

# Virtual Collaboration in Higher Education: Cross-Cultural Competences and Economic Implications

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**Abstract.** *This paper examines virtual collaboration between students of the University of Zagreb Faculty of Organization and Informatics (FOI) and the Carl H. Lindner College of Business, University of Cincinnati, based on a bilateral university agreement. The activity was implemented as a voluntary activity within the elective course Strategic Human Resource Management in the second year of the graduate study programme Economics of Entrepreneurship. The study is based on a qualitative content analysis of student reflections collected across three academic cohorts, comprising 74 FOI students and 62 University of Cincinnati students, for a total of 136 students. The analysis focused on students' use of digital tools to support intercultural interaction and collaboration. The results show that digital tools enabled communication and teamwork, while the activity contributed to intercultural learning, greater confidence in English communication, personal reflection and the development of relevant digital and collaborative competences that support participation in the global labour market and the digital economy.*

**Keywords.** internationalization of higher education, human capital development, digital economy, cross-cultural management, virtual collaboration, global workforce competencies

## 1 Introduction

In the contemporary era, marked by rapid technological development and global interconnectedness, higher education is undergoing a profound transformation. This transformation is closely linked to the changing requirements of the global labour market and the increasing demand for digitally skilled and internationally competent human capital. Higher education institutions are faced with the imperative of providing global, intercultural, and collaborative experiences that enable students to solve complex problems in diverse sociocultural contexts (Gutiérrez-González et al., 2023). Traditional forms of physical student mobility, such as the Erasmus

programme, although highly valuable, are often limited by financial barriers, organizational challenges, and, as the recent pandemic demonstrated, global health crises (Demaj & Alushllari, 2023; Polyakova & Galstyan-Sargsyan, 2021), which also creates inequalities in access to international experience and consequently affects the distribution of human capital. In this context, the concept of Industry 4.0 provides a suitable framework for implementing international experiences from home, contributing to the goals of environmental sustainability and the global accessibility of education (Gutiérrez-González et al., 2023).

As a response to these challenges, Collaborative Online International Learning (COIL) has emerged as an innovative and inclusive strategy of internationalization (Liu, 2023), with increasing relevance for the development of competencies required in international business and knowledge-based economies. COIL, developed by Jon Rubin, represents a model that connects classrooms of two or more universities in different countries, enabling students and teachers to work jointly on projects within their regular courses (Huertas-Abril & Palacios-Hidalgo, 2024; Polyakova & Galstyan-Sargsyan, 2021, Rubin, 2016). The primary advantage of this model is the use of digital technologies as a fundamental tool for pedagogical interaction, thereby opening global opportunities within the curriculum that were previously limited (Borger, 2022). Virtual collaboration projects have also proven effective in developing global awareness and encouraging students to engage with the Sustainable Development Goals (Jansen Van Vuuren et al., 2025).

A key benefit of this approach is that, within COIL, cultural differences are not diminished by online collaboration but become more apparent through virtual exchange. Therefore, the development of intercultural communicative competence is at the core of COIL initiatives (Borger, 2022). To interpret the issues and interaction patterns within this type of collaboration, researchers commonly use well-established theoretical approaches, particularly Hofstede's cultural dimensions framework, originally developed in *Culture's Consequences* (Hofstede, 1980) and later expanded in subsequent work (Hofstede et al.,

2010). Dimensions such as power distance and individualism versus collectivism can help explain potential misunderstandings in digitally mediated intercultural collaboration, especially when students work across different cultural, institutional, and communication contexts (Gruber & Bailey, 2021; Hofstede, 1980; Hofstede et al., 2010). This paper focuses on the synergy between digital technology, the COIL methodology, and Hofstede's cultural dimensions framework, with particular attention to their role in fostering students' human capital and capacity for effective collaboration in international and culturally diverse contexts (Rubin, 2016; Hofstede et al., 2010). Its aim is to explore how digital technologies enable virtual collaboration and how cultural dimensions contribute to the development of human capital and competencies relevant for the global labour market. The empirical part of the paper is based on qualitative research, specifically an analysis of student reflections written by FOI students in COIL-based virtual collaboration activities conducted across three cohorts, with a different group of students taking part each year. In this way, the paper seeks to gain deeper insight into students' experiences, perceived challenges, advantages, and patterns of virtual intercultural collaboration, while also exploring how such experiences contribute to the development of skills relevant for their future participation in the labour market.

