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INDICE

12. COIL IN ENGINEERING EDUCATIONAL ACTIVITIES: CHALLENGES AND OPPORTUNITIES

by Néstor Mora Núñez*, Juan Carlos Calabria Sarmiento**

Abstract: Today's educational environments offer a diverse range of innovative tools and approaches to enhance higher education across various aspects. One of the most noteworthy approaches is COIL (Collaborative Online International Learning) activities. The primary advantage of COIL lies in its design, which facilitates the internationalisation of the curriculum through virtual and collaborative activities without requiring travel. In engineering education and professional practice, internationalisation is becoming increasingly crucial. Modern companies operate in global environments, and engineering management requires specialised training to navigate multicultural and interdisciplinary settings. COIL activities enable students to engage in international collaborative efforts without relocating. Collaboration is fundamentally about understanding, designing, and applying knowledge to our ever-evolving reality. Therefore, incorporating collaborative work methodologies is highly beneficial. Such dynamics allow students to gain insights into other realities that may be familiar or quite different from their own. This is particularly significant when considering the application of the Sustainable Development Goals (SDGs), which serve as central themes for international and interdisciplinary work. Active learning catalyses social change, with SDG 16 (Peace, Justice, and Strong Institutions) as a central focus of this collaboration. In this article, we present the COIL activity

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conducted between Simón Bolívar University of Barranquilla, Colombia (USB), and the University of Cádiz, Spain (UCA). This COIL initiative focused on two key areas: the practical application of Data Science and the SDGs. Participants included undergraduate students studying Data Science at USB and master's students in Systems Engineering Research at UCA. The activity spanned four weeks, comprising two synchronous sessions (an initial and a final meeting) and a series of online groups to facilitate asynchronous participation. Google Meet was chosen for the synchronous/asynchronous sessions. Conversation groups were created in Google so students could chat, exchange files, and hold video conferences. The groups were initially supervised by a teacher, who could intervene if necessary to improve the exchange and management of information. Data from conversations and other interactions were recorded and properly anonymised for later analysis using social network analysis (SNA) tools. This article will present the instructional design used for this activity, the virtual resources employed, the virtual work methodology, and the results obtained. It will also detail the results achieved through the development of activities, the evaluation of completed work, and student satisfaction surveys.

Keywords: COIL, SDGs, Engineering education, Online learning, Collaborative learning.

Abstract: Gli ambienti educativi odierni offrono una vasta gamma di strumenti e approcci innovativi per migliorare l'istruzione superiore in vari ambiti. Uno degli approcci più degni di nota è quello delle attività COIL (Collaborative Online International Learning). Il vantaggio principale di COIL risiede nella sua progettazione, che facilita l'internazionalizzazione del curriculum attraverso attività virtuali e collaborative senza richiedere spostamenti. Nella formazione ingegneristica e nella pratica professionale, l'internazionalizzazione sta diventando sempre più cruciale. Le aziende moderne operano in contesti globali e la gestione ingegneristica richiede una formazione specializzata per muoversi in contesti multiculturali e interdisciplinari. Le attività COIL consentono agli studenti di partecipare a collaborazioni internazionali senza dover trasferirsi. La collaborazione

