

University internationalization in Mexico: Comparative analysis between physical and virtual student mobility through COIL strategies and mirror classes at a public university

Internacionalización universitaria en México: Análisis comparativo entre la movilidad estudiantil física y la virtual mediante estrategias COIL y clases espejo en una universidad pública

Alcocer-Martínez, Fidel Ramón^a, Quijano-García, Román Alberto^b, Guillermo-Chuc, Giselle^c and Bernés-Salazar, Jimena^d

- ^a Universidad Autónoma de Campeche • AAA-6632-2022 • 0000-0002-5106-8932 • 1193269
^b Universidad Autónoma de Campeche • G-6014-2018 • 0000-0001-7316-1997
^c Universidad Autónoma de Campeche • AAA-5907-2022 • 0000-0002-7748-4731
^d Universidad Autónoma de Campeche • OUI-9509-2025 • 0009-0000-3906-1511 • 2191491

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* [\[fralcoce@uacam.mx\]](mailto:fralcoce@uacam.mx)

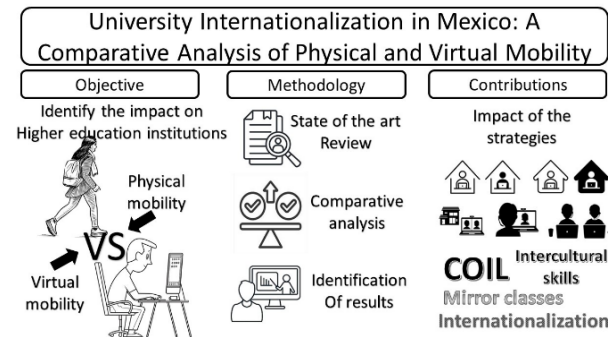


Abstract

This study analyzes university internationalization in Mexico by comparing in-person student mobility with the virtual strategies of COIL (Collaborative Online International Learning) and mirrored classes implemented at a public university. Through a theoretical and documentary review, their foundations, characteristics, areas of application, and educational outcomes are examined. The findings demonstrate that virtual strategies broaden access to international experiences by eliminating economic and geographical barriers, strengthening intercultural, digital, and communicative competencies. Institutional data show that student participation in virtual mobility far exceeds that of in-person mobility, confirming its growing relevance as a means of inclusive internationalization. Challenges related to academic coordination, technological capabilities, and faculty development are also identified. The study concludes that mirrored classes and COIL courses constitute innovative and sustainable tools for curriculum internationalization and academic cooperation in Latin America.

Resumen

Este estudio analiza la internacionalización universitaria en México mediante la comparación entre la movilidad estudiantil física y las estrategias virtuales COIL y clases espejo aplicadas en una universidad pública. A través de una revisión teórica y documental, se examinan sus fundamentos, características, ámbitos de aplicación y resultados educativos. Los hallazgos evidencian que las estrategias virtuales amplían el acceso a experiencias internacionales al eliminar barreras económicas y geográficas, fortaleciendo competencias interculturales, digitales y comunicativas. Los datos institucionales muestran que la participación estudiantil en movilidad virtual supera ampliamente a la movilidad presencial, confirmando su creciente relevancia como vía de internacionalización inclusiva. Asimismo, se identifican retos relacionados con la coordinación académica, las capacidades tecnológicas y la formación docente. Se concluye que las clases espejo y los cursos COIL constituyen herramientas innovadoras y sostenibles para la internacionalización del currículo y la cooperación académica en América Latina.



Internationalization of Higher Education, Virtual Mobility, COIL (Collaborative Online International Learning)



Internacionalización de la educación superior, Movilidad virtual, COIL (Collaborative Online International Learning)

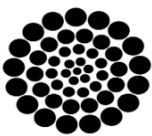
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Introduction

The internationalisation of higher education has become strategically important for universities, particularly in Latin America, due to the need to prepare students to function in global, multicultural and highly interconnected environments. In Mexico, this process has historically been driven by physical student mobility programmes that allow direct cultural immersion in foreign institutions [Soto-Hernández, 2021]. However, economic, geographical and logistical barriers have limited the participation of a significant proportion of students, leading to inequality in access to meaningful international experiences.

