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Technology for Collaborative Online International Teaching: Barries and Proactive Strategies

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Abstract

The study explored the use of technology in co-teaching and proactive measures to overcome implementation challenges in collaborative online teaching in teacher education in South Africa. Despite the considerable benefits of collaborative online international teaching for engagement and learning outcomes, its successful implementation is often hindered by various challenges. The paper reports on the proactive strategies used by three lecturers to address obstacles to harnessing technology for collaborative online international teaching in teacher education. Data were gathered with a qualitative approach and included semi-structured interviews, and reference to minutes of meetings and email and online discussions. The study relied on connectivism learning theory as its primary analytical framework. The participants were three lecturers who collaborated online to teach education modules at the third-year level. The study demonstrates the urgent need for a more welcoming and encouraging digital learning environment. Difficulties encountered include lecturers' lack of experience with digital technologies, erratic Internet connectivity, digital inequalities and insufficient training, these obstacles are, however, not insurmountable. One strategy to achieve more equitable and successful implementation of collaborative online international learning is by taking proactive steps such as collaborative planning, the use of adaptable and easily accessible digital technologies and extensive digital training programmes to create more dynamic, inclusive and productive international teaching settings. By making cooperation and capacity building a priority, education institutions can enable lecturers to traverse online learning environments successfully. The results demonstrate that, in spite of the obstacles to technology adoption, the opportunities for improved educational experiences in collaborative online teaching, from an African perspective, are considerable. The study findings could help stakeholders deploy digital platforms for collaboration and offer useful information for their practical implementation in South Africa.

Keywords: collaborative online teaching, technology, teacher education, connectivism learning theory

1. Introduction

Internationalisation has been widely adopted by higher education institutions around the world, with many institutions using it to enhance global engagement in various ways. Internationalisation 'at home' is one of the ways that has become quite popular among

universities, because it helps students see the world from different angles without them having to travel. One important programme with this strategy is collaborative online international learning (COIL), which has become a potent instrument for encouraging students to become diverse, sustainable and global citizens (Mudiamu, 2020). COIL offers students beneficial opportunities to collaborate across cultural boundaries and cultivate global critical thinking skills. Students are exposed to various worldviews and are urged to think critically about global challenges through collaborative projects and virtual teamwork (Jie & Pearlman, 2018; Mudiamu, 2020). Technology is essential for COIL activities because it makes it possible to form international virtual teams and supports cross-border communication, teamwork and project management (Jie & Pearlman, 2018; Kimizuka & Sato, 2024). Therefore, it is crucial that lecturers and faculty members comprehend the potential and effects of technology when they plan and carry out collaborative international projects in higher education. The learning process can be greatly improved, meaningful cross-cultural relationships can be fostered, and students can be better prepared for the challenges presented by a globally interconnected world through the careful incorporation of digital resources. Hence, this study explored the use of technology in co-teaching and the proactive measures that could overcome implementation challenges in collaborative online teaching in teacher education.

The choice of technology should be taken into account in the planning and execution of COIL activities, right at the start, when the main goals of intercultural collaboration, course structure and pedagogy are established (Mudiamu, 2020). Online forums, video conferencing systems, blogs, Web 2.0 tools, social networks and specialised software for group learning and instruction are examples of synchronous and asynchronous knowledge-building technologies that foster the development of digital competency (Valverde-Berrocoso et al., 2021). At an Australian university, McKenzie et al. (2022) undertook an experiment to find out what a practitioner-based approach to team teaching for blended learning involved. They found that flexible use of ICT tools enabled lecturers and students to engage in a range of classroom roles through online, in-person or hybrid learning. However, in contrast to the benefits of collaborative technology and better international learning, there may be barriers to the smooth operation of COIL initiatives (Jie & Pearlman, 2018). Therefore, failing to emphasise digital tools enough could hinder the efficacy of COIL programmes by creating a disconnect between the intended learning outcomes and the technology being used.

To attain the study objectives, answers to the following questions were pursued: What are the main challenges teacher educators encounter when they utilise technology to establish COIL at a university of technology? What proactive strategies can be developed to overcome the identified obstacles in technology-mediated COIL practices?

