

Business as Unusual: Pedagogical Experiments at ESALA

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The relationship between design, material processes and their application has been a consistent theme in the teaching and research at the Edinburgh School of Architecture and Landscape Architecture (ESALA), at the University of Edinburgh. This work was strengthened and consolidated with the formation of the Architectural Research Workshop (ARW), and with its increased ability to produce large-scale prototypes, and has intensified in recent years as we rethink architectural pedagogy in response to the impacts of climate breakdown and its associated injustices. This paper presents a selection of courses and pedagogies, developed by academic staff at ESALA, that seek to take the environmental crisis as an opportunity to prototype novel construction materials, fabrication protocols, and architectural design methods, foregrounding an open-ended design process that privileges encounters with pre-existing materials over the architect's own aspirations and ideas. In three teaching projects, and across several years and programmes, we outline an approach that emphasizes reuse and repurposing practices in relation to making (material processes and affordances) and making visible (diverting material flows; reclaiming values and valuing protocols).

The three projects discussed—the MSc program “Material Practice,” and two studio options within the BA/MA undergraduate Architecture Honors Program (a third-year unit entitled “Radical Coauthorship,” and a fourth-year one entitled “No Blank Slate”)—encourage a direct engagement with material histories and ecologies (surveys and classifications) and fabrication processes (experiments and full-scale prototyping), demonstrating a probabilistic approach that draws and develops designs from latent and embodied opportunities. These approaches demand that work be not (only) assessed according to final outputs (the considered object or building as desirable outcome), but in relation to the technical platforms, material flows, supply chains, and labor practices associated with them, questioning our very assumptions and biases in the adjudication of meaning, beauty, and value.

MATERIAL PRACTICE¹

One should design merely what can be executed, but always in the most advanced manner and without recourse to imitation.

—Jean Prouvé. *Une Architecture par l'industrie*²

The above quotation encapsulates the pedagogical basis for the “Material Practice” MSc program, in which students are prompted to consider the affordances of both materials and processes of production. This approach was developed in an earlier studio located in the Architectural Research Workshop (ARW), and predicated on innovative materials. The students, working in small groups over a six-week period, would explore the use of flexible fabric formwork for concrete, and develop an intense series of material prototypes and experiments through which, by considering a variety of parameters (e.g., form, texture, accuracy, connections), they would develop both tacit and explicit knowledges. During the fourth week of the course, proposals would be prepared for a final prototype piece, which would be experimental, constructed at as large a scale as possible, and achievable within the time available. Yet the prototype was not important in itself, but as the embodiment of a continuous trajectory of knowledge creation, and was supported by a rigorous and painstaking process of documentation and reflection.

The merger of the University of Edinburgh with the Edinburgh College of Art (ECA) in 2011 allowed these pedagogical experiments to continue, and to be broadened to include craft and other design practices, (product design, textiles, glass making, etcetera), leading to the cross disciplinary MSc programme “Material Practice.” Students now arrive from many different design disciplines and academic backgrounds, and are inducted into a range of studios and workshops, including the ARW, hot and cold glass, textiles, metal work, and casting. A key concern for the programme is the Circular Economy (CE), with projects engaging a wide range of materials and processes, as well as addressing issues of resource extraction, recirculation, consumption, and disposal.



Figure 1. Painting with PLA, Sam Cornwell, ESALA 2017-18. (left). Strategies for Connection - reusing aluminium mullions, Eirini Atmatzidou (2017) and Pablo Sanchez (2018). (right). Tutor: Remo Pedreschi.

One of these projects focused on the waste recovered from the local dredging of canals, which, following dewatering, is otherwise dumped to landfill. The material was first dried and sampled. Having tested its properties and verified its composition (mostly silt, clay, and fine sand), the students then developed several samples, protocols of uses, and prototypes, including a pressed block, a cement stabilised block, a concrete replacement, and extruded clay blocks, which were fired in a kiln by a student with a background in ceramics. However, given the short timeframe of the program, which is only two-semester long, working with external organisations and public corporations such as Scottish Canals presented a number of logistical difficulties, and our focus turned toward the ECA, itself a considerable consumer and producer of waste. Here, students identified waste sources and their potential affordances, in the sense coined by James J. Gibson.³

The ubiquitous use of 3D printing across the College was identified as a significant waste source, characterized by relatively large volumes of failed or discarded print. Recycling points across the campus were established. The recovered scrap was classified, separated, shredded, and remelted to produce a stiff flat board that could be laser cut. Remelting at higher temperatures caused the white PLA, to discolor and flow. While this was initially deemed to be a disadvantage or hindrance, students tested and harnessed these unwanted processes to create artworks, developing marbled surfaces similar to those found in natural stone.

