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Virtual Internationalization in Teacher Education: COIL Experience Between Spain and Germany

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ABSTRACT

Collaborative online international learning (COIL) has emerged as a prominent strategy for internationalization at home, enabling students to engage in transnational academic experiences without physical mobility. While the international student mobility literature has traditionally focused on students who travel abroad, COIL expands the notion of international student experience to include virtual participants. This study examines the pedagogical implications of COIL for preservice teacher education through an eight-week integrated course delivered by two universities in Germany and Spain. Sixty students collaborated in 19 transnational project-based learning teams, using synchronous and asynchronous digital tools to co-develop pedagogical resources in English. Drawing on constructivist and social-constructivist theory and on the cultural intelligence framework, we assessed students' self-reported intercultural competences and satisfaction through pre, mid-, and postexperience surveys (n = 71). The findings indicate high overall satisfaction (82%) and a net promoter score of 81, together with meaningful gains in self-perceived intercultural communication (87%), adaptability in international contexts (87%), and awareness of global issues (74%). Ninety-two percent of the respondents expressed an intention to pursue further international and intercultural opportunities. The results support COIL as an equitable, scalable pathway to international academic experiences in teacher education, and they broaden the international-student research agenda to include virtual participants.

Keywords: collaborative online international learning; internationalization at home; intercultural competence; preservice teacher education; survey; virtual exchange

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INTRODUCTION

Higher education institutions face a persistent paradox: in a globalized world that increasingly values intercultural and international competences, only a small minority of tertiary students ever access physical international mobility. Financial, family, linguistic, and structural barriers continue to restrict who can study abroad, concentrating the benefits of traditional mobility in relatively privileged populations (Bista, 2019). In response, internationalization-at-home strategies—and, in particular, collaborative online international learning (COIL)—have consolidated as scalable alternatives that enable students to engage in structured international experiences without leaving their home institutions (Beelen & Jones, 2015; Hackett et al., 2023).

COIL connects students and faculty across countries through jointly designed online courses that combine synchronous sessions, asynchronous collaboration, and intercultural projects (Rubin & Guth, 2015). Participants in these experiences can be meaningfully understood as virtual international students: learners who, without crossing borders, engage in sustained transnational academic collaboration, navigate intercultural communication, and develop global competences comparable to those fostered by traditional mobility (Higgins, 2024; Cuevas Álvarez et al., 2025). This framing broadens the scope of international student research beyond physically mobile populations and highlights equity considerations that have long been underexamined in the field.

The present study examines the efficacy and pedagogical implications of COIL in preservice teacher education through an integrated course delivered by two universities in Germany and Spain. Preservice teachers are a particularly relevant population: the intercultural competences they develop during initial training are likely to shape their own classrooms and, by extension, the global citizenship education of the next generation (Falasca et al., 2026).

The study is guided by three research questions:

RQ1: To what extent does participation in a COIL course contribute to preservice teachers' self-perceived intercultural competences?

RQ2: How do participants evaluate the design and delivery of the COIL experience?

RQ3: Does COIL participation foster intention for further international engagement among future teachers?

LITERATURE REVIEW

Theoretical Foundations of COIL

COIL is grounded in constructivist and social-constructivist learning theory. Lessons and course content are delivered both synchronously—through videoconferencing or occasional in-person meetings—and asynchronously—through learning-management systems and shared digital repositories (Hackett et al., 2023). Learners construct knowledge about the subject matter as they engage in learning activities and are assessed against the course's learning objectives. Constructivism emphasizes that learners actively build their own understanding through experiences and interactions with their environment; social constructivism adds that this process is essentially interpersonal and collaborative (Vygotsky, 1978). In COIL, these active learning situations operate across two modalities and produce three layered outcomes: knowledge about interculturality, knowledge about the disciplinary content, and metacognitive knowledge about the learners themselves as transnational collaborators.