The paper reports on the use of technology in COIL, discusses the research methods and theoretical framework used for this study, offers a thoughtful analysis of the challenges and benefits of the technology in COIL and provides suggestions for proactive strategies, before presenting the study conclusions. This discussion aims to summarise results, draw well-informed conclusions and make suggestions for further investigation.

2. Literature Review

This section presents a review of the literature on the efficiency of technology in COIL projects and strategies for overcoming potential roadblocks to online collaboration. The point of departure is justification for the implementation of technology in collaborative projects.

2.1 Implementation of Technology in COIL Projects

The effectiveness of COIL initiatives depends on the efficient use of technology. In order to promote meaningful online collaboration, higher education institutions must guarantee that students and lecturers have access to trustworthy digital platforms and tools that make real-time communication and ongoing teaching and learning possible. Jie and Pearlman's (2018) research presents a course development model for internationally networked teaching that focuses on improving intercultural awareness, cultural competencies and communication skills of college students through cost-effective global collaboration with diverse colleagues. They propose technology-integrated, international, networked teaching approaches for college students that will improve intercultural awareness, cultural competencies, communication and civil involvement while remaining cost-effective. Their findings also indicate that COIL courses promote experiential and collaborative learning to foster student-to-student interactions, cultural understanding and knowledge development, and professional development for lecturers.

The study of Prakaschandra et al. (2024), which involved second-year clinical technology students, reports a pleasant experience, despite constraints relating to language limitations and insufficient connectivity. They used novel digital tools, common lifestyles and intercultural sensitivities to promote cultural knowledge exchange and teamwork. The study emphasises the need to transfer academic knowledge to practical applications to improve learning. The study demonstrates that the adoption of collaborative digital learning technology provides extra opportunities to deepen global involvement and improve intercultural abilities in the classroom, thereby offering an authentic learning environment.

The effective integration of digital technology has been a major driving force behind COIL programmes. The study of Magen-Nagar and Shonfeld (2018), which investigated the impact of an online collaborative learning programme on Master of Education students' attitudes towards technology, is relevant. The outcomes of this quantitative study are that participation in the online collaborative learning programme had a substantial effect on students' perspectives, by reducing fear while improving confidence and favourable attitudes towards technology use in education settings. These findings highlight the relevance of well-planned technology strategies for improving the effectiveness of online collaborative learning environments such as COIL.

It is evident that the efficient use of digital technology is critical for the effectiveness of COIL projects. Efficient digital technology utilisation is critical for COIL projects, and requires institutions to provide dependable platforms, real-time communication tools and ongoing instructional support to ensure effective learning and, as a result, foster positive attitudes in students and professional development for lecturers (Butarbutar, 2025; Hasyim et al., 2024).

2.2 Conquering the Technology Obstacles in COIL

To create effective online collaboration activities and meaningful collaborative learning environments, the integration of technology should fully support collaboration; however, both lecturers and students may encounter challenges. Scholars have studied the difficulties faced by lecturers and students in COIL activities, as well as proactive measures to overcome those difficulties. Butarbutar (2025) found that inconsistent Internet connections, freeloaders, unpunctuality and a lack of experience with technology are obstacles for the adoption of technology-enabled collaborative learning. To overcome the barriers, the teachers employed following tactics: They used university-sponsored Internet, provided orientation at the start of class, ensured group formation and topic selection based on students' past knowledge, provided additional peer tutoring time and encouraged self-directed learning. Furthermore, written

discussions, peer assessments and oral comments were delivered via the WhatsApp group chat function, while the materials, assignments and teacher feedback were offered asynchronously through Google Classroom.

By using digital tools, COIL enables students to access course materials, interact with lecturers and execute tasks with international students (Hasyim et al., 2024). A challenge may be lecturers' unpreparedness to be involved in a COIL project. Hasyim et al. (2024) examined five factors to determine how prepared instructors were infrastructure, self-efficacy, digital literacy, technology pedagogy content knowledge and school management, and concluded that instructor preparation for COIL must be based on self-belief, excellent tactics and institutional support.

