Exploring COIL as an authentic learning pedagogy

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Background. Collaborative online international learning (COIL) has become popular within universities to internationalise the curriculum and enable students' development as global citizens. It facilitates the coconstruction of disciplinary knowledge across cultures. This authentic learning experience is characterised by an authentic context, authentic tasks, access to experts and the incorporation of multiple roles and perspectives. By emphasising collaborative knowledge construction, reflection, articulation, coaching and scaffolding, COIL can potentially enhance engagement and improve educational outcomes, especially when designed to reflect the complex tasks performed by professionals in the field.

Objective. To explore the learning experiences of undergraduate clinical technology students participating in a COIL project and to determine whether COIL could provide an authentic learning environment.

Methods. A qualitative approach, sampling 2nd-year clinical technology students (n=16) registered for a Research Methodology I module at a university of technology, was employed. After ethics approval was obtained, we conducted focus group discussions, lasting approximately 45 - 60 minutes, using a semi-structured interview guide. Data were examined using thematic analysis.

Results. Five themes emerged: Participant experiences, communication, cultural perceptions, the development of graduate attributes and translating theory to practice. Despite the challenges, such as time zones, delays in peer responses and poor connectivity, students reported a positive experience. Language was a challenge, but they overcame this by adopting innovative digital tools. Students were exposed to the lifestyles of their Mexican peers, and work-balance strategies were shared. Being exposed to peers from a different lingua-culture, having the same demands and a common purpose was a catalyst for the exchange of cultural knowledge. This also created a platform for intercultural sensitivities. Students were able to work as a team, were motivated by their peers and adapted to the challenges. The theme translation of theory into practice enabled students to conceptualise theoretical content in a practical manner, which ultimately enhanced their learning.

Conclusion. COIL is a useful pedagogy to offer an authentic learning experience for research methods; it satisfies all nine constructs of authentic learning.

Keywords. Authentic learning, COIL, internationalisation.

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Complex global health issues call for a focus on the development of intercultural competencies to enable health practitioners to communicate effectively with patients from diverse cultural backgrounds.[1] Currently, common pedagogies for global health education in medical curricula are didactic,[2] with a call for a redesign of health professional education. In this context, digital technologies may be used to connect students internationally, foster collaborative partnerships and enable transformative learning among students for mutual learning.

Contemporary learning pedagogies such as e-learning are useful for the collaborative and inter-connected learning that students may need in global health.[3] In health sciences, the impact of globalisation occurs through the concept of 'internationalisation' of the curricula.[1] The COVID-19 pandemic accelerated a pivot to virtual exchange methodologies. While internationalisation should incorporate teaching on global health, it should also promote programmes that foster student mobility and learning activities that develop intercultural competencies;[3] the current challenge lies in developing the learning methodology itself. This requires innovative strategies, yet few studies exist,[1] particularly of health professionals, despite the potential for such collaborations.

Authentic learning experiences can promote the development of knowledge and skills in real-life settings, improving students' understanding of the relationship between learning environments and the challenges of their broader communities.[4] Designing an authentic learning environment in the virtual setting may be complex as students need to engage in activities that mimic professional practice.[5] A framework for authentic learning environments has been proposed,[6] encompassing nine constructs: authentic context, authentic tasks, access to experts, multiple roles and perspectives, collaborative construction of knowledge, reflection, articulation, coaching and scaffolding and authentic assessments. Digital technologies may support students in constructing skills and knowledge,[7] and facilitate the development of competencies necessary to navigate the global health agenda. When supported by guidance and resources, this engagement could provide opportunities for authentic learning to occur[8] within the online classroom.[9] One such strategy is the collaborative online international learning (COIL) pedagogy.

COIL falls under the virtual exchange (VE) umbrella, which focuses on online intercultural interactions and collaboration.[10] The changing face of health professions education now prioritises the international perspective,[11] and COIL can facilitate the development of such intercultural competencies, although research is still needed to explore its role as an authentic learning pedagogy.[12] The purpose of this study, therefore, was to explore the experiences of undergraduate CT students who participated in a COIL project, and to determine whether COIL could provide an authentic learning environment as outlined by Herrington *et al.*[6] This article only

reports on the research carried out with the students from the Durban University of Technology (DUT).

Methods

A qualitative approach was used to collect data from students enrolled for the Bachelor of Health Sciences in Clinical Technology (CT) at DUT. This project was aligned with the United Nations Sustainability Development Goal 16: 'Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels'.

