

INTEGRATING POSTGRADUATE, UNDERGRADUATE, AND K-12 DESIGN LEARNING THROUGH INTERNATIONAL VIRTUAL MOBILITY

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ABSTRACT

This paper presents preliminary results from a project to create and implement an International Virtual Mobility Centre for Design Education across three educational levels: postgraduate, undergraduate, and basic education. The initiative seeks to promote a transcultural approach to Design learning, focusing on training high-level researchers and consultants (postgraduate), professionals for the job market (undergraduate), and fostering Design literacy in elementary and secondary education. The project builds on two previous international collaboration experiences developed in undergraduate Design courses and teacher education programmes. The undergraduate initiative focused on developing competencies for teamwork in geographically distributed contexts and for understanding the impact of culture and context on Design. The postgraduate initiative aimed to prepare educators for teaching Art and Design in primary and secondary schools. The main goal is to establish a framework for international virtual mobility in Design education that connects the three levels of instruction. This involves developing a pedagogical model adaptable to different stages of learning and promoting sustained international collaboration, which represents the first concrete contribution of this project. Expected outcomes include: (a) continuously and systematically offering courses that support international virtual mobility at each educational level; (b) offering courses that integrate at least two levels of education; (c) establishing foundations for expanding participation to other Design-related programmes and institutions; and (d) developing and testing Design-based teaching and learning frameworks and methodologies. Ultimately, the project aims to foster innovation in Design education through international collaboration and the integration of multiple learning levels within a shared pedagogical structure.

Keywords: Design education, international virtual mobility, collaborative learning

1 INTRODUCTION

This project addresses the following research question: **How can Design education be integrated across different levels through collaborative activities in an international context?** The overall objective is to establish an international virtual mobility hub for Design education at postgraduate, undergraduate, and K-12 levels, fostering integration across these levels. The specific objectives are: (a) to develop a pedagogical framework for virtual mobility across different levels of Design education; (b) to develop a web platform for virtual mobility by integrating free digital information and communication technologies (DICTs); and (c) to evaluate the framework and platform through courses in basic education, undergraduate, and postgraduate programmes.

The project is based on same-level and cross-level course interactions in an international setting. Expected outcomes include: (a) the continuous and systematic offering of courses enabling international virtual mobility at each educational level; (b) the continuous and systematic offering of courses integrating at least two educational levels; (c) the establishment of conditions for the future inclusion of additional Design-related undergraduate and postgraduate programmes and institutions; and (d) the development and testing of Design-based teaching and learning frameworks and methods. Figure 1 illustrates both interaction models: solid lines represent same-level interactions, while dashed lines indicate cross-level interactions.

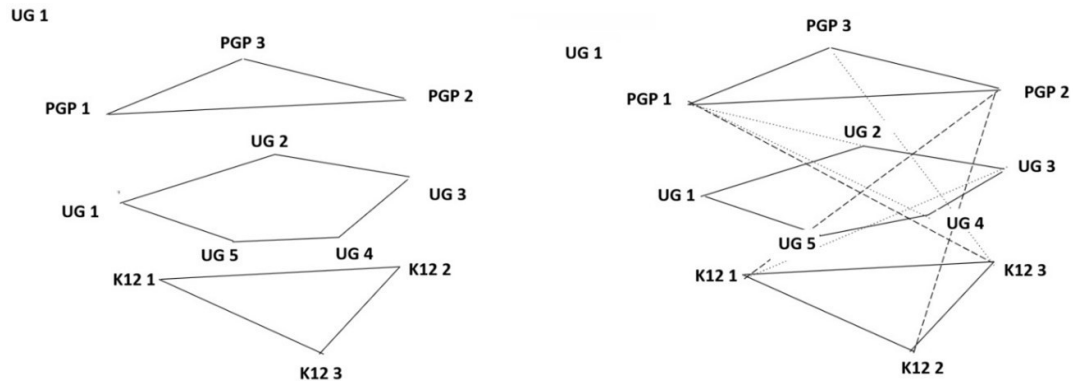


Figure 1. Interaction model for same-level and cross-level courses, including graduate programmes (PGP), undergraduate programmes (UP), and K-12 education (K12)

The project's originality and relevance lie in its collaborative, virtual, and international approach to Design education across three educational levels, integrating both perspectives on the nature of the Design process: designerly ways of knowing and design thinking. Postgraduate education will address both perspectives due to its interdisciplinary character; undergraduate education will emphasise designerly ways of knowing; and K–12 education will adopt design thinking, reflecting its general education focus. This initiative will be operationalised through the International Virtual Mobility Centre for Design Education, which will involve researchers from universities in Europe, North America, and South America, and schools from the same countries.