The paper is structured as follows: after the theoretical framework, the research methodology is presented, followed by the analysis and interpretation of results, while the final section provides concluding remarks and recommendations for the implementation of virtual activities based on the COIL approach in higher education.

## 2 Theoretical Framework

This chapter presents the theoretical framework of virtual collaboration in higher education, with an emphasis on the role of digital technologies and the COIL approach in connecting students from different geographical and cultural environments. Special attention is given to Hofstede's cultural dimensions as a framework for understanding intercultural differences in virtual teams. The final part of the chapter describes the application of virtual collaboration within the course Strategic Human Resource Management through collaboration with the University of Cincinnati.

### 2.1 Virtual Collaboration and Digital Technologies

Virtual collaboration in higher education is defined as a process in which students from different geographical locations work together to achieve shared learning goals by using information and communication

technologies (Demaj & Alushllari, 2023). Digital technologies have transformed pedagogical interaction, enabling the creation of contemporary learning environments that transcend physical boundaries (Borger, 2022). The key characteristics of COIL include teamwork, problem solving, and the development of intercultural awareness through "learning at home" (Huertas-Abril & Palacios-Hidalgo, 2024; Vahed, 2024). In COIL projects, platforms such as Zoom, Slack, and Skype become primary tools for engaging students in joint projects, promoting interdisciplinary learning and digital literacy (Medina et al., 2025; Vahed, 2024). The use of these tools not only facilitates communication but also supports the development of 21st-century "super skills," reduces anxiety in foreign-language communication, and increases students' confidence (Liu, 2023). Research shows that the design of collaborative activities, including pedagogical strategies and the selection of ICT tools, directly affects the success of online learning experiences (Reyes et al., 2025). Unlike traditional virtual mobility, COIL is integrated into the curriculum, making it cost-effective and accessible to a wider group of students who cannot afford physical travel (Liu, 2023; Polyakova & Galstyan-Sargsyan, 2021). This model not only strengthens intercultural competencies but is also considered a sustainable solution for the internationalization of higher education in the post-pandemic period (Sharma & Panackal, 2025).

### 2.2 Hofstede's Cultural Dimensions in the Virtual Context

Hofstede's framework, consisting of six dimensions of national culture: power distance, individualism/collectivism, masculinity/femininity, uncertainty avoidance, long-term orientation, and indulgence/restraint, continues to represent a foundation for understanding cultural differences (Fleşeriu et al., 2023; Kunwar, 2021; Hofstede et al., 2010). In the context of virtual collaboration, these dimensions significantly influence team dynamics, which is particularly relevant in multinational companies and globally distributed teams. For example, the dimension of individualism versus collectivism is reflected in the way students approach responsibility within a group (Kunwar, 2021; Zheng et al., 2025). Power distance defines the extent to which inequalities are accepted, which in COIL projects may influence interaction between students and professors or within student pairs from cultures with different hierarchical structures (Kunwar, 2021). From an economic perspective, understanding these dimensions contributes to more effective management of international human resources. Although Hofstede's model has been criticized for its tendency toward generalization, it still provides practical guidelines for navigating complex local challenges and adapting communication strategies in a multicultural digital

environment, which is essential for achieving high-quality outcomes of intercultural learning (Molina González et al., 2026; Fukkink et al., 2024).

## 2.3 Virtual International Cooperation as a Cost-Effective Mechanism for Developing Human Capital

International educational experiences contribute to graduate employability through the development and strategic use of multiple forms of capital, including human, social, cultural and agentic capital (Dai & Pham, 2024). These insights are particularly relevant for COIL-based learning, as internationally oriented educational environments can strengthen students' preparedness for culturally diverse labour markets by fostering professional skills, intercultural sensitivity, social networks, and career-related agency (Dai & Pham, 2024). Virtual international collaboration supports the development of students' human capital by enhancing cultural intelligence, intercultural communication competence, and preparedness for work in international and culturally diverse professional contexts (Hackett et al., 2023). The relatively lower importance attributed to academic performance suggests that labour market integration is not determined solely by grades or formal educational achievement (Pham et al., 2024). This indicates that graduates' employability depends not only on what they know academically, but also on how effectively they can communicate, collaborate, understand organisational culture, and strategically mobilise different forms of capital in professional contexts (Pham et al., 2024). Given that physical mobility involves only a small proportion of students, approximately 1% globally and around 10% in the United States and the European Union, COIL offers considerable potential as a cost-effective and more inclusive mechanism of internationalisation (Gelashvili & Blanco, 2024).