Against this backdrop, virtual forms of internationalisation have emerged as innovative, inclusive and sustainable alternatives, notably mirror classes and Collaborative Online International Learning (COIL) courses. Both strategies base their effectiveness on international academic interaction through digital technologies, allowing students and teachers to participate in intercultural experiences without the need for physical travel [Simón Bolívar University, n.d.; García-Meza and González, 2025]. The growing adoption of these modalities in Mexican public institutions suggests a structural change in university internationalisation policies.

The objective of this study is to comparatively analyse the characteristics, benefits, limitations and educational impact of physical student mobility and virtual mobility—particularly in COIL and mirror classes—within a Mexican public university. The added value of this research lies in highlighting how virtual internationalisation contributes to democratising access to global experiences, enhancing intercultural skills and strengthening international academic networks, aspects that were traditionally attributed exclusively to face-to-face mobility [Borger, 2022; Hackett et al., 2023]. The central problem addressed in this study is to determine which modality—physical or virtual—generates greater reach and impact within a public university context characterised by budgetary constraints and socioeconomic inequalities. It also seeks to identify the differential elements between the two strategies and evaluate the relevance of virtual modalities as institutional mechanisms for sustainable internationalisation.

State of the Art

The internationalisation of higher education has become particularly relevant in recent years, largely driven by technological advances and the need to connect diverse academic environments without relying exclusively on physical mobility. In this context, mirror classes emerge as an innovative pedagogical strategy that promotes academic cooperation and intercultural learning through the use of virtual platforms. This methodology is an effective tool for strengthening the internationalisation of the curriculum and expanding opportunities for academic interaction between students and teachers from different universities around the world [Simón Bolívar University, n.d.].

The approaches included in current strategies for the internationalisation of the curriculum focus on integrating intercultural, international and global dimensions into academic programmes, classified in the literature as: face-to-face and traditional strategies, and virtual strategies and technological innovations [Valenzuela, 2024].

As part of face-to-face and traditional strategies, academic mobility through international exchanges via partnerships with foreign institutions seeks to enrich the learning of students and academics with international experience [Soto-Hernández, 2021]. Higher education institutions (HEIs) integrate intercultural and linguistic skills in order to prepare students for a global labour market [IES CINOC, 2024]; on the other hand, HEIs promote international collaboration through shared academic programmes, offering double degree options and joint research projects.

The virtual strategies used by HEIs are mainly based on technological innovations, ranging from asynchronous activities in which students manage their own progress on shared platforms installed in foreign institutions, to massive open online courses, known as MOOCs (Massive Open Online Course) [García-Meza and González, 2025], which are perceived as an underutilised strategy, mainly due to a lack of continuity in their development within institutions, a lack of local repositories, little encouragement to update them, and perhaps less appeal to students because they do not offer interaction with real international students.

Another virtual strategy is mirror classes, which are defined as a university collaboration strategy based on synchronous or asynchronous connection between two or more groups of students and teachers from institutions in different countries, who teach equivalent or complementary subjects using Information and Communication Technologies (ICT). Their main objective is to enrich the teaching-learning process through the exchange of cultural, academic and professional perspectives, contributing to the formation of a global-local profile in both students and teachers [Simón Bolívar University, n.d.].

Mirror classes, in addition to responding to internationalisation objectives, are linked to the global trend towards the virtualisation of teaching, especially in areas such as business and administration, where an understanding of international contexts is essential for professional training. Through these practices, institutions are able to implement a globalised, flexible and inclusive education that fosters the development of intercultural, communicative and digital skills [Yangali et al., 2021].

Mirror classes are an academic resource that allows the development of a course, chapter or project to be shared synchronously or asynchronously with foreign universities through a common digital platform. They are based on the principles of collaborative learning and the internationalisation of the curriculum, bringing the experience of academic mobility closer to those who cannot participate in face-to-face exchanges [Universidad Privada del Este, 2023].

Likewise, Yangali et al. (2021) highlight that this methodology is based on the theory of collaborative learning proposed by Vygotsky, where knowledge is constructed through social interaction and joint work.

From this perspective, mirror classes promote active learning, autonomy, critical thinking, and the development of intercultural and digital skills, which strengthen professional training in higher education. These practices are also aligned with the COIL model, which aims to promote global learning and university cooperation through the use of shared digital environments [Hackett et al., 2023].

