

TRANSITIONING TO REGENERATIVE DESIGN: LEARNING BEYOND TRADITIONAL EDUCATION

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ABSTRACT

Young designers face significant challenges transitioning from academia to professional practice, particularly in the demanding and increasingly vital field of regenerative design. This paper presents a collaborative design practice where students tackled a real-world challenge beyond the traditional educational setting, transforming the experience into both their thesis work and subsequent professional projects. The framework was provided by an open call for the Biennial of Design 27 (BIO27) in Ljubljana, which offered students critical insights and practical knowledge for their future careers. Their project, centred on the complex and unfamiliar topic of water, motivated them to develop a method combining natural processes, vernacular principles, and new technologies into a cohesive solution. This established method was not a one-time effort but continues to guide their navigation of diverse and complex projects through multiple iterations in their professional work. By integrating ecological, technological, and vernacular diversity into a single learning framework, the project demonstrates how alternative educational approaches can equip future designers with the competencies necessary to navigate complex social and ecological realities. It suggests that embracing diverse modes of knowledge production—scientific, local, experiential, and more-than-human—can enrich engineering and product design education, and support students in developing the resilience, sensitivity, and adaptability required for contemporary design practice.

Keywords: Regenerative design, diversity, vernacular knowledge, new technology, natural process

1 INTRODUCTION

Education emerges not merely as a cornerstone of social cohesion and knowledge acquisition, but as a dynamic axis for cultivating competencies that underpin sustainable societies [1]. Within the context of product design and engineering education, this role becomes particularly critical, as design curricula increasingly engage with complex socio-ecological challenges that exceed purely technical problem-solving [2]. A recurring challenge, however, lies in translating these imperatives into pedagogical structures that move beyond conceptual exploration towards situated, practice-based engagement. As Meyer and Norman (2020) delineate, design education unfolds across at least two institutional archetypes: autonomous design academies and departments nested within research universities [3]. The latter, embodying traditional product design paradigms as articulated by Yavuzcan and Gür (2020), privilege faculty-driven research and disciplinary advancement, with studio practices typically commencing in theoretical lectures before practice-based exploration, often culminating in conceptual prototypes that rarely transcend ideation [4].

At the University of Ljubljana, Academy of Fine Arts and Design (UL ALUO), this model is reflected in a range of research-oriented and industrial design projects presented via posters and 3D models in exhibitions. While such formats support creative exploration and disciplinary experimentation, they are often constrained by academic timeframes and controlled conditions, typically spanning approximately three months and aligning with the ideation phase of the Double Diamond process [5]. These structural limitations can restrict students' exposure to extended project development, interdisciplinary collaboration, and iterative prototyping under real-world pressures. This gap becomes particularly evident in the context of regenerative design, where design outcomes are expected to respond to ecological systems, local contexts, and long-term environmental impacts rather than isolated problem definitions.

A growing body of literature suggests that, despite the increasing presence of regenerative and sustainability-oriented discourse in design education, such approaches are frequently invoked at a conceptual level without being fully operationalised through life-cycle thinking, field-based research, or adaptive design methodologies [6]. In this context, contemporary designers are increasingly called upon to adopt systemic perspectives, prioritising resilience, sensitivity, and adaptability in response to planetary boundaries.

In response to these pedagogical challenges, this paper examines an alternative educational trajectory through a case study of a student-led project initiated via an international open call for the Biennial of Design 27 (BIO27). The study draws on practice-based research methods, combining fieldwork, interviews, iterative prototyping, and reflective analysis to examine learning processes in Master's-level product design education. Unlike conventional studio assignments, the open call functioned as an externally situated learning framework, introducing real-world constraints, public accountability, and interdisciplinary collaboration into the educational process.

Open to a broad international audience, the call foregrounded the theme of “super vernacular” design, encouraging participants to engage with local knowledge systems, material cultures, and ecological conditions. For the participating students, this context enabled a form of situated learning in which regenerative principles were explored through sustained research, fieldwork, and iterative prototyping beyond the boundaries of a standard academic course.

Guided by the research question, *How can open calls enable regenerative design learning processes in product design education?* this paper analyses the BIO27 case to examine the pedagogical characteristics of open-call-driven projects. The study further asks:

- (1) How do open-call frameworks differ from conventional studio formats in structuring learning processes?
- (2) Which real-world constraints and interdisciplinary interactions most significantly shape students' engagement with regenerative design?
- (3) What aspects of this approach hold potential for adaptation within higher design education curricula?