riguarda fondamentalmente la comprensione, la progettazione e l'applicazione delle conoscenze alla nostra realtà in continua evoluzione. Pertanto, l'integrazione di metodologie di lavoro collaborativo è estremamente vantaggiosa. Tali dinamiche consentono agli studenti di acquisire conoscenze su altre realtà che possono essere familiari o molto diverse dalla propria. Ciò è particolarmente significativo se si considera l'applicazione degli Obiettivi di Sviluppo Sostenibile (SDG), che costituiscono temi centrali per il lavoro internazionale e interdisciplinare. L'apprendimento attivo catalizza il cambiamento sociale, con l'SDG 16 (Pace, Giustizia e Istituzioni Solide) al centro di questa collaborazione. In questo articolo, presentiamo l'attività COIL condotta tra l'Università Simón Bolívar di Barranquilla, Colombia (USB), e l'Università di Cadice, Spagna (UCA). Questa iniziativa COIL si è concentrata su due aree chiave: l'applicazione pratica della Data Science e gli Obiettivi di Sviluppo Sostenibile. Tra i partecipanti figuravano studenti universitari di Data Science presso l'USB e studenti magistrali di Ingegneria dei Sistemi di Ricerca presso l'UCA. L'attività è durata quattro settimane, comprendendo due sessioni sincrone (una riunione iniziale e una finale) e una serie di gruppi online per facilitare la partecipazione asincrona. Google Meet è stato scelto per le sessioni sincrone/asincrone. Sono stati creati gruppi di conversazione su Google, così che gli studenti potessero chattare, scambiare file e tenere videoconferenze. Inizialmente, i gruppi sono stati supervisionati da un insegnante, che poteva intervenire, se necessario, per migliorare lo scambio e la gestione delle informazioni. I dati delle conversazioni e di altre interazioni sono stati registrati e opportunamente anonimizzati per una successiva analisi tramite strumenti di analisi dei social network (SNA). Questo articolo presenterà la progettazione didattica adottata per questa attività, le risorse virtuali impiegate, la metodologia di lavoro virtuale e i risultati ottenuti. Descriverà inoltre i risultati ottenuti attraverso lo sviluppo delle attività, la valutazione del lavoro svolto e i sondaggi sulla soddisfazione degli studenti.

Parole chiave: COIL, Obiettivi di sviluppo sostenibile, Formazione ingegneristica, Apprendimento online, Apprendimento collaborativo.

Introduction

In today's higher education landscape, the internationalisation of curricula has evolved from an added benefit to an essential requirement for preparing global professionals (De Wit e Leask, 2019). However, traditional physical mobility is often hindered by economic, geographical, and bureaucratic barriers, resulting in participation rates of less than 10% for many institutions (Knight, 2012). In this context, "Internationalisation at Home" has become a crucial strategy to provide the majority of students, who are unable to study abroad, with the global competencies they need (Beelen e Jones, 2015).

In today's higher education landscape, institutions face the dual challenge of training both competent professionals and responsible global citizens, in line with the 2030 Agenda for Sustainable Development. In this context, internationalising the curriculum is no longer optional; it has become a strategic necessity closely linked to Sustainable Development Goal 4 (Quality Education). Specifically, target 4.7 emphasises the importance of ensuring that all learners gain the theoretical and practical knowledge needed to promote sustainable development, appreciate cultural diversity, and foster global citizenship (UNESCO, 2017; United Nations, 2015).

Traditional physical mobility, constrained by economic and geographic barriers, reaches only a small share of students, resulting in unequal access to essential global skills. For instance, at the University of Cádiz, only 2.852% of students participated in an in-person mobility program during the 2024-2025 academic year. Similarly, Simón Bolívar University also reported a low percentage of students who were able and willing to undertake internationalisation experiences in a face-to-face format. This raises an important question: how can we enhance the internation-

alisation experience at our universities?

Collaborative International Online Learning (COIL) emerges as a vital solution. COIL embodies Sustainable Development Goal 17 (Partnerships for the Goals) by enabling cross-border cooperation among universities without the carbon footprint associated with physical travel (De Wit e Leask, 2019). This model connects classrooms across countries through digital tools, enabling students and teachers to collaboratively create knowledge and explore cultural meanings without leaving their home institutions (Rubin, 2017).

Collaborative International Online Learning (COIL) has emerged as one of the most transformative and motivating educational methodologies. According to Rubin (2017), the COIL model connects classrooms across countries through digital tools, enabling students and teachers to collaboratively construct knowledge in a multicultural and interdisciplinary environment without leaving their home universities. More than just a virtual connection, COIL emphasises experiential and collaborative learning. It is designed to facilitate interactions that involve negotiating meanings and developing intercultural competence (Guth e Rubin, 2015). Its significance lies in its ability to equip students with essential soft skills for the 21st century, including remote teamwork, cross-cultural communication, and digital adaptation.