The cited studies confirm that the implementation of COIL could present substantial problems. However, addressing these hurdles and taking proactive steps not only increases the efficacy of COIL projects but also fortifies digital equity and cross-border intercultural understanding.

A well-planned technology integration strategy is required to foster positive attitudes in students and encourage lecturers' professional development. As a result, discussion of a theoretical framework that facilitates the exploration of technology use in COIL and proactive steps to address implementation challenges in teacher education follows.

2.3 Teacher Education COIL Project

Three universities have collaborated on the COIL project for teacher education since its start in 2022 to 2025. During the preparation phase, the instructors of the partner institutions collaborated extensively to create a shared syllabus. They engaged in discussions and reached consensus on the learning objectives, topics that students will debate, how and when to work together and student evaluation. The COIL project lasts between six and eight weeks. The project goal was to familiarise the students with education-related Sustainable Development Goals. Additionally, the students had to have a multi-perspective awareness of how people in other regions view global challenges in education, learning and life. The teacher education students worked together in mixed teams, with a representative from the international partner university expected to be on each team. The student teachers worked together every week to exchange knowledge on the various subjects the lecturers had created.

At the end of the project, the students write a reflective piece about their experiences and complete the evaluation form. Technology has been an essential part of the COIL project since its inception. Technology has made the interactions between students and lecturers, as well as between students themselves, possible.

3. Theoretical Framework

Connectivism learning theory was used as a theoretical lens for this paper. The theory was developed by George Siemens and Stephen Downess in 2005 (Alam, 2023). Connectivism is a learning theory that emphasises the way social networks and technology affect learning and it implies that learning entails traversing these networks, where knowledge is dispersed (Alam, 2023; De Valle Garciá Carreño, 2014). Connectivism highlights how crucial it is for students to critically assess and integrate disparate information sources to create new knowledge and adjust to novel circumstances (Alam, 2023). The theory has drawn criticism, with claims that it overemphasises social media and technology, while undervaluing other elements, including motivation, individual learning preferences and the role of the lecturer (Alam, 2023). Nevertheless, the theory is applicable to technology-enabled learning and can be used to design new models of learning that are more student-centred and collaborative (Alam, 2023; De Valle Garciá Carreño, 2014). Alam (2023) lists the following key principles of connectivism:

- Learning is a process of connecting specialised nodes or information sources.
- Learning may reside in non-human appliances.
- Capacity to know more is more critical than what is currently known.
- Nurturing and maintaining connections is needed to facilitate continual learning.
- Ability to see connections between fields, ideas and concepts is a core skill.
- Currency (accurate, up-to-date knowledge) is the intention of all connectivist learning activities.

The theory is pertinent to the study because it conceptualises learning as a network of creative processes, wherein knowledge stored in a database must connect with the appropriate individuals in the correct context to be considered learning. (Alam, 2023; De Valle Garciá Carreño, 2014). Furthermore, the theory is relevant because students recognise and engage with these networks and collaborate with others to create new knowledge and understanding (Alam, 2023; Mphuthi & Tshelane, 2023). Students have to collaborate online using digital tools, which they also use for communication and online activities. Lecturers also collaborate extensively to create a shared syllabus and to be creative in designing the COIL learning activities. Students and lecturers are able to adapt to changing circumstances, and to continually seek out new knowledge and experiences (Alam, 2023). Connectivism is pertinent to online learning because it offers a framework for comprehending how students engage with and create knowledge using technology (Mphuthi & Tshelane, 2023). Technologies such as Microsoft Teams, Zoom, WhatsApp, Padlet, Tricender and Canvas can help lecturers create, administer and deliver written discussions and thereafter gauge students' understanding of course content. Digital tools should be equally available to lecturers and students to facilitate real-world learning and improve knowledge and skills for managing the global agenda.

4. Research Methodology

This study used an interpretive research methodology to explore the experiences of lecturers when they used technology in COIL experiences. The aim and objectives of the study were considered carefully and thoroughly explained to the participants. The study employed the qualitative research method. Purposive sampling was used to recruit participants because sampling was done with a specific goal in mind. Lecturers were asked to consent to participate before the study commenced, and participation was entirely voluntary. Participants were guaranteed anonymity and confidentiality. The required ethical clearance and institutional authorisation were acquired.

