools such as Google Docs, Google Drive, Google Sheets, Google Slides, Google Forms, G-mail and Google Meet. These tools can be used to support teaching, learning, research, and administration in academic institution. These allow students to work with lecturers on research projects, research presentations, assignments and on documents in real time. G-mail, Google Meet and others workspace tools facilitate communication between lecturers, students, researchers, librarians and administrators. Google file also allows users to store, organise, access and share academic documents from different devices. Researchers use Google Docs for collaborative writing, Google Sheets for organising data, and Google Forms for collecting research responses (UNESCO, 2026).

More so, Microsoft teams is a collaborative platform that can support communication, teaching, learning and information sharing. Likewise, it facilitates virtual teaching, group work, communication, file sharing, assignment management, peer learning, research collaboration and interactive between lecturers and students. Lecturers and students can share their screen, presentations, documents and other learning materials during online classes. Online session can also be recorded where the institution's settings and permissions allow it, this will enable students to review lessons later. Team can work with Microsoft 365 applications such as Word, Power-point, Excel, and OneNote to support a connected learning environment. Therefore, Microsoft teams serve as important collaborative technology for supporting teaching and learning in academic environment (Ogudu, 2023).

Zoom is a video-conferencing platform that support real-time communication, interaction, and collaboration between lecturers and students. It is majorly use in academic environments for online lectures, virtual class discussions, group learning, breakout rooms, screen sharing, guest lecture and seminars, online presentations, research collaboration, interactive learning, flexible learning and so on. It can therefore complement face-to-face teaching and provide opportunities for students and lecturers to collaborate regardless of their physical location (Thomas & Amer, 2019).

In addition is Moodle. Its full meaning is "Modular Object-Oriented Dynamic Learning Environment". This is a learning management system that supports teaching, learning, communication and collaboration among students and their lecturers. Moodle forums allow lecturers to discuss academic topics with their students, ask questions, exchange ideas and provide feedback. Students can submit assignments electronically, while lecturers can assess the work and provide comments and feedback through the platform. Similarly, the lecturers can monitor students' participation, assignment submissions, quiz performance, and progress through course activities. Moodles can be integrated with various educational tools and resources, allowing institutions to create a broader digital learning environment (UNESCO, 2026).

WhatsApp is another trend which can be used as a collaborative communication tool to support teaching, learning and interaction between lecturers and students. Its major uses include: quick communication, urgent reminders and notifications, support for remote learning, peer-to-peer learning, sharing of learning materials, assignment collaboration, voice and video learning sessions, and building an academic community. Its widespread use and relatively simple interface make it a potentially useful supplementary tool for academic collaboration (Claudio et al., 2021)

Discussion forum is an online platform where lecturers can post questions, share ideas, discuss academic topics and respond to one another. Discussion forums enhance collaborative teaching by promoting interaction, knowledge sharing, peer learning, critical thinking, feedback, group problem-solving, and contentious academic communication between lecturers and students. They can therefore compliment face-to-face teaching and strengthen collaborative learning in academic communities beyond the physical classrooms. Students can contribute to online discussions at convenient times, making forums useful for online, blended, and distance learning environments. It also gives students

opportunities to participate in learning activities, including those who may be less comfortable speaking in a physical classroom (Jerry & Beatrice, 2024).

B. Benefits of using Collaborative Technologies for Teaching and Learning in Higher Institutions.

A new era of educational innovation has been brought about by the digital revolution, which has transformed traditional classrooms into dynamic, interactive learning environments (Sylvanus et al., 2024). Collaborative technologies promote communication, teamwork, knowledge sharing, research collaboration, students' engagement, flexibility and digital competence in academic communities. Effective communication and collaboration play a crucial role in educational institutions. In Fasola and Abimbola (2023), collaborative technologies foster a positive learning environment, boost student engagement, and enhance academic performance. Also, they facilitate seamless information sharing between teachers and students. Tools such as email, instant messaging, discussion forum and video conferencing platforms make communication between students and lecturers faster and easier. Similarly, researchers can use Google Docs for collaborative writing, Google Sheets for organising data, and Google Form for collecting research responses.

Also, collaborative technologies transform teamwork in higher education by breaking down physical barriers, streamlining group assignments and preparing students for modern digital workplaces. Sylvanus et al. (2024) identify smart classroom, digital libraries and smart devices as determinants of collaborative teamwork that improved learning in secondary schools in Uyo Metropolis, Nigeria. Also, collaborative technologies transform research in higher education by connecting scholars across global distances. They allow real-time co-authoring, seamless data sharing, and efficient project management. Essential tools include cloud suites, file-sharing platforms, google drive, box, iCloud drive, Dropbox, Microsoft OneDrive, Quip, Slack and Visual spaces. All these tools enable individuals to share file and documents while others are used for knowledge sharing by teams in organisations (Fasola & Abimbola, 2023). Students can create and manage group assignments collaboratively, allowing members to contribute even when they are not physically together, as a result of this, collaborative technologies transform passive classrooms into active learning spaces.

Dwi et al (2024) affirms that by supporting student engagement through collaborative technology-based collaborative platforms had a major impact on student engagement. Similarly, the presence of collaborative learning platforms makes students more enthusiastic and excited because it attracts students' attention. The use of collaborative technologies in higher education can significantly improve students' engagement by making learning more interactive, participatory, and flexible. Regular use of collaborative platforms helps students to develop communication, teamwork, information sharing, and technology skills that will be useful for academic and professional development. Likewise, it enables lecturers and peers to comment on students' contributions, assignments or group work, helping students to identify areas for improvement, students can also exchange ideas, explain concepts from one another. These collaborative technologies also help students to feel connected to their classmates and their lecturers (Sylvanus et al., 2024).