Existing literature on Collaborative Online International Learning (COIL) and virtual exchange has thoroughly documented the benefits of these educational interventions. Pioneering studies, such as those by Deardorff (2006), establish a theoretical foundation for how these interactions foster cultural empathy and self-awareness. Similarly, O'Dowd (2018) has examined how tele-collaboration positively influences participants' communicative and digital competence.

Recent research also emphasises the role of "Internationalisation at Home" as a catalyst for educational equity and sustainability (Beelen e Jones, 2015). Studies by Campbell and Walta (2015) indicate that virtual experiences enhance critical awareness of global issues, which aligns with the principles of Education for Sustainable Development (ESD). Additionally, both Deardorff (2006) and O'Dowd (2018) have documented how these interactions cultivate empathy and communicative competence.

Most available studies focus on synchronous communication methods, such as videoconferencing, which can create access and connectivity barriers in contexts affected by digital divides, thus hindering the full inclusion advocated by the Sustainable Development Goals (SDGs). Traditional learning management systems (LMSs) such as Moodle and Blackboard are often used (Appiah-Kubi e Annan, 2020). However, there is limited evidence on how asynchronous messaging tools, such as Google Chat, can effectively foster in-depth academic partnerships. This research aims to address this gap by employing a hybrid methodology that prioritises written and asynchronous interactions, offering a more flexible, inclusive, and sustainable model for international collaboration.

There is a notable lack of research on the use of instant messaging tools and asynchronous workspaces (such as Google Chat) as the primary means of academic interaction. While the literature on computer-mediated communication (CMC) indicates that asynchronous communication can promote deeper reflection by alleviating the pressure to respond immediately (Hrastinski, 2008), there is insufficient empirical evidence on how sustained messaging over weeks specifically influences the cohesion of international teams in Collaborative Online International Learning (COIL) projects. This research seeks to address this gap by employing a hybrid methodology that emphasises written interaction in

collaborative spaces as the foundation for project development.

This study examines a Collaborative Online International Learning (COIL) experience implemented between Simón Bolívar University in Colombia and the University of Cádiz (UCA) in Spain. The intervention was designed using a sequential hybrid model that included a synchronous introductory session, four weeks of development via Google Workspace chats, and a synchronous closing session.

Based on this design, the research outlines the following key objectives:

1. to analyse the effectiveness of a hybrid model that combines synchronous starts and ends with asynchronous development in coordinating Hispanic-Colombian teams;
2. to evaluate the development of intercultural competence and the perception of "otherness" following four weeks of text-mediated interaction;
3. to assess student satisfaction with Google Chat as an academic tool and to identify the facilitators and barriers to transatlantic communication.

Methodological Framework

COIL Experience Design Description:

This text provides a brief overview of the study's context, with a focus on the University of Cádiz (UCA). UCA is a public university in Spain serving the province of Cádiz through four specialised campuses and enrolling over 22,000 students. The university is internationally recognised for its expertise in marine and environmental studies and serves as an academic bridge between Europe and North Africa.

The study took place at the Higher School of Engineering on the Puerto Real Campus during the “Research Methodology” course, which is part of the Master’s Degree in Research in Systems and Computer Engineering. This course runs during the second semester, from February to June. In the 2024-2025 academic year, 16 students were enrolled, five of whom were from outside the European Union.

The course syllabus includes an introduction to the Sustainable Development Goals (SDGs), with an emphasis on aspects relevant to engineering research. All students had the opportunity to participate in the Collaborative Online International Learning (COIL) activity; however, only 11 chose to do so.

To design this COIL experience, we used the ADDIE instructional design model, comprising the phases of Analysis, Design, Development, Implementation, and Evaluation.

During the analysis phase, we identified three key elements to consider.

The analysis phase began with an assessment of the feasibility of conducting synchronous online sessions. COIL (Collaborative Online International Learning) activities face two primary challenges: language barriers and the availability of a time slot that accommodates all participants.

In our case, we had an advantage: the students shared the same language. Thus, we concentrated on the second challenge: identifying a suitable time for everyone. To address this, we conducted an initial survey to identify potential scheduling conflicts between the courses at both universities.