COIL is also rooted in intercultural communication, which seeks to appreciate and understand cultural similarities and differences to facilitate effective collaboration across cultures (Bennett, 1993). COIL aims to promote intercultural competence and global citizenship by equipping students with the knowledge, skills, and attitudes needed to function effectively in globalized settings (Hackett et al., 2023).

Typical COIL courses deploy online collaborative projects that require transnational teams to coproduce assignments, presentations, or research outputs—fostering cross-cultural communication, critical thinking, problem solving, and empathy for diverse perspectives. The cultural intelligence framework, first articulated by Earley and Ang (2003), has since been translated into actionable models for developing intercultural capability in educational and professional settings (Livermore, 2024), underscoring its relevance for teacher preparation.

COIL, Virtual Exchange, and International Student Experience

As a relatively young but rapidly expanding field, research on virtual exchange has been consolidated in dedicated syntheses such as the Stevens Initiative's annotated bibliography (Woodman & Kastler, 2020), which maps the state of the field and its methodological gaps. Research on international students has historically centered on physically mobile populations: their adjustment, well-being, academic performance, and employability (Bista, 2019). Virtual exchange challenges and extends this research agenda by offering comparable experiences—intercultural contact, language use in authentic communication, and the negotiation of academic norms—while students are left at home (Higgins, 2024; O'Dowd, 2018). Recent work published in the *Journal of International Students* documents how virtual exchange programs can function as an explicit internationalization-of-the-curriculum strategy (Cuevas Álvarez et al., 2025), how structured online interaction cultivates English communicative and intercultural skills (Higgins, 2024), and how COIL can advance global citizenship and SDG-aligned learning in Ibero-American contexts (Falasca et al., 2026). Most recently, Higgins (2026) documented how a COIL project between Thai and German undergraduates fostered multicultural competency and collaborative adaptability within an internationalization-at-home framework—a bilateral configuration closely comparable to the experience in Spain–Germany examined here.

Studies using the Cultural Intelligence Scale (CQS) and related instruments have shown that COIL can produce measurable gains in intercultural competence (Hackett et al., 2023). Moreover, the literature reports persistent challenges. Effective communication and coordination among instructors and students from diverse cultural and linguistic backgrounds is a recurrent obstacle, and cultural differences can generate misunderstandings about project goals and expectations (O'Dowd, 2018). High-quality virtual exchange benefits from clear coordination and preparation (Hackett et al., 2023; O'Dowd, 2018). Digital literacy demands are substantial, and quality virtual exchange benefits when students receive explicit cultural sensitivity preparation and clear communication protocols (O'Dowd, 2018).

COIL in Preservice Teacher Education

For preservice teachers, COIL is especially valuable. The competences cultivated—designing collaborative tasks across contexts, managing linguistically diverse groups, using digital tools pedagogically, and reflecting on one's own culturally situated assumptions—map directly onto professional teaching standards and onto the global citizenship education agenda (Higgins, 2026). Moreover, future teachers who experience COIL as students are more likely to design comparable experiences for their own pupils, generating a multiplier effect across school systems (Higgins, 2026).

The COIL Course: Design and Implementation

The COIL course reported here was co-designed and co-delivered by two universities in Germany and Spain during the first semester of the 2022–2023 academic year. All participants were preservice teachers preparing for primary- and secondary-level certification. The initiative integrated two separate 14-week courses—Project-Based Learning (PBL) for Interculturality, Social and Emotional Learning at the German University, and Educational Theory at the Spanish University—into a single eight-week COIL

module entitled Collaborating and Educating in English with Personalized Education, Positive Psychology, and Social and Emotional Learning for Elementary Schools, running from October to November 2022.

Sixty students worked on 19 transnational project teams (three to four students per team). Each team developed a pedagogical resource grounded in positive psychology and social-emotional learning. Synchronous instruction and coordination took place via Microsoft Teams; teamwork unfolded through Zoom and WhatsApp; and project outputs were shared on Padlet and delivered as PowerPoint or Genially presentations. The course was designed around five learning outcomes. Students would (a) appreciate cultural differences through transnational collaboration; (b) develop transnational collaborative skills while designing training aids for teachers' new to positive education and social and emotional learning; (c) develop writing and speaking skills in English; (d) use digital media for weekly interaction with international peers; and (e) develop project-based learning skills under faculty coaching.

