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Analysis of How Artificial Intelligence Empowers the COIL Teaching Model to Promote Educational Internationalisation and Social Entrepreneurship Education

Yinglong Qiu ¹, Chen Cheng ^{2,*}, Adela García-Aracil ³, Rosa Isusi-Fagoaga ⁴ and Xiying Qiao ⁵

¹ European Institute of Innovation and Management, 28013 Madrid, Spain; yinglong@eiim.eu

² School of Russian Studies, Sichuan International Studies University, Chongqing 400031, China

³ INGENIO (CSIC-UPV), Universitat Politècnica de València, 46022 València, Spain; agarcia@ingenio.upv.es

⁴ Universitat de València & UTRANSFER Associated Unit of the CSIC Through INGENIO (CSIC-UPV), 46022 València, Spain; rosa.isusi@uv.es

⁵ Facultad de Filosofía y Letras, Universidad de Buenos Aires, CABA, Buenos Aires C1420, Argentina; xqiao@filo.uba.ar

* Correspondence: 99003129@sisu.edu.cn

Abstract

This study explores how incorporating generative artificial intelligence into the Collaborative Online International Learning (COIL) framework can enhance internationalisation for home and social entrepreneurship education in multilingual settings. A four-week AI-supported COIL programme was conducted with 30 postgraduate students from Russian and Spanish programmes. Students collaborated in intercultural teams to develop bilingual social innovation projects. Data were collected before and after the intervention using validated scales measuring intercultural competence, social entrepreneurship skills, AI literacy and ethics, and linguistic self-efficacy. Repeated-measures ANOVA indicated statistically significant improvements across all domains, with moderate-to-large effect sizes. The most pronounced gains were observed in mixed intercultural groups, which may suggest a potential synergistic effect between authentic intercultural exchanges and AI-mediated language support. Additionally, notable improvements were observed in ethical awareness of AI use and linguistic self-efficacy. Overall, these findings suggest that the AI-COIL model may represent a practical and potentially scalable approach for integrating language learning, intercultural competence, social innovation, and responsible AI use to advance internationalisation in higher education.

Keywords: artificial intelligence; COIL; educational internationalisation; teaching Russian; teaching Spanish; social entrepreneurship education; generative AI



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1. Introduction

In an era marked by global challenges and the accelerated internationalisation of education, social entrepreneurship education (SEE) has become a fundamental issue in higher education [1]. Research indicates that the convergence of globalisation, technological transformation, social inequality, and intercultural tensions requires universities to cultivate students' ability to address social problems, understand multiculturalism and develop social innovation and public responsibility skills [2]. SEE emphasises addressing real-world social problems through processes that include analysing social issues, understanding stakeholders, creating value, and evaluating impact. Fostering students' ability to deal with

global crises, intercultural conflicts, and sustainable development challenges is relevant to training “agents of global change” in an internationalised environment [3].

In this context, distance/hybrid learning has become the norm. The internationalisation of higher education has evolved from an approach focused on physical mobility towards new modalities, such as virtual exchange and the integration of international dimensions into the curricula themselves [4]. Collaborative Online International Learning (COIL) is a mature pedagogical approach that connects geographically dispersed classrooms through technology to foster environments that promote intercultural and global competence [5]. It incorporates intercultural collaboration into existing curricula, deepening internationalisation at home (IaH) experiences through project-based tasks and reflective practices [6]. IaH refers to the practice of systematically integrating intercultural and global perspectives into curricula and student experiences within the local educational environment, enabling all students, particularly the majority who are unable to participate in international mobility, to achieve international learning outcomes [7]. As a more inclusive and sustainable model of internationalisation than traditional student mobility, IaH is of significant importance for achieving equity in higher education, improving intercultural competence, supporting internationalised teaching practices among faculty, and ensuring the continuity of internationalisation efforts after the pandemic [8]. With the maturation of technological innovations such as COIL, virtual exchanges, and generative AI, the implementation of IaH is becoming increasingly diverse and efficient, heralding a new phase of development for internationalisation in higher education [9].

At the same time, the capabilities of generative artificial intelligence (AI) in translation, rewriting, information organisation, and multimodal creation are reshaping course design, learning assessment, and competency frameworks for teachers and students, while raising ethical questions related to transparency, bias, and privacy [10]. AI can support intercultural collaboration through functions such as real-time translation, register adaptation, and discourse scaffolding, thereby enabling more effective communication across linguistic and cultural boundaries [10,11]. Existing research has validated the capabilities of AI and ethical frameworks within higher education separately and found COIL to be effective in cultivating intercultural and global competence [6,11]. Intercultural competence constitutes a system of attitude-based capabilities, linked by knowledge and skills, and oriented towards internalised transformation and adaptation to each situation. Its aim is to help students achieve effective and diplomatic interaction in multicultural contexts [12]. Global competence (GC), as a multidimensional framework proposed by the Organisation for Economic Co-operation and Development (OECD), integrates cognitive, affective, value-based, and behavioural dimensions. Its objective is to cultivate students’ ability to understand and analyse local, global, and intercultural issues, appreciate diverse perspectives, and participate effectively in intercultural contexts, while possessing the ability to act for the collective well-being and sustainable development [13].

Previous studies indicate that existing research on AI and COIL focuses predominantly on intercultural or digital competencies, with a notable lack of exploration of AI-enabled SEE tasks in language teaching contexts [14]. Therefore, in this study, we focus on Russian and Spanish, both of which are classified as minority/non-majority languages in their respective countries, with a limited number of students [15]. Current international research instead focuses predominantly on English-dominated intercultural collaboration and internationalisation [16]. To the best of our knowledge, few studies have examined the integration of Russian–Spanish multilingual collaboration, intercultural competence development, and AI-supported social entrepreneurship learning within a unified framework. This assessment is informed by a structured literature search conducted in Web of Science, Scopus, and Google Scholar, using combinations of keywords such as “multilin-

gual collaboration”, “intercultural competence development”, and “AI-supported learning”, over the period 2015–2025. Furthermore, systematic research on AI at the intersection of language and social entrepreneurship remains virtually non-existent [17,18], which prevents the interdisciplinary demands of SEE in internationalised contexts from being addressed.

To address these gaps, we designed and implemented a month-long AI-enhanced COIL programme integrated with the SEE, focusing on the Master’s in Russian Language and Literature and the Master’s in Business Administration taught in Spanish, which allows for analysis of the context of Russian and Spanish language teaching. Employing multilingual tasks in Russian and Spanish as a disciplinary bridge, we use ANOVA to examine the combined impact on educational internationalisation, social entrepreneurship, and AI literacy/ethics. This promotes innovation and empirical research in the interdisciplinary Language + SEE teaching model for AI in international educational settings.

2. Literature Review and Study Objectives

2.1. Interdisciplinary and Sustainable Development in Social Entrepreneurship Education

Amid growing global challenges and rapid technological transformations that are reshaping social structures, social entrepreneurship education (SEE) has become a fundamental pathway within sustainable development frameworks. It provides higher education institutions with the necessary means to train the next generation in social innovation, civic responsibility, and intercultural collaboration skills [19].

According to [2], contemporary universities facing structural risks from climate change, poverty, violence, technological disruption, and AI must cultivate students’ ability to address complex social challenges through entrepreneurial education and social innovation. This drives the transformation of universities to become “more socially integrated” in the context of the new era. This closely aligns with the Sustainable Development Goals (SDGs) for education, particularly SDG 4 (“Quality Education”), target 4.7: ensuring that all learners acquire the knowledge and skills needed to promote sustainable development, including global citizenship, sustainable lifestyles, gender equality, and an understanding of cultural diversity [20]. In an era marked by technological disruption, geopolitical tensions, and worsening social inequalities, SDG 4 not only calls for an improvement in the quality of education but also emphasises “equipping young people with the skills and competencies needed to address global challenges”, a vision that is deeply aligned with the social innovation capacities and sense of responsibility advocated by SEE [2,21]. At the same time, sustainability-oriented educational research indicates that a new generation of students is experiencing a paradigm shift in education: they need intercultural, interregional, and interdisciplinary learning to understand the complexity of global issues, while cultivating practical skills in real-world social contexts [22]. Through stages such as social problem analysis, stakeholder understanding, value creation, and impact assessment, SEE cultivates students’ ability to address social crises and the challenges of technological transformation [23].

Currently, many university programmes aimed at cultivating talent in the field of social entrepreneurship continue to be based on the theoretical foundations and teaching strategies of traditional entrepreneurship education [24]. However, social entrepreneurship and commercial entrepreneurship differ significantly regarding their conceptual objectives and operational logic [25]. Social entrepreneurship not only requires technical and financial business skills but also emphasises a range of cross-cutting competencies that are transferable to the context, such as systemic understanding, empathy, intercultural communication [26], collaboration with stakeholders, and social impact assessment [27,28]. Consequently, several scholars have argued that social entrepreneurship education must

transcend traditional business school frameworks and adopt an interdisciplinary approach to cultivate students' ability to address public and social challenges [3]. The authors of [29] emphasise that social entrepreneurship education must be interdisciplinary and integrate business knowledge, public sector logic, and social sciences to equip students with innovative social entrepreneurship skills. The effective implementation of SEE requires the construction of an interdisciplinary learning ecosystem.

2.2. Internationalisation of Higher Education and Collaborative Online International Learning

As the internationalisation of education accelerates, this interdisciplinary need intensifies [30,31]. Higher education must not only address local social challenges but also cultivate students' ability to understand and respond to global imperatives such as multicultural conflicts, refugee crises, global poverty, climate crises, social inequalities, and technological transformations. International research consistently recognises that global problems have inherently transnational, intercultural, and trans-systemic characteristics, placing social entrepreneurship education at the natural intersection of internationalisation and interdisciplinarity [32,33]. Reference [34] explicitly states that social entrepreneurship education should be based on research from diverse national and cultural contexts. Through intercultural and interdisciplinary integration, it helps students understand the structural variations in social problems in different regions, thus generating more universally applicable and sustainable innovative solutions. Course design increasingly emphasises the sequential chain of "interregional collaboration–intercultural understanding–interdisciplinary integration".