The survey results indicated that the most effective option was to engage with an informal student group at Simón Bolívar University. This group, known as “Semillero” (Seedbed), comprises undergraduate students who are highly motivated to engage in extracurricular activities.

From the University of Cádiz, we selected a group of students from the Master's Program in Engineering and Computing Research. This group had a course that aligned with the Semillero's meeting schedule. Their task was to develop a research project proposal, and the COIL activity was designed to expose them to social circumstances beyond their immediate environment and to enhance their understanding of the Sustainable Development Goals (SDGs) in multinational contexts.

Moreover, the analysis phase indicated that the COIL activity should be approached experimentally. Both teachers and students needed a straightforward, hands-on experience beforehand to grasp concepts that could only be understood through practical application.

After a thorough analysis phase, we crafted an engaging design for the upcoming activity, meticulously structured into three distinct phases. First, participants would attend an immersive four-hour introductory session conducted in real time to foster interaction and collaboration. This would be followed by a three-week phase of collaborative work, allowing students to delve deeply into their projects at their own pace and to connect asynchronously with peers across the digital landscape.

We would conclude with a dynamic four-hour session in which students would present their findings and engage in meaningful evaluation, again in a synchronous format to share insights and foster dialogue.

To ensure a seamless experience for both groups of students, we carefully selected ideal dates that would alleviate any sense of pressure. We established start and end dates, creating a generous four-week window for operations. Notably, the activity would be paused for Easter 2025 after the third week, allowing students an invaluable opportunity to step back and reflect. This designated week of rest was intended to inspire them as they began

conceptualising their final presentations, giving them the chance to channel their creativity and ideas into their projects.

In the initial phase, we cemented a series of engaging activities that would set the stage for a rich learning experience:

Initial session, Wednesday, week 0 (Kick off session):

- (5 min) Welcome to UCA. (Pr. Néstor Mora);
- (10 min) Welcome to USB. (Pr. Jaime Díaz Uribe, Internationalisation Coordinator, Faculty of Engineering, Simón Bolívar University);
- (15 min) Presentation of the activity: Objectives and opportunities. Evaluation. Explanation of how we will carry it out. Roles. Virtual development spaces. Notes on each step of the work. Platforms: GSheets, Google Chat, and GMeet. Timeline for non-classroom work. (Pr. Néstor Mora);
- (10 min) Information on forming workgroups of 4 to 10 students. (Pr. Néstor Mora) The groups will be presented to students at random, ensuring that each group has the same proportion of students from each university. It is suggested that each student dedicate approximately 3-5 hours per week, spread over 3-4 days;
- (20 min) Group meeting via Google Meet: Getting to know one another (activity). (Groups);
- (15 min) Explanation of the Sustainable Development Goals (SDGs) and identification of the most relevant resources for working with them: SDGs and sensory analysis. (Pr. Néstor Mora);
- (15 min) Related activity: Choose 3 SDGs to work on during the week. This will introduce the work platform and help students understand how to interact with each other within their groups;
- (15 min) How do we obtain knowledge from data? Students will be shown the working databases. (Pr. Juan Carlos Calabria);

The subsequent phase unfolded within a dynamic online

environment (Chats spaces), where exploration took centre stage. The primary objective in this digital landscape was to uncover the wealth of data on the selected Sustainable Development Goals (SDGs). With virtual tools at hand, the groups delved into the available information, seeking insights to deepen understanding and guide efforts toward meaningful impact. Characterise them. Identify the real-world environment for the project. Record the concepts and relationships in the group's Google Sheet.

To understand the development of what was done in the following weeks, the relevant aspects that were carried out in each of these will be shown below.

Week 1: Exploring Vibrant Concepts, Intertwined Relationships, and Robust Models

This week marks the continuation of the period during which our dynamic activity first began. On Thursday of this engaging first week, each group is required to submit a first thorough performance evaluation. This important responsibility should be delegated to the student serving as the plan monitor, who will diligently compile the review and post it to the group's shared Google Sheet. Should any questions arise during this process, they must be directed to the student designated as the clarifier. Armed with a problem-solving mindset, the clarifier will seek satisfactory solutions. If they encounter a roadblock, they will promptly escalate the issue to the professor for further assistance.