2 STATE OF ART AND RESEARCH CONTEXT

2.1 Internationalisation and Virtual Academic Mobility

In recent years, initiatives, programmes, and projects promoting education have increasingly emphasised student retention, qualification, recognition, support, and academic expansion. This trend presupposes scientific, technological, and academic cooperation across horizontal, vertical, bilateral, and multilateral levels [3], shaping internationalisation policies and practices in higher education, including design-related fields such as Design Education.

Global interconnectedness has intensified, particularly through physical international academic mobility, which grew from approximately 2.1 million students in 2000 to 6.9 million in 2022 [1], consolidating mobility as a central pillar of internationalisation [4]. In parallel, new forms of interaction have expanded, accelerating the adoption of digitally mediated learning strategies on a global scale. Virtual academic internationalisation increasingly relies on collaborative learning methodologies that develop digital, linguistic, and intercultural competencies to support joint projects and multi-institutional learning initiatives in transnational contexts. This is especially relevant for Design Education, as it enables collaborative experiences in globally distributed, inter-, multi-, and transdisciplinary networks, fostering knowledge creation, skills development, and the ability to address complex contemporary challenges.

2.2 International Collaborative Learning and Design Education

The internationalisation process involves international institutional partnerships and projects implemented through at-home actions (within the institutional context), curriculum adaptation, virtual mobility and exchange, and collaborative teaching projects with international partners in globally connected learning environments [5]. Collaborative Online International Learning (COIL) has been highlighted in literature as a key methodology for virtual internationalisation in higher education. Pedagogically, COIL structures collaborative experiences through synchronous and asynchronous digital technologies, connecting geographically distant academic communities from diverse linguistic and cultural contexts. It promotes interaction and mobility by encouraging engagement with national and international sources in virtual learning environments, fostering the development of intercultural and global competencies through shared projects [5][6].

COIL aligns with the broader movement of internationalisation of the curriculum, understood as the intentional integration of international and intercultural dimensions into teaching, research, and outreach [2], with the potential to democratically expand institutional reach and support new knowledge-oriented learning pathways [5]. In Design, these challenges are framed as wicked problems, characterised by the absence of definitive or singular solutions [7][8]. Problem understanding and solution creation are inseparable and concurrent, as challenges are fully grasped through attempts at resolution, rendering design a continuous process of problem redefinition [7][8]. Addressing such challenges requires cognitive strategies centred on synthesis, modelling, and experimentation, aligning with designerly ways of knowing—a constructive knowledge culture grounded in conceiving, testing solutions, and making new things [9].

2.3 Articulation Across Educational Levels in Literature

Findings from a systematic literature review indicate that virtual mobility has been explored mainly in initial higher education, with limited presence in basic education and a scarcity of approaches that promote broader articulation across educational levels. There is a lack of models that coherently connect basic, undergraduate, and postgraduate education in international virtual mobility experiences. This gap demonstrates that virtual mobility in Design Education remains underexplored and highlights the need to develop new pedagogical artifacts capable of supporting collaborative, continuous, and integrated practices across educational levels. Such structures should address the pedagogical specificities of each level, as well as the institutional, curricular, and technological challenges involved, contributing to the consolidation of pedagogical models for international virtual mobility in Design Education.

2.4 Challenges and Pedagogical Needs

Virtual mobility is recognised as a key mechanism for internationalisation, strengthening international academic collaboration. The literature highlights benefits such as improved intercultural communication, competency development, cultural awareness, respect for diversity, and democratised access to internationalisation. However, significant challenges persist, including unstable internet connectivity, unequal technological infrastructure, language barriers, time zone differences, and the absence of institutional policies to ensure continuity. These constraints indicate that even well-structured initiatives face organisational, pedagogical, and technological limitations, underscoring the need for pedagogical artifacts that better organise and integrate virtual mobility experiences. Flexible and adaptable pedagogical frameworks are therefore identified as promising avenues for innovation in Design Education, supporting collaboration and articulation across educational levels in international contexts [19].

