Volume 19 (2026), pp. 59-70
American Journal of STEM Education: Issues and Perspectives
eISSN 3065-1190 | Print ISSN: 3069-0072
Star Scholars Press
https://doi.org/10.32674/feyqqs09

From Collaboration to Transformation: Leveraging AI in COIL for Sustainable Development Goals

Marina Falasca
I.E.S. en Lenguas Vivas J.R.F., Argentina

ABSTRACT

This case study examines the implementation and impact of the "COIL en Clave ODS" program, focusing on the integration of artificial intelligence (AI) to enhance Collaborative Online International Learning (COIL) initiatives aligned with the Sustainable Development Goals (SDGs) in Ibero-American higher education. Developed by STAR Scholars Argentina, the program supported educators from Latin America, the Caribbean, and Spain in co-designing intercultural projects grounded in sustainability. Through AI-driven tools such as natural language processing (NLP) and interactive galleries, the initiative expanded global visibility, improved collaboration, and demonstrated the transformative potential of merging digital innovation with pedagogical reform.

Keywords: Artificial Intelligence, Collaborative Online International Learning, Global Citizenship, Digital Equity, Higher Education, Sustainable Development Goals.

Editor: Dr. Akhtar Jamil, National University of Computer and Emerging Sciences, Pakistan

INTRODUCTION

Higher education today faces the dual imperative of responding to global crises—ranging from climate change and migration to rising inequality and digital disruption—while preparing graduates to act as ethically engaged global citizens (UNESCO, 2023). In response, institutions are increasingly turning to frameworks such as the United Nations Sustainable Development Goals (SDGs) to guide curricular innovation. Simultaneously, Collaborative Online International Learning (COIL) has gained traction as a cost-effective and inclusive strategy for internationalizing education without requiring student mobility (Rkiki et al., 2025; Nadif & Bidari, 2023; Nadif, 2025; Rubin, 2017; O'Dowd, 2018). COIL's pedagogical foundation lies in intercultural collaboration, dialogic learning, and problem-solving across borders. Yet, in Latin America and the Caribbean, uptake remains limited due to barriers such as technological inequities, language access, limited faculty training, and insufficient institutional support (de Wit et al., 2022; Santos & González, 2023).

As the region seeks pathways to digitally inclusive education, new technologies, —particularly Artificial Intelligence (AI), —offer promising tools to extend access and innovation. AI tools can help democratize education by enabling real-time translation, automating data analysis, improving instructional design, and reducing barriers for underserved populations (Smith & Lee, 2023; OECD, 2024). However, the integration of AI in pedagogical settings raises complex questions related to ethics, equity, and agency. While AI is widely discussed in the context of STEM or business education, less attention has been paid to its use in global learning environments and COIL initiatives. This case study addresses that gap by documenting the implementation of "COIL en Clave ODS," a professional development program that embeds AI into intercultural collaboration and sustainability education.

LITERATURE REVIEW

Collaborative Online International Learning (COIL) has evolved significantly since its initial conceptualization, emerging as a critical approach to internationalizing curricula without requiring physical mobility (Rubin, 2017; O'Dowd, 2018). Recent studies emphasize COIL's capacity to foster global citizenship competencies, intercultural awareness, and transdisciplinary problem-solving skills (Lee, Park, & Kim, 2023; Santos & González, 2023). For instance, Pineda et al. (2024) examined COIL initiatives between Colombian and Spanish universities,

demonstrating that structured intercultural dialogue combined with reflective practices enhances students' critical consciousness and motivation to engage with global challenges.

The integration of COIL with the Sustainable Development Goals (SDGs) has gained momentum as educators seek authentic contexts for global learning. Hirata et al. (2023) highlight that embedding the SDGs within COIL projects promotes transformative learning by encouraging students to examine complex global issues through multiple cultural lenses. Moreover, Andrade and Prebianca (2023) report that COIL experiences oriented toward sustainability themes increase learners' sense of agency and their ability to propose context-sensitive solutions, reinforcing the value of linking virtual exchange with global priorities.