As an inspiring suggestion, each team is encouraged to present 10-15 compelling concepts related to their chosen topic. The intricate relationships between these concepts should be framed as "polynomials," showcasing a clear structure that includes the Name, Context, and Definition for each entry.

Students are expected to document their progress on the

topic in the team's Google Sheet, noting the date, the time spent on the work, and their satisfaction with their achievements. Google Sheets also features a comments section, creating an opportunity for meaningful feedback and collaboration.

Weeks 2, 3, and 4: Unfolding Collaborative Work from Week 1

As we enter the next phase of our project, Monday will bring an intriguing challenge. Teachers will present a compelling "problem" that each student team will tackle, delving into an exploration of solutions. This problem will be closely connected to the Sustainable Development Goals (SDGs) that each team has thoughtfully selected, linking their efforts to the broader mission of fostering a better world. While the challenge is designed to be approachable, it demands the full range of cognitive skills we cultivated over the past week. This is a chance for creative thinking, critical analysis, and collaborative problem-solving to be clearly demonstrated. To ensure everyone is informed and organised, notifications will be sent via email, accompanied by an updated Google Sheet for quick reference. In addition, each group will prepare a Google Slides presentation.

This visual narrative must clearly communicate the objectives and processes essential for untangling the puzzle they face. Over the next two weeks, teams will engage in this collaborative journey, transforming their insights and creativity into tangible solutions.

Final week. End of activity. Closing session program:

- (20 min) The teachers will make a brief comment about the activity;
- (10-15 mins each) Each group spokesperson will give a presentation on their work. A Google Slides presentation will be assigned to each group;

- (5-10 min) Each student will evaluate the groups' contributions through a survey/form;
- the collected data will be displayed;
- (15 min) The teachers will share their perspectives, and there will be time for students to express their viewpoints on the entire activity;
- (5 min) Thank you and farewell—closing of the activity.

In this section, we examine the innovative technological tools that facilitated the COIL activity. The Microsoft Teams platform was selected for our live sessions, a choice enabled by the seamless access that both UCA and USB have to this versatile tool. Its robust features allow students to connect seamlessly, regardless of participant count, fostering an inclusive and dynamic environment for collaboration.

For group assignments, we turned to Google's suite of free online tools: Google Chat, Google Sheets, and Google Slides. This selection was driven by their user-friendly interfaces and the vibrant interactivity they provide, making the collaborative experience engaging for students. With most participants equipped with Android phones, they are just a click away from the resources they need, thereby enhancing their learning experience.

In any collaborative setting, defining roles is critical for maintaining focus and organisation. To this end, we introduced three key roles: the leader or coordinator, who guides the group; the secretary or collection officer, who captures ideas and organises them; and the group spokesperson, who communicates the team's progress.

Other members were encouraged to specify their assigned tasks and recount their accomplishments, promoting a sense of accountability and teamwork. We also emphasised the importance of flexibility in these roles, allowing students to adapt and delegate functions as the project evolves, ensuring everyone has the

opportunity to contribute meaningfully.

In all collaborative work groups, teachers assumed a critical role as facilitators, guides, and architects of the learning experiences in which students actively participated. They were responsible for designing engaging and meaningful tasks that prompted student interaction and exploration. It was also imperative for teachers to effectively manage any challenges that emerged within the groups. This entailed stepping in to mediate conflicts, helping students navigate disagreements, and fostering a positive and constructive atmosphere.

In addition, educators played a pivotal role in fostering an environment conducive to mutual reflection. Instead of merely offering swift responses to students' questions, they prompted deeper reflection by posing thought-provoking questions that encouraged students to delve into the material and connect with one another.

This approach to questioning not only nurtured a rich culture of inquiry but also inspired students to express their thoughts, exchange diverse perspectives, and learn collaboratively. Through this dynamic interaction, the classroom transformed into a community of thinkers, where ideas flourished and insight thrived.

Ultimately, the overarching goal was to facilitate meaningful interactions that would lead to the collaborative construction of knowledge. By doing so, teachers aimed to improve educational practices and enhance student learning through a synergistic approach that emphasised collective support and teamwork among students. Through this dynamic process, students not only gained a deeper understanding of the subject matter but also developed essential skills, including communication, critical thinking, and collaboration.