3 LEARNING FROM DESIGNERS

Before engaging international K–12 partners, a pilot experience was conducted with a local school to examine cross-level interaction without the influence of cultural differences. Prior COIL experiences at undergraduate and graduate levels informed the handling of cross-cultural issues in design learning. The study brought together undergraduate Visual Design students and high school students through a partnership with a nearby public school.

Students enrolled in the Design Methodology course were organised into four Design Studios (DS1–DS4), each defining its brand and design market focus. The project comprised eight meetings. In the first session, undergraduate students welcomed the high school students and presented their studios and areas of interest. In the following session, high school students presented everyday problems to be addressed through peer learning and co-design. Both groups exchanged ideas, after which the Design Studios selected a problem, and high school students chose the teams they wished to join. The problems addressed were as follows:

- Dopamine and social media - too much time on the phone
- Inequality and Prejudice
- Raising awareness of inequality

To work together, they used the Double Diamond process (Design Council, 2004) to go through the stages of: Discovering the problem to be solved, to understand the chosen problem (3rd Meeting); Defining the focus and framing to be given to the problem (4th Meeting); Developing possible solutions by prototyping models, testing and iterating to finally (5th, to 7th Meetings); and Delivering the best

possible solution within the deadline and with the available resources (8th Meeting). The results obtained are shown in Figure 2.



Figure 2. Proposed solutions

Throughout the process, data and information were collected using four tools: a questionnaire to create a student profile; a comprehension map to assess students' self-perception; a questionnaire to assess students' perceptions of their abilities; and a questionnaire to evaluate the project process. Additional information was collected from photographs, videos, and researcher notes (Figure 3).

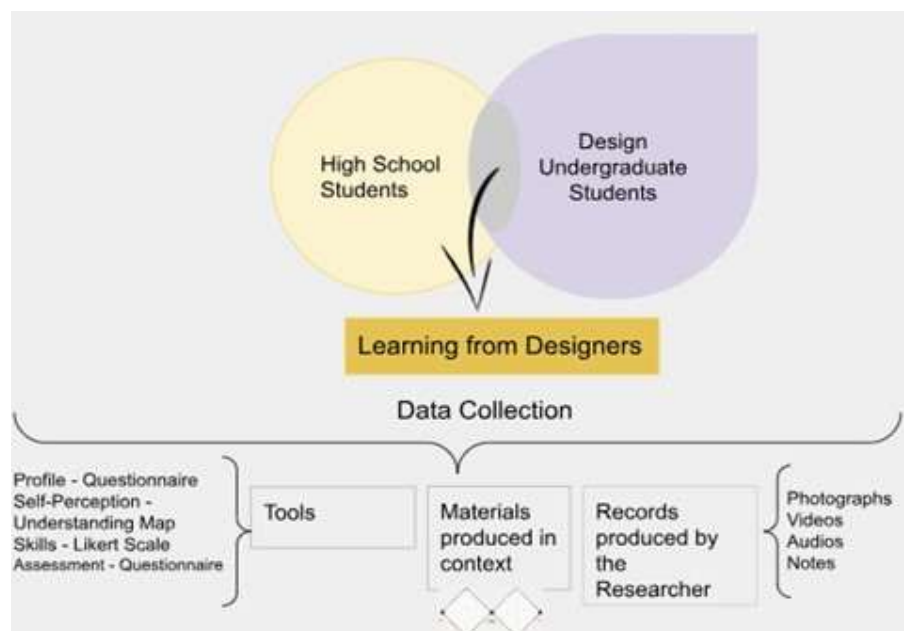


Figure 3. Synthesis

This experience suggests that undergraduate design students have the skills to support high school students to understand the design process through peer-learning projects. Literature emphasises that peer learning fosters social bonding, work organisation, appreciation of materials, and encourages questioning—reducing shyness and increasing confidence—as well as connection through identity, communication, and the valuing of shared experiences and knowledge [11].

Observations indicate that peer interactions between high school students and undergraduate design students of similar age facilitate concept understanding, as the use of shared language and terminology enhances comprehension. Peer groups with mixed ages promote experiential proximity, enabling a deeper understanding of learning challenges and strategies to overcome them for both groups. Structured peer interactions involving students from higher grades further reinforce learning by expanding knowledge through co-participation.