Data were gathered using semi-structured interviews and from minutes of meetings, emails and online discussions. The data were examined using thematic analysis. The data were allocated codes, categories were developed from these codes and abstracted further into subthemes and themes. The identifying information of participants was anonymised throughout the data gathering and analysis process. The participants are referred to as Lecturer A, Lecturer B and Lecturer C.

5. Findings and Discussion

An overview of the research participants is given at the start of this section. At a university of technology, the three lecturers collaborated as teacher education instructors to implement COIL with third- and fourth-year students. The participants held Master's degrees and were full-time employees at the university, where they taught undergraduate studies in teacher education. The lecturers shared their views and experiences regarding the use of technology in co-teaching and the proactive measures to overcome implementation challenges in collaborative online

teaching in teacher education. The study was directed by two aims: i) to identify the main challenges lecturers encounter when they utilise technology to establish COIL in teacher education at a university of technology; and ii) to determine the proactive strategies that could overcome the identified obstacles in technology-mediated COIL practices in teacher education at a university of technology.

The lecturers expressed their opinions on the challenges they encountered in utilising technology and proactive measures they instituted to overcome implementation challenges in collaborative online teaching in a South African teacher education programme. The recurring themes in the data make it evident to collaborative lecturers who intend to use technology in COIL projects that they will face obstacles and should take proactive steps to overcome them. The recurring themes of the qualitative data are discussed below.

5.1 Challenges Relating to Technology and Implementing COIL

Despite the geographical distance from each other, the lecturers and teacher education students were able to communicate using technology; however, they still encountered difficulties. This section of the research will discuss the responses of the participants to the first question: What are the main challenges teacher educators encounter when they utilise technology to establish COIL at a university of technology?

5.1.1 Unfamiliarity with Digital Tools

The findings indicate that lecturers found technology to be a barrier. Lecturers commented as follows:

Lecturer A: *I realised that I was unfamiliar with some of the educational tools that my international partner used, such as Tricender, Padlet and Canvas, even though I was familiar with some of the technological tools that we used during the discussions, such as MS Teams, Zoom, and email, which served as a platform for our discussions. Because I didn't know how those platforms worked, I was unable to ask my students to do anything on them, which created a barrier for me. My students were also not familiar with these digital tools. The fact that I was not familiar with digital tools made me feel small and [it] affected my confidence.*

Lecturers' lack of familiarity with digital tools, particularly when international partners used a variety of platforms, could be a barrier. In practice, this can lead to unequal participation and a lack of cohesion in course delivery. This knowledge gap can make lecturers inefficient in their delivery of COIL material because it limits engagement with students. Digital tools can help lecturers and students with teaching, learning and communication. Jie and Pearlman (2018) advocate for the intentional selection of user-friendly, accessible and cost-effective tools that all partners can use comfortably to ensure inclusivity and reduce friction during implementation.

The participant mentioned that students were not familiar with some of the tools used in the collaboration process either. This shortcoming will affect teaching and learning because it will prevent students from executing some of the activities. This demonstrates that, to assist students, lecturers must be familiar with digital technologies and comprehend how technology affects COIL activities (Mudiamu, 2020).

The statement *made me feel small* denotes a disparity in power brought about by teachers' lack of technological expertise. The utterance indicates that the speaker felt less capable or empowered as a result of unfamiliarity with technology – not educational inadequacy. This is indicative of a larger conversation in schooling, namely that professional capability is increasingly defined by digital competency. Being unfamiliar with digital tools can disrupt confidence and affect a lecturer's sense of self. In COIL initiatives, technology might be seen

as a gatekeeper; however, paradoxically, it is also the tool that makes teaching, learning and communicating easier. Therefore, insufficient knowledge of technology interferes with confident performance, which is necessary to maintain professional legitimacy and authority.