Research Methodology Applied

Applying a COIL methodology to develop an activity that harnesses a diverse array of collaborative tools is an exciting and innovative endeavour (Rubin e Guth, 2015). In our exploration, we directed our collaborative efforts toward using a flexible and dynamic platform, specifically the Google environment, which enables seamless connectivity and interaction (Emilzoli *et al.*, 2025). Given the limited number of published cases in this area (Hackett *et al.*, 2023), it is essential to position this initiative as a unique opportunity to examine the intricate dynamics of learning.

In our exploration, we directed our collaborative efforts toward using a flexible and dynamic platform, specifically the Google environment (Emilzoli *et al.*, 2025), which enables seamless connectivity and interaction. Given the limited number of published cases in this area, it is essential to position this initiative as a unique opportunity to examine the intricate dynamics of learning.

Consequently, we opted for a qualitative approach rooted in the 'case study' model, a method that enables us to examine the phenomenon in its authentic real-world context, where boundaries between the experience and its context are often blurred (Yin, 2018). This approach is particularly suited for capturing the rich cultural backgrounds inherent in educational settings (Merriam e Tisdell, 2016).

Now, let us highlight the notable participants in this activity. As highlighted earlier, we assembled a diverse group of students from each university. At USB, a substantial gathering of undergraduate learners convened around an engaging initiative titled "Semillero," or "Seedbed," fostering a nurturing environment for emerging ideas and collaboration.

Meanwhile, the UCA students participating in this endeavour were enrolled in the "Research Methodology" course, an

integral component of the “Master’s Degree in Research in Systems and Computer Engineering.” Of the sixteen enrolled, eleven enthusiastic students participated in this ground-breaking activity, each bringing their own unique perspectives and experiences to the collaborative table.

Four types of data collection instruments were utilised: initial and final surveys, Google Chat groups, and Google Sheets spreadsheets containing initial questions and final presentations from each group. The characteristics of these instruments are described as follows:

The initial and final surveys were meticulously designed to elicit students’ prior knowledge, set expectations, and evaluate the outcomes of their learning experiences, while aligning their responses with the specific objectives established for the activity.

To facilitate student collaboration, Google Chat groups were utilised as the leading platforms for interaction. These groups provided a dynamic environment where students could share their ongoing work, observe the evolution of collaborative efforts, and brainstorm innovative solutions to the problems at hand. Throughout this process, teachers played an active supervisory role, fostering meaningful interactions that helped prevent and resolve potential issues.

During the initial phase of the project, students engaged in a negotiation process to choose a relevant problem topic to explore and address. The details and insights gathered during these discussions were meticulously documented in Google Sheets, ensuring a clear record of their thought processes and decision-making.

As the project culminated, students prepared to present their findings and solutions. On the final day, they delivered their presentations synchronously, showcasing the results of their hard work and collaborative efforts to their peers and teachers.

In this study, we employed a thematic analysis strategy as outlined by Braun and Clarke (2006). This approach involved several key components: familiarisation with contextual data, negotiation of interactions, exploration and review of relevant themes, and the defining and naming of those themes.

Qualitative research typically features open and evolving research questions, which allow for a significant degree of flexibility (Creswell e Poth, 2018). This is particularly important as the development of COIL (Collaborative Online International Learning) activities still necessitates further investigation. The initial research questions we posed focus on three main areas:

- area 1: Intercultural Competence: “In what ways do students articulate the evolution of their perceptions of the partner country’s vibrant culture following their immersive experience in the COIL project?”;
- area 2: Exploring the Dynamics of Virtual Collaboration: “In what ways do international teams cultivate rich interactions within the tapestry of an asynchronous chat-like environment?”;
- area 3: Obstacles and Enablers: “What technological and pedagogical elements do participants recognise as the primary challenges to cultivating trust within a virtual environment?”.

In this article, we focus solely on the second line of inquiry, as we identified the need to restructure the questions for lines one and three.

