Reseach Report
version 3 | 23.06.2025

Values in the Making

Exploring ecologies of making for Architectural Education

Max Bernaerts | 4852192
AR3EX115 | Explore Lab 39

supervisors:
Eireen Schreurs
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Academic architectural education trains students to operate within an abstracted reality, operating through drawings, models, and calculations to bring together materials and approach design challenges. While this abstraction facilitates the dissection of complex problems, it risks disrupting the direct relationship between (future) architects and the materials they work with. Limited opportunities for hands-on engagement with materials and their processes on a full scale can alienate students from the tactile, contextual, and embodied knowledge of materiality.

This research explores ways of overcoming that material alienation by investigating the act of making as a physical material encounter within the context of architectural education. Emphasis is placed on both the pedagogical qualities and the spatial contexts of the act of making, with the aim of deriving its value for architectural education and exploring how a school environment can facilitate, or even stimulate, these activities. On a broader scale, it addresses the relationship that our mainstream building culture has with materials, accepting the extraction, processing, consumption and eventual disposal of precious resources.

Firstly, in terms of the pedagogical qualities of making activities, this research focuses on the acquisition of tacit knowledge as a result of encounters with the physical and sensory dimensions of different materials and through the body-based appropriation of (a master's) knowledge. It examines how working directly with materials can provide students with valuable insights into the inherent properties, limitations and behaviour of materials. This, in turn, leads to a more profound comprehension of resource cycles, modes of application and expressive potential.

Secondly, looking at the spatial contexts of making, hereafter referred to as making ecologies, this research provides an insight into the organisation of infrastructures that facilitate making activities. From three case studies, characteristics such as the nearness of materials, tools and skilled people, as well as the availability of open, unprogrammed space, are identified as shaping the character of a place in relation to making.

Projecting these findings onto the content and context of architectural education, this research concludes that hands-on exercises cultivate a conscious and intuitive sensitivity towards materials. These embodied learning experiences help students develop a more grounded understanding not only of materials, but also of assembly, craftsmanship, and construction, allowing future architects to develop the insights needed to engage with the discipline in a more critical and responsible manner.

Act of making, architectural education, tacit knowledge, material properties, making ecologies

content

the principle of (im)posibilities

preface

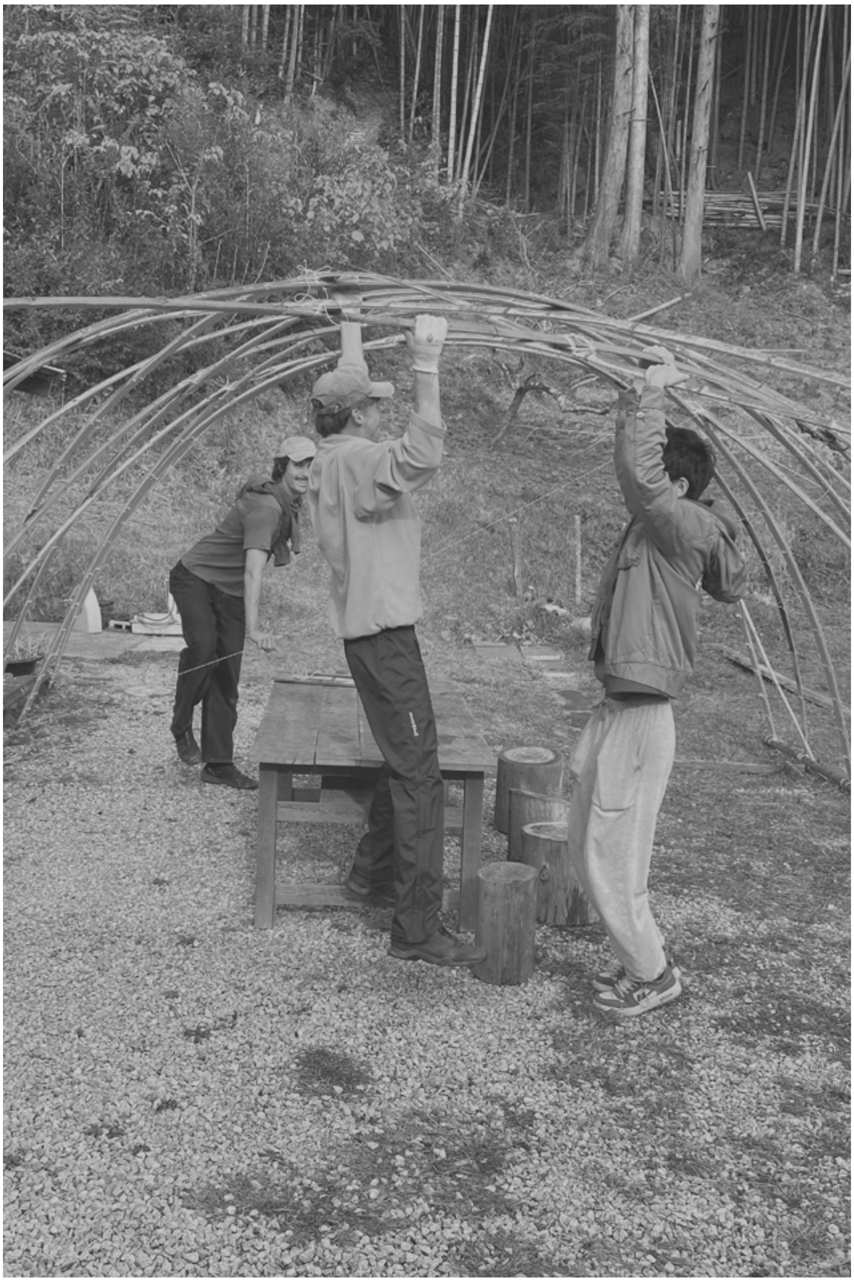
Just one and a half hours' drive from Tokyo, through the tunnel and over the bridge that crosses the bay, as if the ocean itself is the only border of the ever further expanding city, lies Kamanuma, nestled in the inland of the Chiba Prefecture peninsula. The moment I arrived, the contrast with the city was striking. In Tokyo, every square meter is a battleground for space. Here, vast fields, dense forests, and an almost overwhelming emptiness stretched out, land abandoned and reclaimed by nature as the shrinking population could no longer tend to it. This abundance of space became the perfect playground for us students. Unlike the corporate learning environment of the university—where the day revolves around arriving at school, plugging in laptops, and translating ideas into neatly printed sheets—we were free to break away from those confines and get our hands dirty. Our professor Tsukamoto-san's interest in this village stems from its stark contrast with urban life. In his view, life in cities is very convenient, but if you want to pursue something outside of this framework of convenience, you face numerous restrictions, a phenomenon he describes as "the principle of impossibilities". In Kamanuma, however, students find an open environment to experiment collaboratively and practice architecture in a hands-on way, what he refers to as "the principle of possibilities" (Tsukamoto, Chiba, Kuan, & Tane, 2023). The forest and fields provided us with resources, the well-equipped and carefully maintained tool shed provided us with the necessary gear.

For weeks, a group of students had been working on designing a bamboo greenhouse, creating drawings and parametric models on the computer. Now, we stood in the forest, ready to cut the bamboo, split it into slices, and assemble it into the structure. It didn't go as planned. Clean digital drawings were overlayed by messy sketches, and white sheets of paper were soon stained. But by the end of the day, after many trials and errors, the two-dimensional weaved surface started to rise from the ground. Pulling the ends of the bamboo together and bending them into arches created a three-dimensional vault that could support our own weights due to the tension in the structure. The result was only a small pavilion serving no real purpose, but the sense of achievement and satisfaction was great, and the lessons learned to further adapt the design were even greater. It felt as if our bodies were naturally meant to learn this way: through experimenting, making, reflecting, and repeating the process over and over.

This activity, along with others, gave me insights into the architectural education I've experienced over the past years. It highlighted the value of bringing paper ideas and hours spent in front of a screen into something tangible—sourcing materials, working with them, assembling them into a spatial structure, and throughout these processes, being confronted with the flaws in your own designs and learning from them.

In this work I aim to develop this curiosity in the values of making as a guiding theme throughout the year-long research and design project within the Explore Lab graduation studio. It is both a plea for a material, hands-on approach to architecture, in both education and practice, and a personal exploration of how I want to approach architecture in the future.

Different steps in the assembly process of the bamboo greenhouse mockup →



the ambiguous position of architectural education

introduction

Architecture education covers a wide range of topics—research, design, management, building technology, and so on—and does this mostly in traditional academic classroom or studio settings. The curriculum leads students to of a university degree, meaning that "architectural education is supposed to be academic" and to be accredited as such "it must demonstrate its foundation in scientific research" to meet the terms of the European Qualifications Framework, which resulted out of the Bologna Process[1] (De Walsche, 2021, p. 39). As the author of this text is highlighting, positioning architectural education in this framework causes friction. It is simply not compatible with the same scientific format as, for instance, natural sciences or humanities studies, "instead of being research-based, the design studio is practice-based; instead of being taught by researching academics, it is taught by designing practitioners." Further on, he poses an interesting question about the interpretation of 'academic' schooling in architectural education:

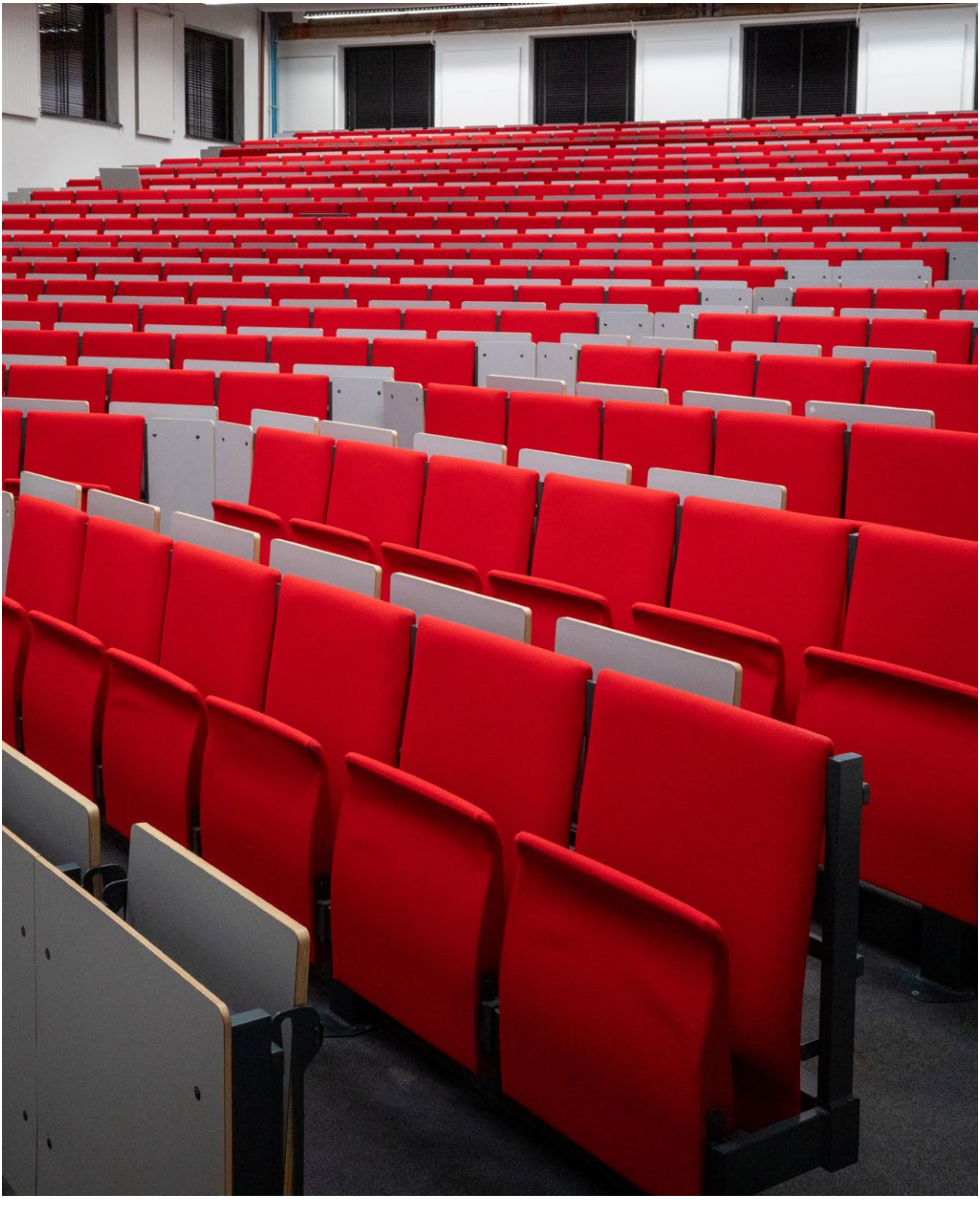
> "Does this mean, then, that studio education is not academic? Or does it mean that the non-academic environment of the design studio is nonetheless able to produce academic education despite its scarce link to formal scientific research conduct, its practice-based approach, and its non-academic teaching practitioners?" (De Walsche, 2021, p. 39)