## 3 Methodology

The focus of this paper is on the synergy of digital technology, COIL methodology, and Hofstede's framework in the context of developing competencies relevant to contemporary labour markets. The aim is to explore how digital tools facilitate virtual collaboration and how cultural dimensions shape the learning experience in an online international environment. Given the stated objectives, research questions were formulated. Accordingly, the following two research questions were defined:

RQ1: What is the role of digital technologies in virtual collaboration at the level of higher education institutions?

RQ2: How do students perceive the experience of communicating with students from other cultures?

To address these research questions, a qualitative content analysis was conducted on student reflections, with the aim of identifying recurring themes related to digital collaboration, intercultural communication, and the perceived development of relevant skills. Hofstede's framework was used as an interpretative background for discussing intercultural differences rather than as a predefined coding framework.

## 3.1 Research Procedure

A virtual collaboration activity with COIL elements was implemented within the Strategic Human Resource Management course. Participation was voluntary, and students were organized into international teams. The activity did not constitute a fully integrated COIL model because the partner courses retained separate curricula and learning outcomes. Nevertheless, it incorporated key COIL elements through structured international teamwork, comparative analysis, and digitally mediated interaction. The collaboration is based on working on a shared topic, namely the comparison of cultures, business practices, and human resource management through three virtual meetings. The outcome of the collaboration is a group report containing individual reflections of team members.

For the purposes of this paper, qualitative research was conducted, focusing on the analysis of students' reflections on virtual collaboration with COIL elements with students from the University of Cincinnati in the United States. Content analysis traditionally developed as a quantitative method based on predefined categories, statistical processing of textual data, and an emphasis on reliability and generalizability. As a response to the limitations of such an approach, qualitative content analysis emerged and is described as a flexible method for the systematic coding and interpretation of textual data in order to identify patterns and themes (Serafini & Reid, 2023).

The research was designed as a retrospective study covering reflections created within COIL activities conducted in the course Strategic Human Resource Management over three consecutive academic years, with different groups of students included in the analysis. The course is an elective course and is taught in the second year of the graduate study programme Economics of Entrepreneurship. Data collection and analysis were carried out through qualitative content analysis. Student reflections were read several times, and relevant text segments were assigned initial codes through an inductive coding procedure. The coding was conducted by one researcher. To strengthen the credibility and trustworthiness of the analysis, the procedure was systematic and iterative: similar codes were compared, refined, and grouped into broader thematic categories, while the consistency of the categories was checked by revisiting the original reflection excerpts. Examples of the coding process are

provided in Section 4 to increase analytical transparency.

### 3.2 Sample Description

The research is based on group papers written by graduate students of Economics of Entrepreneurship at the Faculty of Organization and Informatics (FOI) after their virtual collaboration with students from the University of Cincinnati. The observed activity included three cohorts of students: 74 FOI students and 62 University of Cincinnati students, 136 students in total. The units of analysis were group reflections written by FOI students, which included individual reports and shared impressions of group members. All available and fully submitted papers produced within the observed activity were included in the analysis. As a result of this activity, a total of 19 group papers by students from FOI were produced. The number of group members varied between 6 and 9, with the ratio of FOI and UC students being almost equal, although FOI students were slightly more represented. The demographic analysis refers only to FOI students, since complete demographic data were available for this group. In the academic year 2023/2024, seven groups participated in the activity, with a total of 58 students, of whom 30 were from FOI and 28 from the University of Cincinnati. Among the FOI students, there were 21 domestic students and 9 international students, of whom 7 were from Indonesia, 1 from the Netherlands, and 1 from France. Regarding the gender structure of FOI students, 24 participants were female (80%), while 6 participants were male (20%). In the academic year 2024/2025, seven groups also participated, with a total of 48 students. Of these, 29 students were from FOI, including 18 domestic and 11 international students from Indonesia, while 19 students participated from the University of Cincinnati. Among FOI students, 6 participants were male (20.69%), while 23 participants were female (79.31%). In the academic year 2025/2026, five groups participated in the activity, and the collaboration included 15 FOI students and 15 students from the University of Cincinnati. This cohort did not include any international students among the FOI participants. All 15 FOI participants were female (100%). FOI students represented a relatively homogeneous group in terms of age, with an average age of 23 years and no major deviations among participants. Demographic characteristics of the University of Cincinnati students were not analysed due to incomplete demographic data. However, it was known that they came from different years of study and different study programmes, which made their academic background more heterogeneous than that of the FOI students.