C. Barriers to the Use of Collaborative Technologies for Teaching and Learning in Academic Communities.

As technologies are widely considered as essential tools for teaching with strong potential for enhancing learning, so as academic institutions also faced many challenges when using technologies for group work and information sharing. Although collaborative technologies improve communication, knowledge sharing, teamwork, and teaching and learning, their effective use in academic communities can be limited to some inevitable factors (Abdul-Hassim. & Bakar, 2025).

The major barriers to the using of collaborative technologies in higher institutions include limited digital literacy skills among students and lecturers, managing student distractions, resistance to pedagogical change, high costs, poor internet, lack of training, the digital divide, privacy and security concerns, lack of institutional supports and compatibility and integration problems (Jennifer

et al, 2022). Similarly, academic community often face barriers of outdated communication methods and limited resources. Also, the rapid pace of technological advancements can make it difficult for academic community to keep up and adapt. As a result of this, the lecturers and the students may struggle to maintain effective communication and collaboration (Ranbir, 2024).

Despite the potential of technology in education which has been embraced to create more interactive and personalized learning experience, still, so many students easily get distracted while handling digital tools by playing games or watching videos instead of doing schoolwork or engaging themselves with educative platforms. Social media notifications, entertainment, unrelated online activities, and inappropriate use of collaborative platforms may reduce users' concentration and academic performance (Mary, 2024). Similarly, unreliable power and connectivity lead to frequent power outage and low internet bandwidth interrupt online classes, meetings, research activities and access to cloud-based resources, especially in institutions where alternative power sources are limited. Not only that, but unequal hardware distribution also creates a digital divide between well-funded and under-resourced student groups. Differences in access to devices, internet services, and digital skills among students and lecturers can create unequal opportunities to participate in technology-supported academic activities.

Ranbir (2024) reports high costs of purchasing software licenses, hardware upkeep, network upgrades and strain institutional finances as parts of challenges facing in integration of technology into educational systems. Insufficient funding for purchasing and maintaining technology is a major obstacle in many higher institutions in developing counties like Nigeria. Not only that, inadequate or declining opportunities for training and professional development prevent many lecturers from building the necessary skills to enhance their teaching methodologies. Lack of ongoing technical support and troubleshooting assistance also hinders effective use of collaborative technologies for teaching and learning in higher institutions. Some lecturers and students are still feeling reluctant to change established practices or doubt the value of technology for teaching and learning.

III. Possible Solution to Barriers Facing the Use of Collaborative Technologies in Higher Institutions

In developing countries like Nigeria, academic institutions are facing many barriers when using collaborative technology, such as poor internet, high-cost bandwidth, lack of regular training and so on. Overcoming these barriers requires targeted investment, robust technical support, strategic planning, target policy, continuous professional development and fair distribution of resources to support effective and inclusive technology integration in education (Abdul-Hassim & Bakar; Ranbir, 2024). In order to tackle these problems, academic libraries should provide reliable, high-speed and affordable internet services across campuses to support online collaboration. Institutions should invest on computers, projectors, smart devices. Servers and other technological facilities required for collaborative teaching and learning. Similarly, lecturers, librarians, students and other staff should receive continuous training on the effective use of tools such as Google Workspace, Microsoft Teams, Zoom, Moodle and Discussion Forums. (Johnson et al, 2016).

Additionally, institutions can provide subsidized internet data, campus Wi-Fi and access to licensed collaborative platforms in order to reduce financial burdens on users. Not only that, reliable electricity and alternative power sources such as solar systems and generators should be provided to keep technological facilities operational. To protect academic information and users' data, strong security measures, user authentication and awareness programmes should be implemented. Moreover, institutions should provide inclusive access to ensure that students and staff with disabilities or limited technological skills can participate effectively in digitally supported academic activities. In addition, institutions should select collaborative tools that are easy to use, mobile-friendly and compatible with the devices commonly available to students and staff. Management should also encourage lecturers and staff to embrace and adopt collaborative technologies by demonstrating their benefits and involving users in technology-related decisions (Khan & Khan, 2025).

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IV. Conclusion and Recommendations

In conclusion, the use of collaborative technologies has become an important part of teaching, learning, communication, and knowledge sharing in academic environments. Platforms such as Google Workspace, Microsoft Teams, Zoom, Moodle, WhatsApp and discussion forums enable librarians, lecturers and students to interact, share resources, work on group projects, communicate beyond the traditional classroom, and participate in learning activities more conveniently.

Despite these benefits, challenges such as poor internet connectivity, insufficient digital skills, unreliable power supply high costs of maintenance, inadequate ICT infrastructure, technical problems and concerns about privacy and security may limit effective adoption. Therefore, academic institutions should provide adequate technological infrastructure, reliable internet and power supply, regular training, technical support, and appropriate institutional policies in order to encourage usage in academic communities. Similarly, academic institutions can also encourage blended learning approaches and provide appropriate funding for the sustainable adoption of collaborative technologies. In conclusion, the effective integration of these collaborative technologies can therefore contribute significantly to creating more interactive, inclusive, flexible, and learner-centred academic communit**ies.**

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