In the wake of the pandemic, IaH has emerged as a distinctive and predominant approach within the theory of internationalisation in education. It emphasises global collaboration and exchange between educational institutions, encompassing the transnational mobility of students and staff, the internationalisation of curricula, and the exchange of educational resources [35]. IaH was originally proposed in response to the structural limitation of internationalisation's over-reliance on cross-border student mobility [36]. A key theoretical contribution of IaH lies in challenging the implicit equation that 'internationalisation equals mobility'. Compared to traditional models of internationalisation, which focus primarily on the mobility of elite students, IaH places greater emphasis on accessibility, equity, and inclusivity [37]. IaH is not a 'substitute' for mobility-based internationalisation, but rather a structural complement to it, transforming internationalisation from 'an experience for a select few students' into 'a routine learning experience for all students' [38]. COIL, as a representative form of IaH, emphasises joint design between institutions, teamwork, and intercultural reflection. It is typically integrated into 4-to-12-week modules within existing courses (including language, discipline-specific, and interdisciplinary modules) and provides students with authentic intercultural learning contexts without the need for physical mobility [39]. For example, SUNY COIL offers comprehensive implementation resources, including course development guides, readiness self-assessments, sample syllabi, and assessment recommendations [40]. The *Ulysses COIL Handbook: A Practical Guide for Educators* provides a comprehensive set of operational guidelines covering course descriptions, implementation procedures, assessment frameworks, and teacher training for COIL, clearly outlining how to integrate it into classrooms engaged in international collaboration within higher education [41].

The COIL model is now widely applied in higher education across disciplines such as business, education, and the social sciences. It assists students in collaboratively tackling complex, cross-cultural topics such as international market analysis, corporate sustainability, and digital education. This approach advances educational internationalisation, particularly by fostering cross-cultural collaboration, cultivating innovative practices, and

enhancing students' global teamwork capabilities [23,42]. A case study by the American Council on Education (ACE) on U.S.–Japan partner institutions demonstrates that COIL has become a significant driver in advancing virtual exchange and has become particularly important in the post-pandemic era. An increasing number of universities and colleges are seeking new approaches to provide students with global competence, complementing traditional in-person mobility and academic exchange formats [43]. The COIL programme, a collaboration between Dutch and Japanese universities, assists Japanese SMEs in expanding into the Dutch market. In this initiative, students from both countries serve as consultants, driving traditional products into new markets through market research and promotional video production. The project not only enhances students' practical skills but also boosts the international competitiveness and sustainable development capabilities of Japanese SMEs [43]. In the field of language education, cross-cultural communication seeks not merely linguistic knowledge and skills but effective communication with others. Cultural factors, in particular, exert a broad influence on academic behaviours and outcomes beyond the classroom. Currently, there are opportunities for Cross-Cultural Online Integration COIL within global language education; educators must equip themselves with a set of cross-cultural communication tools and play a crucial facilitating role [44–46]. In another case study of the COIL English-language teaching methodology involving Ukraine and Spain, the approach aimed to foster student engagement in global collaboration. The results demonstrated that the participating students achieved significant improvements in collaborative English writing, oral communication skills, and cross-cultural understanding [46]. Currently, most COIL research remains largely confined to English-dominated contexts. Implementing COIL in non-English contexts could help challenge the implicit assumption that 'English equals internationalisation', thereby providing a more accurate reflection of the logic of knowledge production in multilingual internationalisation [47].

2.3. Artificial Intelligence Drives the Integration of COIL and Social Entrepreneurship Education

Despite growing attention to the COIL field, its systematic application in social entrepreneurship education (SEE) remains insufficient, particularly in research integrating artificial intelligence [6]. The existing research suffers from structural issues, including limited quantity, uneven thematic distribution, and weak methodological foundations. Although numerous case studies have attempted to integrate COIL with social entrepreneurship, theoretical research remains in its infancy, lacking robust empirical evidence [48,49]. This research gap offers valuable clues to the potential of COIL as a pedagogical approach [6]. For example, a transnational case study involving students from the United States and Spain demonstrates that integrating SEE with COIL effectively promotes authentic cross-cultural collaboration within SEE. Students' personal, social, and cognitive skills were enhanced, further highlighting the significance of this combined teaching approach in improving students' cross-cultural competence and reducing the inequalities inherent in traditional international education [49]. In one programme, Swiss and Angolan students collaboratively completed a comprehensive task, including identifying needs, developing a business model (BMC), and assessing impact, all based on real-world social problems. This highlights the pedagogical synergy between COIL and SEE: intercultural teams bring together local and global perspectives, while online collaboration enables students to develop social innovation skills, intercultural competence, and entrepreneurial action, despite being geographically separated [40]. In the broader context of ongoing debates concerning the role, boundaries, and ethical norms of AI in higher education [50,51], the present study addresses a timely and consequential question: to what extent can an AI-

enhanced COIL model effectively strengthen core SEE competencies in interdisciplinary learning environments?

2.4. Integrating Artificial Intelligence in Higher Education: Capabilities, Design, and Ethics

In recent years, researchers have proposed complementary but distinct theoretical perspectives on AI from ethical governance, capability frameworks, learning sciences, and intercultural collaboration. First, at the ethical and normative level, the authors of [10] systematically propose seven ethical principles for generative AI in educational applications (transparency, explainability, human-centred oversight, privacy protection, bias mitigation, contextual consistency, and institutional alignment). They emphasise that the integration of generative AI into teaching must transcend mere technical implementation, requiring the construction of a “cognitive–social–ethical triadic” pedagogical ecosystem to prevent algorithmic logic from replacing human-centred judgement within the teaching environment. This perspective aligns with the post-pandemic trend of “responsible technologisation” advocated by specialists in educational technology ethics, according to which the educational deployment of AI must prioritise intrinsic ethical controllability as a fundamental principle, rather than considering it a secondary issue.

Second, from the perspectives of learning science and collaborative learning, the authors of [52] conducted a quasi-experimental study that demonstrated that AI-based collaborative platforms (such as Kampal) not only improve students’ metacognitive awareness but also promote the formation of more stable “collective cognitive structures” in distance- and blended-learning scenarios. This research offers a contemporary interpretation of traditional theories of collaborative learning (such as social constructivism and group learning theory) in the digital age: AI can function as a “meaning generator and consensus coordinator” in asynchronous collaboration, rather than simply serving as a content generation tool.

Third, regarding digital competence and learning outcomes, the authors of [53] conducted a randomised controlled trial based on the DigComp 2.2 framework. Recent empirical research demonstrates that learning supported by generative artificial intelligence (generative AI) refers to computational technologies capable of producing seemingly novel and meaningful content from training data, such as text, images, or audio [54,55]. This technology has broad prospects for application in multiple fields, such as commerce, education, healthcare, and content generation. Common generative AI models, such as DALL·E 2, GPT-4, and Seedance, are profoundly transforming the way we work and communicate [55,56], and they can produce significant compensatory effects for students with initially lower levels of digital competence. Notably, considerable progress has been observed in areas such as information and data literacy and digital problem-solving skills. These findings suggest that, if properly designed, monitored, and embedded within educational systems, AI has the potential to promote equity and reduce existing digital gaps, rather than worsen them.

From a development perspective, the authors of [55] introduced and validated the AI-ED-SAT scale, offering a straightforward framework to assess educators’ AI skills. Their findings reveal that teacher AI competence encompasses four interconnected domains—technical knowledge, instructional design, ethical sensitivity, and critical judgement. Importantly, ethical judgement emerged as the strongest predictor of actual teaching practices, emphasising that successful AI-supported education depends not only on technical expertise but also on teachers’ capacity to make ethically sound decisions in complex classroom environments.

Meanwhile, agencies responsible for quality assurance and curriculum development are establishing systematic principles for embedding AI into education. A white paper

by [56] highlights three main pillars for AI-enhanced curricula: aligning with desired learning outcomes, ensuring accessibility for all students, and conducting essential bias audits. Building on this, the University of Calgary’s three-stage “Explore–Engage–Expand” framework stresses that AI considerations should be incorporated throughout the entire curriculum development process—from defining learning objectives and designing instructional activities to creating assessment methods. Continuous iteration and ethical reviews are vital to sustain the fairness and longevity of AI-driven educational programmes [57]. This perspective also aligns with the broader framework of sustainable education, in which ethical, inclusive, and responsible uses of AI are considered essential for supporting long-term educational equity, social responsibility, and sustainable development goals.

These research strands collectively indicate a growing consensus: AI in higher education is shifting from a mere technological tool to an integral part of broader systems, such as ethical governance, competency frameworks, pedagogical strategies, and empirical assessments. This comprehensive perspective provides both a macro-level theoretical foundation and practical justifications for incorporating AI tools into COIL courses, deploying structured ethical checklists, designing tasks centred on skill development, and employing quasi-experimental methods to assess learning outcomes. Additionally, this study, building upon [58], shows that combining the Understanding by Design (UbD) model [59,60] with a generative AI co-design framework (human–AI hybrid co-design) significantly enhances course alignment. This method effectively integrates the triad of “objectives–assessment–learning activities,” making international collaborative courses more functional and cohesive. A complete short course was designed, and to ensure its quality, we refer to Hilali’s AI-Designer-Learner (ADGIE) model [54], which introduces AI-assisted iterative mechanisms at each stage of the course development process.

2.5. *The Objectives of This Study*

To this end, the present study aims to construct and validate an interdisciplinary teaching model that systematically incorporates generative artificial intelligence (AI) into international collaborative online learning (COIL). Using Russian/Spanish and social entrepreneurship tasks, it comprehensively assesses the overall improvement effects of AI-enhanced COIL interventions on students’ educational internationalisation competencies, social entrepreneurship skills, and AI knowledge and ethical awareness. This provides evidence-based support for the innovation and viability of the “Language + AI + Social Entrepreneurship” teaching model in international education contexts. The study had the following objectives.

Objective 1: To assess whether AI-enhanced COIL interventions significantly increase students’ intercultural sensitivity, intercultural communication skills, global awareness, and the quality of localised internationalisation experiences, thus validating the synergistic role of AI in internationalised teaching.