The most robust virtual internationalisation strategy used by HEIs is COIL courses, which promote learning experiences in an intercultural context through virtual platforms, based mainly on teamwork with students from different countries [García-Meza and González, 2025]. COIL courses are characterised by collaboration between teachers from different international institutions to design and coordinate joint academic activities. Students are organised into mixed international teams and participate in collaborative projects that combine synchronous and asynchronous activities, with an emphasis on the development of intercultural and global competencies through the intensive use of information and communication technologies (ICT) [COIL UNAM, 2024].

The possibility of achieving internationalisation without the barriers of physical mobility, such as economic or geographical limitations, facilitates access to global experiences, favouring the development of intercultural, linguistic, communicative and problem-solving skills; promoting pedagogical innovation and academic collaboration among teachers, creating international networks of learning and cooperation [University of Burgos, 2025].

COIL Courses and Mirror Classes

Among the most relevant characteristics of mirror classes is their ability to integrate technological resources that facilitate communication and cooperation between students from different contexts. They involve coordinated planning between teachers, the use of shared platforms, the definition of common themes, and the implementation of collaborative activities such as forums, debates, case studies, and joint research projects [Simón Bolívar University, n.d.].

The profile of the teacher in a mirror class requires a more active role as an intercultural mediator and technology manager. According to the Manual for Mirror Classes [Pedagogical University of El Salvador, 2022], the teacher must possess pedagogical skills to plan virtual sessions, the ability to coordinate with fellow teachers, and mastery of ICT tools that facilitate synchronous and asynchronous communication.

In addition, they must foster a collaborative, respectful and participatory environment in which students feel motivated to interact with international peers. In this sense, the role of the teacher transcends the simple transmission of knowledge, becoming a facilitator of global learning and an agent of internationalisation [Yangali et al., 2021].

For their part, students are characterised by their willingness to work collaboratively, their cultural openness and their autonomy in learning. According to published studies, students who participate in mirror classes develop digital, communicative, and intercultural skills by interacting with peers from other countries and disciplinary contexts.

They are expected to possess initiative, responsibility, and the ability to adapt to different methodologies and educational systems [Pedagogical University of El Salvador, 2022]. In general, the literature on mirror classes agrees that both teachers and students must adopt proactive, reflective and collaborative attitudes, as the success of this methodology depends on the joint commitment of all participants [Barbosa, 2022].

COIL courses use a combination of technological tools that enable synchronous and asynchronous academic work to create multicultural teams that perform joint tasks that require more planning than mirror classes; LMS platforms, videoconferencing systems, forums, wikis, or shared repositories are not the end goal of COIL courses, but rather represent the means for intercultural and academic interaction [State University of New York (SUNY), n.d.].

In this type of course, teachers jointly design the syllabus with common learning outcomes and joint learning and assessment activities [Hackett et al., 2023]; and the most commonly used strategies range from collaborative learning in multicultural teams, projects based on real problems contextualised to the participants, guided intercultural reflective activities to achieve transnational cultural immersion, and shared formative assessments, all designed to achieve the simultaneous development of disciplinary knowledge and intercultural competencies [Borger, 2022].

The roles and attitudes of teachers participating in COIL focus on: designing and facilitating the learning experience, assessment activities, mediating intercultural conflicts, and promoting equity among students from different institutions [University of Glasgow, 2024]. Mastery of the disciplinary content of the agreed learning objective is a prerequisite for teaching peers, which must be accompanied by pedagogical skills to design collaborative learning, digital literacy skills, and an interest in curricular and intercultural internationalisation [Hackett et al., 2023].

Digital skills, cultural openness and curiosity, and a proactive attitude to communication are desirable competencies and attitudes among students participating in COIL courses [Borger, 2022].

Areas of application and needs addressed

Mirror classes respond to the need for higher education institutions to strengthen the internationalisation of the curriculum, promote intercultural learning and develop global competencies in students. They are particularly useful in higher education and postgraduate programmes, where the exchange of specialised knowledge is essential. In the area of business, they allow for the comparison of economic, administrative and financial approaches across different cultural contexts, broadening students' understanding of global business phenomena [Universidad Privada del Este, 2023].

