

FILLING THE (EDUCATIONAL) GAP: DESIGNING FOR AND WITH THE FUTURE

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ABSTRACT

The Norwegian University of Science and Technology (NTNU) Department of Design continually explores innovative educational methods to support student creativity in higher education and position the university as an incubator of innovation. One track in this endeavour is to engage students in shaping their own learning environments, opening discussions on modernising design pedagogy and fostering a culture of empowerment and innovation. As part of this ambition, we tested a novel approach in the course Design in Wood. While our department is in an overall process of reconstruction and reconceptualisation, we saw an opportunity to involve students in literally shaping their own – and future design students' – physical environment. Working in interdisciplinary groups, students identified and analysed leftover spaces in the Design building and transformed them into useful places, based on current and future needs, aiming to enhance the use of circulation areas. This was not merely a theoretical design assignment but also involved that each group made a full-scale realisation of their design.

We interviewed the design students who took this course to explore the value of involving students in co-designing their joint environment and how such co-design exercises may contribute to modernising design pedagogy and foster a culture of empowerment and innovation. This work treats leftover and circulation spaces as sites for learning, identity, and empowerment, inviting students to co-design the very environments they inhabit. It combines full-scale making, spatial transformation, and student co-creation to modernise design education while adhering to diverse student needs, and ways of working. The approach may be useful for design educators, course coordinators, and university leaders who want to develop and establish strategies for turning campuses into inclusive incubators of empowerment and innovation. Potentially, external partners may benefit from the students' competences if paired with research funding. It may also benefit programmes beyond design that seek to engage diverse student groups in co-creating meaningful learning environments. Our findings indicate that the exercise strengthened students' sense of ownership, responsibility, and innovation. We argue that such assignments offer significant potential for turning universities into incubators of empowerment and innovation, offering a promising path for modernising design education.

Keywords: Co-design, learning environments, innovation in design education, furniture design/furnistruktures, full-scale making

1 INTRODUCTION

Design education increasingly needs to prepare students for complex, socio-technical and materially grounded problems. Yet we see a general drift in the design education toward more screen-based work and academic deliverables that can underplay craft, prototyping, and the tacit competences designers rely on in practice. In addition, there is increased pressure – and societal need – to educate students that are creative, solution oriented and innovative. This paper studies the experiences from a qualitative case study of a course in which students co-designed and built full-scale furniture and spatial structures – "furnistruktures" – for leftover circulation areas in their own design building.

1.1 Course context and intervention

The ongoing process of redesigning the Institute of Designs (ID) provided an opportunity to involve the students directly in this process. The intention in doing so was to support student ownership of the future learning environment, practical, non-digital making, tacit learning through working alongside skilled practitioners, and teamwork. The course Design in Wood _, given autumn 2025, asked students to "fill the gap" by identifying underused leftover areas in the design building and transforming them into useful

informal meeting places. This meant that, rather than designing an object for an exhibition or a hypothetical brief, groups had to respond to a real site, with existing constraints and users. The specific assignment was formulated like this:

“The Institute of Design is in the process of restructuring all areas.

Your job in DIW is to identify and analyse the useful (leftover) spaces in the ID building.

By adding furniture/structures, you should make good and useful places within the building, based on our current and future needs.

Fill in structures to enhance the use of all circulation areas; workplaces, social zones, individual spaces, etc.”

The students worked in small interdisciplinary teams of 3 students from design, architecture, and exchange students from abroad. They had access to expert craft support from a professional cabinetmaker (non-academic staff), enabling tacit transfer of know-how about wood, joints, tools and buildability. The course involved continuous work in shared spaces where passers-by could observe, ask questions, and provide feedback during the build. Hence, the assignment explicitly connected student learning to a tangible, shared outcome in the physical campus environment.

The idea of studying this course was born from something one of the researchers had heard when passing by one of the groups during their practical work in the design building.

“This is our legacy”

This simple statement was at the same time intriguing and awakened a wish to find out more about this learning experience and what may be learned from it.

