Recalibrating Confidence through Participation: A Design-Based Study of Virtual Student Mobility in a Generative AI–Supported Learning Environment

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Abstract

Many educators intuitively recognise that meaningful international learning does not simply increase students' confidence; rather, it often leads learners to become more aware of the limits of their own abilities and understanding. Despite this shared intuition, how such moments of awareness emerge, and how they appear in empirical data, has remained largely a black box in international and digital learning research. As technology-mediated global learning environments become more prevalent, learning outcomes are often measured by gains in confidence or self-assessed competence. In contexts characterised by complexity, uncertainty, and authentic participation, however, such interpretations may overlook important dimensions of learning. This study adopts a design-based research (DBR) perspective to examine how participation in a semester-long, synchronous Virtual Student Mobility (VSM) course reshaped Japanese university students' self-perceptions of intercultural competence (McKenney & Reeves, 2018). In this course, Japanese students participated remotely and in real time in an undergraduate course offered at a U.S. university, engaging alongside local students in lectures, discussions, and collaborative activities within a technology- and generative AI–supported learning environment designed to scaffold participation and comprehension. A pre-post survey informed by the OECD PISA Global Competence Framework (2018) and an integrated intercultural competence scale developed by Fantini were administered, with 41 students enrolled in the 2025 courses voluntarily completing both surveys. Contrary to expectations, post-course self-assessment scores declined across most survey items. Rather than interpreting this decline as a negative outcome, the study situates the findings within the design of the learning environment itself. Quantitative results are examined alongside qualitative end-of-course reflections, which consistently indicated deeper awareness, heightened recognition of communicative complexity, and increased reflective engagement. This apparent tension highlights a critical but often underexplored phase of learning: the recalibration of learners' self-perceptions following authentic participation in complex learning settings. By foregrounding learning design as the unit of analysis, this study reframes decreased confidence not as failure, but as a meaningful indicator of learning in future-oriented, technology-enhanced environments. The findings suggest a need to rethink assessment practices in global digital learning and offer design implications for supporting learners as they navigate uncertainty and emerging awareness.

Keywords: *Virtual Student Mobility (VSM), Learning Design, Future-Oriented Learning Environments, Student Engagement, Self-Assessment and Recalibration, Design-Based Research (DBR)*

1. Introduction

As technology-mediated international learning environments continue to expand in higher education, Virtual Student Mobility (VSM) has emerged as an increasingly accessible way for students to participate in global learning experiences without physical travel [1]. Alongside this development, generative AI-supported tools such as automatic subtitles, translation systems, and AI-generated summaries are rapidly being integrated into online learning environments to support comprehension and communication across linguistic and cultural differences. Within this context, successful learning outcomes in virtual exchange and COIL environments are often discussed in terms of increased intercultural competence, greater confidence, or improved self-perceived communicative ability [2], [3], [4], [5]. However, authentic participation in complex international learning environments may not always increase learners' confidence. In some cases, direct engagement with unfamiliar academic and intercultural contexts may instead increase awareness of the limits of one's own communicative ability. Although educators often recognise this phenomenon intuitively, it remains underexplored in research relying heavily on self-report measures of confidence and competence. As a result, decreases in self-assessment scores are frequently interpreted negatively. This study argues that such interpretations

may overlook an important dimension of learning in complex, participation-oriented environments. Rather than viewing reduced confidence as a failure, this paper examines the possibility that changing self-perceptions may reflect a meaningful recalibration process emerging through authentic participation. From this perspective, learning involves not only acquiring skills or confidence, but also developing a more realistic and reflective understanding of one's own abilities within socially and culturally situated contexts.

To explore this issue, the present study adopts a DBR perspective [6] to examine a semester-long synchronous VSM programme connecting a Japanese university and a U.S. university. In this learning environment, Japanese students participated remotely and in real time in undergraduate courses alongside local U.S. students. The environment incorporated multiple forms of technological and generative AI support, including live captions, translation support, recorded sessions, and AI-assisted summaries, with the aim of lowering barriers to participation while maintaining authentic interaction and academic complexity. Using pre-post survey data informed by the OECD PISA Global Competence Framework [7] and intercultural competence measures developed by Fantini [8], together with qualitative end-of-course reflections, this study investigates how students' self-perceptions changed through participation in this AI-supported VSM environment. Particular attention is given to the apparent contradiction between declining self-assessment scores and students' qualitative reports of deeper awareness, increased reflection, and heightened recognition of communicative complexity. By foregrounding learning design and participation as the central analytical lens, this paper proposes that decreased confidence may, in some contexts, function as a meaningful indicator of learning rather than its absence.

