

EDITORIAL

TRAINING THE RESEARCHERS OF THE FUTURE: EMERGING PRACTICES IN DESIGN SCHOOLS

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ABSTRACT

ALTHOUGH DESIGN HAS HISTORICALLY BEEN CLOSELY LINKED TO PROJECT-BASED PRACTICE AND EXPERIMENTATION, IN RECENT DECADES IT HAS CONSOLIDATED AS AN ACADEMIC FIELD WITH ITS OWN METHODOLOGIES AND CONCEPTUAL FRAMEWORKS. HOWEVER, MUCH OF THE KNOWLEDGE GENERATED BY UNDERGRADUATE STUDENTS REMAINS INVISIBLE, CONFINED TO INSTITUTIONAL ARCHIVES AND EXCLUDED FROM SCIENTIFIC DISSEMINATION CIRCUITS. IN RESPONSE TO THIS SITUATION, THE SPECIAL ISSUE “EDUCATING THE RESEARCHERS OF THE FUTURE” SEEKS TO MAKE VISIBLE RESEARCH PROJECTS DEVELOPED IN DESIGN SCHOOLS ACROSS DIFFERENT COUNTRIES, HIGHLIGHTING THEIR POTENTIAL TO GENERATE RELEVANT AND SITUATED KNOWLEDGE. THE ARTICLES GATHERED IN THIS ISSUE ADDRESS TOPICS SUCH AS BIODESIGN, SUSTAINABILITY, PEDAGOGICAL METHODOLOGIES, AND COLLABORATIVE CREATIVITY, DEMONSTRATING THAT UNDERGRADUATE RESEARCH CONSTITUTES A KEY SPACE FOR STRENGTHENING DISCIPLINARY DEVELOPMENT AND BUILDING A COLLECTIVE MEMORY FOR THE DESIGN FIELD. LIKEWISE, THE EDITORIAL UNDERSCORES THE NEED TO STRENGTHEN METHODOLOGICAL STANDARDS, PROMOTE INSTITUTIONAL SUPPORT STRUCTURES, AND INTEGRATE RESEARCH MORE SYSTEMATICALLY INTO DESIGN SCHOOL CURRICULA. EDUCATING DESIGNERS CAPABLE OF CONDUCTING RESEARCH, CRITICALLY REFLECTING, AND PRODUCING KNOWLEDGE THUS EMERGES AS A FUNDAMENTAL CONDITION FOR ADDRESSING COMPLEX SOCIAL, ENVIRONMENTAL, AND TECHNOLOGICAL CHALLENGES.

KEYWORDS: DESIGN RESEARCH, DESIGN EDUCATION, UNDERGRADUATE RESEARCH, DESIGN RESEARCH EDUCATION, TEACHING RESEARCH

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Design has historically been a discipline deeply rooted in action. Unlike other academic fields, whose development has centered primarily on theoretical reflection or scientific research, design has evolved through practice: through the studio, material experimentation, prototyping, and creative problem-solving. This forward-looking nature has been one of its main strengths, enabling design to respond agilely to the challenges posed by changing social, cultural, and technological contexts. If design is a discipline that learns by doing, then it must also learn by researching what it does.

For much of the 20th century, the knowledge generated by designers was transmitted primarily through professional practice, teaching in design studios, and the informal exchange of experiences among creative communities. In recent decades, a field of design research has emerged with its own conceptual frameworks, methodologies, and academic publication venues (Archer, 1995; Cross, 1999; Findeli, 2001; Rodgers & Yee, 2023). This process has led to the recognition that design generates knowledge in specific ways. Nigel Cross (2001) described these forms of knowledge as *designerly ways of knowing*, emphasizing that design thinking constitutes a legitimate form of research. Additionally, Frayling (1994) distinguished between research for design, about design, and through design—categories that have helped structure the methodological debate in the field.

Various design schools have begun to ask themselves how to train designers who not only solve problems but also generate knowledge about them. This debate—which today centers on the emerging field of *design research education*—highlights the need to integrate research more systematically into the design curriculum, particularly from the earliest stages of university education.

However, the institutionalization of design research remains inconsistent. While graduate programs and research centers at many universities have established robust research areas, the production of knowledge at the undergraduate level continues to face significant challenges. Each year, thousands of students undertake thesis or degree projects that explore issues relevant to design and society. These projects often serve as venues for intense conceptual and material experimentation, where new methodologies, technologies, and design approaches are tested.