Throughout the module, students engaged in online discussions, joint Zoom lectures, peer feedback, and cultural presentations, supported by language scaffolding and technical assistance. The final projects were jointly evaluated by the two instructors and archived in a shared Padlet, where teams also provided peer feedback.

RESEARCH METHOD

Research Design

This study followed a pre-mid-post survey design with a single cohort of COIL participants. Three questionnaires were administered: before the COIL module (October 24, 2022), at the midpoint (November 16, 2022), and after completion (December 11, 2022). The analysis reported in this paper focuses on the postexperience questionnaire, which captures participants' self-reported intercultural competence gains, their satisfaction with the design and delivery of the experience, and their intention to pursue further international opportunities.

Participants

The post-COIL questionnaire received 71 valid responses from preservice teachers enrolled across the two partner institutions: 44 from the Spanish university and 27 from the German university. All the respondents were adults enrolled in regular degree programs in education. Participation in the research component was voluntary and independent of course grade.

Instrument

The questionnaire was grounded in the cultural intelligence (CQ) framework proposed by Earley and Ang (2003), who defined cultural intelligence as an individual's ability to function effectively in culturally diverse situations. CQ comprises four dimensions—metacognitive, cognitive, motivational, and behavioral (Ang et al., 2007)—and has been widely used in intercultural competence research (Matsumoto & Hwang, 2013). The post-COIL instrument used a five-section structure: (a) administrative identifiers; (b) development of intercultural skills (five Likert items); (c) satisfaction with the experience (five Likert items); (d) a single item on interest in further international opportunities (1–5 interest scale); and (e) a net promoter score (NPS) item assessing willingness to recommend the experience.

The five intercultural skills items asked participants to rate, on a five-point Likert scale from strongly disagree to strongly agree, the extent to which the international experience had helped them to (a) broaden their understanding of other cultures; (b) adapt effectively to any international or intercultural context; (c) communicate effectively with people from different cultural backgrounds; (d) work productively with people from different cultural backgrounds; and (e) raise awareness of global issues. The

five satisfaction items addressed course duration, peer interaction, faculty interaction, appropriateness of technology, and overall satisfaction.

Data collection and analysis

The questionnaires were administered through Microsoft Forms and completed anonymously. Descriptive statistics (frequencies and percentages of agreement) were computed for each Likert item. For the recommendation item, the net promoter score was calculated following a standard procedure: the percentage of detractors (disagree or strongly disagree) was subtracted from the percentage of promoters (agree or strongly agree); respondents who answered “undecided” were treated as neutrals and excluded from the NPS arithmetic.

Ethical Considerations

The study was conducted in accordance with the ethical guidelines of the participating institutions. Participation in the research component of the course was voluntary, and no identifying information was collected in the questionnaires. All the respondents were adult university students who provided informed consent prior to completing the surveys. In accordance with the institutional guidelines of the participating universities, formal ethics review and approval were not required for this study, as it involved anonymous, voluntary questionnaires that collected no personally identifying information and posed no more than minimal risk to participants.

RESULTS

Table 1 summarizes the COIL course structure and participants. Tables 2 and 3 present the participants’ responses to the intercultural competence and satisfaction items of the postexperience questionnaire. Intention for further international engagement and the net promoter score are reported in the text.