Objective 2: To analyse whether project-based COIL tasks integrated with AI tools improve students’ basic social entrepreneurship skills, including identification of social problems, generation of creative solutions, development of value propositions, awareness of social impact, collaboration, and social responsibility.

Objective 3: To examine changes in students’ understanding of AI, their discernment about generative AI, their awareness of data privacy, their recognition of biases, their assessment of transparency, and their responsible use practices before and after the intervention. This explores the effectiveness of AI in promoting literacy and ethics in collaborative international courses.

Objective 4: To analyse the operational mechanisms of AI-assisted multilingual collaboration (Russian/Spanish) within COIL social entrepreneurship tasks, including AI support for linguistic production and intercultural communication, whether multilingual collaboration fosters the creation of social entrepreneurship in teams, and students' perceptions and acceptance of the interdisciplinary learning experience (Language + AI + SEE).

3. Research Methodology

This study employed a pre–post quasi-experimental design. Through a four-week AI-enhanced COIL intervention, we examined the pedagogical effects of generative AI on online intercultural collaborative learning. The main research focuses included social entrepreneurship education (SEE) competencies (identifying social problems, co-creating value, intercultural collaboration, impact design, etc.), AI literacy and ethical awareness, Russian/Spanish proficiency, and interlinguistic collaboration performance. The intervention design integrated four basic elements—COIL, AI, language learning, and social entrepreneurship education—to analyse their interdisciplinary interactions and combined effects. This study was approved by the Academic Ethics Committee of the European Institute for Innovation Management in Spain.

3.1. Participants and Grouping

This study is exploratory in nature. Situated within an emerging field of research, it primarily focuses on the feasibility of the AI-COIL approach, the directionality of effects, and the underlying mechanisms, rather than seeking statistical generalisation [61]. The study sample consisted of 30 postgraduate students who volunteered to participate from two institutions: 15 Russian language Master's students from a School of Foreign Languages at a Chinese University, and 15 MBA (Master of Business Administration) students from a Spanish business school. All participants volunteered, signed informed consent forms, and agreed not to disclose any personal data, content of submitted assignments, or photographs of online classes.

Group Assignment

To investigate the moderating effects of cultural background and intercultural collaboration structures on AI-COIL-SEE learning outcomes, the 30 students were divided into three independent groups (10 students per group). Russian group: 10 Chinese Master's students in Russian, representing a monocultural and monodisciplinary environment, were studied to observe the effectiveness of COIL in “non-intercultural conditions”. MBA group: 10 Spanish Master's students in MBA with a strong background in innovation and entrepreneurship, but without linguistic pressure, who served as a disciplinary background comparison group. Mixed intercultural group: 5 Russian Master's students + 5 MBA students; this was the main research group that examined intercultural differences in intercultural communication, multilingual interaction (Russian/Spanish/English), social entrepreneurship creation, and AI usage behaviour. The three groups completed identical social entrepreneurship tasks to compare the effectiveness of the AI-COIL model in different team structures. We have drawn upon [62]'s research methodology.

3.2. Intervention Design

The COIL intervention in this study lasted four weeks, during which all groups carried out a social entrepreneurship (SEE) project on a common theme. AI was integrated into the learning process with a dual function: as an auxiliary tool and as an object of reflection.

3.2.1. Content of COIL Tasks (SEE Project Tasks)

Based on the practices of [6] COIL+SEE by [49] and evidence on the promotion of intercultural competence by COIL, we designed the following task for all groups:

- Identify a social problem that is prevalent in both China and Spain or globally (e.g., educational inequality, ageing population, migration and integration, or sustainable development);
- Conduct an in-depth analysis of the identified social problem (problem formulation);
- Conduct a stakeholder analysis (stakeholder mapping);
- Design the value proposition;
- Prepare a bilingual presentation (Russian/Spanish) on social entrepreneurship;
- Submit a reflective report on AI, intercultural collaboration, and the SEE learning experience.

3.2.2. Integration of AI into Teaching

Throughout the collaboration, clear guidelines governed the use of artificial intelligence. These included requirements for teams to disclose their use of AI, an emphasis on responsible use with human oversight, and explicit expectations regarding authorship and ethical reflection on AI-assisted outputs.

In this study, iTourtranslator, an AI translation tool powered by ChatGPT-4o, was used to support language translation [63]. Additionally, students were permitted and encouraged to use generative AI tools such as ChatGPT (GPT-5.2) to facilitate communication and collaboration under the principle of “responsible use” to support the completion of the following tasks:

- Searching for and organising bibliography/resources;
- Bilingual translation, proofreading, and rewriting;
- Generation of stakeholder analysis templates;
- Development of social innovation business models;
- Creation of multimodal content (images, diagrams, and prototype drafts);
- Review of intercultural communication texts;
- Identification of biases, logical flaws, and risks in AI-generated content.

We provided short-term training prior to the use of AI, covering AI transparency, biases, data privacy, ethics of originality, explainability, and limitations. This section is based on [11] regarding AI competency and ethics frameworks, and on the conclusions of [51] on the challenges of AI teaching capabilities.

3.2.3. Intervention and Course Structure (1 Month, Integrated AI-COIL-UbD Model)

The design (see Table 1) follows the UbD reverse design (objectives → evidence → activities) [60], incorporating AI tools and rapid iteration throughout the ADDIE phases. The process and duration are in line with official COIL guidelines.

Table 1. Intervention and course structure.

Week	Learning Content	AI Support Function
1	Breaking the intercultural ice, project selection, training in AI ethics	AI-assisted linguistic communication, information retrieval
2	Analysis of social issues, stakeholder analysis	AI-generated analytical frameworks, text drafts
3	Design of social innovation solutions, drafting of presentation document	Multilingual rewriting with AI, visual prototyping
4	Team presentations, reflection on the use of AI	AI-assisted presentation production

Implemented through a four-week teaching sequence, this study systematically integrated artificial intelligence into every stage of the ADDIE instructional cycle (Analysis, Design, Development, Implementation, and Evaluation). Week 1 combined cross-cultural icebreaker activities with a structured, short-term 90 min AI training module. Centred on ethics and methodology, this training systematically covered intercultural competence, social entrepreneurship skills, and ethically informed AI literacy, and was completed prior to any project-related AI applications. Weeks 2 and 3 focused on AI-assisted problem analysis, the design of social innovation solutions, and the generation and optimisation of trilingual (Russian/Spanish/English) learning content, with an emphasis on human review of AI outputs, cross-cultural comparison, and critical reflection. Week 4 concluded with team project presentations, supplemented by structured reflection activities on the AI application process and cross-cultural collaboration experience.

Throughout the short-term training course, AI was primarily used to support translation and multilingual mediation, content generation, analytical modelling, and the completion of collaborative tasks. At the same time, the COIL methodology was designed to facilitate continuous cross-cultural interaction, teamwork, and co-creation, potentially enabling learning outcomes to emerge not only as technology-supported outputs but also as the development of competencies related to internationalisation, social entrepreneurship, and the responsible use of AI. At the activity level, this design reflects the UbD logic of ‘Expected Understanding—Evidence of Learning—Learning Activities’, which may contribute to enhancing the coherence, transparency, and reproducibility of the teaching implementation.

3.3. Measurement Tools

The questionnaire (see Appendix A) was administered using Microsoft Forms as the data collection tool. Its design followed established international methodologies and theoretical frameworks. All scales employed in this study were adapted from or grounded in validated theoretical constructs and demonstrated satisfactory reliability and internal consistency. It should be noted that this study primarily aims to capture changes in students’ self-perceived abilities and learning experiences, rather than to provide direct evidence of objective improvements in performance. The Intercultural Competence Scale (ICS-AIC: AI-COIL Intercultural Scale) is based on that in [6] but refined into five dimensions: intercultural attitudes, cultural knowledge awareness, communication skills, behavioural adaptation, and self-efficacy. Each dimension comprises multiple specific items to ensure comprehensive and specific measurement. The Social Entrepreneurship Competencies (SEE) scale is based on the eComplex-em model described in [64,65], and is refined into eight dimensions: problem identification, empathy and cultural sensitivity, stakeholder management, innovation and creativity, resource mobilisation, partnerships, outcome evaluation, and ethical responsibility. The AI literacy and ethics scale is based on [10] and is designed around three aspects: understanding and ability to use AI, critical use ability, and ethical awareness. The linguistic self-efficacy scale, which is based on [60,66], focuses on Russian and Spanish and contains four dimensions: expressive confidence, communication ability, AI-assisted linguistic competence, and task performance (see Table 2). All items use a 5-point Likert scale to facilitate quantitative analysis and comparison. See Appendix A for the survey.

Regarding reliability management, the questionnaire underwent content evaluation by two experts in educational and linguistic internationalisation after the design stage. This process helped ensure that all items met academic standards and practical application requirements, while reducing subjective bias. The experts reviewed the content validity of the items and proposed revisions to improve clarity of expression and cultural adaptability.

Additionally, all scales employed in this study were adapted from or based on instruments validated in prior research [6,10,65]. To further validate the internal consistency of the scale, a statistical analysis was carried out using Cronbach's α specific to each dimension. Statistical analyses were conducted using IBM SPSS Statistics (AMOS) version 29. The results indicated that the scale demonstrated acceptable internal consistency, with Cronbach's $\alpha = 0.8271$ ($\alpha > 0.7$ is generally considered acceptable), which is appropriate for an exploratory study. To avoid the risk that a 'good fit' obtained from confirmatory factor analysis with a small sample size may be misleading [67], this study did not conduct confirmatory factor analysis. In addition, Microsoft Forms was configured to require sequential completion of questions, randomise item order, and display prompts such as "Please answer carefully". An integrity statement was included at the start of the instrument, emphasising that all data collected would be used solely for academic purposes. This clarification may have helped to improve participants' conscientiousness and reduce the likelihood of inattentive or invalid responses. In particular, response time was examined as an auxiliary indicator of response quality, with an average completion time of 9.23 min.

Table 2. The four dimensions of this research.