In qualitative research, it is essential to establish initial hypotheses, known as “Working Assumptions” or “Theoretical Propositions.” These guide the researcher’s perspective and can be confirmed, refuted, or refined during the analysis. The following hypothesis has been formulated:

Hypothesis: This proposition concerns the effectiveness of working in an asynchronous chat environment. The structure and execution of the activity were appropriate for providing an

experience that emphasises internationalisation and enhances understanding of the importance of the Sustainable Development Goals (SDGs) in today's society.

This hypothesis was investigated using two methods: observation of chat interactions and analysis of students' responses to a final survey. The first method focused on assessing the level of communication during the chats and the degree of agreement or disagreement expressed among participants. The second method involved a survey, as previously mentioned. Below, we present the questions that comprised the final study of the activity, including the type of questions.

In order to enhance the clarity and engagement of this article, the potential answers will be thoughtfully presented in the results section.

- Question 1. What did you think of the time available for the COIL activity? (4 weeks) Choose one of the options.
- Question 2. Two synchronous sessions have been held, but more may be needed. Choose one of the options.
- Question 3. What improvements would you suggest for the session development format? (Free text).
- Question 4. Has the use of GSheets been useful? Choose one of the options.
- Question 5. Has the use of Google Chat been helpful? Choose one of the options.
- Question 6. How have the synchronous and asynchronous formats worked? Choose one of the options.
- Question 7. Have the SDGs been integrated appropriately into the development of the data application? Choose one of the options.
- Question 8. What improvements do you propose regarding the environment and the format of interaction with the work group? (Free text).

- Question 9. Any additional comments you would like to share? (Free text).

After collecting data from this survey, we will analyse the results from both the chat groups and the survey. We will present the results in the next section.

Results

The final survey responses help us understand how students experienced and developed their internationalisation through a COIL-type activity. It's important to note that not all students who participated in the COIL activity completed the survey. Specifically, the participation rate was 56.7%, with 21 out of the initial 37 students submitting their responses. The results are outlined below:

1. What did you think of the time available for the COIL activity? (3 weeks)
- It was sufficient to meet the set objectives. 66.67%.
- Everything planned was completed, but a little more time would have improved the results. 33.33%.

2. Two synchronous sessions have been held, but more may be needed.
- A few short synchronous sessions (approximately 20 minutes) per group would be required.47,62%.
- No more synchronous sessions are required. 42,86%.
- One session should be scheduled each week. 9,52%.

3. Has the use of GSheets been useful?
- I think it's been perfect for what we've been asked to do. 38,10%.

- We've used it, but there are better alternatives. 33,33%.
- It's been okay, but it could be complemented with other virtual spaces.19,05%.
- No, its use hasn't really been necessary. 9,52%.

4. Has the use of Google Chat been helpful?
- I think it's been perfect for what we've been asked to do. 57,14%.
- It's been okay, but it could be complemented with other virtual spaces. 23,81%.
- We've used it, but there are better alternatives. 19,05%.

5. How have the synchronous and asynchronous formats worked?
- The work has been well done, but I am not comfortable sharing asynchronously. 47,62%.
- It has been very complicated. It's better to do everything synchronously. 28,57%.
- Everything has gone very well. I've enjoyed working this way. 23,81%.

6. Have the SDGs been integrated appropriately into the development of the data application?
- Everything has gone very well. I've enjoyed working this way. 52,38%.
- It has worked, but the overall structure of the work process could be improved. 33,33%.
- I've observed some connections between data and the SDGs, but I need more knowledge to understand them fully. 14,29%.

In addition to multiple-choice questions, short-answer questions were also included. These questions allow students to communicate nuances better than closed-ended multiple-choice questions. Here are the results:

1. What improvements would you suggest for the session development format? Answers:

- increase the number of synchronous sessions for reviewing the problem;
- share the session organisation, scope, and time allocation with the students;
- divide the problem into more specific sub-problems and conduct a more guided activity;
- improve communication between groups;
- you can formalise the video call presentation for each group in class, instead of leaving it to us to manage on our own, since it's more difficult due to scheduling conflicts or a lack of cameras;
- be able to connect via Meet with classmates from the other university for longer during the first synchronous session, either in separate break rooms or by splitting up in the classroom;
- more time;
- I would have liked at least one weekly session to show progress and clarify doubts;
- none (3 responses)
- that everyone can connect from home with their own equipment and in complete comfort;
- that there are breaks;
- eight students did not respond.