Table 1
COIL Course Structure and Participants

Dimension	Description
Partner institutions	Two universities (Germany and Spain)
Host courses	Project-Based Learning for Interculturality: Social and Emotional Learning (14 weeks, Germany); Educational Theory (14 weeks, Spain)
Integrated COIL module	Collaborating and Educating in English with Personalized Education, Positive Psychology, and Social and Emotional Learning for Elementary Schools (8 weeks, October–November 2022)
Students	60 preservice teachers (primary and secondary level)
Team structure	19 transnational teams of 3–4 students
Working language	English (nonnative for all participants)
Synchronous tools	Microsoft Teams, Zoom
Asynchronous tools	Padlet, WhatsApp, Google Docs, email
Survey respondents (post)	71 valid responses (44 Spain, 27 Germany)

Development of Intercultural Competences

Table 2 presents responses to the five items capturing participants' self-reported gains in intercultural competence after the COIL experience. Agreement (the sum of strongly agree and agree) ranged from 74% to 87% across items, with disagreement remaining below 10% for every item and undecided responses below 8%.

The highest levels of agreement were reported for adapting and performing effectively in an international and intercultural context (87%; 42% strongly agree, 45% agree) and for communicating effectively with people from different cultural backgrounds (87%; 53% strongly agree, 34% agree). The latter is particularly relevant given that German and Spanish students worked throughout the module in English, a nonnative language for both groups: the results suggest meaningful gains in confidence and the ability to collaborate in a shared additional language.

A comparable pattern emerged for working productively with people from different cultural backgrounds (77% agreement; 42% strongly agree, 35% agree) and for raising awareness of global issues (74%; 42% strongly agree, 32% agree). Awareness-of-global-issues gains are notable given that the course itself focused on positive psychology and social-emotional learning in Western European contexts. Postcourse conversations within teams frequently expanded from project tasks to broader discussions about educational systems, student well-being across countries, and the relevance of the UN Sustainable Development Goals—suggesting that COIL creates discursive space for global-issue engagement even when these issues are not part of the core content.

Table 2

Self-Reported Development of Intercultural Competences (n = 71)

Item: “Participation in this experience helped me to...”	SD %	D %	U %	A %	SA %	Agree %
Broaden my understanding of other cultures	1	10	4	20	65	85
Adapt and perform effectively in any international and intercultural context	0	4	5	45	42	87
Communicate effectively with people from different cultural backgrounds	0	6	7	34	53	87
Work productively with people from different cultural backgrounds	0	7	16	35	42	77
Raise awareness of global issues	0	4	22	32	42	74

Note. SD = strongly disagree; D = disagree; U = undecided; A = agree; SA = strongly agree. “Agree %” = A + SA. Row totals may not equal 100 due to rounding.

Satisfaction With the COIL Experience

Table 3 reports participants' satisfaction across the five dimensions of the experience. Overall satisfaction was high (82%), with particularly strong ratings for the appropriateness of the technology (93%), interaction with professors (87%), and duration of the experience (86%). Satisfaction with peer interaction, while still positive (72%), was the lowest-rated dimension.

The lower rating for peer interaction likely reflects logistical challenges that are well documented in the virtual exchange literature (Hackett et al., 2023). Although the partner universities shared a single time zone, the two courses met on different days and times, constraining the windows available for team

meetings. Postcourse feedback nonetheless emphasized that students found peer interaction valuable: Several described the COIL project as the highlight of their semester, appreciated the opportunity to learn about a different educational system, and reported making new friendships across borders.

Satisfaction with the appropriateness of technology (93%) underscores the centrality of well-chosen digital tools in virtual exchange. The portfolio used (Microsoft Teams, Zoom, Padlet, WhatsApp, Google Docs, email) combined familiar consumer tools with institutional platforms, reducing the cognitive load of tool acquisition and allowing students to focus on collaboration. Satisfaction with faculty interaction (87%) reflects sustained instructor presence across onboarding, check-in, final presentation, and postcourse one-to-one feedback.