2. Literature Review

2.1 Virtual Student Mobility and International Online Learning

Virtual Student Mobility (VSM) has emerged as an important approach to expanding access to international learning opportunities in higher education, particularly in contexts where physical mobility is limited by financial, geographical, or institutional constraints. The OECD [1] describes virtual mobility as a form of technology-mediated international learning that enables students to participate in educational experiences across borders without travelling physically. Unlike asynchronous online exchange projects, synchronous VSM environments often require students to participate directly in live classes, discussions, and collaborative activities alongside students from partner institutions, creating opportunities for authentic intercultural interaction in real time.

At the same time, participation in such environments can involve considerable linguistic, cultural, and communicative complexity. Previous research on virtual exchange and online international learning has reported benefits including increased intercultural awareness, communication skills, confidence, and global engagement [3], [9], [10]. However, successful participation in these environments requires more than technological access alone. Learners must also navigate unfamiliar interactional norms, disciplinary expectations, and real-time communication demands within multilingual settings. Recent developments in generative AI and learning technologies have further transformed the conditions of participation in online international learning. Tools such as automatic subtitles, machine translation, and AI-generated summaries may help reduce comprehension barriers and support learners' access to classroom interaction. Nevertheless, technological support does not automatically guarantee meaningful participation. Instead, how such tools are integrated into the learning environment through intentional learning design may play a critical role in shaping students' experiences of participation and engagement.

2.2 Confidence, Self-Assessment, and Intercultural Competence

Intercultural competence has frequently been evaluated through self-report measures examining learners' confidence, attitudes, and perceived communicative ability. Frameworks such as the OECD PISA Global Competence Framework [7] and Fantini's intercultural competence model [8] have contributed significantly to understanding how learners perceive their intercultural development in global learning contexts. In many studies, increases in self-assessed competence are often interpreted as evidence of successful learning outcomes. Recent COIL and virtual exchange studies have similarly reported positive changes in learners' intercultural confidence, effectiveness, and perceived communicative ability following participation in international online learning environments [4], [10]. However, self-assessment in intercultural and multilingual contexts may involve important limitations.

Learners entering unfamiliar communicative environments may initially overestimate their abilities due to limited exposure to authentic intercultural interaction. Through sustained participation, they may become increasingly aware of communicative nuance, cultural complexity, and gaps in their own understanding. As a result, declining self-assessment scores do not necessarily indicate reduced competence, but may instead reflect deeper awareness and more critical self-reflection.
This interpretation aligns with perspectives in educational research that view learning as a process involving uncertainty, reflection, and the restructuring of prior assumptions. In complex learning environments, increased awareness of difficulty may represent an important stage of learner development rather than evidence of failure. Nevertheless, this possibility remains underexplored in research on technology-enhanced international learning environments, particularly in studies relying primarily on quantitative self-report measures.

2.3 Learning Design and Design-Based Research

This study adopts a DBR perspective, which views educational interventions as iterative learning designs situated within authentic learning contexts [6]. Rather than focusing solely on technological tools or learner outcomes in isolation, DBR emphasises the relationship between learning environment design, participation processes, and emerging forms of learning. From this perspective, generative AI tools are understood not as solutions that automatically improve learning, but as mediating resources within broader participation-oriented learning environments. In the present study, the learning environment was intentionally designed to support access to authentic participation while preserving the complexity of real-time intercultural interaction. AI-supported tools functioned as scaffolds to assist comprehension and continuity of participation, rather than as mechanisms for simplifying or replacing interaction itself. Accordingly, this study foregrounds learning design as the primary unit of analysis in examining how students' self-perceptions changed through participation in an AI-supported VSM environment.

3. Context and Learning Environment

The present study was conducted within a semester-long synchronous VSM programme collaboratively implemented between a Japanese university and a U.S. university. In this programme, Japanese undergraduate students participated remotely and in real time in regular undergraduate courses offered at the U.S. institution. Rather than participating in a separate exchange programme designed exclusively for international students, participants joined mainstream classes alongside local U.S. students and engaged in lectures, classroom discussions, and collaborative learning activities conducted fully in English.
The VSM courses were designed to provide students with opportunities for authentic participation in an international academic environment while remaining physically located in Japan. Throughout the semester, students attended weekly live classes via Zoom and interacted with instructors and peers in real time. The courses addressed socially and culturally complex topics related to areas such as ethnicity, society, and culture, requiring students to engage not only linguistically but also intellectually and interculturally within unfamiliar academic contexts. To support participation in this environment, multiple forms of technological and generative AI support were integrated into the learning design. These included live automatic captions, AI-assisted translation support, recorded sessions, and AI-generated summaries that allowed students to revisit classroom interaction after class. In addition, the learning management system (LMS) was used to provide supplementary materials, instructions, and opportunities for reflection throughout the semester.
Importantly, these technological supports were not intended to simplify the learning experience or remove communicative difficulty entirely. Instead, the learning environment was intentionally designed to lower barriers to participation while maintaining the complexity and unpredictability of authentic interaction. Students were still required to interpret meaning in real time, negotiate unfamiliar perspectives, and manage the challenges of participating in a multilingual and intercultural classroom environment. From this perspective, generative AI functioned primarily as a scaffold supporting access to participation rather than as a replacement for communicative effort or intercultural engagement. The design of the VSM environment reflected the assumption that participation itself constitutes an important site of learning. Rather than positioning students as passive recipients of international content, the programme aimed to situate learners within authentic social and academic interaction where awareness, uncertainty, and self-reflection could emerge through direct engagement. This design orientation