## 4 Results and Interpretation

This chapter presents the main findings of the study based on the qualitative analysis of students' reflections. Its purpose is to provide insight into how students experienced the international virtual collaboration and which aspects of the activity emerged as most relevant in their reflections.

### 4.1 Thematic Categories of Student Reflections

Based on the content analysis, eight categories were proposed, encompassing coded units, that is, students' observations arising from the experience of international virtual collaboration. To provide insight into the inductive coding process, selected examples are presented to illustrate how meaning units from students' reflections were transformed into initial codes and then grouped into broader thematic categories. For example, the statement "This virtual collaboration was really valuable for me because it helped me step out of my comfort zone" was initially coded as increased self-confidence and was later grouped under the thematic category Personal Growth and Development. A statement referring to nervousness about speaking English was coded as language-related insecurity and assigned to Communication and Cultural Factors, whereas a statement describing a better understanding of differences in business practices was coded as cultural awareness and assigned to Intercultural Learning.

Table 1 shows that the most represented categories were the technological and technical aspect, intercultural learning, and personal growth and development, while the least represented category was previous experience.

The obtained results suggest that students focused most of their attention, as expected, on the collaboration itself, namely on the use of digital technologies in the process of connecting with students from the United States, on understanding cultural differences and specificities, as well as on their own internal processes, such as increased self-confidence, perceived nervousness before the beginning of the collaboration, and the development of various skills.

Regarding the comparison of frequencies across cohorts, it should be taken into account that two fewer teams participated in the third cohort, which also resulted in fewer individual reflections.

The following part of the chapter briefly presents all identified categories, while the technological and technical aspect and communication and cultural factors are discussed in separate sections. This is because the activity was implemented in a virtual environment, where digital tools played a central role in enabling collaboration. Communication and cultural factors were also examined separately because they directly reflect the intercultural nature of the activity and its relevance for students' communication

confidence and future participation in international professional contexts.

Intercultural learning refers to students' observations related to learning about cultures, business practices, and approaches to human resource management, as well as understanding cultural similarities and differences among Croatian, American, and Indonesian cultural frameworks. The results suggest that the collaboration encouraged the development of intercultural understanding through the comparison of different cultural patterns, professional approaches, and opportunities for connecting based on observed similarities. Although the categories of communication and cultural factors and intercultural learning are conceptually related, they were treated separately in the analysis. Communication and cultural factors refer to concrete aspects of communication, such as English-language expression, language-related insecurity, and perceived cultural barriers during interaction. Intercultural learning, on the other hand, refers to broader developmental outcomes, including cultural awareness, openness toward other cultures, broadening of perspectives, and understanding differences in HRM practices.

The category of personal growth and development shows that participation in the project contributed not only to academic learning, but also to the development of competencies relevant to future employment. Students' reflections indicate a gradual increase in communication confidence, reduced anxiety in intercultural interaction, and stronger flexibility, adaptability, organizational skills, and cultural sensitivity. These competencies are important for functioning in multicultural workplaces, participating in global virtual teams, and addressing future business problems through collaboration and effective communication. This is consistent with Liu (2023), who found that digital communication tools can reduce anxiety in foreign-language communication, as well as with employability research emphasizing communication, teamwork, adaptability, and problem-solving as important labour market competencies (Pham et al., 2024; Tang et al., 2024).

The experience of international virtual collaboration was generally perceived positively, with students expressing satisfaction, gratitude, and interest in repeating a similar activity. However, they also recognized challenges such as unequal engagement and insufficient preparedness of some participants, which affected the dynamics of collaboration.

The organizational aspects of collaboration, primarily schedule coordination and dealing with time differences, were included in the category of time management. Both negative and neutral statements were present in the reflections: some students reported difficulties in coordinating meeting times, while others emphasized that there were no significant problems related to time organization. These findings show that time coordination represents an important, but not necessarily equally challenging, issue for all

participants. At the same time, they point to the importance of planning, flexibility, and agreement in virtual international projects. This is relevant from an employability perspective, as Pham et al. (2024) emphasize that professional skills and personal qualities are important for effective functioning after entering the labour market.