By situating the case within broader debates on regenerative design education, the paper reframes student projects not merely as isolated academic outputs, but as extended learning processes capable of fostering reflective practice, methodological adaptability, and professional readiness. In doing so, it contributes to ongoing discussions on how design education might better bridge the gap between conceptual regenerative discourse and situated, practice-based learning. While the study does not aim to quantitatively measure learning outcomes, it offers an in-depth qualitative analysis of learning processes and pedagogical structures enabled through an open-call framework, grounded in fieldwork, interviews, and iterative prototyping developed through the BIO27 project.

2 RESEARCH, EXPERIMENTATION, AND EXHIBITION OF CASE STUDY

The BIO27 project extended over seven months (December to June), functioning as an extended, practice-based learning case comparable to a prolonged academic semester. Unlike conventional studio formats, which often confine students to ideation within academic semesters, this structure fostered situated, practice-led learning by integrating real-world timelines, external accountability, and iterative phases, from research and brief formulation to prototyping and international exhibition, bringing together local and global designers, thinkers, and artists [7]. Through this extended structure, the project enabled a regenerative design learning trajectory grounded in iterative research, field engagement, and reflective practice. This progression cultivated key competencies in systemic thinking and adaptive methodologies, directly addressing gaps in translating regenerative discourse into operational practice. The research phase diverged from theoretical lectures by embedding students in interdisciplinary fieldwork, a core pedagogical shift toward experiential knowledge construction. Through collaborations with microbiologists, ecologists, chemists, physicists, artists, and local stakeholders, students conducted 10 qualitative semi-structured interviews with scientists, park staff, and residents, gaining holistic insights into Slovenia's water challenges. These engagements identified water pollution in Triglav National Park (TNP), a symbolically pristine alpine site threatened by farming and tourism [8], as a key focus. Fieldwork further included three structured site visits with TNP staff: an initial exploratory visit, a data collection visit involving water sampling and resident dialogues, and a final documentation visit linked to exhibition preparation (Figure 1). This sequence developed competencies in empirical rigour

and stakeholder dialogue, enabling students to operationalise regenerative principles via place-based data collection.



Figure 1. Triglav National Park visit and water sampling (Pjorkkala, 2022)

A partnership with Microbium, a pioneer in portable *E. coli* analysers, further exemplified the role of open calls in resource convergence, loaning equipment for on-site assays that bypassed laboratory constraints. Such alliances underscore how open calls catalyse resource convergence, mirroring regenerative models where design education interfaces with industrial innovation to bypass traditional barriers.

Building on this, the experimentation phase emphasised iterative, hands-on prototyping as both a research method and a learning process, through which students developed methodological adaptability by acquiring technical skills during the design process itself. In this phase, they taught themselves xylem-based [9] and ceramic filtration technique [10], including manual clay mixing, despite having no prior experience. Leveraging open-call funds, they introduced clay 3D printing in Slovenia (Figure 2). This sped up design iterations and demonstrated how funding can make digital tools more accessible in education.



Figure 2. Experimentation with 3D clay printing (Bor Cvetko, 2022)

Three semi-public milestones—pitches, research unveilings, and critiques—instilled reflexive communication competencies, refining abstract findings into professional narratives for diverse audiences. The BIO27 exhibition then culminated these dynamics, prioritising process documentation over final products (Figure 3), with students designing project presentations featuring fieldwork visuals, experimentation results, and prototypes. This fostered curatorial agency and professional readiness, transforming real-world frictions into meta-skills like resilience and adaptability.

Taken together, extended timelines, interdisciplinary embeds, iterative reflexivity, and public accountability offer a scalable open call framework for design education. This framework bridges conceptual regenerative design and practice, promoting competencies transferable to standard curricula, such as modular fieldwork modules or industry partnerships, to enhance regenerative learning impacts.



Figure 3. The presentation of work at BIO27 (Urban Cerjak, 2022)

3 ITERATIONS OF THE CASE STUDY

Post-BIO27, the project developed into a master's thesis and a series of international field iterations in Georgia (2022) and France (2023), transforming the initial student project into a longitudinal learning trajectory. Rather than functioning as mere project extensions, these post-BIO27 iterations operated as pedagogical mechanisms for testing, adapting, and reflecting on regenerative design methods across diverse socio-ecological contexts. These iterations served as real-world validation of both methodological transferability and material adaptability.

The first iteration, conducted in Tbilisi, Georgia, in collaboration with Floating University, confronted students with conditions of extreme water contamination and limited site accessibility along the Mtkvari River. This context required rapid methodological adaptation, particularly in filter deployment and on-site prototyping, while simultaneously foregrounding issues of water precarity and community engagement. As a learning outcome, students developed competencies in situated problem framing, stakeholder dialogue, and reflective decision-making under real-world constraints, illustrating how regenerative design learning is shaped through exposure to uncertainty and systemic complexity.