2 CONCEPTUAL FRAMING

The project is grounded in three overlapping perspectives: students as partners, future-oriented design education, and the campus as a living learning environment. Together, these perspectives frame the design of furniture for leftover campus spaces not simply as an exercise in product development, but as a collaborative exploration of how universities can support future forms of learning, social interaction, inclusion, and sustainability.

2.1 Students as Partners in Design

The project builds on research on student–staff partnerships and co-creation in higher education. This perspective understands students as active contributors to the shaping of learning environments and educational practices. Recent research on co-creation highlights how students contribute forms of situated and experiential knowledge that complement the expertise of academic staff and institutional planners [1][2]. This perspective is particularly relevant in projects involving campus environments as students have direct experience of how campus spaces are used in everyday life; they know where people meet informally, where they wait between lectures, where they collaborate, rest, concentrate, or feel excluded. Therefore, designing furniture for leftover spaces becomes more than a design assignment; it becomes a way of investigating how campus life is experienced and how it might be improved. Research on student-staff co-creation also emphasises the importance of dialogue and transparency in collaborative educational processes [3][4]. Notably, partnership does not imply that all participants have identical roles or responsibilities. Rather, it involves recognising different forms of expertise and creating room for negotiation and shared decision-making. In a furniture-design project this means that questions concerning aesthetics, usability, sustainability, accessibility, feasibility, and maintenance become part of the educational process itself.

2.2 Designing for Future Campus Life

The project also draws on discussions about the future role of design education. Contemporary design pedagogy increasingly emphasises sustainability, systems thinking, and social responsibility alongside more traditional design concerns [5]. Design education is not only about developing objects, but also about understanding how design shapes everyday life and future ways of living together. Within this perspective, furniture can be understood as a spatial and social intervention rather than a functional object. Designing furniture for leftover spaces invites students to reflect on how campus life may change in response to new forms of learning, hybrid education, collaboration, well-being, and environmental awareness. Recent work on sustainability in design education argues that ecological responsibility should be integrated directly into design processes and educational practice [6]. This may involve working with reused materials, modular structures, repairability, adaptability, and low-impact

production methods. Leftover spaces may also be viewed as a sustainability resource: instead of focusing primarily on new construction, universities can explore how existing underused environments may be activated through relatively small interventions. It combines practical prototyping with exploratory and future-oriented thinking as the furniture proposals are not only intended to solve immediate needs, but open discussions about possible future forms of campus life.

2.3 The Campus as a Living Learning Environment

A third perspective concerns the understanding of the campus as a distributed and living learning environment. Research on learning spaces increasingly highlights the importance of informal and transitional environments alongside formal classrooms. Learning takes place not only during scheduled teaching activities, but also in corridors, entrance areas, staircases, cafés, waiting zones, and other in-between spaces.

Recent studies on co-designed learning environments suggest that learning spaces should be understood as adaptable environments shaped through interaction between users and surroundings [7]. Similarly, recent guidelines for active and informal learning spaces emphasise flexibility, movable furniture, and support for different forms of individual and collective activity [8][9].

This perspective is particularly relevant for projects focusing on leftover campus spaces. Such spaces are often overlooked because they fall outside formal categories of teaching and administration, yet they play an important role in students' everyday university experience. Research on in-between spaces shows how transitional and residual campus environments can support informal learning, social interaction, and belonging when carefully designed [10][11].

Furniture interventions can therefore be understood as small-scale acts of spatial activation. New "furnistruktures" may transform overlooked areas into meaningful parts of campus life. Research on campus design further suggests that spatial environments influence patterns of social interaction and community formation [12]. The project connects to broader discussions of leftover spaces as opportunities for adaptation, experimentation, and reuse [13]. In this sense, leftover campus spaces become places where alternative futures can be explored through interventions.