Setting, population and sampling strategy

The CT programme is one of two offered by the Department of Biomedical and Clinical Technology. The COIL project comprised an interdisciplinary group incorporating 2nd-year students from health sciences registered for the Research Methods I (RMTD101) module at the DUT and 3rd-year students in the Operations Research module at Universidad Veracruzana (UV) in Mexico. Students (n=51) registered for the module Research Methodology I in CT were invited to participate. The inclusion criterion was students registered for RMTD101, while those not registered for this course were excluded.

The study was conducted after the COIL project had concluded and any assessments had been handed in to prevent participants from feeling coerced into participating in the research. Briefly, the COIL project consisted of seven sessions (four facilitator-guided sessions and three asynchronous sessions), focusing on the different aspects of research methodology (Table 1). Groups were expected to engage with their partners at predetermined sessions to achieve the projected outcomes.

Data collection

Data were collected using focus group discussions (FGDs), which took place face-to-face at a convenient time for the students, lasting ~45 - 60 minutes. The investigators explained the study's objectives to all students during a scheduled session. Emphasis was placed on the low risk of participation and the voluntary nature of the participation while ensuring inclusivity and respect were maintained so that all participants felt valued, even when responding to 'sensitive' questions that may evoke unpleasant reflections. In addition, the FGDs were conducted by a researcher who was not the lecturer, to balance the power dynamic. Students were recruited until meaning saturation was achieved and no new information emerged. Some examples of questions that were posed to the participants were: How did you experience the COIL project? How did the current project help you gain an understanding of your research methodology? A sample of 16 students across two focus groups was realised.

Data analysis

Data were examined using thematic analysis. All voice recordings were transcribed verbatim. The researchers immersed themselves in the data after which data was allocated codes, categories were developed from these codes and further abstracted into subthemes and themes.[13]

Ethical considerations

FGDs were held following full ethical clearance from DUT (ref. no. IREC 221/22). The three primary ethical principles of beneficence, respect for human dignity and justice, were observed to safeguard study participants. Students were informed that participation was voluntary and that should they agree to participate, they may withdraw at any time during the study. In addition, it was reiterated to students that non-participation would not affect their academic performance. An information letter and consent form were also issued via email, explaining the study and the consenting agreement.

Measures of trustworthiness

The rigor of this study was determined through the trustworthiness framework,[14] and assured by adopting strategies of persistent observation, peer debriefing, data saturation, audiotaping, verbatim transcription and a thick description. The credibility of the findings was ensured by the in-depth FGD and probing questions, ensuring a rich description of the phenomena and allowing participants to express their train of thought by managing the discussions so that they proceeded for as long as possible without interruption.[1] A rapport was built with participants by spending time with them prior to data collection. At this time, study information was shared and participants' concerns and questions were addressed. To enhance the study's transferability, an in-depth description of the research

Table 1. Summary of COIL project structure

Interaction	Topic	Facilitators
1st interaction	Introduction of both classes and grouping of students	Synchronised session
2nd interaction	Students meet in their groups for a story circle and then discuss their understanding of research processes and ethics	Synchronised session
3rd interaction	Identify a common problem in their university, as a consequence of the COVID-19 pandemic. Define an ethical research process to investigate the problem	Non-synchronised session
4th interaction	Develop an instrument for collecting information with an ethical approach (interview instrument)	Non-synchronised session
5th interaction	Students apply the instrument to each other in their groups	Non-synchronised session
6th interaction	Students discuss their results, including differences and similarities in difficulties presented	Non-synchronised session
7th interaction	Presentation of results by the student groups	Synchronised session
8th interaction	Reflection session	Synchronised session

COIL = collaborative online international learning.

methodology, nominated samples of direct statements from participants and verbatim quotes were provided. The dependability was enhanced through the in-depth description of the methodology used and all data and documents used in the analysis are available for an inquiry audit.[14]

Results

The analysis of the data culminated in the emergence of five themes: student experiences, communication, cultural perceptions, development of graduate attribute and translation of theory to practice. These are elaborated on below.

Theme 1: Student experiences

A general sentiment from participants was that the COIL experience was both terrifying and exciting. The exposure to a new culture and language, as well as interacting with peers from another discipline in a different country and time zone brought many potential challenges, but also opportunities:

Student Z: '… at first most of my colleagues also me were like "Argh why are we… why are we doing this project?" We felt like it was so unnecessary but not knowing that it will actually have a positive outcome on us …'.

Student L: 'I think it was a very great experience, honestly because to learn a different culture and speaking Spanish, it was so fun. Helping them improve English and them teaching us to speak Spanish was really great'.