Objective	Role	Scale	ScaleID	Num. Dimensions	Num. Items
Obj. 1	Primary	AI-COIL Intercultural Scale	ICS-AIC	5	20
Obj. 2	Primary	Social Entrepreneurship Competency Scale	SEE	8	21
Obj. 3	Secondary	AI Literacy and AI Ethics Scale	AI	3	10
Obj. 4	Secondary	Language Self-Efficacy Scale	LS-ES	4	10

Overall, the development and validation of the scale followed a thorough and systematic process. By using internationally recognised theoretical frameworks, involving expert evaluations, performing reliability and validity tests, and applying multiple data quality safeguards, the instrument provides a strong basis for future quantitative analysis. This careful approach supports its effectiveness in exploring key concepts related to educational internationalisation, social entrepreneurship, and artificial intelligence.

3.4. Data Analysis (Focused on ANOVA)

First, the data from 30 participants, divided into three groups (Russian group $n = 10$, MBA group $n = 10$, and mixed intercultural group $n = 10$), were recorded in SPSS, assigning each person a unique identifier (ParticipantID) and a group variable (Group). The data from the scales corresponding to the pre-test (PRE) and post-test (POST) were then imported into a table format as shown in Table 3.

Table 3. Participant data and abbreviations.

	ParticipantID	Time Pre	Time Post
Russian Group	RS01...RS10	RS01 Pre...RS10 Pre	RS01 Post...RS10 Post
MBA Group	MB01...MB10	MB01 Pre...MB10 Pre	MB01 Post...MB10 Post
Mixed Group	MX01...MX10	MX01 Pre...MX10 Pre	MX01 Post...MX10 Post

Given that the research focuses on cognitive changes before and after the test, as well as on the differences between the three groups, repeated-measures ANOVA was used as the main statistical method. Effect sizes (η^2) are reported to indicate the magnitude of observed differences and to complement significance testing [68]. In interpreting the results, special attention was paid to the main effect of time (whether there were significant changes from PRE to POST), the interaction between time and group (whether the magnitude of change differed between groups), and the partial effect size η^2 (which indicates the

strength of the effect in each dimension). Finally, for each dimension, the intragroup comparison between PRE and POST (time effect), the difference in increase between groups (Group $\times$ Time interaction), and the effect size indicator (η^2) were obtained.

For these reasons, and considering both methodological and practical factors, repeated-measures ANOVA was deemed appropriate for the present study. First, as the within-subject factor includes only two levels (pre-test and post-test), the assumption of sphericity is automatically met; therefore, no formal test is necessary. Second, given the small sample size, formal normality tests may have limited statistical power and may not reliably assess the assumption of normality [69]. In this context, repeated-measures ANOVA—particularly in within-subject designs—is generally considered robust to moderate deviations from normality.

4. Results

This study employed a pre- and post-test design across three groups of participants (Russian group, MBA group, and mixed group) to examine the impact of an AI-enhanced COIL model on four competencies: AI-COIL Intercultural Scale, Social Entrepreneurship Competency Scale, AI Literacy and AI Ethics Scale, and Language Self-Efficacy Scale. The main conclusions are based on repeated-measures ANOVA and group-specific descriptive statistics.

4.1. Intercultural Competence (ICS-AIC)

Table 4 summarises the mean values and standard deviation of the five dimensions of the ICS-AIC in the three groups before and after the test, together with the ANOVA report values. In general, a significant improvement was observed, with the mixed group showing the greatest effect.

Table 4. Intercultural competence (ICS-AIC) data.

Dimension	Group	Sample Size N	Pretest M	Pre-Test SD	Post-Test M	Post-Test SD	Δ	F	p	η^2
Intercultural attitude	Russian group	10	3.12	0.41	3.78	0.39	0.66	18.52	0.001	0.46
	MBA group	10	3.25	0.44	3.89	0.36	0.64	21.14	<0.001	0.51
	Mixed group	10	3.1	0.4	4.12	0.33	1.02	39.72	<0.001	0.67
Awareness of cultural knowledge	Russian group	10	3	0.43	3.6	0.4	0.6	16	0.002	0.43
	MBA group	10	3.2	0.42	3.85	0.39	0.65	18.9	0.001	0.48
	Mixed group	10	3.05	0.41	4.1	0.35	1.05	42.1	<0.001	0.68
Intercultural communication skills	Russian group	10	2.98	0.48	3.55	0.45	0.57	15.33	0.002	0.41
	MBA Group	10	3.4	0.5	4.02	0.46	0.62	19.77	0.001	0.49
	Mixed group	10	3.05	0.47	4.25	0.38	1.2	51.22	<0.001	0.72
Cultural behavioural adaptation	Russian group	10	2.95	0.44	3.5	0.42	0.55	14.2	0.003	0.4
	MBA group	10	3.3	0.43	3.95	0.4	0.65	17.65	0.002	0.46
	Mixed group	10	3	0.45	4.18	0.36	1.18	45.3	<0.001	0.7
Intercultural self-efficacy	Russian group	10	3.05	0.42	3.7	0.4	0.65	17.9	0.002	0.45
	MBA group	10	3.35	0.41	4.05	0.38	0.7	20.2	0.001	0.5
	Mixed group	10	3.1	0.4	4.22	0.34	1.12	48.5	<0.001	0.71

All five dimensions (attitude, cultural awareness, communication skills, behavioural adaptation, and self-efficacy) showed significant improvement, with the mixed group showing the highest overall progress.

Attitude: Mixed group 3.10 $\rightarrow$ 4.12 ($F = 39.72$, $p < 0.001$, $\eta^2 = 0.67$); the Russian and MBA groups also showed significant progress ($F = 18.52$ – 21.14 , $p \leq 0.001$).

Cultural knowledge/communication skills: The effect size of the mixed group reached $\eta^2 = 0.68/0.72$; the other two groups also showed significant increases.

Behavioural adaptation/self-efficacy: The highest effect size was $\eta^2 \approx 0.70$ – 0.71 , indicating medium-to-large effects.

The results indicate that AI-mediated multilingual interaction produces a synergistic effect with authentic intercultural encounters: semantic clarification, pragmatic suggestions, and stylistic coordination by AI reduce communicative anxiety, allowing students to shift their focus from “grammatical correctness” to “situational appropriateness and cultural context”.

4.2. Social Entrepreneurship Competence (SEE)

Table 5 presents the statistical results for the eight dimensions of SEE: the mixed group showed the most balanced and significant improvement overall; the MBA group excelled in the dimension of “innovation/resources”, while the Russian group showed the most notable improvement in “empathy/cultural sensitivity”.

Table 5. Social entrepreneurship competence (SEE) data.

Dimension	Group	Sample Size N	Pretest M	Pre-Test SD	Post-Test M	Post-Test SD	Δ	F	p	η^2
Identification of problems and assessment of social impact	Russian group	10	3.05	0.42	3.72	0.4	0.67	22.1	<0.001	0.51
	MBA Group	10	3.45	0.39	4.1	0.41	0.65	25.84	<0.001	0.56
	Mixed group	10	3.12	0.43	4.28	0.35	1.16	48.01	<0.001	0.68
Empathy and cultural sensitivity	Russian group	10	3	0.44	3.85	0.41	0.85	26.5	<0.001	0.57
	MBA group	10	3.3	0.42	3.95	0.4	0.65	17.2	0.002	0.46
	Mixed group	10	3.1	0.43	4.2	0.36	1.1	40.8	<0.001	0.66
Community participation and stakeholder management	Russian group	10	2.9	0.44	3.58	0.43	0.68	19.52	0.001	0.48
	MBA Group	10	3.4	0.41	4.11	0.39	0.71	29.11	<0.001	0.59
	Mixed group	10	2.95	0.47	4.22	0.3	1.27	54.26	<0.001	0.74
Social innovation and creativity	Russian group	10	2.85	0.46	3.52	0.44	0.67	17	0.002	0.44
	MBA Group	10	3.6	0.4	4.28	0.38	0.68	34.3	<0.001	0.63
	Mixed group	10	3.05	0.48	4.35	0.36	1.3	57.22	<0.001	0.76
Resource mobilisation and fundraising	Russian group	10	2.95	0.45	3.5	0.43	0.55	14.8	0.003	0.41
	MBA Group	10	3.35	0.42	4.05	0.4	0.7	22.6	<0.001	0.52
	Mixed group	10	3	0.44	4.1	0.37	1.1	38.4	<0.001	0.65
Establishment of alliances and collaboration	Russian group	10	3	0.43	3.65	0.41	0.65	18.1	0.002	0.45
	MBA Group	10	3.45	0.41	4.15	0.39	0.7	27.1	<0.001	0.58
	Mixed group	10	3.1	0.42	4.25	0.35	1.15	49	<0.001	0.69
Monitoring and evaluation of social achievements	Russian group	10	2.9	0.44	3.55	0.42	0.65	16.9	0.002	0.44
	MBA Group	10	3.3	0.43	4	0.41	0.7	24.3	<0.001	0.54
	Mixed group	10	3	0.45	4.12	0.36	1.12	41.7	<0.001	0.67
Ethical decision-making and responsibility	Russian group	10	3.1	0.42	3.8	0.4	0.7	19	0.001	0.47
	MBA group	10	3.45	0.4	4.2	0.38	0.75	28.7	<0.001	0.58
	Mixed group	10	3.2	0.41	4.35	0.34	1.15	52.4	<0.001	0.73

The students in the SEE demonstrated significant improvement in all eight dimensions:

- Problem identification and social impact assessment: The mixed group improved from 3.12 to 4.28 ($F = 48.01$, $p < 0.001$, $\eta^2 = 0.68$).
- Empathy and cultural sensitivity: The Russian group showed the greatest improvement (from 3.00 to 3.85, $\eta^2 = 0.57$).
- Community involvement and stakeholder management: The mixed group showed a significant effect ($\eta^2 = 0.74$).
- Social innovation and creativity: The MBA and mixed groups demonstrated optimal performance (highest $\eta^2 = 0.76$).
- Resource mobilisation and fundraising: The MBA group maintained an advantage in this area ($\eta^2 = 0.52$).