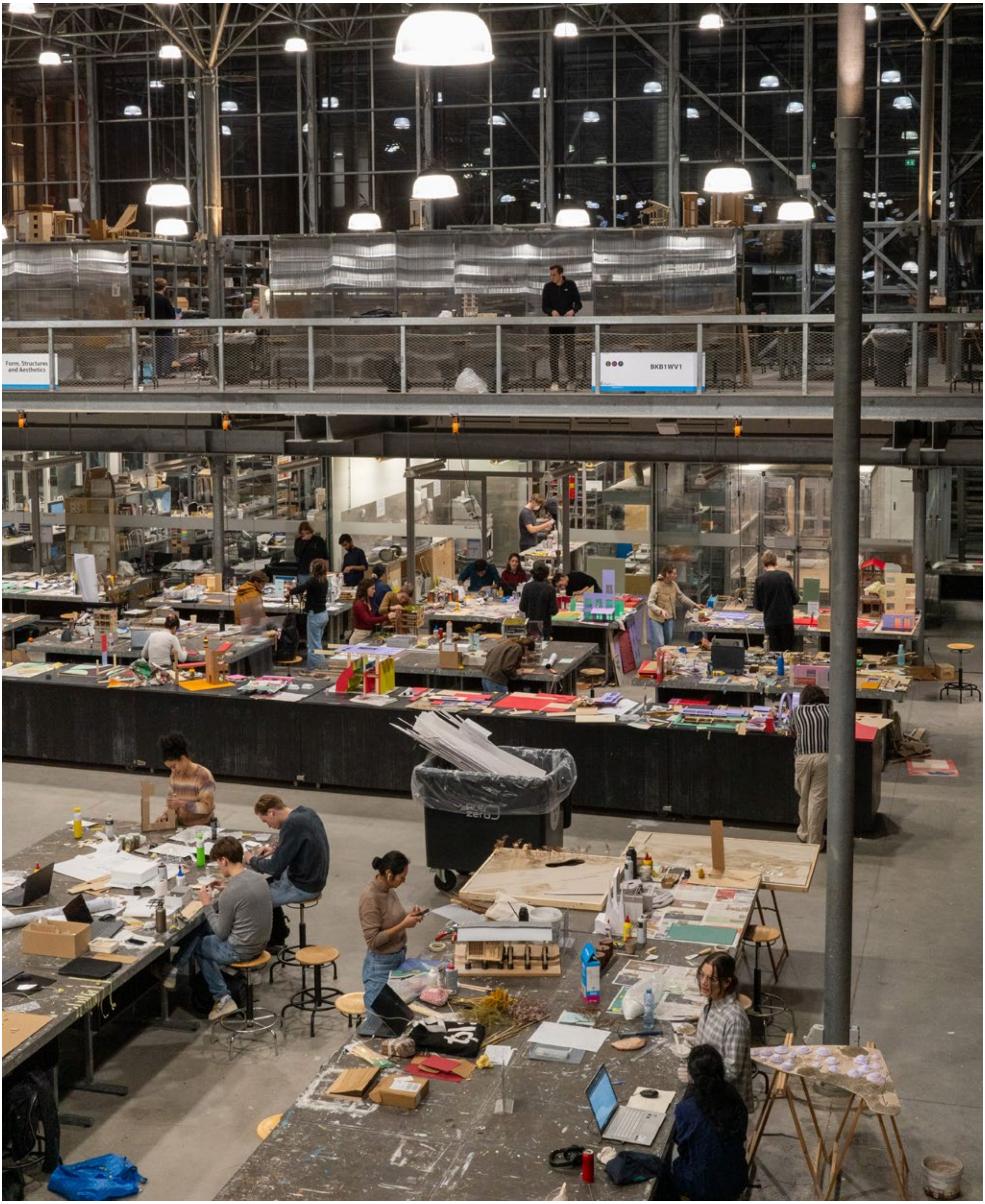
1 — The Bologna Process is a process that started in 1999. It seeks for a reformation to bring more coherence to higher education across Europe to ensure comparability in the standards and quality.

In this research, the question on the "academicness" will be extended further towards the role of the act of making in architectural education. Could we consider hands-on exercises, such as the construction of 1:1 scale mock-ups, as academic? Could the act of making, combined with deducing conclusions and thorough reflection, be seen as valuable academic output? Or is manual work an activity intended only for vocational schools?

The title of this research, "Values in the Making", is inspired by Pauline Lefebvre's contribution to the book *The Hybrid Practitioner (Voet et al., 2022)* and embodies a dual meaning. In her article, Lefebvre describes an architectural firm that integrates physical making into their practice, setting them apart from firms that focus solely on design. Simultaneously, the firm's team engages in a collaborative brainstorm to define the core values of their company, illustrating the second meaning: the act of creating or "making" values. Similarly, this research aims to emphasize the significance of the physical act of making by actively constructing and exploring its values—reflecting both the process and the outcomes of this investigation.

Lecture Hall A in the Faculty of Architecture and the Built Environment, TU Delft, allows for didactic method of teaching in which teachers present information to an audience of passive listeners. →




Form, Structures
and Aesthetics
BKB1WV1

← Model hall in the Faculty of Architecture and Built Environment, TU Delft, facilitator of an experimental learning method in which students work to translate their ideas into physical objects, usually architectural scale models.

material alienation in the current architecture discipline

problem statement

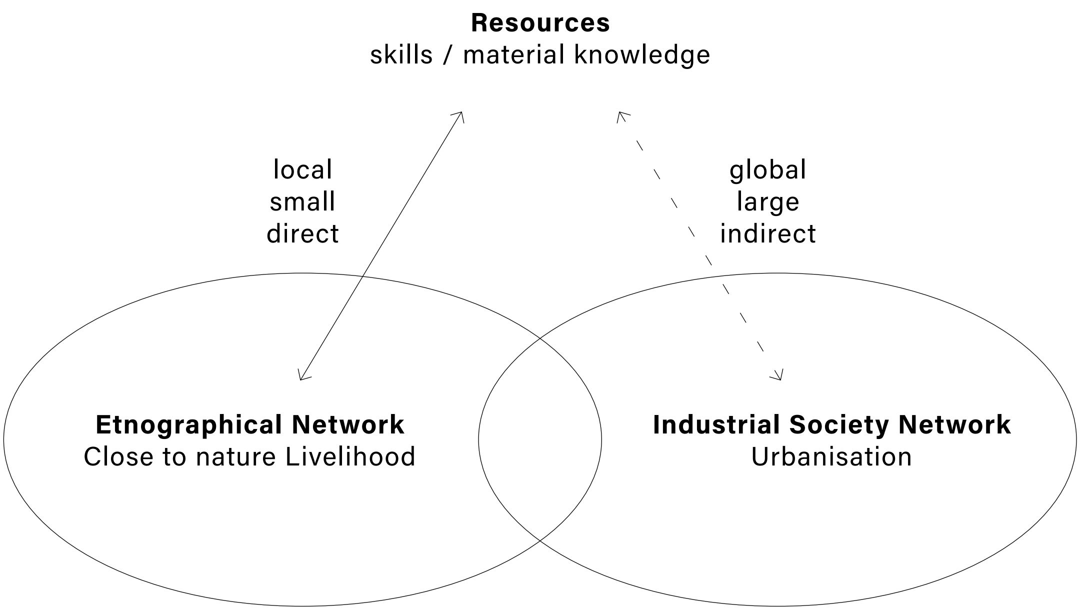


Fig. 1 — Diagram illustrating a societal shift influencing our direct acces to resources. (Tsukamoto et al., 2023) →

The problem I state in this research is tied in a much larger societal shift connected to the processes of industrialisation and globalisation. To introduce this shift, I would like to refer to a diagram (Fig. 1) that illustrates how we moved from a small-scale ethnographic network to a global-scale industrial society network. 'Ethnographic network' refers to social networks organised around close face-to-face relationships. Cultural heritage, and embedded collective knowledge are passed down through generations. People within an ethnographic network may be interdependent but also serve each other in a variety of ways, such as for shared resources. An industrial society network, on the other hand, is usually organised around hierarchical systems of a large-scale, modern society. These networks are often less personal and more structured, designed to support the efficiency and specialisation needed in industrial economies. Knowledge is often codified, standardised, and disseminated through formal channels like for example scientific papers. This shift brought numerous advantages, with extreme specialization enabling us to address societal challenges on a larger scale and with greater complexity. However, it also disrupted our relationship with resources, including skills and knowledge. We have become less aware—and less concerned—about the origins of things, as long as they remain accessible, resulting in a disconnection from our material reality and a growing dependence on external services to access these resources. Already in 1938, following the developments in standardisation and mass production of the second industrial revolution, Anni Albers, tutor at the Black Mountain College, wrote the following;

> Civilization seems in general to estrange men from materials, that is, from materials in their original form. For the process of shaping these is so divided into separate steps that one person is rarely involved in the whole course of manufacture, often knowing only the finished product. But if we want to get from materials the sense of directness, the adventure of being close to the stuff the world is made of, we have to go back to the material itself, to its original state, and from there on partake in its stages of change. (Albers, 1938)

This development is directly relevant to today's mainstream building sector. The transition into the Industrial Society Network has brought significant progress and advantages, making the construction industry highly efficient. As a result, we now have access to high-performance building materials at low cost, delivered through largely imperceptible global supply chains. Thanks to this efficiency and easy availability, we no longer need to concern ourselves with where to source materials—or, more fundamentally, with inventing creative ways to use what is already at hand.