A less represented but still important category is networking and career development, which includes students' observations related to making new acquaintances, recognizing the importance of global collaboration in the educational process, practical preparation for the beginning of a career, and gaining insight into business opportunities and the work environment. The results indicate that students recognized international virtual collaboration not only as an educational experience, but also as an opportunity for professional networking and the initial development of career-related competencies.

**Table 1.** Frequency of thematic categories across cohorts

Source: Authors' own analysis of student reflections

| Category                           | Absolute Frequencies |       |       | TOTAL           |
|------------------------------------|----------------------|-------|-------|-----------------|
|                                    | Academic Year        |       |       |                 |
|                                    | 23/24                | 24/25 | 25/26 |                 |
| Technological and Technical Aspect | 78                   | 65    | 38    | 181<br>(31.81%) |
| Intercultural Learning             | 45                   | 59    | 26    | 130<br>(22.84%) |
| Personal Growth and Development    | 21                   | 35    | 21    | 77<br>(13.53%)  |
| Overall Experience and Challenges  | 18                   | 29    | 19    | 66<br>(11.6%)   |
| Time Management                    | 18                   | 15    | 3     | 36<br>(6.33%)   |
| Communication and Cultural Factors | 17                   | 9     | 7     | 33<br>(5.8%)    |
| Networking and Career Development  | 16                   | 11    | 2     | 29<br>(5.1%)    |
| Previous Experience                | 8                    | 7     | 2     | 17<br>(2.99%)   |
| TOTAL                              | 221                  | 230   | 118   | 569<br>(100%)   |

The least represented category was previous experience, indicating that prior international or virtual collaboration was not a central focus of student reflections. For some students, the project was their first experience of this kind, which may explain their stronger emphasis on communication challenges, adaptation, and personal development.

## 4.2 The Role of Digitalization in the Internationalization of Teaching Activities

In the observed activity, students engaged in virtual collaboration with COIL elements by using various information and communication tools, among which email emerged as the most frequently used tool. Although previous research on COIL projects highlights platforms such as Zoom, Slack, and Skype as important tools for student engagement, collaboration, and the development of digital literacy (Medina et al., 2025; Vahed, 2024), the findings of this research indicate a different pattern of digital communication tool use.

As shown in Fig. 1, Zoom, Google Meet, and WhatsApp appear most prominently in the participants' reflections, while Slack and Skype were not identified as relevant communication channels within the analysed project experience. In addition, Google Docs also played an important role as a supplementary tool supporting meeting organization and collaborative work on content. The use of these tools enabled students to maintain continuous contact with peers from the partner institution and to effectively overcome spatial barriers.

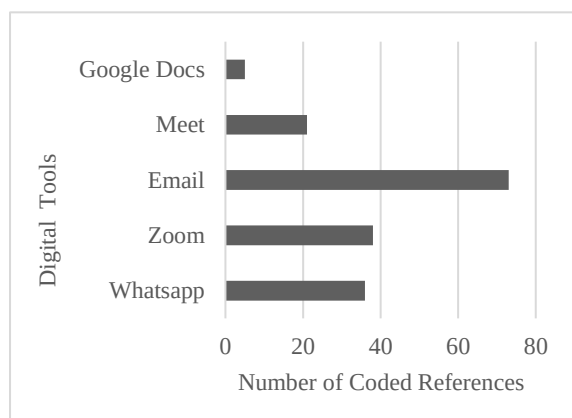


**Figure 1.** Digital tools used for communication and collaboration (N=173 coded references)  
Source: Authors' own analysis of student reflections

Students' impressions indicate that digital tools had both functional and pedagogical value, as they enabled the organization of communication, the exchange of information, and collaboration on joint tasks, while also contributing to the perceived usefulness of online communication and the development of digital literacy. At the same time, students identified internet-related issues and technical difficulties as the main challenges, which shows that the success of virtual collaboration depends on the quality of technical infrastructure and the stability of digital platforms. Nevertheless, information and communication tools played a key role in the implementation of virtual collaboration with

COIL elements, as they served not only as technical means of communication but also as a space for collaboration, idea exchange, and connecting students from different national and institutional contexts.

## 4.3 Communication and Cultural Factors in Virtual Collaboration

According to the results presented in Fig. 2, improvement in English-language communication skills was the most frequently identified aspect, accounting for 20 of the 33 coded references within this category (61%). Fear of language and cultural barriers accounted for 10 coded references (30%), indicating that some reflections emphasized initial insecurity and nervousness related to communication in a foreign language and interaction across cultures. Lack of English-language proficiency was identified in only three coded references (9%), suggesting that explicitly reported language difficulties were considerably less frequent than concerns or initial discomfort related to communication.