The final example concerns a significant number of aluminium box mullions, which had been left over from an earlier research project at the College. Students used the aluminium in a variety of configurations, initially to explore simple ad-hoc smelting and casting operations, and then to investigate the original components' formal and material affordances. The form and the material having a greater affordance than the material

itself. Inevitably, projects started to focus on the design of connections, fabricating nodes from scrap plywood pieces or cutting and reshaping the sections themselves.

In all these projects and across the years, the work always progresses by seeking affordances (what an object can do in relation to specific tools, bodies, or other objects) before design.

RADICAL COAUTHORSHIP⁴

The second pedagogical experiment is a third-year undergraduate studio that has been running at ESALA for the past three years. While also privileging physical prototyping and the encounters with embodied (pre-existing) materials, the "Radical Coauthorship" unit pursues the repurposing and revaluing of objects that have been discarded, or that are usually thought of as having no role to play in an architectural context. Understanding obsolescence as a temporary loss of value, rather than as an objective or definitive physical state, and presuming that any object (discarded toys, rags, polyethylene bottles, milk cartons, glass bottles, etc.) can be potentially woven into productive architectural ecologies, students identify and divert local waste flows, transforming discards or devalued items into materials and units of construction.

The work begins by sourcing (and paying attention to) the selected discarded objects, and with operations such as cleaning, surveying, measuring, and classifying. Having studied the objects' history and composition, students start experimenting with them; testing affordances and prototyping three-dimensional assemblies. Here as in "Material Practice," the unit allows existing objects to steer design investigations and potentials, introducing students to a distributed and participatory understanding of creativity, in sharp contrast with the discipline's hubristic tendency to consign architectural value to concepts or authorial intents, or with its associated reliance on the extraction of primary materials.⁵

As students are free to select the items at the center of their investigations, a wide range of materials and technical operations have been represented over the years, from the slumping of glass bottles to the production of bioplastic sheets and dyes made out of spent avocado pits or orange peels. These activities are not strictly technical, but engage broader questions concerning the attribution and preservation of value in an architectural context. Following Mary Douglas' articulation of dirt as a relational and socially constructed category, one group collected human hair at local beauty salons, and began to study their properties and capacities.⁶ While the material is often associated with a sense of revulsion and abjection, the students tested several techniques and revaluing formats for its use as fibers, developing quilted and felted sheets of various textural qualities, to be used as architectural surfaces and envelopes.

Another group discovered that the metal scrapped in Edinburgh is shipped to distant Asian countries for recycling, and the



Figure 2. Exhaust Chair, Cameron Angus, Jamie Begg and Hannah Davis, ESALA 2018-19. (left). TetraHak/TetraPa(r)k, Alannah Marie Cumming, Andrew Stuart Wyness, and Kaja Isobel Hellman-Hayes, ESALA 2019-20 (right). Tutors: Simone Ferracina & Asad Khan.

resulting sheets of metal are then shipped back for use in the UK. Avoiding the carbon emissions associated with the global transportation and recycling of scrap metal, and promoting its local repurposing, with minimal expenditures of additional energy, the students developed a number of prototypes involving the transformation of discarded objects (bicycle wheels and chains, car parts, gutters, etc.), including a chair made of spent car exhausts. Here, the students also investigated a spectrum of reconditioning operations and textural expressions, from the cleaning and polishing of metal using vinegar and other compounds, to the preservation of rusted surfaces as indexes of previous lives and uses.

In the unit, we also develop tools to register and draw material flows and the generation of solid wastes, and to recognize them as potential resources and opportunities. Having tracked the discarding of materials in a nightclub, for example, one group collected and diverted the discarded plastic corks and cocktail mixers, which cannot be recycled, and used them to fabricate a modular system for the assembly and disassembly of structures, tested with full-scale furniture prototypes.

Beyond the literal impact or scalability of these projects, or their actual ability to reduce material throughput, and in opposition to similar experiments developed, for example, by Martin Pawley in the 1970s,⁷ the pedagogy of the unit aims not only to privilege reuse and repurposing as a 21st century ethos for architectural design, but also to reframe materiality and value

as not natural, objective, or given, but as something that is indeed designed, and that architects must increasingly address, both by promoting new collective imaginaries and horizons of use--new forms of life--and by recognizing the (often violent) physical and historical systems that engender them. When students established, during the eleven weeks of the course, weekly rituals for the collection of milk cartons from local cafes, which were then washed, folded inside out, and transformed into bricks (which performed surprisingly well under compression), or when another group sourced, diverted, washed, and repurposed discarded clothes, and filled them with spent coffee grounds to form large (and intrinsically human-scaled) building blocks—they discovered that these manual or lowly processes of preparation, reconditioning, collaboration and care are, indeed, design processes with a capital D.