5.2 Unstable Internet Connectivity

Unstable Internet connectivity was often mentioned by participants as a major barrier to the successful deployment of COIL with technology. The lecturers provided the following comments regarding erratic Internet access:

Lecturer B*: Internet connectivity was the issue with my partners; when we need to hold a lesson or have a planning meeting, the Internet will be erratic.*

Lecturer A: *This was a major issue for my students as well, because they found it difficult to work with their partners when they were not on campus but rather at home. And some of the international students preferred to do the collaboration of groups after hours because they were working.*

Unstable connectivity was not as an isolated issue. It was a shared experience that reinforced its legitimacy as a systemic barrier rather than a personal or localised failure. It affected both lecturers and students. The underlying requirement is that reliable Internet or connectivity must exist for effective collaboration to be achieved. This demonstrates how unequal access to technology can lead to exclusion. Digital tools should be equally accessible to students and lecturers, should enable real-world learning and enhance knowledge and competencies for managing the global agenda (Prakaschandra et al., 2024).

5.2.1 Digital Disparities

Even though there was access to digital tools, disparities were evident in various aspects, such as access to Internet and devices. According to Aruleba and Jere (2022), ICT adoption is high in South Africa; however, in 2018, only 1.7% of rural households nationwide had access to the Internet, compared to 17.3% of urban households that had this capability. This data are supported by Mthombeni (2024), who explains that, without Internet access, users find it difficult to benefit from the potential of the Fourth Industrial Revolution, especially when it comes to online remote learning or work, which necessitates stable Internet connections. Kennedy and Cronjé (2024) explain that one of the biggest obstacles to the growing use of ICT in education is lack of availability and access to technology. The three lecturers expressed their experiences as follows:

Lecturer B: *Due to the high cost of data for both professors and students, connectivity is a significant concern. In order to work together from home, both parties must look for and purchase data, which is costly.*

Lecturer C: *Although technology is becoming more widely used, data affordability is the problem. Since most of our students are from low-income families and depend on government assistance, it might be difficult to pay for data.*

Lecturer A: *The cost of data in our country is high*.

From these explanations it is clear that connectivity remains a major barrier to effective remote collaboration between lecturers and students. The high cost of mobile data restricts access to online resources and platforms, and makes connectivity a major obstacle in collaborative online learning and teaching. Students, especially those from low-income households, are affected by this financial load, which reduces the effectiveness of remote education and has an impact on academic attainment. According to Chapupu et al. (2024), students in environments with few resources and low income face comparable difficulties when using the Internet.

5.2.2 Inadequate Training in Digital Techniques

Inadequate training in digital techniques could be a barrier to COIL projects. The participants explained this barrier as follows:

Lecturer A*: Digital training is not incorporated into core curricula in many places, particularly in the Global South. In COIL projects, this has been the situation. I didn't receive any instruction on the various digital tools or methods that I might employ to ensure the COIL activities go smoothly.*

Lecturer C: *I was not trained but, fortunately. my collaborative partners helped a lot to know some of the digital tools and how to access and operate them.*

Digital resources are often positioned as neutral and accessible in education discourse, which assumes that lecturers and students already have the abilities they need to interact successfully with digital resources. A barrier may be created by the absence of organised, continuous training in digital technique, particularly for students from underprivileged backgrounds. Uzule and Verina (2023) argue that organisations should be concerned about the digital competencies of staff and should provide frequent training to improve their digital competencies and ensure they keep up with the rapid pace of development of digital technologies. This issue – of lack of knowledge and training in digital techniques – reflects systemic inequalities that are embedded in COIL discourse.

The next section discusses proactive measures that could be taken to overcome implementation challenges in collaborative online teaching in teacher education.

5.3 Proactive Measures for Overcoming Implementation Challenges in COIL

Collaborative international online teaching faces challenges that can be overcome with proactive measures to create more robust and resilient online education methods. Several proactive measures were suggested and serve as themes for enhancing successful COIL, thereby responding to the second research question: What proactive strategies can be developed to overcome the identified Obstacles in technology-mediated COIL practices?