Parallel to these pedagogical advancements is the rapid growth of Artificial Intelligence (AI) applications in education. AI's role in supporting multilingual communication, content generation, and adaptive learning is particularly relevant to COIL, where diverse linguistic and disciplinary backgrounds intersect (Smith & Lee, 2023; OECD, 2024). A recent systematic review by Nguyen et al. (2024) found that AI-powered tools in virtual exchange contexts facilitate inclusive participation by automating translation, simplifying complex information, and personalizing feedback; however, ethical considerations regarding privacy, bias, and data governance remain critical.

Falasca (2025) documents how AI-enhanced digital galleries and natural language processing (NLP) applications have been used to increase the visibility and scalability of COIL projects in Ibero-America, offering innovative pathways to democratize knowledge sharing. Complementing this, Okada et al. (2023) argue that AI-driven analytics in COIL environments can help educators identify emerging themes, assess intercultural learning outcomes, and design more effective interventions aligned with institutional goals.

The current article addresses this gap by demonstrating how AI tools were embedded within COIL design and implementation to enhance sustainability-focused intercultural projects across Ibero-American higher education institutions.

CASE CONTEXT AND EVALUATION

Participants and Program Description

"COIL en Clave ODS para la Educación Superior en Iberoamérica" was conceived by STAR Argentina as a capacity-building initiative addressing the systemic challenges of internationalization in Iberoamerican higher education. This five-week training aimed to provide

a foundational yet transformative experience for educators seeking to design inclusive COIL projects that align with the SDGs. It responded to both pedagogical and institutional needs by creating opportunities for collaboration, interdisciplinary exchange, and technological innovation.

Structured around three key modules, the program engaged a diverse cohort of 16 educators from seven countries: Argentina, Chile, Costa Rica, El Salvador, Spain, Mexico, and Peru. Participants represented a broad range of disciplines including STEM, humanities, social sciences, and education. This diversity enriched the collaborative experience, fostering projects that integrated interdisciplinary and intercultural perspectives. In total, 15 educators completed the program, which followed a scaffolded approach to gradually build expertise.

In Module 1, participants explored the core principles of global citizenship education, including the role of active methodologies, such as flipped learning, problem-based learning, and design thinking, in facilitating meaningful intercultural dialogue online. These methodologies were framed as essential for engaging students in real-world problem-solving that transcends national borders.

Module 2 focused on integrating the SDGs into curricular design. Through instructional strategies like backward design, digital and AI tools, and the application of Bloom's taxonomy, educators learned to craft learning outcomes that not only aligned with global priorities but also promoted transdisciplinary engagement. This phase encouraged participants to see the SDGs not as standalone goals but as interconnected challenges requiring holistic educational approaches.

In Module 3, the emphasis shifted toward institutional sustainability. Participants reflected on structural challenges such as policy gaps, lack of administrative support, and fragmented digital infrastructure. They also engaged in scenario planning to envision long-term COIL strategies at their home institutions.

By placing the SDGs, AI, and global citizenship education at the core of its framework, the initiative offered a transformative professional development pathway for educators across a wide range of disciplines and geographic contexts. This integrative approach empowered participants to engage with emerging global challenges critically, harness innovative digital tools, and design pedagogical strategies that promote equity, sustainability, and intercultural understanding within and beyond the classroom.

Implementation Strategy

The heart of the program lay in its collaborative and practice-based implementation model. Participants were placed in cross-national teams and asked to co-design COIL modules addressing specific SDGs, particularly Goals 4 (Quality Education), 10 (Reduced Inequalities), and 13 (Climate Action). These themes were chosen for their relevance to both regional and global educational priorities.

Digital tools like Zoom enabled live interactions, while platforms such as Google Drive, Padlet, and Miro facilitated asynchronous brainstorming, planning, and reflection. These tools ensured continuity and flexibility, critical for working across time zones and institutional schedules. The collaborative process encouraged distributed leadership, with each team member contributing unique disciplinary and cultural insights to project development.

Ongoing support was provided through mentorship from experienced COIL facilitators. Mentors helped guide the development of instructional strategies, ensured alignment with COIL principles, and offered feedback on integrating digital tools and AI features effectively. A digital resource hub provided curated readings, design templates, and examples of good practice in global education and sustainability.