NO BLANK SLATE: ARCHITECTURES OF REUSE⁸

A fourth year Architecture undergraduate studio course titled “No Blank Slate: Architectures of Reuse” is the third pedagogical experiment we consider in this paper. The studio focuses on the reuse of building components and on the rehabilitation of existing building sites, asking students to consider “sustainability”—sustainable development, and building materials in particular—as dependent on evolving and highly localized and contextualized processes, geographies, and conditions. Sustainability, in the studio, cannot be identified in general, or without knowing where materials will be used and come from, who they affect, or how they are extracted,

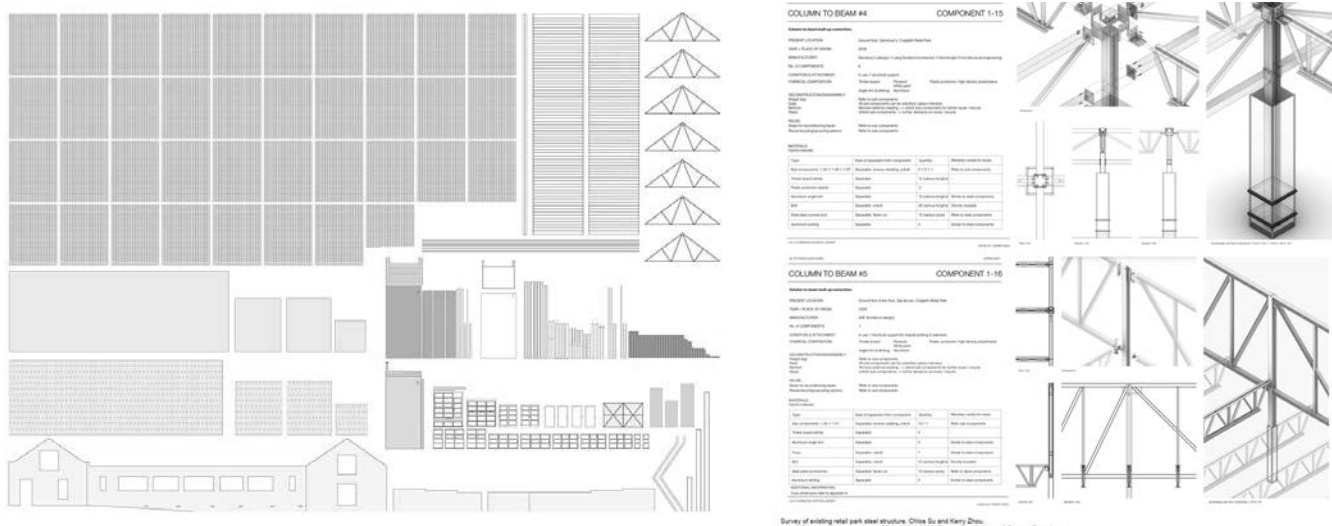


Figure 3. Material inventory of 16 Annandale Street, Edinburgh. Pauline Ramos, Alisa Wang, Manuel Ojeda, and Maria Tan. ESALA, 2020-21. (left). Survey of existing retail park steel structure. Chloe Su and Kerry Zhou. ESALA 2019-20 (right). Co-tutors: Moa Carlsson & Simone Ferracina.

produced, assembled, disassembled, and disposed of. It is not attained by ticking boxes or complying with manuals and regulations, but involves situated knowledges, and the students' own judgements and commitments. Indeed, much of the violence and injustices the built environment inflicts on humans and nonhumans (for instance, through pollution-based forms of colonialism)⁹ is sanctioned by existing legal and social frameworks.

The studio is organized in three interrelated and consecutive steps: site survey, component and material research, and design intervention. Students begin by surveying a building scheduled for complete demolition in Edinburgh. At this stage, they record, measure, and draw the site, as well as study its urban and environmental context. Challenging the need for total razing, they identify opportunities in the existing conditions--observing and taking stock; researching live planning drawings, documents and proposals; reviewing the official correspondence, as well as online community forums; and considering historic maps, and material trajectories across time and space.