A clear contemporary example of this shift I found while watching the documentary “Veins” in which the makers follow a material, in this case marble, from the extraction of its origin to its application in a building. An assistant at the architectural firm responsible for the design sits behind a series of computer screens in New York City. One screen shows rows and columns filled with product labels and numbers. The other display shows a file in which she has set up a rigid grid composed out of many small tiles. **(Fig. 2)** At the scale of the screen, the collage she creates looks like a pixelated image, but looking closer, you realise that all the pixels in the screen are actually pieces of marble, care-fully sorted and joined so that the veins of the marble all line up to constitute a mirrored effect, like the walls in Mies van der Rohe’s Barcelona Pavilion, but at a scale of a thousand. After this realisation, it becomes clear she is designing one of the four main facades of the Perelman Performing Arts Center, a cube-shaped theatre building, part of the master plan for the rebuilding of the World Trade Center. While this building has no further relevance to the subject of this research plan, its design process serves as the exact embodiment of what could be seen as the effects of the globalisation. How did we get to the point where we can design and build a façade in this highly efficient way? How did we manage for an architect, working from the US, to be able to collage parts of marble,

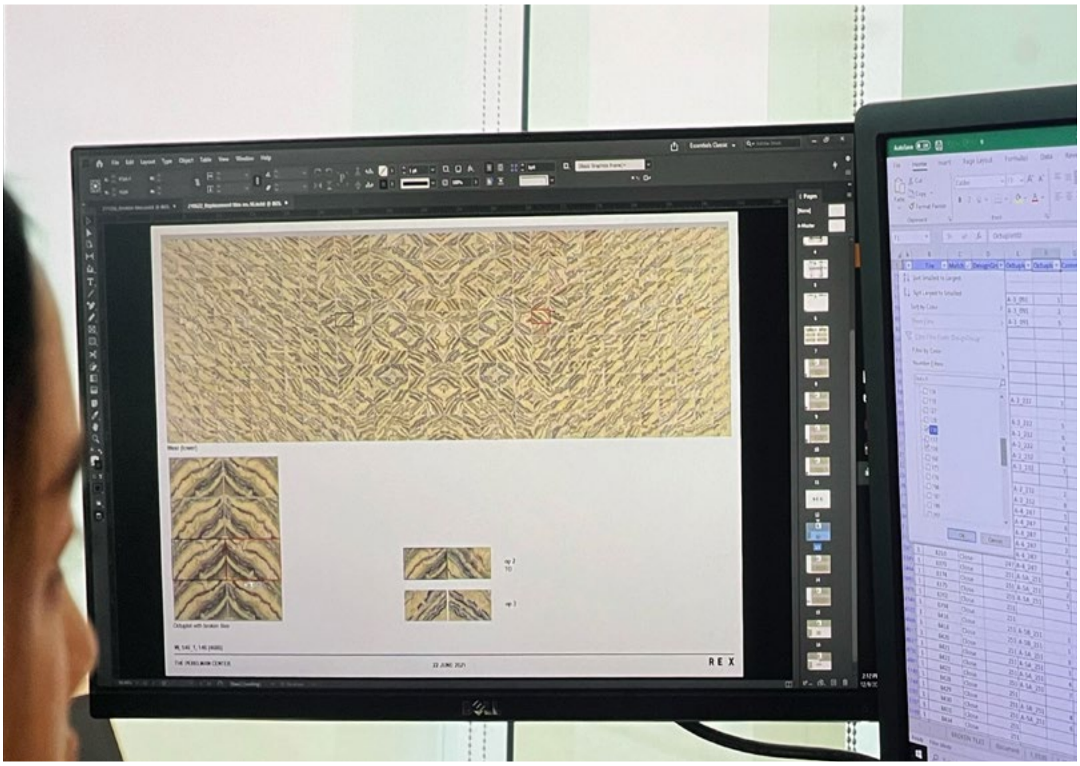


Fig. 2 — Veins (Laurian Ghinitoiu, Arata Mori, 2023)

quarried in southern Portugal, cut, polished and scanned into digital images in France, glued onto glass and assembled into prefabricated steel façade elements in Germany, without even once having touched the actual material? The case shown in this documentary may be an extreme instance of our alienated and extractive construction practices, but the process it depitcs is not that unusual in the current construction industry. This is evident from the convenience with which the New York-based office could get the large quantity of fully processed marble slats all the way from Portugal.

In addition to this material abstraction caused by industrialisation and globalisation, there is the inherent material abstraction of the architectural discipline. We find this abstraction already reflected in the etymology of the noun *architect* and the verb *to design*. The meaning of *architect* "person skilled in the art of building" coming from the Greek *arkhitekton* "master builder, director of works," from *arkhi-* "chief" + *tekton* "builder, carpenter" (Harper, Etymology of architect, n.d.) is implying that the architect him/herself masters the art of building. *Designing* on the other hand, coming from the Latin *designare*, meaning "mark out, point out" (Harper, Etymology of design, n.d.) implies a certain distance to the object. Later, during the renaissance, "the notion of *disegno* (...) signified the separation between the conception of design and the craft of building" (Schrijver et al., 2021, p. 13). This distance is also reflected in the meaning of *project* "a plan, draft, scheme, design," coming from the Latin *proiectum* "something thrown forth," from *pro-* "forward"+ *iacere* "to throw" (Harper, Etymology of project, n.d.). As Robin Evans puts it in his text Translation from Drawing to Building, "Architects do not make buildings; they make drawings of buildings", after which he highlights "the disadvantage under which architects labour, never working directly with the object of their thought, always working at through some intervening medium, almost always the drawing" (Evans, 1986).

In her work *The Tacit Dimension*, Lara Schrijver also recognises the complicated field of relations in which "the engagement with the object for an architect is typically at a remove; the drawings of a building are not its final aim, but a real building is – and as such the drawings and models that aim at its realization form a second filter of both codified knowledge and implicit assumptions that are part and parcel of the discipline" (Schrijver, et al., 2021, pp. 9-10). In architectural education, this remote way of working has a certain advantage: it allows students to focus on developing conceptual thinking, transcending constraints of real-world architectural projects.

“Architecture studies do not facilitate much direct contact with the reality of building, such as the handling of material, inclusion of context, dialogue with craftspersons, as well as with the expectations and demands of the future users” (Lepik, 2020, p. 6). Furthermore, academic exercises are typically exempt from any financial limitations. This controlled environment, safeguarded from real-life restrictions that could hinder creativity, provides a comfortable space for students to grasp the fundamentals of design without being overwhelmed. However, it is worrying that some students, myself included, graduate without ever having been exposed to this reality of construction, without ever having visited a construction site or assembled materials as designed in our projects - if only to find out that most of the structures we design are in fact not feasible to build. “In most cases, students only get to put their skills into practice after graduation, and even once they have joined an architectural practice, it still takes a long time before they can experience a full project from design to handover of the construction” (Lepik, 2020, p. 6).

While much emphasis is being laid on developing ways to improve our understanding of the context we design for, the design process often ends as soon as the drawings are ready for presentation or sent to the contractor. From then on, architects are rarely involved in the actual construction. I acknowledge that this is a broad generalisation of architectural practice. There are, of course, many practices that prioritise close involvement in the construction process, and some that even take on the building work themselves. However, the point serves as a conclusion of the problem statement, to highlight what I see as a growing concern in contemporary architectural education and, by extension, in professional practice: the risk of becoming increasingly detached from the realities of building, taught within the protected environment of the classroom or practised from offices dominated by screens and books, distanced from the physicality and materiality of the built environment that defines our discipline.

The aim in this research is to challenge this material alienation present in architectural education. The focus on the educational context lies in the fact that this is the space where diverse voices and approaches to architecture are brought together in dialogue. Engaging with this variety of approaches enables students—potential future architects—to develop their own perspectives: whether by aligning with existing practices or by imagining alternative paths forward. I am particularly interested in exploring the potential of a more situated and physical approach to architectural education, one that is grounded in direct material engagement and embodied knowledge. Therefore, the overarching question of this project that I aim to answer is:

> *In what ways could hands-on experimentation within architectural education contribute to a more material-sensitive approach to design?*

This question is multilayered and resembles the structure of this research report. First, there is the focus on the programmatic aspect of architectural education, where I want to explore the values of making/hands-on experimentation and how these might enrich/complement the existing academic framework of architectural education.

> *What benefits can students gain from hands-on material experimentation compared to traditional academic architectural education?*

The second part looks at the physical context, the ecology of an architectural school, and how this ecology can facilitate making activities. This subquestion also relates to the part of the graduation project running parallel to this research, the development of an architectural design.

> *How can the physical context of architectural education be designed to encourage hands-on experimentation?*

stimulating making ecologies for tacit knowledge acquisition

hypothesis

Integrating hands-on material engagement into the curriculum can enrich the existing architectural education since it allows for the acquisition of tacit knowledge through body-based learning. Making activities in social contexts allow for the transfer of implicit knowledge in three levels. First there is the knowledge transfer from experienced practitioners to students, secondly, the peer-to-peer knowledge sharing among students and finally the gain of knowledge that is embedded in the process of working with the material. By engaging with materials in direct, hands-on ways, students develop not only the practical skills but also a deeper understanding of material properties and behavior, possibilities and limitations. This closer relationship with materials develops a more intuitive, informed, and responsible approach to design in which materials are used in response to their constructive and expressive qualities.

In addition, hands-on exercises, such as building at a 1:1 scale, expose students to the real size, weight, and cost of materials, initiating a dialogue in which students both shape and are shaped by the material. This interaction reveals the constraints and affordances of materials, and through processes like assembly and disassembly, students encounter unforeseen challenges that often expose flaws in early design thinking. These moments provide valuable learning opportunities within a safe educational environment where failure is an integral part of the learning process. Creating such a space is essential: one where materials, tools, and experienced practitioners are present to support the flow of knowledge, and where generous, open space allows for a range of making activities. As interest in specific materials naturally shifts over time, these spaces must remain flexible, capable of adapting to new practices and emerging material cultures.

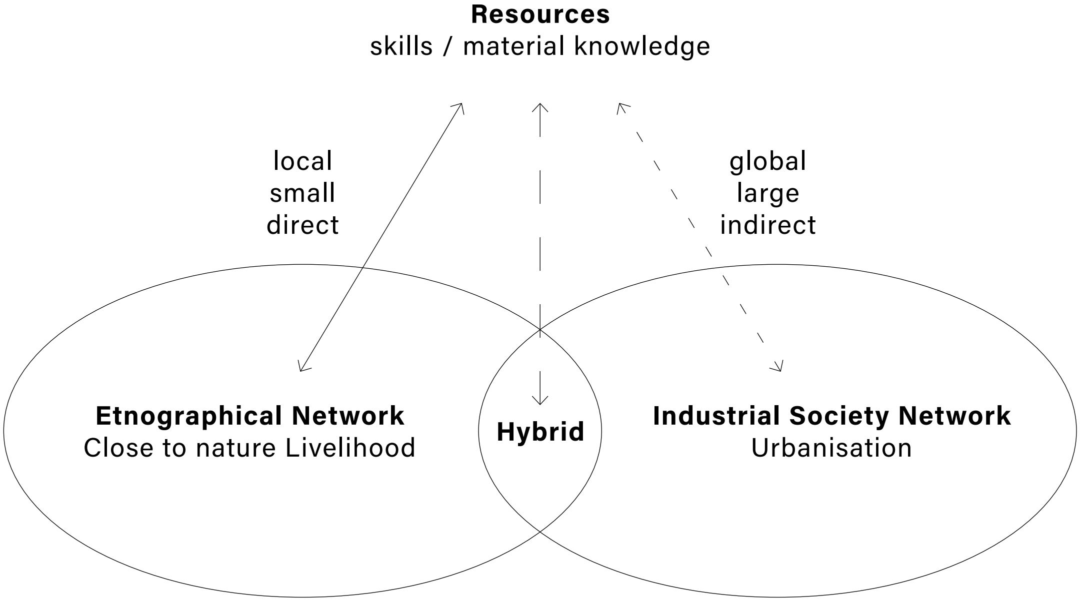


Fig. 3 —Updated diagram introducing a hybrid. (Tsukamoto et al., 2023) →

This research's emphasis on the act of making builds on a long-standing tradition in architecture and its education, drawing inspiration from movements such as American pragmatism and the Bauhaus approach in Europe. More recently, programmes such as DesignBuild, which combine conceptual development with hands-on construction, exemplify how hands-on activities continue to be integrated into architectural curricula to this day. Also in the professional field there is a shift of practices trying to overcome the material abstraction and aiming towards a more hands-on approach, complementing their drawing activities with construction and getting involved on site. Recent litterature on the topic shows that "making is under growing scrutiny in the field of architecture", and that some practices are organising themselves in a way that allows them to participate in the building site and "get involved in the production, transformation or assembly of building elements and materials" (Lefebvre et al., 2021).