2. What improvements do you propose regarding the environment and the format of interaction with the work group? Answers:

- providing meeting support tips to address time zone differences;
- in our case, we organised virtual meetings via Google Meet, which helped us progress more quickly. In real time, we were able to organise ourselves more effectively and address questions immediately;
- more iterations;

- improve communication, more activity among ourselves;
- nothing (2 times);
- better organisation by both sides, establish two coordinators, and have them manage team doubts or concerns between universities:
- nothing really improved since communication is difficult due to the time zones, but we were still able to work well;
- perhaps communication is affected by time zones, but if organised well, it can be done;
- use other virtual spaces, hold more group meetings, and allocate more time to them;
- use tools such as Trello, Slack, or Microsoft Teams. Better team monitoring and structuring;
- the Google suite is quite complete in terms of resources for connecting;
- nine students did not respond.

3. Any additional comments you would like to share? Answers:
- ultimately, very few people end up working in each group. The experience was somewhat wasted due to the low participation. Another curious thing is that the USB students asked to create an external group so they could "communicate more freely where the professors weren't present," which, from my perspective, is counterproductive;
- any additional comments you'd like to share?;
- thank you for the opportunity; everything seemed appropriate. I hope to communicate with you soon;
- truthfully, it was an excellent experience. Working in a team with fellow master's students from another country was an enriching experience that enabled us to learn new things through collaborative research;
- thank you very much for this pleasant experience;

- nothing, everything was fine;
- none;
- none, everything was excellent;
- no, nothing;
- for now, none;
- it is recommended that this practice continue;
- An amazing experience;
- ten students did not respond.

Discussion and Conclusions

This section interprets the results and relates them to the objectives and previous literature. Based on the goals set out in the introduction, we can state that:

1. the effectiveness of the hybrid model—combining synchronous start and end times with asynchronous development—has proven to be a game-changer for coordinating Hispanic-Colombian teams. This is powerfully illustrated in the responses to question #6, where a strong consensus emerges, highlighting the model's success. Although this achievement is commendable, there remain opportunities for enhancement that will be explored later;
2. the assessment of intercultural competence development and the understanding of "otherness" after four weeks of text-mediated interaction has yielded impressive results. As reflected in questions #4 and #5, feedback on the use of Google Sheets and Google Chat has mainly been positive. Notably, 38% of participants rated Google Sheets highly effective, while 19% rated it adequate but identified areas for improvement. On the other hand, while 23.81% consider Google Chat adequate,

implying potential for even better tools, a significant 57.14% believe its use has been effective;

3. finally, the free comments from questions 3, 8, and the additional question reveal that the majority of students have an overwhelmingly positive perception of the activity. This strong feedback highlights the value of the experience and underscores the potential for future success;
4. some of them indicate areas for improvement without underestimating their contributions, both personally and academically;
5. in certain situations, open-ended student feedback highlights essential aspects that may not have been adequately addressed or that fail to meet their expectations. This underscores the urgent need to provide a more thorough explanation of the work's characteristics, structure, and assessment criteria. By doing so, we can better align our efforts with student needs and enhance their overall learning experience.

We must pay close attention to the invaluable suggestions for improvement obtained from the surveys, informal feedback, and our final session of the activity. It is both possible and imperative to pursue initiatives that continuously enhance all the aspects presented in this article.

As we look to the future, this initial experience empowers us to design COIL activities that are not only more effective but also more comprehensive. We are enthusiastic about the opportunity to expand these initiatives to other universities. Professors from institutions in Poland, Algeria, North Macedonia, Bulgaria, and Portugal have already shown great interest. We are actively developing an Erasmus project with these universities to ensure the continuation and growth of these impactful initiatives. Together, we can forge a path towards meaningful collaboration and improvement!

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