3 METHOD

We conducted a 45-minute group interview February 26th, 2026, with 5 students and 2 academic staff involved in the course. The interview explored experiences of the brief, teamwork, site-specific design, deadlines, learning by making, and we discussed possibilities for extending the concept to other courses and contexts. Analysis followed an inductive thematic approach. Speakers are referred to by role (student, course coordinator, staff) to maintain anonymity.

4 FINDINGS

4.1 Ownership, legacy and shaping the future learning environment

The students and staff experienced the interventions as a way of taking ownership of the building. By designing and building elements that remained in everyday use, the project changed the building from something fixed into something students could actively shape. This seemed to generate pride, both in the work itself and in the identity of the design program. A recurring theme in the group interview was a strengthened sense that students could legitimately intervene in the campus environment. The course coordinator described an emerging tradition of "using the building as if it is a bit ours", including the permission to "hack" and build in ways that would normally feel forbidden in institutional buildings:

"We use the building as if it is a bit ours... we can actually use it for more than just walking through and sitting here. We can develop it ourselves." (Course coordinator)

"We have started using the building in our own way. We can also hack it a little, build onto it in one way or another." (Course coordinator)

Students especially appreciated that their work could become visible, forming a lasting contribution rather than a short-lived display (Figure 1). Students worked differently when they knew the outcome would remain in the building and be used by others. The task felt more meaningful than a temporary exhibition piece or a conventional school assignment. Long-term impact seemed to increase commitment and raise the perceived stakes of the work. Their pride was obvious:

"It creates ownership... everyone gets to use it. In previous years projects were placed elsewhere, and I don't know where they are now, but this is here in the building for everyone's benefit." (Student)
"With this it becomes even more permanent. It becomes our legacy." (Student)



Figure 1. "Furnistructures" designed and built by students. Photos taken during building process with professional cabinetmaker and evaluation by academic staff. Photos: Dieter Van Dortmont

4.2 Tangible outcomes, real users and 'learning for the real world'

Because the outcome would remain in place, students invested more effort and were taking more responsibility for their design's impacts on others. This shifted motivation from "a project for us" toward "a project for the community," introducing authentic constraints. The build process also drew staff and other students into conversations, turning corridors into social learning arenas. Students emphasised the importance of designing for the actual place, rather than producing isolated objects. They started to notice when furniture or spatial elements felt misplaced – also in other environments – and appreciated making custom, integrated interventions that responded to the building's architecture and use patterns. This suggests a stronger sense of environmental and contextual design awareness.

"People put in more effort when it's going to stand here and be used by people. You're doing something for others and for the future." (Student)

"You generate a lot of discussion with people who pass by, and that creates engagement." (Course coordinator)

"We had dilemmas because many people came by with thoughts... we got feedback that if it sticks out too much it could be hard to pass." (Student)

4.3 Non-digital, full-scale making as a 'breathing space' in academia

The participants compared this course with more digital, theoretical, and academic forms of study. It was experienced as a valuable counterbalance to the non-physical characteristic of design education. Also, the practical use of tools, materials, and full-scale construction helped students understand design in a more embodied and concrete way. Several participants described this as healthy, human, motivating, and closer to how they wanted to work as designers, repeatedly contrasting the course with screen-based work. Full-scale building was described as refreshing, embodied and personally meaningful – offering a "breathing space" from academic routines. Importantly, students framed making not as anti-academic, but as a way of grounding theoretical knowledge in experience.

"It reminded me how I like to work... try, fail... not sit in front of a PC all day, but use hands and body. I missed that a lot in everyday school." (Student)

"It's valuable... you can say wood swells in summer, but it means nothing until you've handled it and seen it." (Student)

The course gave direct experience with a material rather than abstract knowledge, stressing that practical engagement helped them understand issues such as fit, assembly, and material behaviour in ways that theory alone could not. Wood was also seen as a good teaching material because of "its low threshold for starting, but high threshold for mastering well". Furthermore, it offered something scarce in academic education, access to tacit knowledge, and an escape from the digital world. As any tacit knowledge, this is hard to grasp. However, at the end of the interview, the course coordinator formulated something that made a strong impression on all interviewees:

"There's something deeply human in making." (Course coordinator)

4.4 Interdisciplinary teams, working together by doing and time pressure

Mixed groups of students created both challenges and benefits. Participants suggested that physically making something together requires a different kind of collaboration than theoretical teamwork. It fostered stronger interpersonal ties, practical negotiation, and a more immediate understanding of each other's perspectives. Teamwork in this course was described as very different; creating teambuilding through shared action, including negotiation under time pressure.