4.3. AI Literacy and AI Ethics

Table 6 presents the results of the three dimensions for the total sample ($N = 30$): understanding and use, critical use, and ethical awareness all show a large improvement, with ethical awareness showing the largest.

Table 6. AI literacy and AI ethics data.

Dimension	Group	Sample Size N	Pretest M	Pre-Test SD	Post-Test M	Post-Test SD	Δ	F	p	η^2
Ability to understand and use AI	All	30	3.08	0.4	4.1	0.36	1.02	79.22	<0.001	0.73
Critical AI usage capacity	All	30	2.85	0.37	3.92	0.41	1.07	65.51	<0.001	0.69
Ethical awareness about AI	All	30	2.7	0.42	4.05	0.39	1.35	92.12	<0.001	0.78

This study shows that the most significant improvement was in skills related to artificial intelligence:

- Understanding and ability to apply artificial intelligence: from 3.08 to 4.1 ($F = 79.22$, $\eta^2 = 0.73$);
- Competence in the critical application of artificial intelligence: from 2.85 to 3.92 ($F = 65.51$, $\eta^2 = 0.69$);
- Ethical awareness of artificial intelligence: from 2.7 to 4.05 ($F = 92.12$, $\eta^2 = 0.78$), representing the greatest improvement of all the dimensions analysed in the study.

4.4. Language Self-Efficacy

Table 7 displays the results across four dimensions. The mixed-group condition showed the most significant effects in “task performance and self-assessment,” emphasising the unique educational benefit of AI-supported multilingual collaboration and its ability to produce collaborative learning advantages:

- Regarding confidence expression, all three groups achieved significant improvements ($F = 16.80$ – 40.20).
- Regarding linguistic communication skills, the mixed group showed the greatest increase ($3.10 \rightarrow 4.25$, $\eta^2 = 0.70$).
- Regarding AI-assisted linguistic competence, all groups showed notable improvements ($\eta^2 = 0.53$ – 0.71).

Table 7. Language self-efficacy data.

Dimension	Group	Sample Size N	Pretest M	Pre-Test SD	Post-Test M	Post-Test SD	Δ	F	p	η^2
Confidence in linguistic expression	Russian group	10	3	0.43	3.65	0.41	0.65	17.3	0.002	0.44
	MBA group	10	3.3	0.42	3.95	0.39	0.65	16.8	0.002	0.43
	Mixed group	10	3.05	0.41	4.1	0.36	1.05	40.2	<0.001	0.66
Linguistic communication skills	Russian group	10	2.95	0.44	3.55	0.42	0.6	15.9	0.002	0.42
	MBA group	10	3.35	0.43	4.05	0.4	0.7	22.1	<0.001	0.51
	Mixed group	10	3.1	0.42	4.25	0.35	1.15	45.8	<0.001	0.7
AI-assisted language capability	Russian group	10	3.1	0.42	3.9	0.39	0.8	24.2	<0.001	0.53
	MBA Group	10	3.45	0.41	4.2	0.38	0.75	26.5	<0.001	0.56
	Mixed group	10	3.2	0.4	4.35	0.34	1.15	50.4	<0.001	0.71
Task performance and self-assessment	Russian group	10	3.05	0.43	3.85	0.4	0.8	23.1	<0.001	0.52
	MBA group	10	3.4	0.42	4.15	0.38	0.75	27.9	<0.001	0.58
	o mixed group	10	3.15	0.41	4.4	0.33	1.2 5	55.1	<0.001	0.74

In the domain of task performance and self-assessment, the mixed group recorded the highest gains ($3.15 \rightarrow 4.40$, $\eta^2 = 0.74$).

5. Discussion

Grounded in the AI-enhanced blended learning (COIL) model, this section evaluates the results of four repeated-measures ANOVA analyses alongside descriptive statistics for each group. This study primarily captures short-term patterns of change and initial developmental trajectories, rather than the stability or long-term maintenance of abilities. The findings suggest that the integration of AI-COIL with social entrepreneurship may be associated with the development of IaH, as well as improvements in students’ inter-

cultural competence, social entrepreneurship competency, recognition and understanding of artificial intelligence literacy and ethical awareness, and elevating language self-efficacy. In addition, the reliance on self-report data is intended to capture learners' subjective meaning-making processes, which are central to intercultural learning and ethical engagement with AI, while also highlighting the need for complementary objective measures in subsequent research. Beyond examining instructional effectiveness, this study offers a process-oriented theoretical contribution by exploring how artificial intelligence may mediate intercultural learning within the COIL framework. The findings provide preliminary support for an AI-mediated COIL model in which AI may function as a pedagogical mediator at linguistic, cognitive–interactional, and ethical–reflective levels.

5.1. Intercultural Competence (ICS-AIC)

The findings indicate that improvements in intercultural competence may be associated with the combined effects of AI-supported interaction and structured intercultural engagement. This pattern may reflect a developmental sequence encompassing attitudes, knowledge awareness, communication, behavioural adaptation, and self-efficacy. This is consistent with internationalisation at home (IaH) and established intercultural competence frameworks underpinning COIL/IaH. Notably, the pre–post changes were particularly pronounced in the mixed group.

Building on this, a possible explanatory mechanism is that AI may function as a form of cognitive and linguistic scaffolding, supporting metacognitive regulation, reducing communicative barriers, and enabling more effective participation in intercultural collaboration. This interpretation aligns with perspectives from social constructivism, where learning emerges through mediated interaction and shared meaning-making.

This offers a plausible theoretical explanation linking AI-mediated interaction with improvements in intercultural competence and collaborative learning outcomes, thereby contributing to a clearer understanding of how AI supports intercultural learning.

5.2. Social Entrepreneurship Competence (SEE)

The results suggest that AI-COIL may offer combined advantages in the development of SEE competencies. Artificial intelligence may function as a form of structured cognitive scaffolding, enabling students to quickly generate organised outputs such as stakeholder maps, problem trees, and value proposition canvases, which may contribute to more efficient engagement with complex concepts. Intercultural teams tend to bring diverse perspectives, and the mixed group may demonstrate advantages in problem definition, needs analysis, and solution development, drawing on varied social knowledge and cultural backgrounds. Disciplinary differences may contribute distinct strengths: for example, the MBA group appears to perform strongly in areas such as innovation, resource integration, and feasibility validation, which may be related to their professional training. Together, these dynamics may contribute to observed improvements in SEE competencies.

While the results suggest that the AI-COIL model may offer combined advantages for the development of social entrepreneurship competencies, a more nuanced interpretation is warranted. The use of artificial intelligence as cognitive scaffolding—such as stakeholder maps, problem trees, and value proposition canvases—may substantially enhance efficiency in handling complex social problems. However, this same structuring effect may also entail a risk of cognitive offloading, whereby learners rely excessively on predefined templates and AI-generated structures, potentially constraining deeper critical engagement with ill-defined social realities. This tension suggests that the pedagogical value of AI lies not in automation per se, but in its deliberate integration with reflective and problem-based instructional design.

Similarly, the relatively stronger performance of mixed intercultural groups suggests that cultural diversity may function as a powerful cognitive resource rather than merely a contextual variable. At the same time, intercultural collaboration may introduce higher coordination demands, including divergent interpretive frames and communicative norms. The observed advantages of mixed groups, therefore, may not stem from diversity alone, but from the extent to which AI-mediated communication and task structuring help reduce collaboration costs and enable the meaningful integration of multiple perspectives.

Disciplinary differences further reinforce this dialectical dynamic. The MBA group's strengths in innovation, resource mobilisation, and feasibility assessment may reflect the influence of professional training oriented towards efficiency and strategic reasoning. While these competencies are essential for social venture sustainability, an overemphasis on instrumental rationality may marginalise ethical reflection and contextual sensitivity. In this regard, the AI-COIL framework appears to offer a balancing mechanism, allowing business-oriented competencies to be situated within intercultural dialogue and ethical deliberation.

Taken together, these findings indicate that the effectiveness of AI-COIL in social entrepreneurship education is contingent upon the interplay between technological scaffolding, intercultural diversity, and pedagogical regulation. Rather than functioning as an inherently beneficial tool, artificial intelligence may amplify existing educational dynamics, underscoring the importance of intentional instructional design to harness its benefits while mitigating potential constraints.

5.3. AI Literacy and AI Ethics

The notable increase in ethical awareness of artificial intelligence suggests the potential value of the preparatory teaching on AI ethics and the AI auditing mechanism used in the course. In particular, students were asked to reflect on issues such as biases, provenance, transparency, and the potential social impact of AI-generated outputs. The authentic learning environment may have made ethical considerations more concrete for participants, potentially supporting deeper internalisation at both cognitive and value-based levels. These results suggest that even within brief instructional periods, carefully designed AI education may contribute to the development of students' sense of responsibility and critical judgement.

Importantly, the development of AI ethics competence observed in this study is interpreted through the lens of Education for Sustainable Development [70]. Ethical engagement with AI is not merely conceptualised as technical compliance, but as part of a broader, sustainability-oriented agency. This approach helps align the responsible use of technology with intercultural understanding and social responsibility. It also situates AI literacy within a normative educational agenda that emphasises broader societal sustainability.

5.4. Language Self-Efficacy

In this context, artificial intelligence may be understood as serving two main educational roles. First, as a form of linguistic support, tools such as machine translation, grammatical corrections, and register adjustment may help reduce the language load, potentially enabling students to focus more on the quality of their interactions. Second, AI may function as a mediating tool in multilingual teamwork by supporting the construction of shared understanding and facilitating smooth coordination among team members using different languages. The relatively large effect size observed in the mixed-group condition may indicate the potential of the AI-COIL model to support the cycle of providing comprehensible input, negotiating meaning, and guiding production within authentic

communicative settings. This process may play an important role in supporting active participation and contributing to improved learning outcomes.

5.5. Limitations

It is important to acknowledge that the observed improvements may also be influenced by potential confounding factors, including participants' prior learning experience, developmental readiness, expectancy effects, and repeated testing effects. As such, the findings should be interpreted with appropriate caution, particularly with regard to causal inferences.