Table 3

Satisfaction With the COIL Experience (n = 71)

Satisfaction dimension	SD %	D %	U %	A %	SA %	Agree %
Duration of the experience	0	4	10	48	38	86
Interaction with international peers	0	10	18	31	41	72
Interaction with professors	0	4	9	36	51	87
Appropriateness of the technology	0	0	7	48	45	93
Overall satisfaction with the experience	0	4	14	40	42	82

Note. SD = strongly disagree; D = disagree; U = undecided; A = agree; SA = strongly agree. “Agree %” = A + SA. Row totals may not equal 100 due to rounding.

Intention for Further International Engagement

Participants rated their interest in pursuing additional international and intercultural opportunities—such as eTwinning partnerships, Erasmus+ projects, additional COIL courses, international internships, or other virtual exchanges—on a 1–5 scale (1 = not interested, 5 = very interested). The mean response was 4.6 (SD = 0.8), with 72% of the respondents selecting 5 (very interested) and an additional 20% selecting 4. Overall, 92% of the participants indicated clear interest (scores of 4 or 5) in further international engagement.

Because the respondents were preservice teachers, this result is especially consequential: the participants not only report on their own educational preferences but also signal the dispositions they are likely to bring to their future classrooms, where they may themselves design transnational experiences for their pupils (Higgins, 2026).

Recommendation of the Experience

Willingness to recommend the COIL experience to another colleague was assessed using a five-point item and converted to a net promoter score. Promoters (agree or strongly agree) comprised 85% of the respondents, detractors (disagree or strongly disagree) 4%, and neutrals (undecided) 13%, yielding an NPS of 81 (85 – 4). An NPS at this level is considered excellent and is consistent with the overall satisfaction data reported in Table 3, reinforcing the conclusion that participants perceived the experience as useful for their development as preservice teachers and as future professionals in international educational contexts.

DISCUSSION AND CONCLUSIONS

These findings reinforce the pedagogical value of COIL for initial teacher education in international university settings and extend the evidence base for COIL as a form of virtual international student experience. Eighty-seven percent of participants perceived that COIL helped them adapt and perform effectively in intercultural contexts, and the same proportion reported gains in intercultural communication. These results align with previous research documenting the effectiveness of virtual exchange for developing global and communicative competences (Hackett et al., 2023; Higgins, 2024), and they support the conceptualization of COIL participants as virtual international students whose experience deserves attention within the broader international-student research agenda (Cuevas Álvarez et al., 2025).

High levels of satisfaction with course duration (86%), technological appropriateness (93%), and faculty interaction (87%) highlight the importance of intentional instructional design and well-integrated digital tools. Consistent with constructivist and social-constructivist frameworks (Vygotsky, 1978), these elements did not merely support the logistics of virtual exchange; they scaffolded the social construction of knowledge across borders. The appropriateness of technology is particularly noteworthy: in the absence of physical mobility, digital infrastructure is the medium through which international student experience is enacted, and its fitness for purpose appears to be a precondition for the other satisfaction dimensions.

Ninety-two percent of the respondents expressed an intention to pursue further international and intercultural experiences. This motivational outcome may be the most pedagogically significant finding because it suggests that COIL not only delivers immediate competence gains but also cultivates a sustained disposition toward internationalized learning. For preservice teachers, this disposition is likely to propagate into their future classrooms, contributing to the incorporation of global citizenship education in school contexts (Falasca et al., 2026). This finding is consistent with recent JIS work linking virtual exchange not only to competence gains but also to students' intercultural sensitivity and identity formation (Rogler et al., 2026), suggesting that COIL may shape how future teachers come to see themselves as interculturally competent professionals.

The results also surface areas for improvement. Satisfaction with peer interaction, although positive (72%), was the lowest-rated dimension, and qualitative feedback pointed to scheduling friction between courses with different weekly rhythms. Consistent with prior virtual exchange research (Hackett et al., 2023; O'Dowd, 2018), this suggests that logistical co-planning—not only instructional codesign—is a critical success factor for COIL. Linguistic and cultural scaffolding also emerged as a design concern: Although students worked comfortably in English, the stability of participation might have been higher with more explicit pre-course preparation around intercultural communication norms. This aligns with evidence that structured pre-exchange preparation improves the quality of online intercultural collaboration (Fernández Gutiérrez et al., 2022), reinforcing the case for embedding intercultural-communication scaffolding into COIL design from the outset.