4 PEDAGOGICAL FRAMEWORKS

An adaptable pedagogical framework was proposed to enable replication in other contexts (Figure 4). The experience is structured into three stages: Pre-Project, Intermediate, and Finalisation. In the pre-Project stage, partnerships between the university and the school are established. At the university, the Project Methodology course prepares students to organise design studios, defining a brand and market niche to be presented during the initial meeting with high school students. At the school level, the focus is on fostering contextual exchange and learning among students, promoting a form of literacy that supports sustainable futures and change-oriented learning [12]. Students are encouraged to identify everyday problems to be collaboratively addressed with design students.

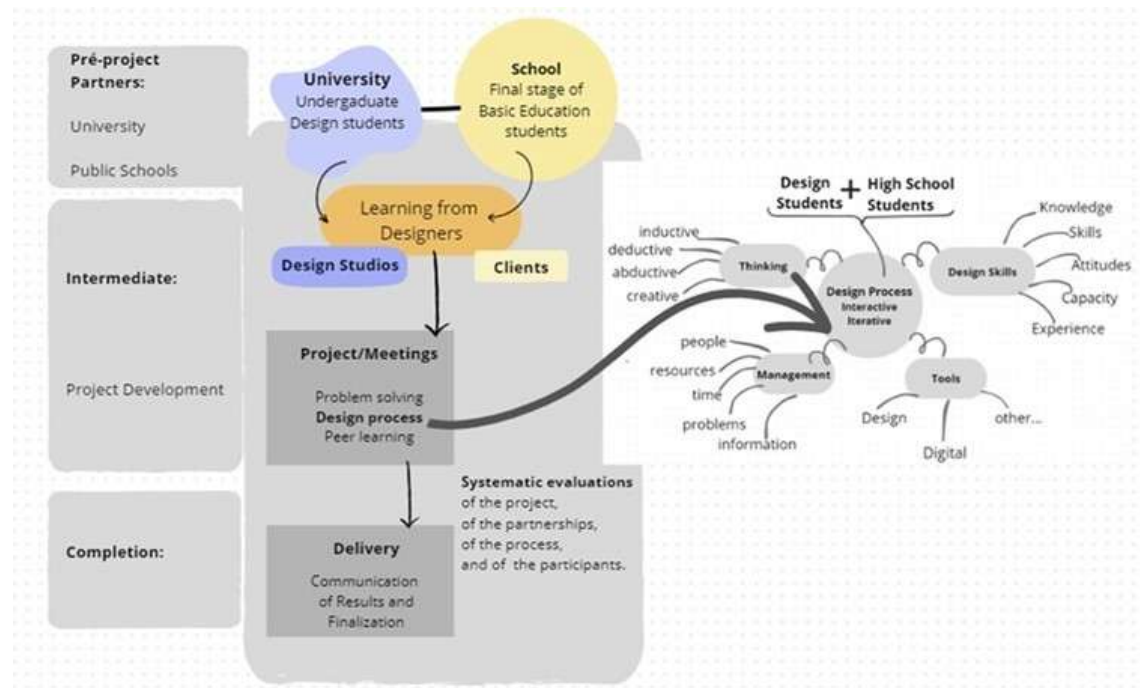


Figure 4. Pedagogical Framework

In the Intermediate stage, the focus is on defining the problems to be addressed by the Design Studios. High school students select the teams they wish to join through peer learning and collaborative participation, applying a design process that integrates multiple ways of thinking, design skills, tools, and project management practices.

In the Finalisation stage, outcomes are communicated, and the process is evaluated through team presentations, delivery of solutions within the course and at the school, and continuous assessment supported by project tools. This stage also includes the identification of necessary adjustments and, when feasible, the implementation of solutions, valuing the learning process and the resolution of everyday challenges through partnerships and available school and community resources.

5 CONCLUSIONS

As stated in the abstract, this paper presents preliminary results from a project aimed at creating and implementing an International Virtual Mobility Centre for Design Education across three educational levels: postgraduate, undergraduate, and basic education. The proposed pedagogical framework is intended to be one of the elements that will generate a more complex framework that will include the three levels of education and the interactions among them. Prior experiences in COIL involving undergraduate students and graduate students have been at the same level and have not generated some kind of framework that could formalise the process.

The prior experiences provided several insights and data about transcultural issues related to Design Education. Systematising data and developing new and more complex experiences will contribute to creating new Design-based teaching and learning frameworks and methodologies.

5.1 AI-assisted writing disclosure

ChatGPT (OpenAI) was used exclusively for language editing and improvement of textual clarity. The authors fully reviewed and validated the final content.

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