Several limitations should be considered. First, the relatively small sample size and the specific disciplinary and institutional context may limit the generalisability of the findings. In particular, given the relatively small sample size ($n = 30$), the statistical power of the analysis of variance (ANOVA) test may have been limited. Second, the four-week intervention period may not be sufficient to capture longer-term development in complex competencies such as intercultural competence and social entrepreneurship. Third, the reliance on self-reported measures introduces the possibility of response bias and may not fully reflect actual behavioural changes. Fourth, as all participants received the intervention, the study design limits the ability to isolate the specific effects of AI-COIL components; future research could incorporate a control group to address this limitation.

Future research should consider multi-institutional approaches, diverse multilingual setups, and longitudinal studies to assess the long-term sustainability and transferability of AI-COIL effects. In addition, qualitative research methods could be incorporated to triangulate self-report data derived from Likert-scale surveys. Additionally, including multimodal evidence—such as data from collaborative processes, evaluations by external experts, and mixed-effects modelling—could enhance the robustness of the findings. Nevertheless, the current findings provide preliminary evidence that the AI-COIL model may offer a potentially valuable and adaptable approach for integrating language learning, intercultural competence, social innovation, and responsible AI use in higher education contexts.

6. Conclusions

This study provides exploratory empirical evidence on the potential value of the AI-enhanced COIL model in supporting the development of students' multidimensional competencies within the framework of internationalisation at home (IaH). Drawing on three sets of pre- and post-test data, the findings provide preliminary quantitative evidence regarding the effectiveness of the model. The results indicate statistically significant improvements across four dimensions: intercultural competence, social entrepreneurship, AI knowledge and ethical awareness, and linguistic self-efficacy. Most dimensions exhibited medium-to-large effect sizes, suggesting that this pedagogical model may support the development of interdisciplinary competencies within a relatively short intervention period. There was a notable, consistent overall advantage demonstrated by the mixed group in almost all core competencies, with effect sizes consistently exceeding those of the Russian language group and the MBA cohort. This pattern may suggest a potential synergistic effect between "authentic intercultural interaction" and "AI-mediated multilingual collaboration". This pattern may lend support to the value of the "authentic intercultural engagement" emphasised by COIL and may also highlight the potential role of AI in reducing language barriers, improving pragmatic adequacy, and facilitating the integration of multicultural information. This may enable learners to engage in intercultural communication and project collaboration under conditions of reduced anxiety and increased support.

The findings further suggest that incorporating AI ethics and its critical use as a pre-course module within daily learning tasks, such as AI auditing and secondary verification mechanisms, may contribute to improvements in students' sense of responsibility and critical judgement. In particular, the dimension of AI ethical awareness showed the largest effect size across the study. This may indicate that within the framework of authentic social innovation tasks and intercultural collaboration contexts, students can more directly experience the risks, biases, and value issues associated with the use of AI. As a result, ethical reflection becomes highly situational, dependent on the context of the task, achieving a double internalisation of technical competence and ethical awareness. Regarding language, this study suggests a dual role of AI in multilingual collaboration: it serves both as a linguistic scaffold to help students overcome grammatical and expressive obstacles and as a collaborative mediator to build shared spaces of meaning within multilingual intercultural teams. Enhanced linguistic skills may facilitate intercultural communication and teamwork in social innovation, potentially contributing to a positive cycle of language growth, cultural understanding, and project-based learning. In the SEE context, the AI-COIL model may support the development of students' higher-order skills—such as problem-solving, idea generation, stakeholder engagement, and impact evaluation—using structured tools such as problem trees, stakeholder maps, and value proposition canvases, alongside diverse perspectives from intercultural teams. The notable benefits seen in mixed-group settings suggest that cultural diversity may function as an active “cognitive asset” facilitated by AI-supported collaboration. Overall, the interaction of language, intercultural factors, and AI support suggests that AI-COIL may represent more than a simple tech upgrade to the traditional COIL model. It may represent a comprehensive teaching framework that supports deep learning and responsible practice across a range of skills.

This study provides initial evidence and a conceptual rationale for a holistic education approach connecting language, intercultural exchange, social entrepreneurship, and AI. The results suggest that AI-COIL may contribute to the development of intercultural understanding, digital literacy, and innovation in higher education. It also provides potential implications for curriculum and policy development, such as AI ethics training, process-centred AI oversight, multilingual collaboration strategies, curriculum design aligned with backward design principles, and data governance and quality assurance at the institutional level. Together, these elements may inform the development of a scalable model for expanding AI-COIL in multilingual, multicultural contexts. These findings should be interpreted as exploratory and indicative rather than conclusive, given the study design and scope.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Research Ethics Committee (CEI) of European Institute of Innovation and Management (protocol code CEI-EIIM/2026/01 and date of approval: 19 January 2026) for studies involving humans.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The study has been reviewed and approved by the El Comité de Ética en la Investigación del European Institute of Innovation and Management. In accordance with the requirements and restrictions imposed by the ethics committee, the datasets generated and analysed in this study are not publicly available due to ethical and privacy considerations, but are available from the corresponding author upon reasonable request.

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Appendix A.

Appendix A.1. Intercultural Competence Scale (ICS-AIC: AI–COIL Intercultural Scale)

Dimension 1: Attitudes toward Cultural Diversity

1. I am willing to actively engage with people from different cultural backgrounds.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
2. I enjoy interacting with people from different cultures and learning from them.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
3. I enjoy hearing others’ stories and understanding their backgrounds.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
4. I take pleasure in gaining a deeper understanding of others’ cultures, experiences, and perspectives.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree

Dimension 2: Cultural Knowledge Awareness

5. I am aware of which cultural knowledge I am employing during cross-cultural communication.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say

- d. Disagree
 - e. Strongly disagree
6. When interacting with people from unfamiliar cultures, I adjust my understanding of culture.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
7. I consciously reflect on the cultural knowledge I apply in cross-cultural situations.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
8. I proactively verify the accuracy of my cultural knowledge during communication.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
- Dimension 3: Intercultural Communication Skills
9. In cross-cultural exchanges, I am a patient and effective listener.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
10. I can make others feel at ease and respected during communication.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
11. I find it relatively easy to connect with people from different cultures.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
12. In cross-cultural interactions, I would adjust my vocal intonation (such as accent or tone) to facilitate better communication.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
13. I can adjust my speaking pace according to different cultural requirements.
- a. Strongly agree
 - b. Agree

- c. Cannot say
- d. Disagree
- e. Strongly disagree

Dimension 4: Cultural Behavioural Adaptation

14. I can discern what behaviours are considered appropriate within a given culture.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

15. In cross-cultural situations, I would adjust my non-verbal behaviour (gestures, posture, etc.).

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

16. In cross-cultural interactions, I would adjust my facial expressions.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

Dimension 5: Cross-Cultural Self-Efficacy

17. I have confidence in socialising with locals in unfamiliar cultural settings.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

18. I am capable of coping with the pressures of adapting to a new culture.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

19. I relish living in unfamiliar cultures and gradually adapting to them.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

20. I am confident I can adapt to everyday situations in different cultures, such as shopping and lifestyle habits.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

Appendix A.2. Social Entrepreneurship Competency Scale (SEE)

Dimension 1: Problem Identification and Social Impact Assessment

1. I am able to identify problems by analysing issues arising within a social context.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
2. I understand how to assess the impact of social projects on communities or the public interest.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
3. I analyse whether the social issues requiring mitigation align with the objectives, mission, and vision of the organisation I represent.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree

Dimension 2: Empathy and Cultural Sensitivity

4. I possess the ability to undertake social entrepreneurship projects from a multicultural perspective.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
5. I can develop social entrepreneurship concepts that balance cultural differences and commonalities.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
6. I can handle experiences that differ from my own cultural background to lead social entrepreneurship projects.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree

Dimension 3: Community Engagement and Stakeholder Management

7. I can analyse how key participants engage with social entrepreneurship projects through stakeholder matrix analysis.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say

- d. Disagree
 - e. Strongly disagree
8. I can design stakeholder engagement plans for social entrepreneurship projects.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree

Dimension 4: Social Innovation and Creativity

9. Employing diverse methodologies to develop social entrepreneurship projects.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
10. I possess the ability to devise unprecedented innovative solutions to address societal challenges.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
11. I can propose diverse solutions to address social issues.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree

Dimension 5: Resource Mobilisation and Fundraising

12. Able to set objectives within time and resource constraints.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
13. Can devise strategies to attract external funding for developing social entrepreneurship projects.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
14. I analyse whether the social issues to be addressed align with the objectives, mission and vision of the organisation I represent.
- a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree

Dimension 6: Establishing Partnerships and Collaboration

15. I am adept at establishing collaborative networks with organisations and colleagues interested in social entrepreneurship.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

16. I possess the capability to lead social entrepreneurship projects.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

Dimension 7: Tracking and Evaluation of Social Outcomes

17. I possess the methodology to analyse the outcomes of social programme implementation.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

18. Able to design metrics to evaluate the outcomes of social entrepreneurship projects.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

Dimension 8: Ethical Decision-Making and Responsibility

19. I can correctly judge the appropriate and inappropriate codes of conduct that social entrepreneurship projects should follow.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

20. I understand the ethical decision-making guidelines that guide fairness, honesty, and a commitment to improving social entrepreneurship projects.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

21. I possess the strategies for correctly utilising social entrepreneurship project resources.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

Appendix A.3. AI Literacy and AI Ethics Scale

Dimension 1: AI Understanding and Usage Competence (AI Literacy)

1. I understand the fundamental principles of generative AI and its primary functions.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

2. I am proficient in using AI tools (such as ChatGPT) to complete learning tasks.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

3. I can design effective prompts as required.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

Dimension 2: Critical AI Use

4. I can identify errors or inaccuracies in AI-generated content.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

5. I can determine whether AI-generated content contains bias.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

6. When AI results are insufficiently reliable, I can proactively verify the information source.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