5.3.1 Cooperative Planning

Digital tools could be used to support planning for COIL. For a COIL project to be successful and to remove obstacles, the collaborating lecturers may need to talk about and include digital technologies during co-planning. Lecturers provided the following suggestions:

Lecturer C: *Planning together few months before our COIL project started helped a lot in discussing issues like the content, learning objectives, students' activities, how to collaborate and the assessment methods.*

Lecturer B: *We began organising months in advance to ensure that our schedules, subjects, and evaluations matched. And early and regular communication and engagement with international partners enabled better alignment of course content and expectations.*

These statements indicate that it is important to properly plan for COIL activities in order to combat challenges. The pre-class design and planning exercises helped students develop their cognitive and affective skills and made the online moderation procedure for COIL projects easier (Ge et al., 2000).

5.3.2 Flexible Tools

Using a variety of less expensive tools helped mitigate connectivity issues. The lecturers reported their experiences as follows:

Lecturer A: *We had to consider less expensive digital platforms that the children could utilise after realising that they would be engaged in a lot of activities at home. We both agreed that, as compared to Zoom or Microsoft Teams, WhatsApp was the least expensive option. Once more, WhatsApp was used by all South African students for communication as it is reasonably priced in our nation. Despite the fact that some of their pupils lacked WhatsApp on their phones, international partners made concessions and consented to utilise the app. The most successful instrument for student communication was WhatsApp. However, the students collaborated on campus using Zoom and Microsoft Teams.*

According to Lecturer A, the popularity of WhatsApp in South Africa is socially and financially rooted, and the claim that *all or most students using it* attests to its cultural significance and role in students' social and academic lives. Adopting this less expensive digital platform enhanced flexibility and enhanced teaching and learning during the COIL project. The lecturers needed to preplan and propose adaptable, less costly digital tools that could accommodate all students, regardless of their location or means.

5.3.3 Training to Use Digital Tools

The lecturers supported each other before and during the collaboration. Lecturer B admitted that she had no knowledge of some of the digital tools that were used by the international partners. She admitted that she needed training to use the different digital tools that were used in various countries:

Lecturer B: *I need to get trained so that I may become more confident and instruct my students on the digital technologies used in the nations where I have worked. Although I learned a lot from my international counterparts, it was rather awkward to be taught by them.*

The statement, *I need to get trained so that I may become more confident* identifies a self-described competency gap and indicates a willingness to take a proactive approach. This presents the participant as self-aware and open to learning, but also exposes an internalised sense of inadequacy related to digital technologies. Digital tools training could equip lecturers with the skills and knowledge they need to effectively utilise digital technologies, which will enhance teaching and learning in COIL projects. Lecturers need to be trained in the different digital tools so that they can use these platforms to organise and deliver educational content, assess student progress and foster communication and interaction in the virtual classroom (Josué et al., 2023). It is, thus, apparent that professional training in the use of collaborative digital tools is essential and would benefit both the lecturers and the students.

6. Conclusion

Global connectivity made possible by technology has promoted inclusivity and diversity in the COIL projects at institutions of higher learning. Because collaborative tools are now more widely available and make online learning at universities possible, teacher preparation programmes also include online learning to improve the preparation of future educators. However, the incorporation of technology may pose a challenges, especially in underdeveloped countries. Reports of the lecturers' experiences, considered through the lens of connectivism learning theory, confirm that, when COIL activities are put in practice, lecturers should consider the difficulties that they and their students may face and take proactive steps to overcome those difficulties.

The data confirm the following recommendations. First, it is important for the collaborative partners to preplan the activities months before embarking on co-teaching together. Second, training in digital tools is needed to navigate issues related to discomfort caused by inequity that stems from colonial legacies, power, positionality, cultural pride and professional

hierarchy. In the third place, institutions should support COIL projects by providing flexible tools for both students and lecturers that will enable accessibility on and off campus.

The thematic analysis revealed a complex interplay of technological, institutional and pedagogical barriers to effective COIL implementation. However, educators demonstrated adaptability and innovation in employing proactive strategies to overcome these challenges. The findings underscore the importance of institutional support, professional development and digital accessibility and flexibility for the success of COIL projects. The findings of this study could guide stakeholders such as students, lecturers and management in adopting digital collaborative platforms, and provide knowledge for their real-world applications in a South African context.

The limitations of the study are that the inputs of only three participants were considered and that behaviours were qualitative rather than quantitatively reported. Therefore, it is not possible to draw comparisons between institutions of higher learning.

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