Implementation processes in universities indicate that these activities have spread to fields such as engineering, health, education, and economics [Pedagogical University of El Salvador, 2022]. In Latin America, 67% of participating universities report having implemented mirror classes between 2020 and 2023, mainly with institutions in Mexico, Colombia, and Argentina, demonstrating their growing relevance in university internationalisation processes [Barbosa, 2022]. They also contribute to the fulfilment of institutional objectives of internationalisation at home, by providing an international educational experience without the need for physical mobility, which democratises access to global experiences and promotes educational equity [UNAN-Managua, 2024].

COIL courses represent an institutional opportunity for the formal internationalisation of the curriculum without the logistical costs of physical mobility, while also allowing for the development of academic networks among participating faculty [State University of New York (SUNY), n.d.]. For students, these courses allow them to develop intercultural, transnational, and communication skills in global contexts, improving employability opportunities and international teamwork experience [Hackett et al., 2023].

Among the most notable benefits are the diversification of teaching strategies, the strengthening of digital and intercultural skills, and the creation of academic cooperation networks between universities. They also encourage collaborative work, the updating of curriculum content in line with global dynamics, and the development of global thinking in students [Simón Bolívar University, n.d.]. Mirror classes promote active, student-centred learning and validate the content taught through interaction between international peers. They also motivate students to participate in multicultural contexts and strengthen their professional identity through the exchange of knowledge [Novoa et al., 2022].

However, virtualisation has its limitations. These include difficulties in coordinating schedules between countries, connectivity issues, differences in academic calendars, and the need for teacher training in the use of ICT [Novoa et al., 2022]. There may also be challenges associated with language, cultural adaptation, and the equitable assessment of learning in diverse contexts. Some institutions that apply it report that 42% of teachers face technical difficulties in the first implementations, although 85% indicated that the experience improved with institutional feedback [Pedagogical University of El Salvador, 2022].

Virtual mobility in higher education

Mirror classes have been successfully implemented in various higher education institutions in Latin America. UNAN-Managua, for example, developed joint projects with universities in Mexico, Argentina, and Colombia, consolidating international teaching teams and benefiting hundreds of students through collaborative activities and shared research [UNAN-Managua, 2024].

In the field of engineering and business, the University of La Frontera (Chile) and the University of Rosario (Colombia) applied this strategy in specialised courses, demonstrating that joint work between universities in different countries boosts student motivation and expands opportunities for interdisciplinary learning [Novoa et al., 2022]. Similarly, Yangali et al. (2021) showed that mirror classes promote the development of research skills in undergraduate students by allowing them to compare methodologies, theoretical approaches and results between Latin American institutions. These types of experiences promote teaching innovation and pedagogical internationalisation as part of the educational process.

COIL courses have been applied in disciplines such as the humanities and languages, social sciences, business and management, engineering, health sciences, and pedagogy [Spieler, 2025]. Case studies demonstrate successful implementations in both theoretical subjects and practical modules, including those using laboratories [Vaquerizo, 2025].

Methodology

This study was developed using a descriptive and comparative approach, based on a documentary analysis and theoretical review of university internationalisation, mirror classes and COIL courses. Recent scientific sources, institutional manuals, implementation guides, and empirical evidence from case studies in Latin America were integrated [Yangali et al., 2021; Hackett et al., 2023; Pedagogical University of El Salvador, 2022].

In addition, a statistical analysis was carried out on institutional data from the Autonomous University of Campeche (UACAM), collected between 2020 and 2024. This data included the number of students participating in physical mobility—both national and international—and those who participated in virtual internationalisation experiences through mirror classes and COIL courses.

The comparison of these figures made it possible to evaluate the relative impact and scope of both modalities within the same institutional context.

The methodology used made it possible to consolidate a comprehensive analysis that combines theoretical evidence with concrete institutional results, providing a robust comparative perspective for the evaluation of both modalities of academic mobility.

Results

The results reveal substantial differences between physical mobility and virtual mobility in terms of access, student participation, costs, academic cooperation, and the development of global competencies. As shown in Table 1, although physical mobility offers a significant advantage in terms of direct cultural immersion, its scope is limited due to economic, logistical, and administrative factors [Soto-Hernández, 2021]. On the other hand, virtual COIL and mirror class strategies substantially increase student participation, democratise access to international experiences and strengthen digital and intercultural skills [Borger, 2022; Universidad Simón Bolívar, s.f.].