Student K: '... all I can say is that the COIL project was great to me. It broadened my understanding for the most content that we had in research methodology…'.

The negative experiences were attributed mainly to the language barrier and the 7-hour time difference.

Student D: 'I think the Mexican students could also agree that language barrier and the time zones were the biggest issues that we both faced, so the UV students also speak Spanish and we spoke English, so the language barrier was an issue and together with the time zone, it made things quite difficult because the time for me that was a biggest for me personally because we could not meet early as others were sleeping'.

Student O: 'I think for now for now maybe not (to implement) yet in all modules. I think maybe if we try to perfect it in this module… maybe if we did everything right first …'.

Theme 2: Communication issues

Subtheme 1: Language

The language of instruction at the DUT is English and South African (SA) students had English as either their first or second additional language. It was envisaged that both student groups would share English as a common language, albeit with differing proficiency levels. This gave students an opportunity to reflect on their privilege in being able to command the English language with higher proficiency.

Student L: 'I think what I then figured in our group is that they were intimidated by us from the beginning, because we were English speaking individuals'.

Other students harnessed the opportunity to learn a new language, which enhanced their COIL experience:

Student Z: 'Well…my experience with COIL…was an amazing experience; I learned a lot and it also improved my communication skill'.

Subtheme 2: Use of technology

In view of possible oral communication barriers, students were encouraged to find creative ways to communicate. Within their teams, they shared translation tools, which became a point for learning.

Student Z: '… we may use Zoom as an app to communicate but like Zoom had so much problems and were not familiar with Zoom. And also Teams like I think due to the network issues, it was not actually smooth as it was on Whatsapp'.

Even when students used such translation tools, they encountered further challenges but found solutions.

Student G: 'It was such a big problem although we spoke some English but there were other words that were not picked up by Google translator when using WhatsApp, which threw your whole conversation in another direction'.

Student K: '... even though they told us that like some of the words they couldn't understand then we try by all means to make them understand in simple words. And it was it was very nice because we also got to learn their language …'.

Subtheme 3: Conceptual challenges

One of the aims of COIL is to provide a platform to address common problems in an interdisciplinary context. Although there was a clear structure for the project, with explicit course content, there were challenges in conceptualising the project across disciplines.

Student C: 'We translated from Google, but they still get a different understanding of something that is not what you wanted to tell them'.

Other students suggested more monitoring or mentoring from lecturers, as there was a sense that some groups on the Mexico side were not fully briefed on the project.

Student O: '… but then the way that you can ensure that the groups are in par with the work…so maybe a lecturer could come in and tell us this is what we are doing and where we are with our work'.

Theme 3: Cultural perceptions and dynamics

Students described their experiences in acquiring intercultural knowledge and attitudes.

Student E: 'I never thought I could be awake at 02h00 in the morning because having to try and meet with the time zones … It was a nice experience to meet the different cultures …'.

The exposure and intercultural exchange were clearly evident in all the groups and elevated their perspective of a country in the northern hemisphere, which for many of our students, was a first encounter.

Student Z: 'Working with the UV student was amazing because I got to learn, except for doing the research, what we were doing around our experiences during COVID-19, … their favourite cuisine, what they actually wear, their environment'.

The COIL interaction also sensitised students to the common issues, which affected both groups, igniting their international awareness and perspectives.

Student G: '… Mexico also experienced load shedding as well and therefore it made it difficult to communicate … I understand now that also students around the world … will face same problems...'.

Theme 4: Development of graduate attributes

Subtheme 1: Development of emotional intelligence

The course of the interaction during this COIL project allowed students to glimpse into the lives of their peers.

Student A: '... a lot of them had to go and take on jobs and that's why a lot of them are working currently and they did not have devices that they can access to communicate with their lecturers … it was just an eye opener in general that we take a lot of things for granted at times …'.

During the interaction, students also had to learn how to accommodate differences and modify their emotions

Student B: 'You don't know how someone is going to react to some statement…we had to calm ourselves down, we had to accommodate everyone'.

Subtheme 2: Skills sharing and acquisition

Students reflected on the attributes of their peers in Mexico, and one of the main aspects that emerged was a deep appreciation of their work ethic, commitment and improvement to the knowledge sets of both groups.

Student F: 'Like the way that they carry themselves, not only in terms of academically. like personal life…; they're not only students but they working as well'.

Student C: 'And also working in groups…even though we have different opinions and work ethic we were able to work together to complete the project'.