The culmination of the program involved virtual presentations where participants showcased their projects to a broader community. These sessions fostered visibility and accountability while also allowing for peer feedback, refinement, and recognition of innovation.

AI Integration and Technological Innovation

A key innovation of the initiative was the strategic use of AI, particularly natural language processing (NLP), to enhance project documentation, evaluation, and dissemination. Rather than treating AI as an add-on, the program embedded these tools into the workflow to streamline and scale its impact. NLP algorithms were used to analyze project outputs (i.e., lesson plans, multimedia content, and narratives) according to thematic relevance to the SDGs. This classification allowed facilitators to identify emerging trends, interdisciplinary links, and recurring challenges or insights across projects.

Moreover, AI-powered tools facilitated automatic translation of materials into English, thereby increasing accessibility for international audiences. This multilingual capacity enabled projects from Spanish-speaking countries to be showcased on global platforms, thus enhancing academic visibility and cross-cultural exchange (Smith & Lee, 2023).

The use of Gamma, a digital storytelling and content organization platform, was central to the development of an interactive project gallery

(Falasca, 2025). This gallery was more than a static repository; it offered a dynamic, AI-enhanced space for exploration. Through visual tagging, keyword search, and thematic filters, users could navigate projects by country, academic field, and SDG focus. This fostered a sense of community and opened pathways for replication and further collaboration.

By embedding AI into both the back-end analysis and front-end user experience, the program highlighted how technology can serve pedagogical goals without overshadowing human agency. Importantly, ethical use of AI remained a constant focus, with discussions on transparency, privacy, and the role of human judgment in interpreting AI-generated insights.

Data Collection and Evaluation

To evaluate the program's outcomes, a mixed-methods approach was adopted. Quantitative data were gathered through pre- and post-program surveys measuring participants' familiarity with COIL and the SDGs, their confidence in designing and implementing COIL projects, and their perceived ability to collaborate across cultures.

Table 1. Descriptive statistical data from the final program questionnaire

	Min.	Max.	*M*	*SD*
Design of an effective COIL-SDG project	4	5	4.80	.414
Integration of COIL-SDG in teaching	2	5	4.47	.834
Implementation of COIL-SDG project	4	5	4.53	.516
Contribution to the community	3	5	4.87	.516
Acquisition of new ideas and perspectives	4	5	4.87	.352
Collaboration capacity	3	5	4.27	.799
Professional development and sense of teaching purpose	4	5	4.80	.414
Teaching skills	3	5	4.73	.594
Confidence	2	5	4.47	.990
Integration of COIL with other work	4	5	4.80	.414

Note. M = Mean, *SD* = Standard Deviation.

Complementing the quantitative results, a thematic analysis of qualitative data, including open-ended survey responses, participant reflections, and project artifacts, provided deeper insights into participants' transformations. These analyses highlighted notable changes in professional identity, pedagogical approaches, and global awareness.
Participants shared compelling reflections that illuminate the program's impact:

> - "For the first time, I truly felt part of an international academic community where every voice mattered. Working alongside colleagues from across Ibero-America expanded my perspective and showed me that intercultural learning is essential for meaningful teaching." (Participant from Peru)
>
> - "Using AI tools for multilingual translation and interactive design helped include all students regardless of language proficiency, which is vital in my context. However, it also raised ethical and privacy concerns, such as protecting students' data and ensuring translations were accurate and unbiased." (Participant from Costa Rica)
>
> - "The mentorship was transformative. I came in thinking COIL was just a video call between classes, but left understanding how to build a structured, problem-based module around real SDG challenges." (Participant from Argentina)
>
> - "Before this program, I never imagined using AI in my teaching. Now I plan to incorporate NLP-based analysis for my students' sustainability projects next semester." (Participant from Chile)

These reflections demonstrate that the program did not merely transfer knowledge about COIL and AI, but reshaped educators' professional identities and pedagogical practices. Participants reported increased confidence in integrating the SDGs into their curricula, designing meaningful intercultural learning experiences, and leveraging AI to reduce linguistic and cognitive barriers. Moreover, they gained foundational understanding of natural language processing and critically engaged with the ethical implications of AI in education, emphasizing the importance of privacy, transparency, and bias mitigation. Many described a renewed sense of purpose in aligning their teaching with global, sustainability-oriented frameworks.