Returning to the previously mentioned diagram (Fig. 1), we can identify a 'hybrid' zone at the intersection of the Ethnographic Network and the Industrial Society Network (Fig. 3). This hybrid represents an approach that leverages the efficiencies and resources of industrial systems while remaining grounded in direct, local engagement. While this reflects a broader social movement, it is again particularly relevant to the field of architecture, both in its education and practice and it allows to position this research within a wider framework of emerging perspectives in the field. These shifts are not binary, academic versus practical, theoretical versus applied, but fluid and cyclical, with ideas and themes continuously emerging, fading, and resurfacing in response to changing cultural demands and trends.

A related and ongoing debate centres on "whether it is the business of architecture to bring out material—to draw attention to it—or whether, on the contrary, architecture should make material disappear, so as to allow other concerns to come forward." In his essay Forget Material, Adrian Forty argues that the rise of digital fabrication, requiring increasingly less human labour, has made it easier than ever for architects to overlook material concerns and focus instead on other design priorities:

> No longer concerned to the same degree with the human aspect of processing materials, it becomes easier for architects to concentrate upon what the materials are used for—upon the end results. (Forty, 2020)

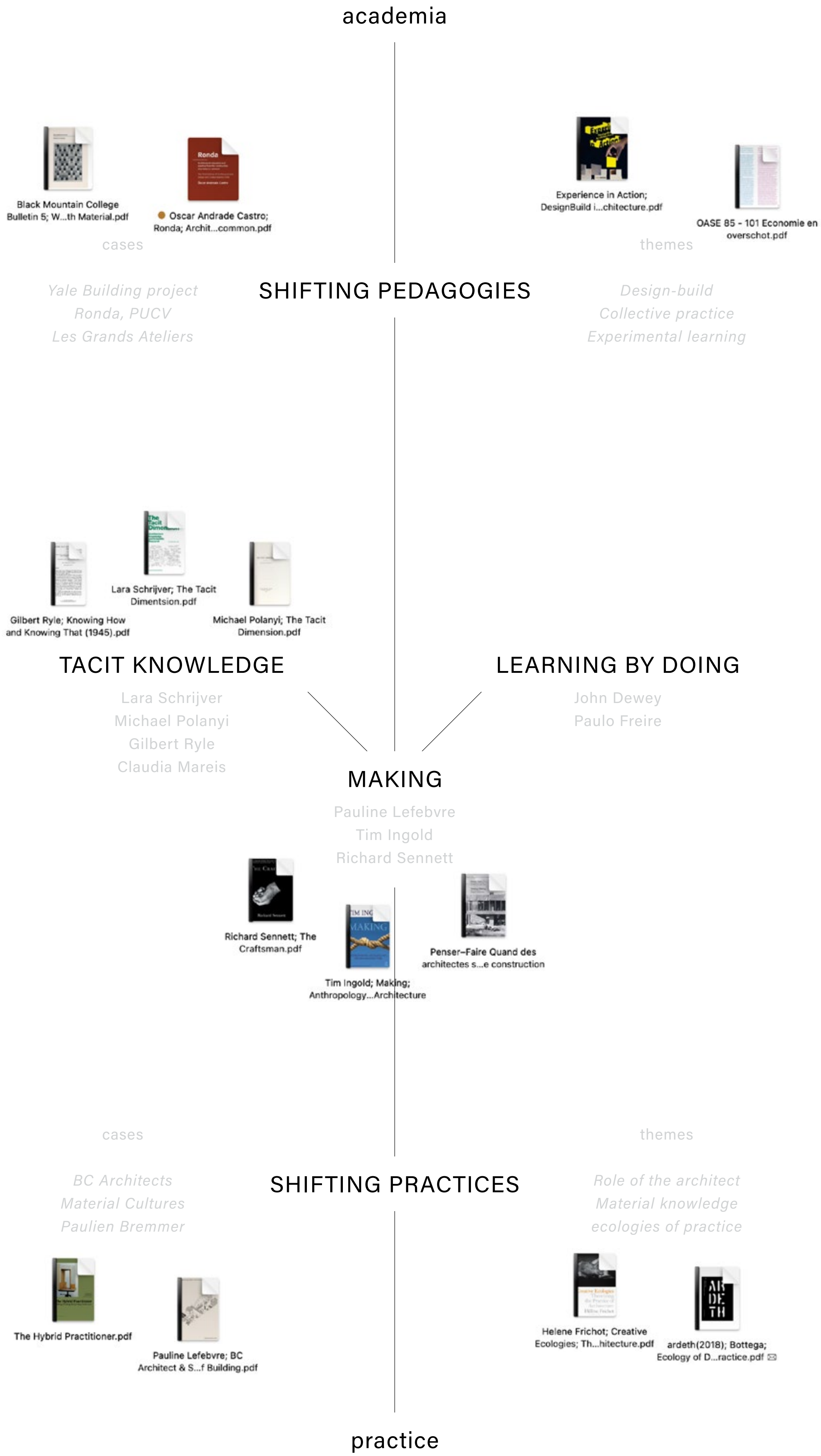


Fig. 4 — Diagram of related research topics including relevant litterature →

In contrast, an essay by Jeannette Kuo offers a different perspective on material concern, linking it directly to the climate crisis, which calls for alternative approaches to architectural production and directly challenges the industrialist ethos of boundless possibility and limitless growth.

> The drive for sustainability in the face of our climate crisis has brought architecture closer to constructive agendas as a means of defining a disciplinary language. While previous generations have foregrounded theoretical or geometrical pursuits as vehicles for architectural experimentation, the current era, finding itself confronted with decades of laissez-faire extraction and consumption, has turned to a more direct understanding of architecture as material construct with finite resources and specific social, economic, and climatic contexts. (Kuo, 2024)

This differences in attitudes toward materiality, between the conscious *abstraction of* materials and the necessary *re-engagement with* them, will continue to cause shifts within both architectural education and practice, echoing the problem of material alienation that is at the heart of this research. The diagram on the left page (Fig. 4) shows that understanding these evolving pedagogies and practices, and the motivations driving them, provides the foundation for this study. At the center is the act of Making, supported by two of its key concepts: the development of tacit knowledge and the acquisition of skills through learning by doing. This reflects an approach to architecture that emphasises hands-on engagement with materials, aligning with pedagogical models that prioritise experiential, practice-based learning over conventional, theory-driven instruction. Likewise, it reflects the broader change in architectural practice, where material engagement and direct involvement in the building process are increasingly seen as essential. In this sense, the research closely aligns with Jeannette Kuo's perspective, advocating for a renewed material consciousness in response to today's ecological and societal challenges.

In order to get a clear understanding of the three central topics of this research, we can define them as following:

Making

In this research, “making” is understood as an activity shaped by the dynamic interplay between three core elements: materials, tools, and the human body. While making can be a solitary practice—as discussed by Tim Ingold and Richard Sennett—this study foregrounds its social dimension, focusing on situations where multiple individuals engage in collaborative processes. Such collaboration creates space for shared learning and the exchange of knowledge. Building on this social aspect, the concept of “making ecologies” is used to describe the settings in which collaborative making occurs. These ecologies involve both the relationships of the makers to one another, where knowledge is shared and developed, and their relationship with the physical surrounding, which supports and can actively stimulate the making process.

Learning By Doing

Learning by doing emphasises the idea that people learn through direct experiences and active engagement, rather than through passive instruction. The concept is popularised by the writings of John Dewey, in which he argued that knowledge isn’t just an abstract collection of facts but rather something that gains meaning when connected to lived experience. In the context of architectural education, learning by doing implies again on engaging with physical materials and learning from hands-on construction experiences.

Tacit knowledge

Tacit knowledge implies to the kind of knowledge or skill that we can acquire but are unable to bring to words, or how Polanyi describes the phenomenon as “one can know more than one can tell.” (Polanyi, 1966, p. 8). Tacit knowledge is situated in a distinction, described by Gilbert Ryle, between the factual knowledge of “knowing that” and the practical skills of “knowing how” (Ryle, 1945). This distinction is central to this research as it highlights that theoretical understanding is fundamentally different from the acquisition of the skills needed to apply it. While one does not preclude the other, this study places greater emphasis on "knowing how", not to diminish the value of theory, but to advocate for a more balanced approach that recognises the formative role of embodied, hands-on experience in architectural education.

Fig. 5 — ‘The Bad Architect’, from Philibert de l’Orme, *Le premier tome de l’architecture*, Paris, 1568, p. 281.

The woodcut shows an architect who is blind and has no hands, wandering in a barren and desolate landscape. The image is an allegorical warning to the architect against indifference to a tactile and engaged experience of the world. (Forty, 2020) →

researching through self-experimentation

methodology

There is an inherent ambiguity in scientifically researching the value of practical activities within architectural education. Ethnographic observation of hands-on practices, for example, allows me as a researcher to document these activities from a distance, but it limits my ability to directly engage with and internalise the implicit knowledge embedded in them. To experience the value of making first-hand, I chose to organise this research empirically, grounded in personal experience. I took full advantage of the open character of the Explore Lab graduation studio and actively sought out diverse opportunities to engage with making, immersing myself both as a researcher and as a participant. This methodology could be formally described as "self-experimentation research," but it also offered me a chance to reconnect with the material tactility I sometimes missed during my studies—using this graduation project as a space to gain practical, material experience within the safe and exploratory environment of schools[2], before transitioning into the professional field.

Following the structure of the research question, the first section focuses on the content of the activities—the processes of making. Through reflection on my observations and participation in various programmes, I identify key qualities that these activities offered. This leads to a formulation of the value of making and its potential contribution to architectural education.

The second section shifts focus to the context in which these activities took place—that is, the making ecology. Here, I outline the characteristics of the spaces I visited, identify recurring features, and draw conclusions about how to create environments that support and stimulate making. As I took part in multiple programmes across different locations, the three cases discussed in the first section do not directly correspond to the three ecologies presented in the second.

2 — During the process, I found that doing things as a student with 'research purposes' opened up a lot of possibilities.

01 processes of making

As mentioned earlier, this first section looks at three cases of making experiences in which I participated: building a bamboo greenhouse mock-up in Kamanuma, plastering with clay in Zaandam, and, finally, thatching a roof in Brussels. The reflections on these experimentations are presented in two parts. First, a textual and visual analysis elaborates on the activities, focusing on the materials, the tools involved, and their interaction with the body. This part is included in this report.