"We learned to do something together - not just discuss. When you solve something physical together it creates closeness, because it's complex." (Student)

"When you're standing and building right next to each other, it becomes another type of teambuilding." (Student)

"We were mixed - architecture students and design students... also exchange students, so we got language barriers and new perspectives." (Student)

The design process itself was not linear. Students described experimenting, receiving feedback from passers-by, adjusting ideas, and sometimes changing direction late in the process. Time pressure was present, especially in the final phase, which seemed to push decisions forward. The learning process was therefore closely tied to trying, failing, adjusting, and building (iterative).

4.5 Co-design beyond the group: feedback from users and inclusivity

Although the interventions invited comments from others, participants noted that this input often came later in the process, rather than in the early ideation phase. One student explicitly reflected that there could have been more involvement from the wider building community. So, while the project supported participation, it was only partly co-design beyond the student groups themselves. Participants described how the installations generated conversation, curiosity, and informal interaction among students and staff. The interventions did not only solve spatial problems; they also worked as social catalysts. Passers-by commented, asked questions, and became involved in discussions, influencing the design process. However, broader co-design involvement was limited in the earliest idea phase. The students suggested earlier and systematic user engagement could improve fit between intention and use. Nevertheless, the project's openness made it visible and inviting, contributing to a building identity that signals student presence, supporting informal ways of working.

"Maybe more involvement of the rest of the people who use the building - to get more opinions in the course." (Student)

"I notice the furniture isn't used the way we thought... but that's not a bad thing. It works, but we may have missed something in the use." (Student)

4.6 Need for interactivity, feedback and accountability

When discussing how the approach might scale to other courses, students were critical of passive digital delivery. They suggested that digital components should be short, interactive, and tied to action, and that frequent feedback is necessary to sustain engagement.

"In the cases where everything has been digital... it's just a lecture. It's completely useless to watch lectures while you walk; it doesn't stick. But interactive modules - where you click through and answer - can work." (Student)

"We need some feedback that makes it move forward." (Student)

Contrasting this course with conventional lectures, they argued that passive lecture formats are difficult to engage with, while interactive formats, staged deadlines, and feedback supports participation. This broadens the relevance of the findings to design pedagogy more generally.

5 CONCLUSIONS

This study suggests that full-scale, site-specific making in an educational setting does more than teach material skills. It fosters ownership, strengthens disciplinary identity, activates social interaction, and makes design work feel meaningful because it has visible and lasting consequences. The case illustrates how a site-specific, full-scale co-design brief can 'fill an educational gap' between studio talk and professional action. Across themes, the intervention cultivated student ownership of the future by making their work materially consequential. Their designs altered daily movement patterns, supported informal meeting, and became part of the building's identity.

From a learning perspective, the project centred tacit knowledge. Students described how concepts like wood movement became meaningful through handling and observation. This resonates with tacit knowledge theory and reflection-in-action, where understanding emerges through iterative engagement with materials and constraints. It also aligns with research on maker-centred pedagogical infrastructures, where learning develops through ongoing relations between tools, spaces, materials, and collaborative activity. The project also functioned as a different social infrastructure for teamwork and inclusion. Mixed groups brought diversity of perspectives, and the open build site invited informal feedback. At the same time, students noted that user involvement arrived late, suggesting that incorporating structured early-phase co-design activities could strengthen inclusivity by allowing a wider range of users and needs shape the project from the start. Finally, deadlines mattered. Rather than treating time pressure as a necessary evil, participants described time-pressure (deadlines) as the mechanism that kept them making continuously and learning from it.

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