SAMPLE PROJECT HIGHLIGHTS

Among the many innovative outputs, several projects stood out for their originality and impact. One project on climate change linked environmental science students in Peru with media studies students in Chile. Together, they designed social media campaigns targeting Gen Z audiences, using platforms like Instagram and TikTok to promote climate action. AI-supported content generation tools were used to create infographics and auto-captioned videos, enhancing accessibility and engagement.

Another standout was a digital storytelling module focusing on migration and human rights. Drawing on students' personal and community narratives, the project combined oral histories, animations, and data journalism. Students learned to use tools such as Canva and Animoto, while reflecting on issues of empathy, representation, and cultural voice.

A third project in economics and public policy engaged students in analyzing global inequality using World Bank and UNDP datasets. Here, AI tools were leveraged for data visualization and multilingual reporting. Students collaborated across linguistic and disciplinary divides, generating policy briefs and presentations in both Spanish and English.

These projects illustrate how AI and COIL, when integrated thoughtfully, can empower students to engage critically with real-world problems while developing essential digital and intercultural literacies. By combining the analytical and adaptive capabilities of AI with the intercultural and collaborative dimensions of COIL, students are empowered to critically engage with real-world challenges such as climate change, inequality, or sustainable development. Through this integration, learners not only apply disciplinary knowledge to authentic global issues but also develop essential 21st-century skills — including critical thinking, problem-solving, and digital fluency.

LESSONS LEARNED

Several key lessons emerged from this pilot initiative. First, positioning AI as a collaborative partner rather than a threat to educators' autonomy proved crucial. Participants were more willing to experiment with new technologies when framed as augmentations to, not replacements for, human creativity and decision-making.

Second, the importance of institutional support cannot be overstated. While individual faculty members were enthusiastic, scaling COIL practices required administrative endorsement, policy alignment,

and recognition of intercultural teaching in tenure and promotion processes.

Third, ethical reflection was crucial to the meaningful use of AI. Participants grappled with questions of algorithmic bias, data sovereignty, and the implications of outsourcing tasks such as translation to AI. These discussions highlighted the pressing need for ongoing professional development in digital ethics, emphasizing that educators and students alike must be equipped to navigate the complex moral and social implications of emerging technologies.

Finally, the program revealed the potential of AI to democratize global learning. By enhancing multilingual communication and reducing cognitive and logistical burdens, AI can bring underrepresented voices into global conversations if deployed responsibly.

CONCLUSION AND IMPLICATIONS

"COIL en Clave ODS" stands as a forward-thinking model for the ethical and purposeful integration of AI within international education. It demonstrates that when educators are equipped with the necessary tools, institutional backing, and creative autonomy, they can co-design transformative learning experiences that extend far beyond the confines of the virtual classroom. These experiences not only cultivate critical global competencies but also foster a sense of shared responsibility for addressing complex global challenges.

At the institutional level, this case highlights the importance of embedding AI within pedagogical approaches grounded in equity, collaboration, and sustainability. Rather than prioritizing technological adoption alone, future initiatives should focus on fostering ethical awareness, intercultural competence, and vibrant learning communities. As the educational landscape continues to evolve, programs like "COIL en Clave ODS" offer a compelling blueprint for building more inclusive, adaptable, and socially engaged global learning ecosystems where innovation is guided by human values and collective purpose.

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MARINA FALASCA, M.Ed., M.A., is a Professor of Curriculum, Pedagogy, and Didactics at *I.E.S. en Lenguas Vivas, J.R.F.*, in Buenos Aires, Argentina. Her major research interests include virtual exchange and Collaborative Online International Learning (COIL), global citizenship education, sustainable development, and the pedagogical integration of artificial intelligence in K-12 and higher education. She has published and presented internationally on topics related to digital pedagogy, intercultural communication, and language teacher education**,** with a particular focus on fostering equity, collaboration, and innovation in global learning contexts**.** Email: marina.falasca@bue.edu.ar

Note: The authors did not use OpenAI's ChatGPT or any other AI tools in the drafting, editing, or refining of this manuscript. All content was generated, reviewed, and refined solely by the authors.