However, capturing the value of these experiences in words is inherently challenging, as much of it is felt rather than spoken—expressed through moments of fulfilment, satisfaction, or even physical exhaustion. To complement the written layer, each activity also resulted in the creation of a physical artefact, an attempt to embody the tacit knowledge gained during the process. These artefacts take the form of a series of vedute (Fig. 6), inspired by the exercise developed by Stichting Vedute in Rotterdam. This exercise invites participants to visualise their understanding of space through a three-dimensional object shaped within the fixed dimensions of 44 x 32 x 7 cm. While this research does not focus directly on the concept of space, I adapted the exercise to represent physical activities, translating the learnings into tangible form. The fixed size of the artefacts also becomes a way of exploring our relationship with materials—whether we impose form on them, or whether materials shape the outcome themselves—reflecting ideas from hylomorphism and new materialism (Lefebvre et al., 2021).

← **Fig. 6** — Collection of Vedute that were mede during the process of this research.

bamboo greenhouse in Kamanuma

material exploration 1 — 10.12.2023

As described in the preface, I participated in the activities from the Architecture lab of professor Yoshiharu Tsukamoto-san at the Tokyo Institute of Technology. The students of this lab engaged in an ongoing project in Kamanuma reffered to as the Small Earth Association. The village used to have an active agriculture but faced depopulation and got taken over by very rough nature. Both paddy fields (agriculture) and houses (architecture) were no longer given their seasonal maintenance processes, as they require a lot of physical labour and, perhaps more crucial, specific knowledge shared mainly by working together, passed on from generation to generation.

The village of Kamanuma is just one example out of many Japanese villages that are threatened in existence by the ageing population and relocation of younger generation towards Japan's ever expanding metropolises. The Small Earth Association, led by Yoshiki Hayashi-san, has taken steps to address this issue by inviting people from urban areas to reconnect with the countryside and actively participate in the processes necessary for the regeneration of the village (Tsukamoto et al., 2023). Their aim is not to return to the past or indulge in a romanticised vision of rural life but to learn from nature and traditional techniques, integrating these practices with the advancements of modern civilisation[3]. A central activity in this effort is the seasonal maintenance of the rice paddy fields, a practice that is deeply tied to the cultural and ecological heritage of this area. With the reintroduction of this labour-intensive activity comes the need for functional spaces to support the work and the workers, store tools and resources, but evenly important, spaces for essential daily activities such cooking, eating, washing and sleeping. While many of these buildings already existed in the village, years of neglect meant they required intensive care or, in some cases, major renovations to make them usable again.

The specific landscape in which this village is located, referred to as *Satoyama*, is the border area between the dense mountainous forest and the flat valley. The term *Satoyama* not only describes this transitional zone but also embodies the rich history of maintenance processes that have shaped it and the harmonious coexistence between humans and nature. In this context, human interventions go hand in hand with natural processes resulting in a livelihood where humans can profit from nature in a sustainable way, without stressing the environment. For instance, traditional practices like coppicing ensure that the surrounding forests remain healthy, allowing them to breathe and encouraging new shoots to sprout from stumps or roots.

3 — This refers back to the Hybrid in fig. 2. We can continue valuable traditional techniques while making advantage of the technological tools, innovative materials and modern construction methods available to us nowadays.

One ongoing project was the addition of a new greenhouse that would have multiple purposes. It would serve as a place to grow specific plants, but also to store tools or have community gatherings. For the design of this structure, students where researching the possibilities to work with bamboo, as this is available in large quantities in the surroundings and harvesting old bamboo trees is part of a traditional forest management technique, also reffered to as coppicing.

Material

Bamboo
Compared to other wood species, bamboo grows relatively quickly and yet develops a strength that makes it very suitable as a building material. Its light weight makes it easy to transport and handle, and it also has natural water-resistant properties, adding to its versatility and durability. Kamanuma is surrounded by a dense bamboo forest. If left untouched, the bamboo would take over the whole mountain range and the fully grown bamboo's would block all the light for the small sprouts. Through active coppicing, the right bamboo culms are selected and taken down to serve for the main load bearing structure of the greenhouse mock-up.

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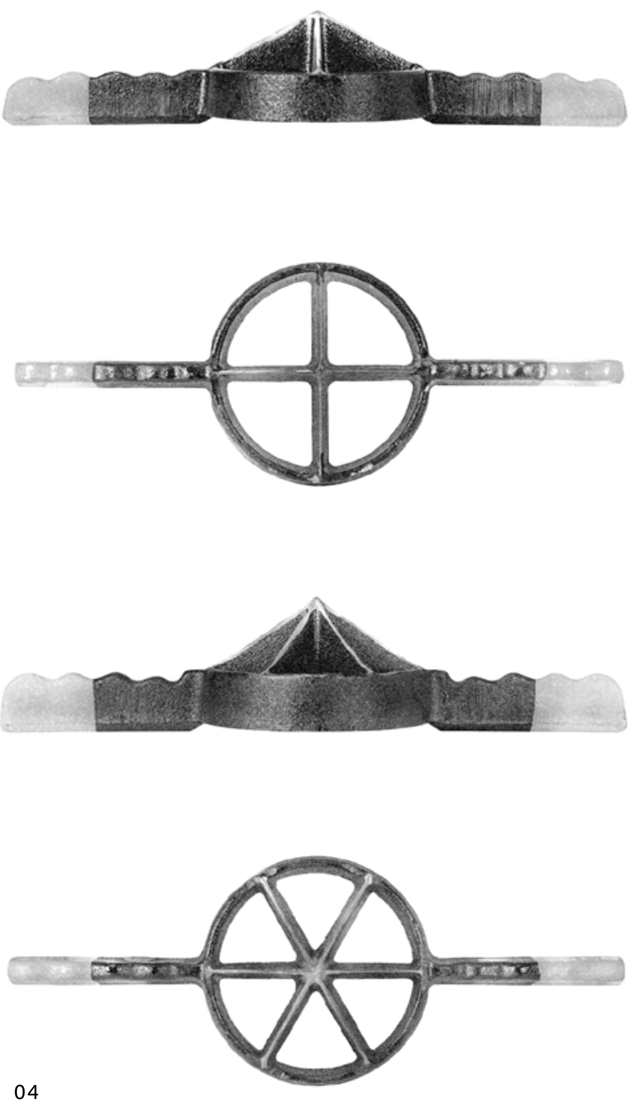

04

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Tools

01 — Bamboo saw
A manual saw that cuts through the stems by pulling. Unlike western tools, most Japanese tools operate by pulling towards the body instead of pushing away. Push saws apply more force into the cut, allowing for faster cutting, whereas Japanese pull saws prioritise precision in woodworking.

02 — Chain saw
Used by people that dont care about precission or want to have faster cutting and feel like the bamboo saw takes to long, or too much effort.

03 — Spike tabi/Jikatabi
Shoes that allow more grip on the steep hillsides. The term "tabi" refers to traditional split-toe socks or shoes, which separate the big toe from the other toes. This design improves balance and grip.

04 — Bamboo splitter
This tool reminded me of what we sometimes use to cut apples into small pieces. It is a cast iron element with two handles and a circular array of sharp steel splitting knives, similar to the blade of an axe. There are several variations with varying numbers of splitting knives, from two-way splitting knives to three-way splitting knives and even up to 12-way splitting knives. The splitter is placed in the correct position on the piece of bamboo and the first splitting is made by hammering the splitter into the culm, preferably with a plastic hammer so as not to damage the cast iron element. To further split the culm, the handles are used to pull the splitter through the wood. This requires a lot of pulling power and the weight and strength of several bodies to hold the bamboo in place.

05 — Rope
Strong rope is used to lash the split segments of bamboo together. We first tried to do this with jute rope, but as the bamboo segments were sharp and slid slightly on top of each other due to the great forces, the jute was cut by the bamboo. This knotting became an interesting activity. It turned out that we had all learned different techniques in the past, as we all had different cultural backgrounds, so we could show each other what we thought was the best way to hold the two pieces of bamboo together.


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Body

During the construction process of this bamboo greenhouse, material, tool and body came together in several moments. We learnt how to select the right bamboo culms, carefully choosing mature and straight trees from the forest to ensure strength and durability. The bamboo forest was very dense and on a steep slope. therefore, we used the right shoeware and small hand saw, as the chainsaw would not be manageable in such tight conditions.

Splitting the bamboo into equal parts is a skill in itself, requiring you to use your body weight and the right tools to work your way through the knots that hold the culm together. It takes several attempts to get the initial split right so that you end up with equal sections. We learned that when the sections would be too uneven, they end up having differences in bendability. We experienced this while building up the structure as we witnessed distortion in the curvature of the greenhouse. As we only noticed this when we lifted the structure, we had to lower it again and replace some sections. From the moment the first split is hammered in, the splitting tool simply follows the fibres, so there is no way back to adjust the proportions.

Once split, we started to weave the eight-metre-long sections together. This process tested our spatial sense as each cutout had to be woven in, each time alternating below and above the perpendicular cutouts to create a stable and harmonious framework that has the same strength throughout. To tie the sections together, we learnt different techniques from each other and from the internet.

When we finally started lifting the structure, we immediately felt the tension of the whole structure. By pulling the ends together to form an arch, we introduced a strong outward force that stabilised the structure. During the construction process, we relied on our intuition to turn the technical plans and drawings that had been made in advance into a physical mockup. These plans showed us how to intertwine the bamboo, but we could never have guessed what forces the overall framework would produce. In the end, we tested the structure with our own bodies by hanging from it.

Expression

Engaging with the bamboo through hands-on experimentation provided valuable insight into the material's potential for architectural expression. This became particularly visible in the weaving pattern, which was as a response to the challenge of combining individual, relatively weak segments into a cohesive and structurally robust roof. Once the prototype was assembled, we immediately began to consider how the structure might evolve with the addition of a secondary layer, transforming it into a functioning greenhouse capable of resisting water and retaining heat. This led to questions around how the structure would appear if it were covered with shrink wrap, a material commonly used in the greenhouse industry, or wheter we should look for other materials with similar properties.

Further considerations arose when reflecting on the openings in the structure. While the weaving pattern could theoretically be extended linearly, without interruption, both ends of the vaulted form would require a different structural approach to accommodate an entrance. Although these design questions remained unresolved at the time, the opportunity to reflect on them in the presence of the built prototype proved to be highly valuable. The development of the greenhouse will continue in the coming time by a new generation of students, and it will be insightful to see how these questions of architectural expression are addressed in the final outcome.

clay plaster wall in Zaandam

material exploration 2 — 30.10.2024

Some years ago, I interned at Paulien Bremmer, an architecture studio in Amsterdam. Since then, I have remained in contact with her, and we continue to update each other on our activities. As an architect, she is particularly interested in the dynamics that occur on construction sites between architects, contractors, and craftsmen. Architects typically oversee the construction site and assign specific tasks to contractors. However, it is the contractors who are more familiar with certain materials and possess greater knowledge of their processes and techniques for working with them. Therefore, giving orders to these skilled professionals may feel out of place. This, among other factors, led Paulien to become more involved in the construction process and acquire greater material knowledge and skills. This not only to learn how to work with the materials but also to provide her with insights into their application capabilities, helping her design with them more effectively.