However, much of this research remains confined to academic reports or institutional archives. Many projects end up stored in university libraries or digital repositories without ever entering the mainstream of scientific discourse. As a result, a significant portion of the knowledge produced in design schools remains invisible to the academic community. As long as this research remains invisible, the field of design will continue to start from scratch time and again.

This situation creates a paradox that is particularly significant for the field's development. Year after year, new generations of students explore similar questions, experiment with comparable materials, and develop solutions to recurring problems. Yet, because of the limited circulation of this work, much subsequent research fails to build on prior insights and findings. The absence of systematic dissemination mechanisms thus hinders the construction of a collective disciplinary memory that would allow for the accumulation and development of knowledge generated in educational contexts.

At the same time, it is important to recognize that undergraduate research has its own distinct characteristics. It often stands out for its creativity, exploratory nature, and sensitivity to emerging issues. However, it is also common for such research to face difficulties in areas fundamental to academic research, such as process traceability, methodological systematization, or the rigorous validation of results. These limitations should not be understood as inherent weaknesses of undergraduate research, but rather as part of a field in the process of consolidation that requires strengthening its methodological standards and support structures.

In this context, progress requires moving forward simultaneously in two complementary directions. On one hand, it is essential to strengthen the quality standards of research conducted in educational settings, promoting practices of documentation, analysis, and validation that help consolidate its contribution to disciplinary knowledge. On the other hand, it is equally important to create opportunities for dissemination that raise the profile of this work and integrate it into academic discourse within the field of design.

The special issue “Training the Researchers of the Future: Emerging Practices in Design Schools” arises precisely in response to this dual need. The call invited design graduates who received their degrees between 2018 and 2024 to submit articles based on research conducted as part of their thesis or degree projects, as well as academics who guided these educational processes. The goal was to highlight experiences that position design as a research practice capable of generating relevant, rigorous, and situated knowledge, emphasizing the potential of undergraduate research to strengthen disciplinary development and promote meaningful learning.

The contributions included in this special issue were written by thirteen authors from six universities in five countries: Brazil, Chile, Colombia, India, the United States, and Spain. This geographic diversity reflects the growing international interest in strengthening design research at the undergraduate level and demonstrates that the questions raised in the call for papers resonate across a wide range of educational contexts.

Taken together, the articles demonstrate how degree projects can serve as spaces for methodological experimentation, material exploration, applied research, and pedagogical reflection. Based on this analysis, three major thematic strands can be identified throughout the contributions: material exploration and biodesign; pedagogical and methodological research in design; and experimental pedagogies focused on creativity, sustainability, and collaboration.

MATERIAL EXPLORATION, BIODESIGN, AND SUSTAINABILITY

A first set of articles examines design research through the lens of material experimentation, biodesign, and the exploration of new relationships between design and nature.

The article “**Development of a repairable dermal layer for venipuncture phantoms**”, by Andrés Mente Valderrama, Andrea Wechsler Pizarro, and Pablo Domínguez González, presents an interdisciplinary research project at the intersection of design and nursing aimed at developing a biodegradable biomaterial that simulates human skin. Through the formulation of various hydrocolloid compositions and their validation in real-world clinical simulation settings, the study demonstrates how design can contribute to pedagogical innovation in the teaching of medical procedures.

In “**Bacterial bioluminescence and biophilic design: An interdisciplinary approach to sensory experiences in urban well-being**”, Antonia Ramírez and Rubén Jacob Dazzarola explore the potential of bacterial bioluminescence as a design resource aimed at promoting emotional well-being in urban environments. Through the development of an experimental prototype based on Photobacterium cultures, the study combines qualitative methods and physiological measurements to analyze the user experience, demonstrating the potential of biodesign to foster new relationships between nature and the built environment.

In a similar vein, the article “**Situated biodesign: cocreation of ecosystem support in the Meandro del Say wetland**”, by Alexandra Huertas Caycedo and Diana Gómez García, proposes an interdisciplinary methodology that integrates design, biology, and community participation to address environmental issues in Bogotá. The project develops an ecosystem support system inspired by biomimicry that seeks to strengthen the relationship between community and territory.