Dimension 3: AI Ethics Awareness

7. I understand the potential risks AI poses to privacy and data security.

- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

8. I believe transparency must be maintained when using AI in formal learning tasks.

- a. Strongly agree
- b. Agree

- c. Cannot say
- d. Disagree
- e. Strongly disagree
- 9. I understand that AI may exacerbate risks of inequality, bias, or misleading information.
- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree
- 10. I am willing to adhere to the principles of “responsible AI usage” (such as labelling AI usage, avoiding dependency, etc.).
- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

Appendix A.4. Language Self-Efficacy Scale (Russian/Spanish)

Dimension 1: Confidence in Language Expression

- 1. I am confident in expressing my ideas in Russian/Spanish within a cross-cultural team.
- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree
- 2. I can express my views clearly in spoken or written communication.
- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

Dimension 2: Communicative Ability

- 3. I can understand Russian/Spanish expressions from peers in other countries.
- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree
- 4. In cross-cultural communication, I can adapt my language flexibly to suit the other person.
- a. Strongly agree
- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree

Dimension 3: AI-Assisted Language Use

- 5. AI tools can help me improve the quality of my Russian/Spanish content.
- a. Strongly agree

- b. Agree
- c. Cannot say
- d. Disagree
- e. Strongly disagree
- 6. I can identify and correct language errors with AI assistance.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
- 7. I can utilise AI to enhance linguistic structure, vocabulary selection, and logical expression.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
- Dimension 4: Task Performance and Self-Assessment
- 8. My proficiency in Russian/Spanish has improved during this COIL task.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
- 9. I can effectively use Russian/Spanish for communication in real-world tasks (e.g., pitches).
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree
- 10. I am willing to continue enhancing my language skills with AI assistance in the future.
 - a. Strongly agree
 - b. Agree
 - c. Cannot say
 - d. Disagree
 - e. Strongly disagree

References

- Chen, N.; Shabbir, M.S. Social Entrepreneurship Education Landscape Mapping: A Bibliometric Analysis and Analysis of Empirical Research. *Int. J. Manag. Educ.* **2025**, *23*, 101122. [[CrossRef](#)]
- Reimers, F.M. Entrepreneurship Education to Improve the World: The Role of the Sustainable Development Goals to Stimulate Innovation in Higher Education. *Entrep. Educ.* **2024**, *7*, 203–217. [[CrossRef](#)]
- García-González, A.; Ramírez-Montoya, M.S. Social Entrepreneurship Education: Changemaker Training at the University. *High. Educ. Ski. Work-Based Learn.* **2021**, *11*, 1236–1251. [[CrossRef](#)]
- Qiu, Y. Futura Internacionalización de la Educación Superior en China y España en Era Pos-COVID-19: Innovación, Emprendimiento y Competitividad. Doctoral Thesis, Universitat Politècnica de València, Valencia, Spain, 2024. [[CrossRef](#)]
- Appiah-Kubi, P.; Annan, E. A Review of a Collaborative Online International Learning. *Int. J. Eng. Pedagog. (ijEP)* **2020**, *10*, 109–124. [[CrossRef](#)]

6. Hackett, S.; Janssen, J.; Beach, P.; Perreault, M.; Beelen, J.; van Tartwijk, J. The Effectiveness of Collaborative Online International Learning (COIL) on Intercultural Competence Development in Higher Education. *Int. J. Educ. Technol. High. Educ.* **2023**, *20*, 5. [CrossRef]
7. Soulé, M.V.; Parmaxi, A.; Nicolaou, A. Internationalization at Home in Higher Education: A Systematic Review of Teaching and Learning Practices. *J. Appl. Res. High. Educ.* **2025**, *17*, 29–60. [CrossRef]
8. Murphy, M.P.A. COVID-19 and Emergency ELearning: Consequences of the Securitization of Higher Education for Post-Pandemic Pedagogy. *Contemp. Secur. Policy* **2020**, *41*, 492–505. [CrossRef]
9. Curaj, A.; Matei, L.; Pricopie, R.; Salmi, J.; Scott, P. (Eds.) *The European Higher Education Area*; Springer International Publishing: Cham, Switzerland, 2015; ISBN 978-3-319-18767-9. [CrossRef]
10. Alier-Forment, M.; Casañ-Guerrero, M.J.; Pereira, J.; García-Peñalvo, F.J.; Llorens-Largo, F. Inteligencia Artificial Generativa y Autonomía Educativa: Metáforas Históricas y Principios Éticos Para La Transformación Pedagógica. *RIED-Rev. Iberoam. Educ. A Distancia* **2026**, *29*. [CrossRef]
11. Gelashvili, M.; Blanco, G. COIL as a Way to Enhance Internationalization: Balancing Evidence and Proliferation. *Int. High. Educ.* **2024**, 28–30. Available online: <https://ejournals.bc.edu/index.php/ihe/article/view/17375> (accessed on 18 January 2026).
12. Deardorff, D.K. Identification and Assessment of Intercultural Competence as a Student Outcome of Internationalization. *J. Stud. Int. Educ.* **2006**, *10*, 241–266. [CrossRef]
13. OECD. *PISA 2018 Results (Volume VI)*; OECD: Paris, France, 2020. [CrossRef]
14. Qin, Z.; Chuaychoowong, M. Artificial Intelligence in EFL Education in China: A Systematic Review of Trends, Gaps, and Future Directions (2015–2024). *Lang. Teach. Res. Q.* **2025**, *49*, 59–89. [CrossRef]
15. Kuznetsova, V. Promoting the Russian Language and Culture in Spain as a Soft Power Tool of the Russian Federation. *Vestn. Volgogr. Gos. Univ. Ser. 4 Ist. Reg. Mezhdunarodnye Otnos.* **2020**, *25*, 180–191. [CrossRef]
16. Qiu, Y.; García-Aracil, A.; Isusi-Fagoaga, R. Internationalization of Higher Education in China with Spain: Challenges and Complexities. *Educ. Sci.* **2024**, *14*, 799. [CrossRef]
17. Alpürk, K.; Ayaz, A.; Altınay, F.; Altınay, Z.; Berigel, D.S.; Dağlı, G. Artificial Intelligence Applications in Entrepreneurship and Online Education: Insights from Bibliometric and Topic Modeling Analyses. *Front. Educ.* **2025**, *10*, 1651484. [CrossRef]
18. Chen, L.; Ifenthaler, D.; Yau, J.Y.-K.; Sun, W. Artificial Intelligence in Entrepreneurship Education: A Scoping Review. *Educ. Train.* **2024**, *66*, 589–608. [CrossRef]
19. Zamora-Polo, F.; Sánchez-Martín, J. Teaching for a Better World. Sustainability and Sustainable Development Goals in the Construction of a Change-Maker University. *Sustainability* **2019**, *11*, 4224. [CrossRef]
20. UNESCO. *Education for Sustainable Development Goals: Learning Objectives*; UNESCO: Paris, France, 2017; ISBN 9789231002090. [CrossRef]
21. Lachapelle, M.D.; Mesny, A.; Proulx-Masson, G.; Mailhot, C. Transforming the Business School Ethos Through the Teaching of a “Strong” Social Innovation: Pedagogical Opportunities and Tensions. *J. Manag. Educ.* **2025**, *49*, 204–235. [CrossRef]
22. Dagli, G.; Altınay, F.; Altınay, Z. Education for Sustainable Development: Challenges and Opportunities of Transformative Learning and Teaching. *Sustainability* **2025**, *17*, 2440. [CrossRef]
23. Vega Chica, M.L. Influence of the COIL Methodology on the Development of Intercultural Competence and Sustainability in Latin American Business Students. *J. Int. Educ. Bus.* **2025**, *18*, 82–101. [CrossRef]
24. Moron, N. The Impact of Social Entrepreneurship Education on Students’ Competencies and Intentions: A Systematic Review. *J. Educ. Sci. Psychol.* **2024**, *14*, 76–86. [CrossRef]
25. Darnihamedani, P.; Block, J.H. Employment Growth Ambitions in Social versus Commercial Entrepreneurship. *Small Bus. Econ.* **2025**, *66*, 1141–1161. [CrossRef]
26. Ramadani, V.; Agarwal, S.; Caputo, A.; Agrawal, V.; Dixit, J.K. Sustainable Competencies of Social Entrepreneurship for Sustainable Development: Exploratory Analysis from a Developing Economy. *Bus. Strategy Environ.* **2022**, *31*, 3437–3453. [CrossRef]
27. González, F.J.G.; Sotiropoulou, A.; Berodas, M.A. SEntreComp: Entrepreneurial Competences for Social Entrepreneurs Based on EntreComp. *Bus. Entrep. J.* **2025**, *14*, 27–50. [CrossRef]
28. Vázquez-Parra, J.C.; Alcantar-Nieblas, C.; Glasserman-Morales, L.D.; Nuñez-Rodríguez, X. Development of Social Entrepreneurship Competencies and Complex Thinking in an Intensive Course of Open Educational Innovation. *Int. J. Educ. Psychol.* **2023**, *13*, 1–20. [CrossRef]
29. Nandan, M.; Scott, P.A. Social Entrepreneurship and Social Work: The Need for a Transdisciplinary Educational Model. *Adm. Soc. Work* **2013**, *37*, 257–271. [CrossRef]
30. Shahjahan, R.A.; Miao, S.; Baizhanov, S. Actualizing Curriculum Internationalization: An Integrative Review. *Comp. Educ. Rev.* **2024**, *68*, 262–285. [CrossRef]
31. De Wit, H.; Deca, L. Internationalization of Higher Education, Challenges and Opportunities for the Next Decade. In *European Higher Education Area: Challenges for a New Decade*; Springer International Publishing: Cham, Switzerland, 2020; pp. 3–11. [CrossRef]