Box 1

Table 1

Physical mobility: advantages and disadvantages

Advantages	Disadvantages
Total cultural immersion	High economic cost
Face-to-face experience	Limited scope
Intensive language skills development	Geopolitical, economic and social barriers
Impact on student identity	Complex procedures

Source: Prepared internally

The impact of mirror classes and COIL courses can be seen in multiple dimensions. On a pedagogical level, they enable students to strengthen cross-cutting skills such as effective communication, critical thinking and problem solving in multicultural environments. On an institutional level, they support internationalisation policies and promote interdisciplinary work between faculties. Finally, on a personal level, they foster empathy and openness towards other culturesm [Yangali et al., 2021].

Box 2

Table 1

Virtual mobility: COIL and Mirror Classes

Advantages	Disadvantages
Democratises access to international mobility	Less cultural immersion
Develops intercultural and digital competence	Technological dependence
Facilitates the creation of sustainable academic networks	Requires high coordination among teachers
Institutional scalability	Requires training in ICT

Source: Prepared internally

In general terms, mirror classes and COIL courses are teaching strategies that strengthen the internationalisation of the curriculum, as can be seen in Table 2. They promote inter-institutional cooperation and enhance active learning. Their implementation requires planning, teaching commitment and adequate technological infrastructure, but their benefits in university education are widely recognised [Universidad Privada del Este, 2023]. On the institutional side, time and technological resources must be allocated for their operation, as well as recognition of activities that contribute to the internationalisation of higher education [State University of New York (SUNY), n.d.].

In the case of UACAM, data show that between 2020 and 2024, only 32 students participated in physical international mobility, while 503 students participated in virtual mobility through COIL courses and mirror classes. This represents a 1600% increase in student participation compared to traditional physical mobility. In proportional terms, only 0.4% of enrolment participated in physical mobility, while virtual mobility reached 6.8% of the total number of university students.

Conclusions

The results indicate that virtual mobility, especially through COIL strategies and mirror classes, is a powerful and effective mechanism for promoting internationalisation in Mexican public universities. Although physical mobility provides a deeper intercultural experience, its limited scope means that only a small number of students can benefit from it [Novoa et al., 2022].

In contrast, virtual mobility is positioned as a sustainable, scalable and inclusive strategy that responds to the contemporary challenges of higher education. It offers opportunities for mass participation, develops digital and intercultural skills that are highly valued in the global labour market, and strengthens inter-institutional academic cooperation through international learning networks [Hackett et al., 2023; Borger, 2022]. Furthermore, it contributes to the objectives of internationalisation at home, enabling global education without the need for physical travel [UNAN-Managua, 2024].

In conclusion, COIL and mirror class strategies should be considered fundamental pillars in the internationalisation policy of public universities. Their implementation not only complements physical mobility, but surpasses it in terms of scope and equity, becoming a strategic tool for educational transformation and the consolidation of a truly global university education.

Recommendations

Although virtual mobility strategies are less costly than physical mobility, it is necessary to allocate resources for the intensive training of teachers, students and institutional management areas. At the same time, the promotion of their implementation must begin with the teaching staff, providing them with the time and space to establish links with peers from institutions in other countries in order to develop an adequate strategy plan.

Declarations

Conflict of interest

The authors declare that they have no conflict of interest. They have no known competing financial interests or personal relationships that could have appeared to influence the article reported in this article.

Contribution of the authors

Alcocer-Martínez, Fidel Ramón: Contributed to the idea of the project, the research method, data analysis, discussion and conclusions.

Quijano-García, Román Alberto: Contributed to the research method, data analysis, discussion, and conclusions.

Guillermo-Chuc, Giselle: Contributed to the research method, data analysis, discussion, and conclusions.

Bernés-Salazar, Jimena: Contributed to the review of the state of the art, the research method, and data analysis.

Availability of data and materials

The spreadsheets used for data collection, comparative tables, and analysis are available upon request to the corresponding author.

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Abbreviations

COIL	Collaborative Online International Learning
IES	Instituciones de Educación Superior
MOOC	Massive Open Online Course
SUNY	State University of New York
TIC	Information and Communication Technologies
UACAM	Autonomous University of Campeche
UNAM	National Autonomous University of Mexico
UNAN	National University of Nicaragua

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