In this particular case, Paulien, together with other architects and the homeowner, invited a master plasterer to teach them the process and application of the material. The training was spread over several days, during which they treated the base wall, mixed the plaster, and applied and finished a clay plaster wall together. Informative discussions were alternated with hands-on practice.

Material

Clay plaster (Leempleister)
Loam, a mixture of sand and clay, has always been used as a construction material, as it is naturally found in the soil or in river deposits. In recent decades, it has often been replaced by gypsum, which is more robust. However, there is renewed interest in clay plaster, as the material has the ability to regulate indoor moisture levels more naturally, resulting in a healthier environment. It also aligns with the growing interest in using bio-based building materials. The drying process of gypsum plaster is a chemical one, and it remains hard, so when demolished, it is processed as construction waste and often ends up in landfills. In contrast, clay plaster can eventually be removed from the wall manually and mixed with the soil in the garden without harming the environment.

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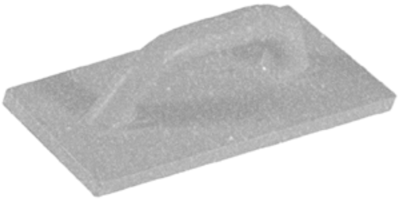

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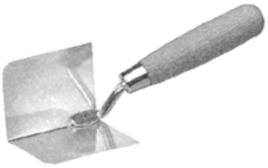

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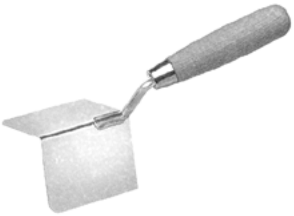

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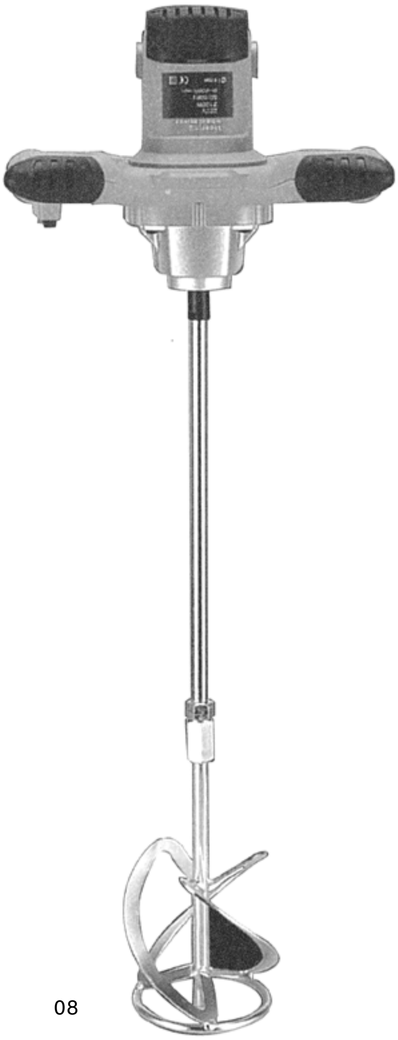

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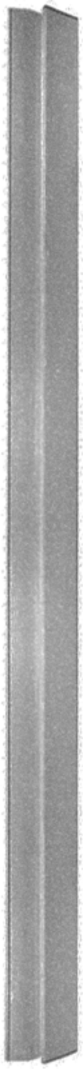

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Tools

01 — Hawk (Raapbord)
Used to hold a manageable amount of plaster close to the wall during application. Ergonomics are crucial in plastering. Amateurs often tend to collect too much plaster, which can will eventually lead to arm pain.

02 — Pointing trowel (Troffel)
This is the same tool used in masonry, but in this context, it serves as a scoop to transfer the plaster from the mixing bucket onto the hawk.

03 — Plasterer's trowel (Raapspaan, Plijsterspaan)
A plasterer's trowel is used to apply plaster to the wall or ceiling. The plasterer typically slides the material from the hawk onto the trowel and then onto the surface, all in one smooth motion.

04 — Corner trowel (Hoektroffel)
Available in two versions to finish inner and outher corners.

05 — Rule, Derby (Wandrij, Rijlat)
Used once the entire wall is covered with plaster. Its length allows for smoothing larger sections of the surface, helping to redistribute excess plaster from areas with too much to spots that are underfilled.

05 — Scarifier (Kam):
Used to comb through the initial layer of plaster to scratch up the surface before a second layer is applied. This ensures a much stronger bond between the two layers.

07 — Sponge float (Schuurbord)
When wetted, the soft sponge has the right texture and absorbency to glide over the plaster to blend in any remaining marks or air pockets. This is a very satisfactory process, making clear that all previous smoothing attempts were unnecessary.

08 — Mixer and Bucket (Mixer en Ton, Kuip)
Although clay plaster is a natural material, it is processed industrially to ensure consistency and meet building regulations. After being dried and packed into bags, it needs to be mixed with water before use. As this is not a chemical process, you can mix, wait, and add more water as needed, making the work less stressful.

10 — Ladder (ladder)


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Body

In plastering, the primary skill lies in mastering the "swing" – the fluid motion of transferring material from the hawk to the wall using the plasterer's trowel. This movement appears deceptively simple, resembling the backhand motion in tennis. While it may appear effortless, mastering this technique and applying the right amount of plaster to the trowel requires practice and precision. Watching an experienced plasterer execute it with ease and speed makes it challenging to replicate the movement, especially for beginners. For us amateurs attempting this for the first time, the motion felt awkward and often resulted in plaster splattering onto the floor. The process became easier to grasp when we asked the master to demonstrate the movement in slow motion. At one point, we all stood there, practising in the void with imaginary tools, mimicking the motion until it felt more natural. In many ways, plastering feels like an intricate dance. Perfecting the swing requires extensive practice, precise hand-eye coordination, and a steady hand. To avoid exhaustion, it's important to work gradually, handling just the right amount of plaster. Too much material makes the trowel heavy and tires the arm, while too little results in frequent trips up and down the ladder. Working at the correct height on the ladder is essential, as extended work above shoulder level can quickly fatigue the arms. We learned that ergonomics are very important in this craft, especially when it comes to large amounts of the same type of work that stresses the body in the same way.

Applying the plaster to the wall demands the right balance of pressure and a consistent, smooth spread. Beginners often make the mistake of focusing on achieving an even finish during the first application. However, the initial layer is meant to bond securely with the base wall, and overworking it can be counterproductive. One common error is the temptation to pull the trowel downwards, which disrupts adhesion and can pull plaster off the surface. This movement should be avoided entirely. Engaging with the material's properties is equally crucial. Describing the ideal consistency of plaster is challenging, as terms like "viscous" lack precision. Instead, it's about tactile experience – scooping, dropping, and testing the plaster to determine its readiness. Plaster that's too dry will crumble and fail to stick, while overly wet plaster will slowly slide down the wall. Achieving the perfect consistency is a sensory skill developed by direct contact with the material.

Expression

Working with clay plaster offers a range of expressive possibilities for finishing a wall. One of the primary variables is the composition of the plaster mix, which directly influences its colour. Different combinations of sand and clay produce a spectrum of earthy tones: greys, reds, beiges, and browns. In some cases, fibres are added to increase the strength of the mixture. These fibres also contribute to the visual character of the surface, as some remain visible, giving the wall a more textured and speckled appearance.

A second layer of expression lies in the treatment of the final surface. Clay plaster can be left in its raw form, retaining the marks of the application process and revealing the hand of the plasterer. In our case, these marks were less refined, which led the owner to opt for a sponge float finish. This technique smooths the surface evenly, resulting in a finish that resembles a gypsum wall painted in an earthy tone. One of the key advantages of clay plaster is the absence of a chemical drying process. As a result, the material remains reworkable over time. If the surface becomes scratched or dented, imperfections can be addressed simply by re-wetting and re-sponging the area.

thatched roof in Brussels

material exploration 3 — 26.11.2024

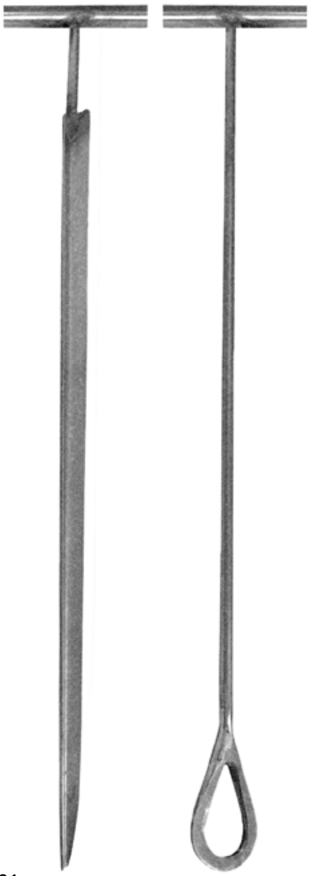
In this one-day workshop we collectively assembled a reed roof. Given the time and the lack of previous experience of any of the participants, the scale of the roof was limited to around two by six meters. Ideally, thatching is done at a dry time of year, but the light rain during the workshop didn't cause any real problems. When the roof structure was finished, it was immediatly exposed to a heavier rainfall so we could witness the magical waterproofing properties of a bundle of reeds.

A wooden framework is used as the base for the thatched roof. Depending on the desired final expression it is either an open framework or wooden boards. The open framework, also referred to as 'batten' allows exposure of the craftmanship, with the bottom of the thatch remaining visible form inside. Securing the thatch on a closed layer of wooden boards allows easier assemblage and more options for additional insulation to comply with the current building regulations.

Material

Reed (Riet)
The thatch reed used during this workshop was ordered form China. This was a first moment of realisation that even a local craft like thatching has undergone changes influenced by globalisation. Chinese reed is not only cheaper, but, according to the master thatcher, also more resilient against water. He claimed that thatched roofs constructed with Chinese reed have a lifespan of around forty years, while local reed from the Netherlands or Belgium will need replacement after half of this period. The reed is harvested in winter, when it is as dry as possible, bundled, and then shipped worldwide.

Reed is a material that offers many possibilities for the expression of craftsmanship. The main expression can be seen at the top of the roof, called the ridge. At this point the reed comes together from two sides and this 'knot' requires special detailing. In the more traditional cases, this detail is solved by weaving the reed in specific patterns that allow the thatcher to hide the extension of the reed. In other cases, the ridge is covered with additional material, sometimes organic such as sedum, or sometimes ceramic tiles combined with cement. Also, around chimneys or dormers, the thatcher has to find creative solutions to bridge the gaps and ensure watertightness.



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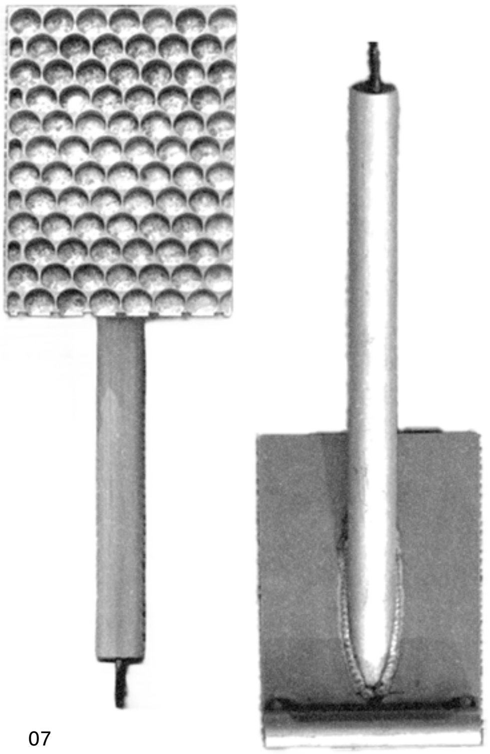

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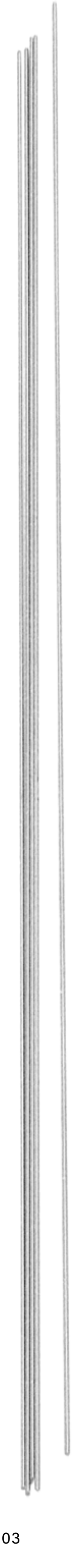

03

Tools

01 — Stitching needle and gutter (Naald en goot)
There are different ways of securing the bundles of reed to the framework. A more traditional way is the stitching method in which the needle and gutter find their way through the reed, securing a wire behind the wooden batten and pulling it to the surface.