Here too, projects have ranged from the repurposing and diversion of local retail parks, with thick gabion walls made out of shopping carts filled with construction rubble; and public facilities constructed by connecting and filling whiskey barrels, to the rehabilitation of an existing library, with is insulated with straw and reclad with materials found/moved on site, or sourced locally. A common trait, however, is that structures of uncertain architectural merit are read, understood, and valued for the energy, labor, and carbon they embody.

The survey usually results in the careful drawing of structures to be maintained and revalued; in a catalogue of embodied materials, components, and parts available for reuse and

repurposing; as well as in diagrams that identify different "shearing layers" (with reference to the concept elaborated by Stewart Brand), construction assemblies, and conditions of attachment¹⁰ The survey and catalogue--rather than abstract concepts or ideas--become the starting point for the students' design proposals.

In addition, to better understand where the existing building components come from, as well as the effects of the associated material extraction on "reciprocal landscapes"¹¹ that are often far-removed from the site, we ask students to curate illustrated biographies of components and objects. One student investigated the life of whiskey barrels, from the harvesting of oak trees in the United States, to the repeated uses of the barrels in Scottish distilleries, to secondary functions, deconstruction, and the eventual use as biofuel. Another student revealed the journeys, uses, and progressive exhaustion of locally quarried slate—a common roofing material in Scotland.

Using the findings from this research, students begin to explore suitable ways to intervene on their demolition site curating deletions, additions, and recombinations. Starting from a reality that is complex, messy, and constraints-ridden, they begin making decisions about what design programs, reuse and repurposing strategies, and material and component choices are sustainable in the context of their plot, in this city, and at this moment in time. This localized and time-bound approach to design is what we term a "no blank slate" pedagogy.

CONCLUDING THOUGHTS

The label "business-as-unusual" has gathered three pedagogical responses to the climate emergency, aiming to test design methods and approaches that are not predicated on consumption, waste, the extraction of raw materials, and the associated injustices. In no sense are these competitive but

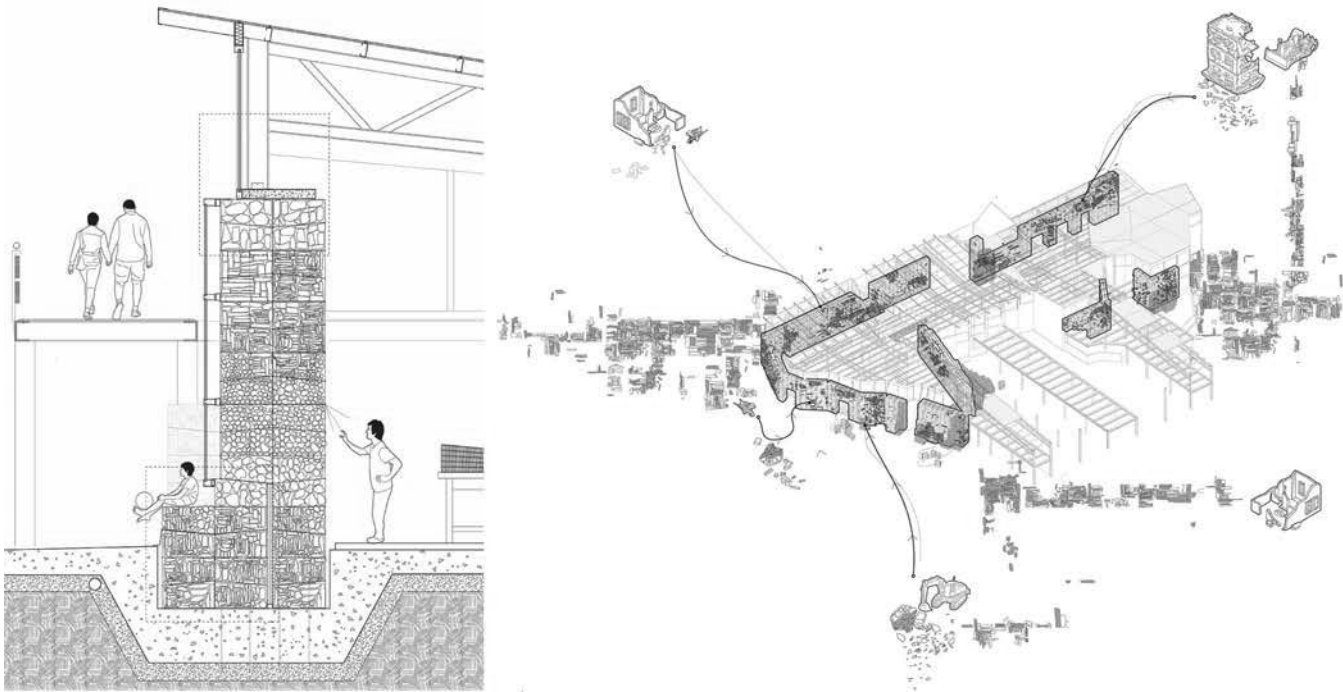


Figure 4. Gabion walls made of shopping carts. Sonakshi Pandit. ESALA 2019-20. Co-tutors: Moa Carlsson & Simone Ferracina.

rather complementary. A common focus on existing buildings and embodied materials grounds the three approaches, prioritizing encounters with that which already exists to ideas and intents about what could be, which often rely on virgin materials transported from far-away places, and on modernist notions of improvement.