became particularly important in interpreting changes observed in students' self-assessments over the duration of the course.

4. Methodology

This study employed a pre-post survey design within a DBR framework to examine changes in Japanese university students' self-perceptions following participation in a synchronous VSM course. The study focused not only on learning outcomes, but also on how participation in an AI-supported international learning environment reshaped students' perceptions of intercultural communication and participation. The study was conducted during the Fall 2025 semester in a U.S.-linked undergraduate course involving Japanese students participating remotely and synchronously in regular U.S. university classes. A total of 60 students were enrolled in the programme, and 41 students voluntarily completed both the pre-course and post-course surveys. Only matched responses from these participants were included in the analysis.

The surveys were administered at two time points: at the beginning of the semester and after completion of the course. The questionnaire consisted of self-report items related to intercultural understanding, communication, and participation in international online learning contexts. Drawing on the OECD PISA Global Competence Framework [7] and Fantini's intercultural competence framework [8], survey items were organised into six conceptual categories: (A) attitudes and values, (B) cultural self-awareness, (C) practical communication skills, (D) collaboration and interaction, (E) learner agency, and (F) inclusivity and responsibility. All items were rated using a five-point Likert scale. Mean and median values were calculated for each category, and pre-post differences were examined descriptively. In addition to the quantitative survey, an end-of-course feedback survey was conducted to gather qualitative reflections regarding students' learning experiences. These open-ended responses were used to contextualise and interpret the quantitative findings, particularly regarding students' perceptions of communicative difficulty, participation, and intercultural awareness.

5. Findings

5.1 Quantitative Findings

Analysis of the pre-post survey results revealed that post-course self-assessment scores decreased across nearly all survey categories. While students generally reported high levels of confidence and positive attitudes at the beginning of the semester, their evaluations became lower following participation in the U.S.-linked VSM course. Table 1 presents the mean and median scores for each survey category before and after the course.

Table 1. Pre–Post Survey Comparison of Japanese Students' Self-Assessment Scores (Fall 2025)

Group	Category	Pre Avg.	Post Avg.	Pre Median	Post Median
A	Attitudes & Values	4.87	4.70	5.0	5.0
B	Cultural Self-Awareness	4.70	4.45	5.0	5.0
C	Practical Communication Skills	3.98	3.54	4.0	4.0
D	Collaboration & Interaction	4.40	4.34	5.0	4.0
E	Learner Agency	4.62	4.67	5.0	5.0
F	Inclusivity & Responsibility	4.52	4.41	5.0	4.5

The largest decreases were observed in Group C (Practical Communication Skills) and Group B (Cultural Self-Awareness). In particular, items related to confidence in communicating with speakers from different linguistic backgrounds, explaining ideas clearly in intercultural settings, and managing communication difficulties showed noticeable declines. In contrast, Groups A (Attitudes & Values) and F (Inclusivity & Responsibility) demonstrated relatively smaller changes. Examination of the median values suggests that many attitudinal items had already been rated very highly at the beginning of the

semester, indicating a possible ceiling effect in the pre-survey. Overall, the findings indicate a pattern in which students entered the course with highly positive self-perceptions, but evaluated their intercultural communication abilities more cautiously after completing the semester-long VSM experience.

5.2 Qualitative Findings

Qualitative responses collected through the end-of-course feedback survey provided important contextual support for the quantitative findings. Overall, students evaluated the course positively in terms of learning value, instructional quality, and the opportunity to participate in a U.S. university course. Many described the experience as meaningful, stimulating, and valuable for their personal and academic development. At the same time, students frequently referred to the challenges associated with participating in real-time English-medium classes. Common themes included the speed and spontaneity of discussion, difficulty initiating contributions, and uncertainty during intercultural interaction. Several students explicitly reflected on becoming more aware of their own limitations in intercultural communication despite initially believing they could manage such interaction successfully.