Finally, in “**Bio-based panels made from forest waste: the case of Eucalyptus globulus Labill**”, Trinidad Lazcano Alvarado investigates the feasibility of transforming Eucalyptus globulus capsules into biomaterials for use in interior design. Through methodologies such as Material Driven Design, the study demonstrates how material experimentation conducted in educational settings can contribute to the development of solutions aligned with the principles of the circular economy.

EDUCATIONAL RESEARCH AND RESEARCH METHODOLOGIES IN DESIGN

A second group of articles examines design research from the perspective of pedagogy and teaching methodologies.

In “**Analyzing Research in Design Education: Studio Practice as Legitimate Inquiry**”, Tharique De Silva explores the potential of the design studio as a space for research within interior architecture education. Drawing inspiration from Donald Schön’s (1983) ideas on the reflective practitioner, the study demonstrates how iterative design processes enable the development of research methods grounded in reflection in action.

Meanwhile, Bernardo Candela Sanjuán and Noa Real García, in “**Undergraduate education and cultural transfer. Study on graphic brands in the Canary Islands**”, examine the potential of the undergraduate thesis as a venue for applied research in graphic design. Through a historiographical study of Canarian graphic brands, the authors develop a visual archive and a series of cultural transfer products, including a published book, a digital platform, and a public exhibition.

In “**Permeable boundaries. Exploring transdisciplinary collaborations in biodesign for innovation**”, Diana Marcela Quiroga analyzes the dynamics of collaboration between students and faculty from different disciplines in biodesign courses. The study proposes diagnostic tools designed to strengthen teaching methodologies focused on interdisciplinary work.

EXPERIMENTAL PEDAGOGIES FOR CREATIVITY AND SUSTAINABILITY

A third group of articles explores teaching strategies aimed at developing creative, collaborative, and socially responsible skills.

In “**Designing with Communities: A Framework for Undergraduate Research in Sustainable Fashion**”, Nirbhay Rana proposes an educational model that integrates sustainability, participatory research, and social justice into the training of fashion designers. The proposed framework positions communities as active partners in the research process.

For their part, Lauro Cohen and Nubia Suely Silva Santos, in “**Creative and collaborative thinking through recycling in design education**”, analyze the educational potential of handmade paper recycling workshops for fostering creativity, collaboration, and adaptive thinking among design students.

CONCLUSIONS AND PROJECTIONS

The contributions gathered in this special issue demonstrate that design research conducted in undergraduate settings constitutes a fertile ground for the generation of disciplinary knowledge. The articles show that senior projects can serve as spaces for methodological experimentation, material innovation, and critical reflection, capable of contributing to contemporary debates in areas such as sustainability, health, culture, and education.

One of the most significant contributions of this special issue is that it brings to light research that might otherwise remain

confined to university libraries or institutional archives. By being transformed into scholarly articles, these works enter academic circulation, allowing their findings to contribute to the construction of a collective memory within the field of design.

From this perspective, **Base Diseño e Innovación** seeks to help create a space for emerging designers interested in research, promoting the dissemination of knowledge developed daily in the classroom while simultaneously encouraging the progressive improvement of quality standards in design research. Creating this space involves recognizing that design knowledge is also produced in classrooms, workshops, and thesis projects, where students explore, for the first time, the relationship between design practice and research.

Looking ahead, it is essential to continue conducting research that examines how to integrate research into the curriculum of design schools, exploring pedagogical models, teaching methodologies, and institutional structures that can strengthen research training starting at the undergraduate level.

Furthermore, a particularly relevant field is emerging for research on design pedagogy, focused on analyzing the teaching practices that foster inquiry within educational settings. This includes experimental workshops, interdisciplinary labs, faculty-student mentorship models, and project-based learning strategies.

Finally, it would be worthwhile to explore the long-term impacts of undergraduate research on designers' professional and academic trajectories, analyzing how these experiences contribute to the development of researchers, innovators, and agents of change.

In a world marked by increasingly complex social, environmental, and technological challenges, training designers who are capable of conducting research, thinking critically, and generating knowledge is essential to the future of the discipline. In this sense, training researchers starting at the undergraduate level is not merely an educational opportunity: it is a necessary condition for design to continue building knowledge about itself.

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