Subtheme 3: Adaptability

The very nature of this COIL project meant that students were exposed to novel contexts, and to succeed, students had to extend themselves out of their comfort zone and find strategies to deal with their challenges or adapt accordingly.

Student G: '... it was so stressful due to language barrier and different time zones but on the positive side it gave me an experience on what I could do in such situations'.

Subtheme 4: Motivation by peers

Peer learning is known to be a powerful tool, and it clearly emerged as one of the main ideas for this theme. Students from DUT recognised good practices in their peers like commitment, accountability and work ethic, and ultimately translated into improved practice.

Student C: '... even though they had some classes at that time they made sure that they would attend the session with us'.

Student L: '… the session breaks where we had to do articles … My group, we just did it but compared to how they went extensively into how they came about into their topic … their work ethic is very good'.

Despite the challenges with the communication, network, resources and time zones, students harnessed a common goal to overcome these and successfully complete the task.

Student H: 'We couldn't fail because none of us wanted to come back next year for this research... As much as it was fun, there was also anxiety, but we want to pass and get over it'.

Theme 5: Translation of theory to practice.

This project allowed for the content of research methodologies to become more understandable when applied in a real-life context.

Student Z: '… I did not quite understand the topics but interacting in this COIL project brought so much understanding, I was able to learn some parts which I did not understand'.

This translation of theory into practice was more important when students acknowledged the value of taking these skills with them into subsequent years.

Student B: 'I think it also help us in sighting methods to approach people because next year we going to be approaching people to get our data from them, so it helps us ...'.

Discussion

This study explored the experiences of undergraduate CT students who participated in a COIL project and aimed to determine whether COIL could provide an authentic learning environment. Our findings support those in the literature, indicating that students generally perceived COIL as a positive experience, despite the challenges. Students enjoyed the process of the acquisition of knowledge through the project and thereby developed intercultural sensitivities.

Students experienced challenges in communication owing to interdisciplinary differences, as anticipated. Although the students verbalised interdisciplinary communication as one of the challenges, they also cited this as one of the most satisfying skills obtained through the project, as it fostered an understanding of the broader value of their work. This was similar to findings reported in a study of doctoral students in an interdisciplinary context.[15] While the other challenging experiences are reflected in the literature,[16,17] setting clear parameters and turnaround times could mitigate some of these problems.[16]

The development of intercultural competencies has become important as the rise in demand for practitioners who can participate effectively in the global economy grows.[3] Our study found that students were sensitised to the similar challenges of their international peers, especially during the COVID-19 pandemic. These cross-cultural contradictions and challenges served to explicitly target notions of ethnocentrism and exemplify universal values[15,18] and served as a focus for multi-voices and adaptations.[19]

Cooperative learning using COIL bolsters active and team-based learning through students working together to solve problems in a social context.[20] Our study showed that students learnt from their peers, particularly regarding work ethic and different research philosophies. Peer learning is a powerful strategy for learning, and it is effective at facilitating students' learning about global health,[21] expanding their understanding of a complex problem and supporting the sharing of core knowledge to apply acquired information.[22] In this study, it was evident that a common vision for each team's research was necessary to spur them to navigate through the various challenges encountered during the project.

Integrating theory and practice enhances learning,[23] and health sciences studies show that collaborative learning methods improve students' outcomes, particularly in complex subject matter.[24] COIL facilitated an appreciation for the various epistemological approaches used in research. An important finding was that students integrated and applied knowledge of research methodology in a real-life setting, thus promoting the development of skills in an interdisciplinary context, similar to other recent publications[25,26] through a guided process.

While the knowledge taught at universities may be not retrievable in real life,[4] this project provided an authentic context where students engaged with peers from a different lingua-culture on a real-life issue, with actual project design and data collection. This project also deepened

intercultural sensitives and enhanced the depth to which the subject content was understood, despite challenges.[17] Access to experts was available throughout this project. Students adapted to multiple roles and reflected on different perspectives, ultimately collaboratively constructing knowledge. Assessments were authentic and students formulated creative strategies for dealing with the challenges, as they would in a real-life setting.

Conclusion

The recent uptake of collaborative digital learning technologies presents additional opportunities to deepen global engagement and develop intercultural competencies within a classroom, thereby providing an authentic learning environment. This study shows that COIL heightens students' international perspectives and strengthens undergraduate collaborative medical education by preparing students to work in the rapidly evolving global health space.

Declaration. We declare that this manuscript is our original work and has not been published anywhere else in the past.

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Data availability statement. The data generated and analysed during the current study are available from the corresponding author on reasonable request.

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