

Beyond the classroom: hands-on activities for a tactical action in a university campus courtyard

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Abstract

The paper reports the outcomes of a “circular” design and self-construction workshop developed with master's degree students in architecture and design at the Politecnico di Torino (Italy). The project is set in a real-world context, which the hands-on activities aim to transform and improve. The activities allowed experimentation with “circular” construction solutions, starting with the use of waste materials as a resource, which led to the creation of furniture in the courtyard of the university campus, transforming it from a fragile space to a place with a new collective value. The learning experience is aimed not only at the acquisition of practical skills by students, but also at reflecting on how to transform waste into a new material for projects, through a low-cost tactical action that started from a need of the students and was developed by the students themselves, involved in the construction of a community space.

Keywords: hands-on activities; learning-by-doing; “circular” design sprint, self-construction, tactical action.

1. Introduction

Schools of Architecture and Design around the world increasingly recognize the strategic value of hands-on activities as fundamental competence of their educational curricula. Some technical universities - such as the Massachusetts Institute of Technology in Cambridge (USA), the Eidgenössische Technische Hochschule in Zurich (CH), Auburn University in Alabama (AU), and the University of Central Lancashire in Preston (UK) - have long been investing in new teaching models that allow theory to be applied to practice and include experimentation and prototyping as a way of learning by doing, with the aim of developing students' practical skills and strengthening their understanding of the subject matter (Mackintosh, 2014).

The paper reports the outcomes of a design sprint and self-construction workshop developed with master's degree students in architecture and design, as part of the course *Designing and Developing the Circular Economy*, conducted at the Politecnico di Torino in Italy.

The outputs and outcomes of this educational experience will be presented, and its goals will be discussed. In particular, the workshop aimed at:

- experimenting with a practical learning model to engage architecture and design students;
- working with students on the principles of the circular economy;
- operating on a real space with real needs by tactically transforming it into a collective place for students.

The originality of the contribution consists in presenting a learning experience not only aimed at the acquisition of practical skills by students but also at reflecting on how to transform waste in a new material for projects, giving it a new life. Schools of Architecture and Design must in fact invest in new educational models that can prepare students to become professionals capable of dealing with the potential and difficulties of applying circular economy principles in practice (Giannoccaro et al., 2021).

Moreover, the contribution illustrates a project that is set in a real-world context, which hands-on activities aim to transform and improve. This is a tactical action project that, through a temporary, low-cost intervention, aims to stimulate long-term changes (Sasser, 2017) by engaging students and teachers in the creation of installations for the physical and social regeneration of a public place.

The hands-on activities described in the contribution allowed experimentation with circular construction solutions, which led to the creation of furniture in the courtyard of the university campus, transforming it from a fragile space to a place with a new collective value.

2. Improving university outdoor space: the project brief

Activities correlating practice, circular economy, and tactical actions are strongly promoted by the Technology of Architecture and Design research group of the Politecnico di Torino, which has been conducting experiences for years in collaboration with the Innovative Technology Systems Laboratory (LaSTIn) of the same university. In particular, the article describes an activity conducted as part of the course “*Designing and Developing the Circular Economy*”, an interdisciplinary course involving students with different educational backgrounds from master's degree programs in Architecture and Design, with the aim of training new professional figures with transversal skills that can prefigure circular solutions for different building and design sectors (Montacchini et al., 2024).

As part of the course, students are involved in a ‘circular’ design sprint activity as an opportunity to practice applying some of the principles of designing for the circular economy, with a focus on reuse, repurpose, upcycling and disassembly of materials and products at the (supposed) end of their useful life.

The experience described in the article refers to the a.y. 2022/2023, when thirty students were called upon to design and create, in only eight hours of time, temporary furniture for the Morgari street’s courtyard within the university campus, where the LaSTIn Laboratory is also based. The courtyard, although recently renovated, looked like an anonymous space, completely bare and devoid of furniture and equipment.

The project brief responds to a need that has long been felt by the student community: to equip this space with furniture to make it a usable place for all in which to carry out activities for study but also for relaxation, recreation, food consumption, meeting and socializing. To improve outdoor spaces on college campuses is a well discussed need to which it is important to respond. As some articles on the topic highlight, carrying out study and recreation activities outdoors has positive effects, perceived and objective, on students’ health and well-being (Dadvand et al., 2016; Wilson, 2018).

3. ‘Circular’ materials

The challenge of the proposed brief is to combine a design goal in a real-world context with an unconventional design approach, in which waste materials drive solutions, inspire form and function. Axes, pallets, wooden boxes, signal nets and waste materials from the recently completed construction site, piled up in the campus courtyard itself, became the Km 0 materials from which to start educational experimentation, thanks to the immediate availability of “raw material” (Figure 1).

Such materials have become the new resources for design, have inspired concepts, have been the “medium” through which to learn and develop observational skills, particularly useful for redesigning second lives and new uses of the same.

Waste materials were also an opportunity to experiment “in the field” with the potential and difficulties of circular design processes.