These encounters take on many forms—the acquisition of knowledge through material processes of fabrication and assembly; the curation of precise taxonomies and systems of classification and revaluing; the tracing of object biographies and material histories; the surveying of existing structures and opportunities; the identification of risks, uncertainties, and toxicity levels; as well as cleaning, repairing, and reconditioning operations. In the three courses, these encounters are understood as preceding (and as generative of) designs, but also situate teaching within a probabilistic framework of collaboration—of learning together, from one another, and from the materials at hand.

In the three courses described above, exemplifying this open-ended pedagogy, the final outputs and results are not known in advance. Tasks have a plurality of answers and solutions, and outcomes can be completed in more than one way. What is ultimately produced depends on the students' engagement, progression, and navigation through uncharted territories and materialities. Different students may use different methods and strategies, and there are no predetermined correct results. At times, this open-endedness can be overwhelming. At other times it is hugely stimulating and empowering, and often

emancipating. Success largely relies on active and protracted communication and interaction between students and instructors, between hands and materials, and on ongoing dialogue and intellectual exchange. Because the described material exploration and the delight and surprise that follow prolonged experimentation cannot be reproduced or captured in high-quality graphics produced at the last minute for the sake of a final presentation, the (in architecture schools) common end-of-year-charette (an intense period of work immediately before hand-in) becomes irrelevant.

Read in this way, the three courses also begin to question the output-oriented approaches of much architectural practice and education, considering the creation of knowledge and value—and the learning trajectories thus woven—more important than the designs themselves. If design can revalue objects, and if revaluing involves situated, emplaced, embodied, and committed encounters—as well as practices of care and maintenance—shouldn't these practices correspond with a weakening of the architectural object, understood as a commodity exchangeable on the global market?

Going forward, these approaches, started independently of each other, but will grow from each other towards a collective understanding, towards an 'ecology of solutions', that is not the result of a "directive," but a consequence of a predisposition towards a responsive, open-ended, and student centered pedagogy. It is hoped that the output will continue to be surprising.

ENDNOTES

1. MSc Material Practice, ESALA, Edinburgh College of Art, The University of Edinburgh. Designed and led by Remo Pedreschi.
2. Benedikt Huber and Jean Claude Steinegger, *Jean Prouvé. Une Architecture par l'industrie*. (Zurich: Editions d'architecture Artemis, 1971), 11. Quoted in Hubert Damisch, Anthony Vidler, and Julie Rose, *Noah's Ark: Essays on Architecture* (Cambridge, MA: The MIT Press, 2016), 236.
3. James J. Gibson, *The Ecological Approach to Visual Perception* (New York: Psychology Press, 2011).
4. Unit 2 "Radical Coauthorship," AD3 Explorations, ESALA, Edinburgh College of Art, The University of Edinburgh. Designed and led by Simone Ferracina with Asad Khan.
5. This argument, and a philosophy of design and value geared towards the radical uptake of reuse and repurposing in architectural design, are further developed in a forthcoming book. Simone Ferracina, *Ecologies of Inception: Design Potentials on a Warming Planet* (London and New York: Routledge, 2022).
6. Mary Douglas, *Purity and Danger: An Analysis of Concepts of Pollution and Taboo* (London and New York: Routledge, 2002).
7. See, for example, Martin Pawley, *Garbage Housing* (London: Architectural Press, 1975).
8. Unit 3 "No Blank Slate: Architectures of Reuse," AD4 Tectonics, ESALA, Edinburgh College of Art, The University of Edinburgh. Designed and led by Moa Carlsson and Simone Ferracina.
9. Max Liboiron, *Pollution Is Colonialism* (Durham: Duke University Press, 2021).
10. Stewart Brand, *How Buildings Learn: What Happens after They're Built* (New York, NY: Penguin Books, 1995).
11. Jane Hutton, *Reciprocal Landscapes: Stories in Material Movement* (Abingdon and New York, NY: Routledge, 2020).