The second iteration, developed in Cognac, France (Figure 4), shifted the pedagogical focus towards material localisation and circular resource thinking. By replacing sawdust with local cognac waste (grape pomace and stems), students tested the adaptability of the filtration method while maintaining comparable bacterial reduction performance. This iteration strengthened learning outcomes related to material experimentation, vernacular resource integration, and professional communication with local industry stakeholders, reinforcing the regenerative principle of working within, rather than against, local material ecosystems.

Across these iterations, the project transitioned from a student-led educational exercise into a transferable design methodology capable of responding to diverse realities. From an educational perspective, the iterative structure enabled longitudinal learning rarely accessible within standard studio courses. Students were required to reflect on previous decisions, identify which aspects of the method were essential and which were contingent, and reconfigure their approach accordingly. This process cultivated a form of methodological literacy central to regenerative design education: the ability to design not fixed solutions, but adaptable systems that evolve through context-specific feedback.



Figure 4. Iteration development and bio-waste in Cognac, France (Pjorkkala, 2023)

4 DISCUSSIONS

The BIO27 open-call framework reveals transformative potential for regenerative design education by restructuring learning beyond conventional studios. From a methodological perspective, the case demonstrates how extended, open-call-based projects can function as learning laboratories, where design education, research, and professional practice intersect. Key benefits include authentic professionalisation through super vernacular themes, which integrate real-world constraints such as extended timelines and public accountability. These elements foster competencies absent in ideation-focused courses, including prototyping, interdisciplinary collaboration, and reflexivity, while also enabling the formation of enduring networks with experts and communities (Microbium, TNP staff). Iterations in Georgia and France further demonstrate scalability, supporting the transferability of adaptive methodologies across contexts.

Taken together, these observations foreground three interconnected pedagogical contributions of open-call-based learning in regenerative design education: iteration as a structured learning mechanism rather than mere project continuation; open calls as externally situated frameworks that support students' transition from academic settings into professional practice; and regenerative design as a method learned through contextual adaptation and iterative feedback rather than predefined solutions.

Challenges remain, however. The study does not quantitatively assess learning outcomes or compare the open-call framework with alternative studio formats, which constrains the evidential basis for claims about enhanced learning or long-term impact. In addition, the study is based on a single case, which limits generalisability and calls for further comparative research across different institutional and cultural contexts. Open calls are competitive and often unpaid, which creates barriers for early-career designers, while the additional demands placed alongside academic workloads can generate significant stress. These issues reflect broader tensions within practice-based learning, underscoring the need for stronger institutional support and mentorship structures. Recognising these limitations, the paper refrains from presenting the BIO27 case as a definitive model and instead positions it as an example from which others can adapt elements, rather than replicate the entire framework, within their own contexts.

This case study therefore advocates embedding open-call elements into curricula through a modular approach. Open-call frameworks function as discrete, transferable pedagogical units such as fieldwork, external briefs or industry collaborations that can be integrated into existing curricula without structural overhaul. These modules retain key features of the open-call format, including external accountability, real-world constraints and interdisciplinary collaboration, while remaining adaptable to institutional contexts and fostering cross-disciplinary skills and regenerative expertise. For product design and engineering education, this approach highlights how technical experimentation, material research and systems thinking can be integrated with regenerative and contextual design frameworks. By bridging conceptual discourse and situated practice, it contributes scalable models for design education confronting planetary challenges and positions academies as hubs for systemic change.

5 CONCLUSIONS

This paper presents an open-call-based approach as a practice-based educational and research methodology for developing advanced student projects in design education. The BIO27 case shows how such an approach can strengthen product design curricula by integrating scientific research, local knowledge, and real-world practice. In doing so, it cultivates key skills and competencies, including resilience, sensitivity, and adaptability, which are essential for regenerative design. Crucially, the case illustrates how learning can extend beyond conceptual exploration towards sustained engagement with complex socio-ecological realities.

The approach proved effective across iterations in Slovenia, Georgia, and France. It combines nature-based, vernacular, and digital methods into a model capable of adapting to diverse contexts and global challenges. Rather than proposing a fixed educational model, the study suggests a transferable logic for structuring learning processes that support professional transition and long-term methodological development. Future work will explore how selected elements of this approach can be systematically integrated into standard curricula, contributing to ongoing efforts to operationalise regenerative design education and expand the pedagogical tools available to design educators.

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