02 — Reed Thatching Screws (Dakdekschroeven)
The development of power tools also made its way to the thatching culture. This resulted in the development of a special type of screw that is combined with a galvanised steel wire. Twisting this wire enables gradual tightening of the bundles on the framework.

03 — Galvanized wire bars (Gegalvaniseerde staven)
Horizontal bars are placed on the bundles, aligned with the wooden battens of the formwork. Combined with screws, they secure the reed to the framework. Initially, the steel wire of the screws is loosely twisted around the galvanised bar, allowing the *driving* the reed. Once in the correct position, the wire is tightened to lock the reed in place.

04 — Wire twisters, Rödler (Zakkentrekker)
This handheld tool features a spring-loaded spindle and a hook used to twist the steel wire around the galvanised bars. Pulling the tool rotates the hook, tightening the wire. Commonly used in the concrete industry, it also knots together the rebar reinforcement.

05 — Drill driver with prolongation bit (Schroeftol met verlengd bit)
This more conventional tool is used in combination with a extended bit, a prolongations of around 30 cm which allow the thatcher to fix the screws in the wooden framework all the way through the pack of the reed.

06 — Hanging Ladder, Biddle, Thatcher's Horse (Rietdekkersstoel)
The thatching process starts at the bottom and moves upwards. When work has progressed to the point where it is no longer possible to work from the scaffolding, these ladders are used. They are secured by two hooks that are locked behind the wooden framework.

07 — Knocking board, driver (Klopper)
The most specialist tool of the thatcher is the knocking board. This board has a surface with small circles that enable to drive the reed into the right position.


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Body

The thatching process includes several actions that look simple from a distance, but become more complex when trying them yourself. The ease with which the thatcher showed us these actions was proof of the skills he had developed over the years. A first example is how he handles the bundles of reed in an almost aggressive but at the same time very gentle way, rubbing, almost caressing the material in the desired position as if it was a malleable matter just like clay. Once placed on the wooden frame, it is a challenge to secure the bundles in place, but not to fix them definitively. It is a matter of feeling the right tension as you twist the steel wire. He couldn’t really explain verbally how much tension was needed, so he suggested we feel it with our hands. Professional thatchers somehow develop a sixth sense that allows them to see through the thatch. Once the first bundles are cut open, the reed covers the wooden framework so the thatcher has to guess where the wooden batten is hiding. As a beginner you somehow always loose this guessing game, making you miss the bar and screwing into the air. After some practice and after finding the first reference points, you become more skilled at ‘sensing’ the position of the bar. The master thatcher could just drill directly through the pack of reeds and always hit the spot on the first try. A final clear example of a skill is driving the reed into the correct position. This action requires fine coordination, as you have to keep an eye on the entire surface of the reed while adjusting the small details. It is an act of positioning the body in the right position, shifting your perspective, and constantly alternating between focusing on the details and zooming out to the bigger picture.

Expression

The roof in our workshop only had one side so we collectively decided to leave the reed at the top uncut, resulting in a tuft of dried reed flowers. This ‘unfinished’ detail showcases how the corner of thatched roofs are dealt with. The more you reach the upper corner of the roof, the more horizontal the direction of the fibres needs to be to be able to finish the detail of the corner. As is visible in our case, the tuft slowly grows towards the middle, with a gradual change in fibre direction going from horizontal to vertical.

(practical) knowledge acquisition through physical experiences

conclusion

Through the three material explorations, we discovered that making activities involve the creation of a specific context where materials, tools, and bodies interact, enabling the transfer of knowledge. When encountering a material for the first time, an unskilled body begins to explore it through direct touch or the use of a tool. When the tool is used effectively, it feels almost like an extension of the body, allowing a direct connection with the material. Through this interaction, valuable insights are gained about the material's properties, like weight or stiffness, and its behaviour, like bending or shrinking. It is as if the material responds, revealing how it should and should not be handled. The unskilled body gradually acquires this understanding, often in the form of tacit knowledge, intuitive and difficult to articulate. This learning typically occurs with guidance from another body, someone who has prior experience with the material: the skilled body. The dynamic interplay between material, tool, and bodies creates an intuitive learning experience, where knowledge is gained through hands-on practice and direct engagement.

This intuitive learning experience that making allows is extremely beneficial in the context of architectural education. It is a way that can help us complement theoretical knowledge with practical skills. Using the terms of Gilbert Ryle, making allows us to develop knowledge that was merely an understanding of "knowing that" to a deeper knowledge that includes "knowing how". (Ryle, 1945). Through trail, error and repetition, making allows us to transforms theoretical concepts into embodied understanding, embedding this knowledge into our muscle memory. It cultivates what I would call a "general dexterity", a technical ability, a modest level of material knowledge and skill that brings the architect, the learned, closer to the craftman, the skilled, enabling us to better understand their material thinking and language. Additionaly, making causes an appreciation of the complexities of material use, insights in resource constraints and the physical effort that construction processes demands, causing architects to rethink their designs and reflect on the broader implications of their design choices—skills essential for bridging the gap between academia and practice.

Finally, and equally important making ressonates with the ethos of "mens sana in corpore sano", a healthy mind thrives in a healthy body. Making, as pure physical exercise, also plays a role in keeping our bodies active, using different muscles and constantly refining our visual-motor skills. After all, our bodies are not meant to sit in front of a computer all day.


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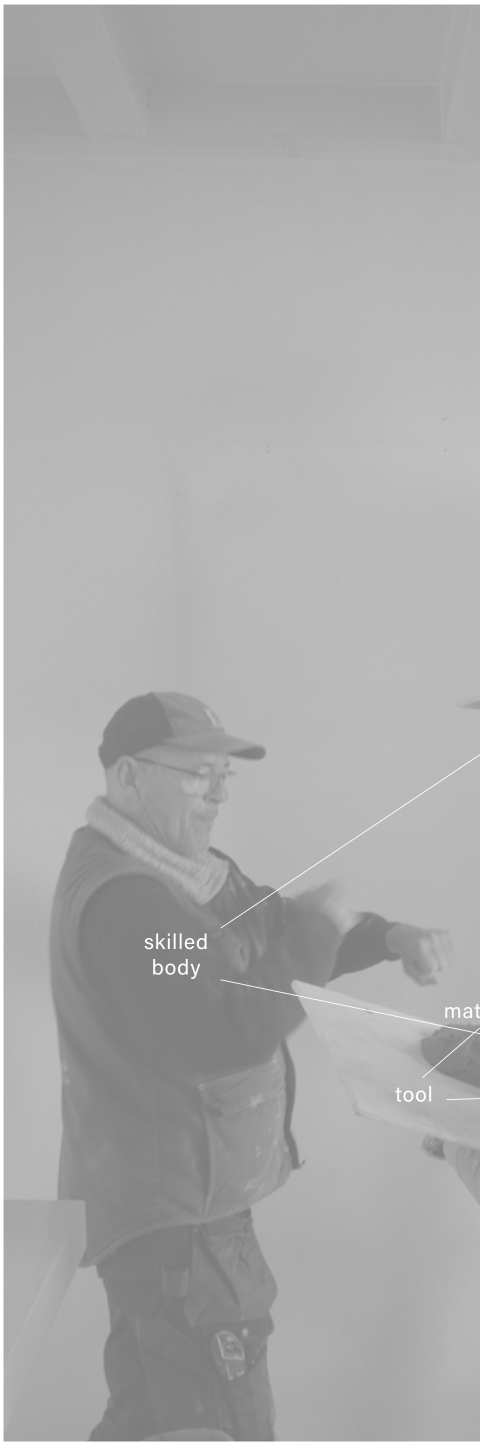
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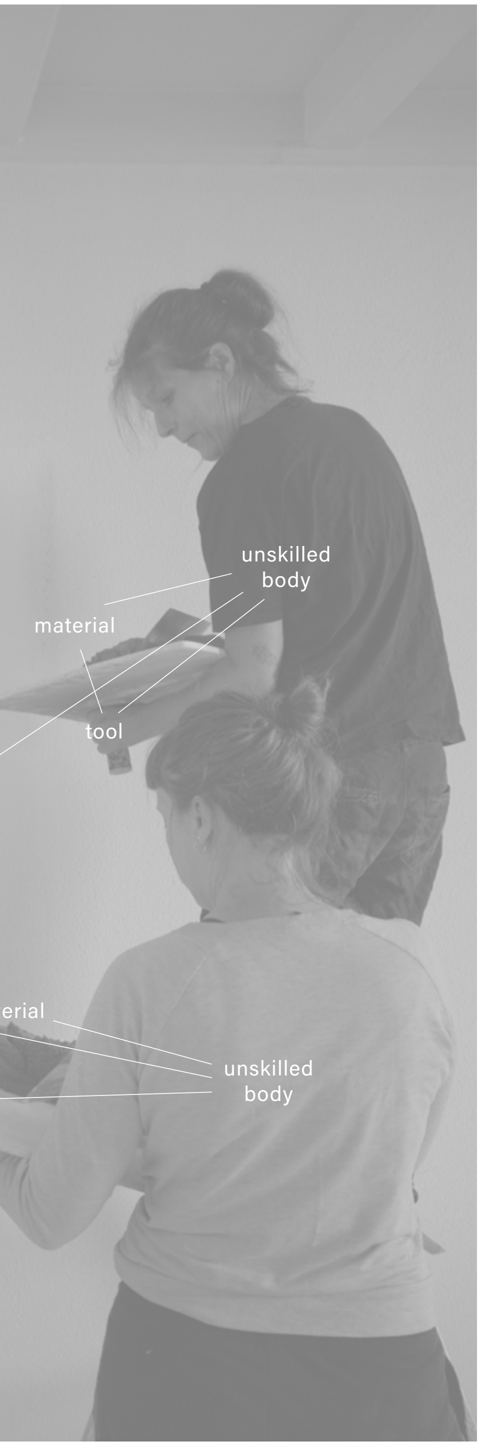
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02 ecologies of making

In this second section we continue the research by looking at the contexts in which the making activities take place. While these settings might at first appear secondary to the acts of making themselves, we might as well argue that they play a fundamental role in enabling and shaping these processes. The context not only hosts but actively conditions what is possible, influencing both the dynamics and outcomes of the work. To better understand these environments, the following chapter examines three case studies through a situated lens. Each case was explored through first-hand experience, involving site visits and active participation in the programmes offered by the different institutes. These engagements were driven by the aim of this research: to gain direct insight into the workings/practicalities of hands-on/alternative educational models by inhabiting and using them from within.