Taken together, the findings support COIL as an effective vehicle for intercultural competence development, digital literacy, and preparation for work in globally diverse environments—and they do so for a population of students who, during the same academic period, did not engage in physical mobility. From a JIS-relevant perspective, this points to an expanded, more equitable conception of international student experience that includes sustained virtual exchanges alongside traditional mobility (Higgins, 2024, 2026; Cuevas Álvarez et al., 2025).

A distinctive contribution of this study lies in what it suggests about equity. Because COIL required no travel, visa, or residence-abroad costs, it extended sustained international and intercultural experience to preservice teachers who, in the same academic period, did not—and in many cases could not—undertake physical mobility. Traditional study abroad continues to be shaped by financial, family, and structural constraints that concentrate its benefits among comparatively advantaged students (Bista, 2019), whereas the internationalization-at-home logic underpinning COIL is designed to reach all students within the home curriculum rather than a self-selecting minority (Beelen & Jones, 2015). Specifically, this equity dimension

has a multiplier effect: broadening who gains international competence during initial training shapes the range of educators who will later design globally oriented learning for their own pupils, many of whom will themselves face barriers to mobility. Understood in these terms, COIL is not merely a substitute for physical exchange but an instrument for widening participation in the international student experience—a reframing with direct relevance for equity concerns at the center of current international education scholarship (Cuevas Álvarez et al., 2025; Higgins, 2026).

This study demonstrates that COIL courses designed from a constructivist perspective and oriented toward international collaboration among preservice teachers can meaningfully enhance self-reported intercultural competence, intercultural communication, and global awareness while cultivating a positive disposition toward future international engagement. These outcomes matter for teacher education because the competences and dispositions preservice teachers develop during training tend to shape their classroom practices, influencing the global citizenship education received by the next generation of pupils.

IMPLICATIONS

Several practical implications follow. First, partner institutions should codesign all phases of the COIL course, with particular attention to the alignment of meeting times, clearly defined instructor roles, and continuous faculty presence across onboarding, formative checkpoints, and debrief. Second, the choice and integration of digital tools is consequential: a coherent and familiar digital environment reduces cognitive overhead and allows intercultural content to come to the fore. Third, explicit moments of cultural reflection—beyond disciplinary content—appear to expand the depth of intercultural learning, suggesting that well-placed reflection prompts should be built into the course design.

With respect to research on international students, these results argue for a broader conception of international student experience that includes virtual participants. Future work should integrate standardized measures (such as the Cultural Intelligence Scale or the Multicultural Personality Questionnaire) with performance-based and longitudinal assessments, move beyond self-reports to triangulate perceived and observed intercultural competence, and extend COIL implementation to STEM disciplines and other underexamined fields. The impact of COIL on faculty members' own intercultural competence development is likewise worth investigating: Instructors in well-designed COIL programs are themselves engaged in sustained transnational collaboration, with potential professional-learning outcomes that have received limited empirical attention.

Limitations

This study has several limitations. The analysis is based on self-reported data from a single COIL cohort, and perceived competence gains may not correspond fully to observable performance. Relatedly, although the study employed a pre–mid–post design, the present analysis draws on a postexperience questionnaire to capture participants' consolidated perceptions close to the module; a full longitudinal analysis tracing the trajectory of change across the three measurement points remains an avenue for future work. The sample, while sufficient to detect patterns, is modest and drawn from two Western European institutions; generalizability beyond similar contexts should be established empirically. Nonetheless, the convergence of strong satisfaction, meaningful self-perceived competence gains, and a high net promoter score suggest that, for this population, COIL functioned as an effective and sustainable pedagogical strategy for internationalization at home.

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Conflicts of Interest: The authors declare that they have no conflicts of interest.

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