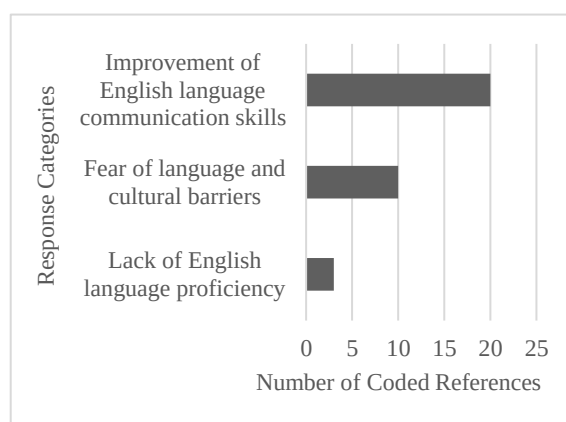


**Figure 2.** Communication and cultural factors (N=33 coded references)  
Source: Authors' own analysis of student reflections

Based on this, it can be concluded that the communication aspects of this collaboration represented both a challenge and a developmental opportunity. On the one hand, students faced a certain level of insecurity related to possible language barriers, while on the other hand, this very experience contributed to the development of their English-language competencies and greater confidence in using English in an international context. This is relevant for students' future employability, as Tang et al. (2024) identify English proficiency as one of the highest-rated contributors to job success and performance, while Pham et al. (2024) also report sufficient English proficiency as the most important factor for obtaining employment among international graduates.

## 5 Conclusion and Future Work

Overall, the findings indicate that virtual collaboration with COIL elements contributes to the development of economically relevant competencies and strengthens students' readiness for participation in the global and digital labour market. The activity may also be interpreted as a relatively cost-effective approach because it enables international collaboration without the travel and accommodation costs associated with physical mobility. However, the identified economic implications are indirect and interpretative rather than empirically measured financial effects.

In response to the first research question digital tools played a key role in the implementation of the activity, as they enabled communication, information exchange, and joint work among students from different national and institutional contexts, while also overcoming time and geographical barriers. Although students identified technical difficulties, internet connection issues, and scheduling challenges, collaboration and adaptation enabled them to overcome these obstacles while developing competencies relevant to international business and the global labour market.

In response to the second research question, students generally perceived the experience of communicating with students from other cultures positively. The experience strengthened their intercultural understanding, confidence in using English, and communication and organizational skills relevant to multicultural professional environments.

The methodological limitations of the research primarily arise from the way students were included in the examined activity. The course in question is an elective course that is not taken by all students of the cohort, and the virtual collaboration activity within the course was also optional rather than mandatory. Therefore, the number of participants was relatively small, which partially limits the possibility of generalizing the findings to the broader student population.

The limitation regarding generalizability is also related to the fact that this case does not represent the original COIL model, but rather virtual collaboration with COIL elements. Unlike a fully integrated COIL approach, in which the teaching objectives, learning outcomes, and activities of partner courses are more strongly aligned, in this research the syllabi and learning outcomes at FOI and the University of Cincinnati were only partially aligned. This circumstance affects the interpretation of the results, as the findings refer to a specific form of virtual collaboration rather than to a complete COIL model.

An additional limitation concerns the use of content analysis, as the interpretation of student papers may include a certain degree of subjective assessment by the researcher. Although the analysis was conducted systematically, the possibility of interpretative bias cannot be completely excluded.

The obtained results may be useful for courses with similar content, as well as for future cohorts of the course Strategic Human Resource Management, especially in the context of planning and implementing virtual collaborations that can help students develop skills needed for their professional careers. In accordance with the ethical principles of scientific research, all results were processed at the group level and anonymized.

Recommendations for future research include increasing the number of participants and conducting research within the framework of the original COIL model, that is, on courses from different universities and countries that have aligned syllabi and learning outcomes. Future research could also include virtual collaboration within a single course involving three or more different universities, which would enable a comparison of students' experiences across different institutional and cultural contexts. In addition, future studies could apply content analysis to students' reflections or communication records using both digital analytical tools and manual coding conducted by researchers. Comparing the results obtained through these two approaches would make it possible to identify the advantages and limitations of each method. Finally, future research could examine how students who participated in virtual international learning experiences later cope with real international settings, particularly in the context of the international labour market and professional communication.

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