Figure 1. The Km 0 waste materials used in the project: axes, pallets, wooden boxes, signal nets from the construction site became the available materials from which to start educational experimentation.

4. Hands-on activities and the 'circular' design sprint

The adopted approach was the design sprint, inspired by the Google Venture methodology used to solve critical issues through prototyping in a short time (Knapp et al., 2016). The term 'circular' refers to the fact that the design solutions identified during the process are closely linked to the availability of present materials destined for the landfill. Students had to design and self-construct tables, benches, chaise lounges, and stools taking into consideration the limited amount of waste and its defined shapes and sizes (Figure 2).



Figure 2. From yard waste to temporary furniture for the campus courtyard: tables, benches, chaise lounges, and stools self-constructed by students.

The workshop was divided into two challenging and intense half days of work, four hours each. The first half-day consisted of harvesting the materials and the technologies and tools available at LaSTIn, initial cleaning of the materials, concept definition and prototype creation. The second half-day was aimed at reviewing the prototype, finishing work and releasing the artifacts.

Students first observed and selected the source materials that guided the concept, sensing opportunities for new life from the waste. The students then became familiar with tools and equipment, performing initial machining and testing ways of connecting elements. For example, they experimented with unhinging pallets to make planks, sanding, drilling, cutting scrap materials, and joining them through dry connections such as screws, nails, and joints. At this stage, it was also possible for them to observe what are the difficulties of working with imperfect materials and semi-finished products that, unlike new ones, require quite a long time for technical processing of cleaning and sorting.

Concept definition was carried out by students divided into small groups. They each brainstormed on the possibilities of using the available materials, based on the dimensional, material and sensory characteristics of the materials and what they were able to evoke. For example, a construction net was imagined as a backrest for a seat because of its flexible characteristics and mesh-like appearance, just as a wooden box was imagined to be used as a base for a bench.

Finally, the implementation of the prototype allowed the concept to be verified and tested students on the effectiveness of the solution as a whole, enabling them to reflect on the adoption of non-traditional design solutions, based on a circular design approach, with a limited amount of time. In fact, the time factor is not secondary in the process. Having a limited amount of time to finish the project means taking care to limit the amount of processing and transformation required as much as possible. This implies that the project will be all the better the more it is able to enhance and integrate within it the materials in their original state. It means learning to interpret and see waste for its strengths.

5. Results and conclusions

The activity described in the article is not a single experience, but rather a component of a didactic experiment that is currently underway within the context of our academic courses (<https://www.youtube.com/watch?app=desktop&v=hesmoTo2prc>). Starting from specific project opportunities, the potential of reusing waste materials is investigated and the challenges involved in proposing a practical approach with technologies appropriate to the context and the actors are discussed.

The results of the experience described were multiple, and not just educational. Through the hands-on activities, students learned how to build, assemble, and make, and how to design, manage, plan, honing hard-skills related to materials, technologies, and equipment. In the meantime students increased soft-skills that will be fundamental to their future profession: team work, creative thinking, problem solving, organization (Figure 3).



Figure 3. Hands-on activities and students' soft skills.

The hands-on work, in addition to providing an opportunity for learning technical skills, fostered intense moments of relational exchange among the students, becoming an opportunity for participatory design, knowledge co-generation and experience sharing in a real project context. The teaching evaluation questionnaire - prepared by the Joint Teaching Committee (Comitato Paritetico per la Didattica – CPD) to check the quality of the teaching and the satisfaction of the student community - returned positive data on learning and skill enhancement. Students' comments emphasise the value of bringing theory and practice closer together and for the opportunity to engage in hands-on experimentation.

Specifically, the project contributes to the growing research on innovative educational modes in the field of circular economy, investigating the effectiveness of hands-on learning models that enable reflection on the new life of waste that can become part of the project as new materials. An educational mode that starts “from the bottom,” from discarded matter, from waste, to experiment and learn the principles of circular design, promoting reuse and waste reduction. This form of design practice has great potential not only as a learning method, but also as a solution for the transformation of weak spaces. In fact, in terms of physical-spatial outcomes, the activities conducted made it possible to enhance an underutilized but highly significant courtyard as a relational space outside. The qualitative assessment, carried out through direct observation, shows that this tactical, low-cost action, started from a need of the students and developed by the students themselves, led to the construction of a community space. Students have reappropriated an empty courtyard, equipping it to be used for leisure activities in the

intervals between classes, as a space for eating meals outdoors, and for moments of pause, relaxation and sharing. The teachers themselves are using the new equipment to organize outdoor lectures and informal gatherings with students (Figure 4).



Figure 4. Ways of use: outdoor lectures and moments of relaxation.

The space previously perceived as unhelpful and meaningless is now a “place” experienced and cared for by those who made it with their own hands, investing their own time and energy. In this sense, the design sprint activity was an opportunity to bring out, on the one hand, the potential of the space and, on the other, a way to provide immediate solutions to a felt need through prototypes. This also made it possible to raise the university's awareness of the issue and have it address it with more defining furniture solutions and perhaps, why not, designed according to the principles of design for the circular economy.

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