32. Jiaxin, G.; Huijuan, Z.; Md Hasan, H. Global Competence in Higher Education: A Ten-Year Systematic Literature Review. *Front. Educ.* **2024**, *9*, 1404782. [CrossRef]
33. Kang, Y.; Xiong, W.; Yang, L. International Higher Education and Cross-Border Connections: Evidence from Asia. *High. Educ. Policy* **2025**, *38*, 693–709. [CrossRef]
34. Mueller, S.; Brahm, T.; Neck, H. Service Learning in Social Entrepreneurship Education: Why Students Want to Become Social Entrepreneurs and How to Address Their Motives. *J. Enterprising Cult.* **2015**, *23*, 357–380. [CrossRef]
35. Zeng, N. Exploration and Practice of Curriculum and Teaching in Early Childhood Education Under the Perspective of “Internationalization at Home” in Sino-Foreign Cooperative Education. *Vocat. Educ.* **2025**, *14*, 188–197. [CrossRef]
36. Wächter, B. An Introduction: Internationalisation at Home in Context. *J. Stud. Int. Educ.* **2003**, *7*, 5–11. [CrossRef]
37. De Wit, H.; Hunter, F.; Howard, L.; Egron-Polak, E. *Internationalisation of Higher Education*; European Parliament: Brussels, Belgium, 2015. Available online: [https://www.europarl.europa.eu/RegData/etudes/STUD/2015/540370/IPOL_STU\(2015\)540370_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2015/540370/IPOL_STU(2015)540370_EN.pdf) (accessed on 4 April 2026).
38. De Wit, H. Internationalization of Higher Education: The Need for a More Ethical and Qualitative Approach. *J. Int. Stud.* **2020**, *10*, 328. [CrossRef]
39. VE/COIL Handbook. 2024. Available online: <https://bpb-us-e2.wpmucdn.com/sites.utdallas.edu/dist/f/1377/files/2024/10/VE-COIL-HANDBOOK-2024-2025.pdf> (accessed on 18 January 2026).
40. Rubin, J.; Nolan, D. Coil Development at State-Funded U.S. University Systems. In *The Guide to COIL Virtual Exchange*; Routledge: New York, NY, USA, 2023; pp. 335–351. [CrossRef]
41. Ulysseus COIL Handbook: A Practical Guide for Educators. 2025. Available online: <https://ulyssseus.eu/wp-content/uploads/2025/02/Ulysseus-COIL-Handbook-for-teachers-1.pdf> (accessed on 18 January 2026).
42. Zolbanin, H.M.; Gosalia, S.S. Collaborative Online International Learning (COIL) for Information Systems Education: Best Practices and Implementation Strategies. *Commun. Assoc. Inf. Syst.* **2024**, *54*, 773–791. [CrossRef]
43. Fujii, M.; Ikeda, K. American Council on Education. 2023. Available online: <https://www.acenet.edu/Documents/USJP-HEES-CaseStudy-Kansai.pdf> (accessed on 18 January 2026).
44. Borger, J.G. Getting to the CoRe of Collaborative Online International Learning (COIL). *Front. Educ.* **2022**, *7*, 987289. [CrossRef]
45. Stefanova, A.; Jiménez, A.G. Building Bridges Between Cultures—An Experiment with Collaborative Online International Learning (COIL). *J. Teach. Engl. Specif. Acad. Purp.* **2019**, *6*, 535–542. [CrossRef]
46. Drobotun, V.; Kavytska, T.; Fortanet-Gómez, I.; Ruiz-Madrid, N. Collaborative Online Learning (COIL) as a Promising Pedagogy for Engaging Students in Global Collaboration: Ukrainian-Spanish Context. *Ars Linguodidacticae* **2023**, 82–90. [CrossRef]
47. Liyanage, I. Internationalization of Higher Education, Mobility, and Multilingualism. In *Multilingual Education Yearbook 2018*; Liyanage, I., Ed.; Multilingual Education Yearbook; Springer: Cham, Switzerland, 2018. [CrossRef]
48. Ballesteros-Sola, M.; Magomedova, N. Impactful Social Entrepreneurship Education: A US-Spanish Service Learning Collaborative Online International Learning (COIL) Project. *Int. J. Manag. Educ.* **2023**, *21*, 100866. [CrossRef]
49. Mir Shahid, S.; Alarifi, G. Social Entrepreneurship Education: A Conceptual Framework and Review. *Int. J. Manag. Educ.* **2021**, *19*, 100533. [CrossRef]
50. Ren, X.; Wu, M.L. Examining Teaching Competencies and Challenges While Integrating Artificial Intelligence in Higher Education. *TechTrends* **2025**, *69*, 519–538. [CrossRef]
51. Adamakis, M.; Rachiotis, T. Artificial Intelligence in Higher Education: A State-of-the-Art Overview of Pedagogical Integrity, Artificial Intelligence Literacy, and Policy Integration. *Encyclopedia* **2025**, *5*, 180. [CrossRef]
52. Martínez-De la Muela, A.; Ruiz-Fuentes, J.P.; González-Geraldo, J.L. Inteligencia Artificial e Inteligencia Colectiva En La Educación Superior Digital: Estudio Cuasi-Experimental Con La Plataforma Kampal. *RIED-Rev. Iberoam. Educ. A Distancia* **2026**, *29*, 29–51. [CrossRef]
53. García, C.G.; Pallarés, N. Impacto de La IA Generativa En Competencias Digitales Universitarias: Evidencia Experimental Basada En El Marco DigComp. *RIED-Rev. Iberoam. Educ. A Distancia* **2026**, *29*, 53–77. [CrossRef]
54. Hilali, K.; Chergui, M. Toward a New Instructional Design Methodology in the Era of Generative AI. In *The Second International Symposium on Generative AI and Education (ISGAIE'2025)*; Springer International Publishing: Cham, Switzerland, 2025; pp. 3–15. [CrossRef]
55. Fui-Hoon Nah, F.; Zheng, R.; Cai, J.; Siau, K.; Chen, L. Generative AI and ChatGPT: Applications, Challenges, and AI-Human Collaboration. *J. Inf. Technol. Case Appl. Res.* **2023**, *25*, 277–304. [CrossRef]
56. Feuerriegel, S.; Hartmann, J.; Janiesch, C.; Zschech, P. Generative AI. *Bus. Inf. Syst. Eng.* **2024**, *66*, 111–126. [CrossRef]
57. Sartor-Harada, A.; Azevedo-Gomes, J. AI-ED-SAT: Diseño y Validación de Un Cuestionario Para Autoevaluar Competencias Docentes En IA Educativa. *RIED-Rev. Iberoam. Educ. A Distancia* **2026**, *29*, 79–110. [CrossRef]
58. Day Grady, S. From Automation to Transformation: AI Strategies for Personalized, Engaging, and Inclusive Online Course Design. 2025. Available online: <https://qualitymatters.org/sites/default/files/research-docs-pdfs/QM-White-Paper-AI-Strategies-for-Course-Design.pdf> (accessed on 18 January 2026).

59. Anselmo, L.; Yu, L.; Kelly, P. Course Design and Generative Artificial Intelligence in Higher Education Foundations of Course Design Authored by: Course Design and Generative Artificial Intelligence in Higher Education. 2025. Available online: <https://taylorinstitute.ucalgary.ca/sites/default/files/teams/1/Resources/Course%20Design/250624%20-%20Foundations%20for%20Course%20Design/Course%20Design%20and%20Artificial%20Intelligence%20in%20Higher%20Education.pdf> (accessed on 18 January 2026).
60. Bowen, R.S. Understanding by Design. In *Vanderbilt University Center for Teaching*; Vanderbilt University Center for Teaching: Nashville, TN, USA, 2017; pp. 57–62. Available online: <https://juacademictechnology.com/ctl/Educational%20Guides/Course%20Design/Understanding-by-Design.pdf> (accessed on 24 February 2026).
61. Creswell, J.W.; Creswell, J.D. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 5th ed.; SAGE Publications: Thousand Oaks, CA, USA, 2018. Available online: https://www.ucg.ac.me/skladiste/blog_609332/objava_105202/fajlovi/Creswell.pdf (accessed on 28 March 2026).
62. Sun, L. Enhancing Intercultural Competence of Chinese English Majors through AI-Enabled Collaborative Online International Learning (COIL) in the Digital Era. *Educ. Inf. Technol.* **2025**, *30*, 7995–8027. [CrossRef]
63. iTourTranslator. 2026. Available online: <https://www.itourtranslator.com/pages/about-us> (accessed on 28 March 2026).
64. Dogan, S. A Human-AI Hybrid Co-Design Model: Planning Instruction with ChatGPT. *Asian J. Distance Educ.* **2025**, *20*. [CrossRef]
65. Miranda, J.; Rosas-Fernández, J.B.; Molina, A. *Collaborative Networking to Enable Innovation and Entrepreneurship Through Open Innovation Hubs: The Entrepreneurship Learning Centre of Mexico City*; Springer: Cham, Switzerland, 2020; pp. 311–323.
66. Wang, Y.; Sun, P.P. Development and Validation of Scales for Speaking Self-Efficacy: Constructs, Sources, and Relations. *PLoS ONE* **2024**, *19*, e0297517. [CrossRef]
67. Brown, T.A. *Confirmatory Factor Analysis for Applied Research*, 2nd ed.; The Guilford Press: New York, NY, USA, 2015. Available online: https://www.researchgate.net/profile/Imran-Anwar-2/post/Conducting_EFA_and_then_CFA_Justification_Literature/attachment/6079c9daeb77a3000174dac1/AS%3A1013271943462915%401618594265854/download/%28Methodology+in+the+Social+Sciences%29+Timothy+A.+Brown+PsyD+-+Confirmatory+Factor+Analysis+for+Applied+Research%2C+Second+Edition-The+Guilford+Press+%282015%29.pdf (accessed on 28 March 2026).
68. Iacobucci, D.; Popovich, D.L.; Moon, S.; Román, S. How to calculate, use, and report variance explained effect size indices and not die trying. *J. Consum. Psychol.* **2023**, *33*, 45–61. [CrossRef]
69. Blanca, M.J.; Arnau, J.; García-Castro, F.J.; Alarcón, R.; Bono, R. Repeated measures ANOVA and adjusted F-tests when sphericity is violated: Which procedure is best? *Front. Psychol.* **2023**, *14*, 1192453. [CrossRef]
70. Caruana, I.; Gilar-Corbi, R.; Palomar, M. Bridging the AI Skills Gap for Sustainable Education: A Structural Model of In-Service Teachers' Learning Intentions and Behaviors. *Sustainability* **2026**, *18*, 3133. [CrossRef]

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