These qualitative reflections suggest that the decline observed in post-course self-assessment scores was not associated with dissatisfaction or disengagement. Rather, students' responses indicate that direct participation in authentic intercultural interaction prompted deeper reflection on the complexity of communication in multilingual academic settings. This tendency was particularly visible in areas related to practical communication skills, where students appeared to reassess their abilities based on lived communicative experience rather than abstract assumptions.

6. Discussion

The decline observed in students' post-course self-assessment scores should not be interpreted as evidence of negative learning outcomes or reduced intercultural competence. Instead, the combined quantitative and qualitative findings suggest a process of recalibration in students' self-perceptions following sustained participation in an authentic intercultural learning environment. Prior to the course, many students reported very high levels of confidence and positive attitudes toward intercultural interaction. However, participation in the U.S.-linked course exposed students to the realities of spontaneous English discussion, diverse interactional norms, and the cognitive demands of real-time participation in a multilingual academic environment. Through these experiences, students appeared to develop a more cautious and realistic understanding of their own communicative abilities.

The particularly large decrease observed in Group C (Practical Communication Skills) is significant in this regard. The findings suggest that confidence in intercultural communication may initially reflect idealised or assumed self-perceptions rather than experience-based understanding. Through authentic participation, students moved from a general belief that they "could probably communicate" toward a more situated awareness of the complexity of actual intercultural interaction. As summarised in the course analysis, students appeared to shift from "I think I can do this" to "I realise how complex this actually is." Importantly, the qualitative feedback demonstrates that lower self-assessment did not coexist with negative attitudes toward the course. On the contrary, students simultaneously reported high levels of satisfaction, meaningful learning, and increased awareness of intercultural communication challenges. This tension suggests that productive difficulty and increased reflective awareness may represent important dimensions of learning in international online education. From a learning design perspective, the findings also highlight the role of generative AI-supported learning environments in shaping conditions for participation. Tools such as live captions, translation support, and AI-generated summaries may have lowered barriers to comprehension and enabled sustained participation in the course. However, these tools did not eliminate communicative complexity itself. Rather, they supported students' access to authentic interaction while preserving the uncertainty and challenge inherent in intercultural communication.

7. Conclusion

This study examined how participation in an AI-supported VSM environment influenced Japanese university students' self-perceptions of intercultural communication and participation. While pre–post survey results showed decreases across many self-assessment categories, qualitative reflections suggested that students experienced the course as meaningful, challenging, and intellectually valuable. The findings indicate that authentic participation in complex intercultural learning environments may

prompt learners to reassess their communicative abilities more realistically. From this perspective, reduced confidence may reflect an important stage of learning rather than evidence of failure.
The study also highlights the importance of learning design in AI-supported international education. Although generative AI tools may support access to participation, they do not eliminate the complexity of intercultural communication itself. The findings suggest the importance of more nuanced interpretations of self-report measures and learner development in authentic participation contexts.

REFERENCES

[1] OECD, “Virtual Student Mobility and Learning Mobility in Higher Education”, OECD Publishing, Paris, 2021.
[2] O’Dowd R., “What Do Students Learn in Virtual Exchange? A Qualitative Content Analysis of Learning Outcomes Across Multiple Exchanges”, The Internet and Higher Education, Vol. 52, 2021.
[3] Johnson A., Tuncer H., “Facilitating Intercultural Competence Development in Virtual Exchange: The Student-Generated Survey”, Asian Journal of Distance Education, Vol. 18, No. 2, 2023, pp. 159–185.
[4] Anderson A. M., Or J., “Fostering Intercultural Effectiveness and Cultural Humility in Adult Learners Through Collaborative Online International Learning”, Adult Learning, Vol. 35, No. 1, 2024, pp. 3–15.
[5] Hackett S., Janssen J., Beach P., “Pedagogical Dimensions and Intercultural Learning Outcomes of COIL: A Review of Studies Published between 2013–2022”, Journal of Studies in International Education, Vol. 28, No. 5, 2024, pp. 761–779.
[6] McKenney S., Reeves T. C., “Conducting Educational Design Research”, Routledge, London, 2018.
[7] OECD, “PISA 2018 Global Competence Framework”, OECD Publishing, Paris, 2018.
[8] Fantini A. E., “Assessing Intercultural Competence: Issues and Tools”, in Deardorff D. K. (Ed.), The SAGE Handbook of Intercultural Competence, Sage Publications, Thousand Oaks, 2009, pp. 456–476.
[9] O’Dowd R., “From Telecollaboration to Virtual Exchange: State-of-the-art and the Role of UNICollaboration in Moving Forward”, Journal of Virtual Exchange, Vol. 1, 2018, pp. 1–23.
[10] Gray M. I., Nowak A. V., “Enhancing Intercultural Competence of Future Public Health Professionals: The Impact of Collaborative Online International Learning (COIL)”, Journal of Medical Education and Curricular Development, Vol. 13, 2026.