We explore three distinct but complementary case studies that embody this idea of "making ecologies" supporting architectural education: Stadsatelier de Ville in Brussels, Hooke Park in Dorset, and Les Grands Ateliers in Villefontaine. Each of these institutions challenges conventional educational models by positioning the act of making as a subject for knowledge generation and transference and by critical approaches of materiality with ecological transformation in mind. Through close analysis of their contexts, pedagogies, and infrastructures, we can use these case studies as a fertile ground for discussion and insights into how architectural education can be reimagined as a situated, hands-on, and materially engaged practice.

stadsatelier de Ville

visit to a circular material hub, Brussels — 25 → 26.11.2024

General programme

Stadsatelier de Ville, is a platform in Brussels that combines an architecural practice with material innovation and architectural education. Situated within an urban environment, where cycles of demolition and construction constantly reshape the built environment, Stadsatelier de Ville intervenes in these cycles as an opportunity for sourcing geological materials like sand, clay and gravel from the construction sites. The facility combines a storage depot for these salvaged materials with a processing plant and production hall for bio- and geo-sourced building materials, creating a material ecology that is in sync with what is happening in its direct environment.

The central pedagogical objective of this institute is to democratise access to alternative building materials and practices. By organising hands-on workshops that bring together students and professionals (architects, contractors, craftsmen), Stadsatelier de Ville hosts a transdisciplinary learning environment where both tacit and explicit knowledge are shared. It is not an isolated educational enclave but an active part/personage in its urban context. The questions it poses (How can geo and bio sourced building materials become mainstream? How can legislation be adapted to support non-standard materials?) are not only pedagogical but political. The institution situates itself at the intersection of education, policy, and practice, advocating for systemic change through grounded, material experimentation.

Personal programme

I was able to particapte in one of their offered workshop that was organised in collaboration with architecture students from RWTH Aachen. This tow day programmem focused on prototyping architectural details using mainly three bio-sourced materials: clay, wood and thatch. Hands-on sessions were alternated with lectures and project visits in which we could see practical applications of the used materials at scale.

Infrastructure

The physical infrastructure of the hub is very much a work in progress. At present, it consists entirely of temporary structures such as sea containers, concrete interlocking blocks, and tents, making it inherently open-ended and adaptable. A lightweight roof structure, assembled from wooden beams typically used as temporary supports in concrete formwork, rests atop the prefabricated concrete blocks. In the case of Stadsatelier de Ville, the choice of materials directly reflects the ethos of the programme, functioning as an expression of circular architecture.

Situated in an urban area undergoing significant development, the facility is designed with the potential for relocation in mind. Its modular and demountable construction makes it easy to dismantle and reassemble elsewhere if needed. In fact, such a move is already anticipated. Growing interest in the hub's activities has led to the allocation of a new site, allowing for the expansion of both its infrastructure and programming. Plans for the new facility include an extension of the current collection of prefabricated elements with a salvaged steel structure. This new building will bring together material production and educational activities under one roof, forming a large, open structure that supports flexibility of use.

Current infrastructure of the stadsatelier, an assembly of existing building elements →

← Experiments with rammed earth are conducted outdoors, not necessarily due to a lack of covered space, but to assess the material's resistance to weather and other environmental conditions. Various prototypes remain permanently on site, and over time, the ways in which they begin to disintegrate provide valuable insights. These gradual changes offer important lessons that can inform future experiments.

Hands-on experimentation is key to achieving the perfect clay mix. It's all about the tactile experience of scooping, dropping and testing the plaster to determine its readiness. →

← Hands-on sessions are alternated with moments of reflection, focusing on the properties of different clay mixtures. In this context, the Carazas test is used to compare how varying levels of moisture and pressure affect the material. Nine samples are arranged in a grid, with one axis representing increasing moisture and the other representing different degrees of applied pressure. This method allows for a structured comparison and a better understanding of how these variables influence the behaviour of clay.

← The prefabricated concrete blocks provide an ideal surface for plastering experiments. Overcoming the large gaps between the columns requires different techniques. Since we are working with natural materials, they can be washed off after every workshop without harming the environment.

Hooke Park

Visit to a woodland campus — 12 → 17.03.2025

General programme

Hooke Park, the rural satellite campus of the Architectural Association (AA), presents a contrasting yet complementary model to Stadsatelier de Ville. Located in the woodlands of Dorset, the campus is built around the idea of immersive, experimental design-build education, where students engage directly with timber sourced from the surrounding forest. This proximity to material origin is not incidental but foundational: there is a deep sense of responsibility and respect for the materials used, a more ethical and context-sensitive approach to construction. Hooke Park's focus on timber construction is not an attempt to go back to traditional crafts but to look for alternatives of industrialised timber practices, which often rely on uniform, wasteful, and globally sourced components.

In the broader context of making ecologies, Hooke Park exemplifies the importance of site-specificity, close relationship to materials, and experimental pedagogy. the forest is both resource and teacher. By offering a space where students can design, build, and reflect in close proximity to material sources, Hooke Park challenges the disembodied tendencies of architectural education and instead roots it firmly in the ecological and the experiential. The "principle of possibilities" discussed in the preface to this report is highly relevant here.

Personal programme

The pedagogical framework at Hooke Park is centred on long- and short-term research and design programmes that integrate craft, digital fabrication, and full-scale prototyping. I participated to the week-long "Full Moon Theatre" programme in which we designed and built a structure intended to illuminate a performance using only moonlight. This project demanded not only architectural ingenuity but also collaboration with professionals from the theatre sector, and experimentation with non-standard materials and techniques. The programme required us to stay on site in one of the pavilions, which was originally constructed by students. Compared to the programme at Stadsatlier de Ville, living on site for a while really contributing to the overall experience.

Infrastructure

The spatial infrastructure of Hooke Park reinforces this idea of material experimentation. Every stage in the wood process has its dedicated pavilion: from the sawmill, drying rack up until the shredder and wood chip oven that is used for heating all the structures on site. Facilities include a wide range of woodworking tools, digital fabrication equipment, and the "Big Shed" – A large, open-plan assembly hall that can be used for a variety of purposes and complements the fixed workshop layouts. The campus provides on-site accommodation, allowing students to live alongside their projects and their materials, blurring the boundary between living and learning. The staff, including skilled craftspeople and engineers, offer supportive guidance and critical challenge, facilitating a learning environment that values the process over the outcomes.

All of the architectural structures on the campus are closely tied to the educational programme, serving as demonstrative examples of experimental construction methods. The main workshop, designed by Frei Otto, consists of three domes supported by an arrangement of timber logs. While the individual logs are not particularly strong on their own, the strength of the structure lies in the way the elements work together to form a stable dome. The large shed features another notable timber construction, using spaceframes made from self-built laminated sections.

The roof structure of the main wood workshop, designed and built by Frei Otto. The buildings itself express the experimental programme of the site and dictate the use of wood. →

An additional pavilion of interest is the wood chip storage facility. This structure was designed using 3D scanning technology, allowing designers to analyse the geometry of irregular timber elements. By identifying the most suitable use for each piece, they were able to maximise structural efficiency and minimise material waste through reduced off-cuts. While the approach proved to be effective in theory, the structure eventually had to be dismantled due to wood decay. This "failure" offered again valuable insights for future iterations of the construction method that was used.

🡐 The layout of the wood workshop includes fixed workbenches and machinery, allowing the second main building, known as "the Big Shed," to remain free of any permanent programme. This open configuration enables the space to accommodate temporary or project-specific needs that require a large covered area.

🡐 One of the defining characteristics of Hooke Park is its emphasis on developing custom tools tailored to specific tasks. Within this experimental setting, there is no standardisation of workflows; instead, each process requires its own methodology.

The making of a bee hive involving a process of knowledge sharing between the bee hive expert and the students, through reworking a wooden log with custom tools. →

The final setup of the Full Moon Theatre included three types of reflectors, each developed over several years and refined for this latest edition. The reflectors were manually operated. We had to become attuned to the material, using our bodies movement to direct the moonlight onto the activity taking place on stage. →

Les Grands Ateliers

Visit to a pedagogical construction facility — 26 → 28.03.2025

General programme

Located in Villefontaine, France, Les Grands Ateliers functions as an industrial-scale facility for architectural prototyping and material research, serving both students and professionals. Its core ambition is to allow full-scale experimentation with actual materials in a safe educational context. The pedagogical model at Les Grands Ateliers is especially focused on early-stage architectural education. First-year students participate in spatial exercises that require them to engage directly with material constraints, structural logics, and collaborative processes.

My interest in this case study stemmed from its alignment with broader concerns around the disconnection between architects and the materials they specify and the pressing needs to shift our normalised, exploitive building industry towards a more circular and sustainable one. it contributes to an evolving discourse on how architecture can respond to the ecological challenges of our time. Les Grands Ateliers addresses this gap by creating a pedagogical ecology in which materials are not abstract commodities but the main characters of the activities.

Programme

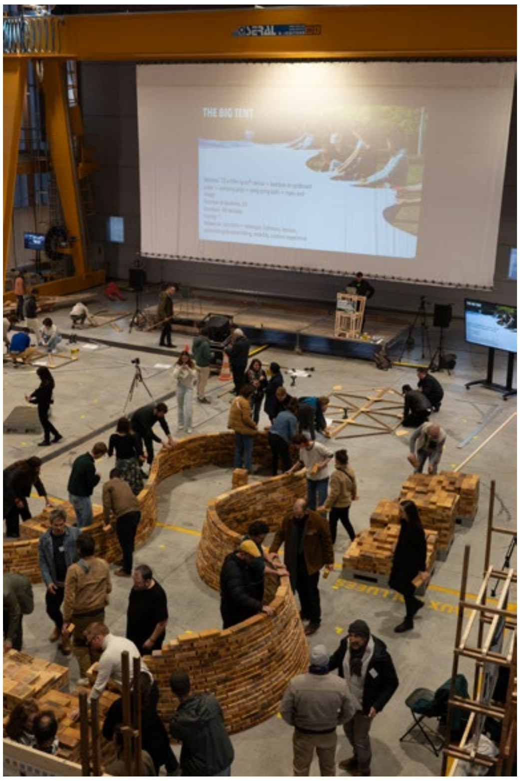
I participated to the "Explearn 2.0", a symposium that convenes educators and researchers focused on learning-by-doing in eco-responsible design. This edition of the symposium opened up the "backstage" of the experiental architectural pedagogy, revealing the tensions, possibilities, and innovations that arise when theory meets practice. Lectures by educators and practitioners from all over the world were alternated by hands-on sessions during which the audience took on the role of students. These sessions offered us the opportunity to engage directly with the Ateliers, participating in exercises that are typically part of their teaching programmes.

Infrastructure

With a semi-open construction hall capable of infinite reconfigurations, Les Grands Ateliers offers an infrastructure that embraces flexibility, adaptability, and collective learning. Its open-ended infrastructure reflects the institution's belief that the spaces of education must remain responsive to changing social, environmental, and technological conditions. These large open spaces are served by several smaller spaces and have particular features that improve their pedagogical character. A particularly striking feature is the so-called "pedagogical balcony," introduced in the large halls to allow students to physically step back and observe their work from above. This elevated perspective supports reflective practices such as sketching or critical assessment of the outcomes.

Within the facility, materials are in constant circulation. Forklifts and pallet trucks transport materials in and out to support ongoing exercises. As far as possible, materials are reused, stored in a vast open shelving system. Beyond its practical storage function, this structure serves as a live catalogue, offering a visual inventory of available resources.

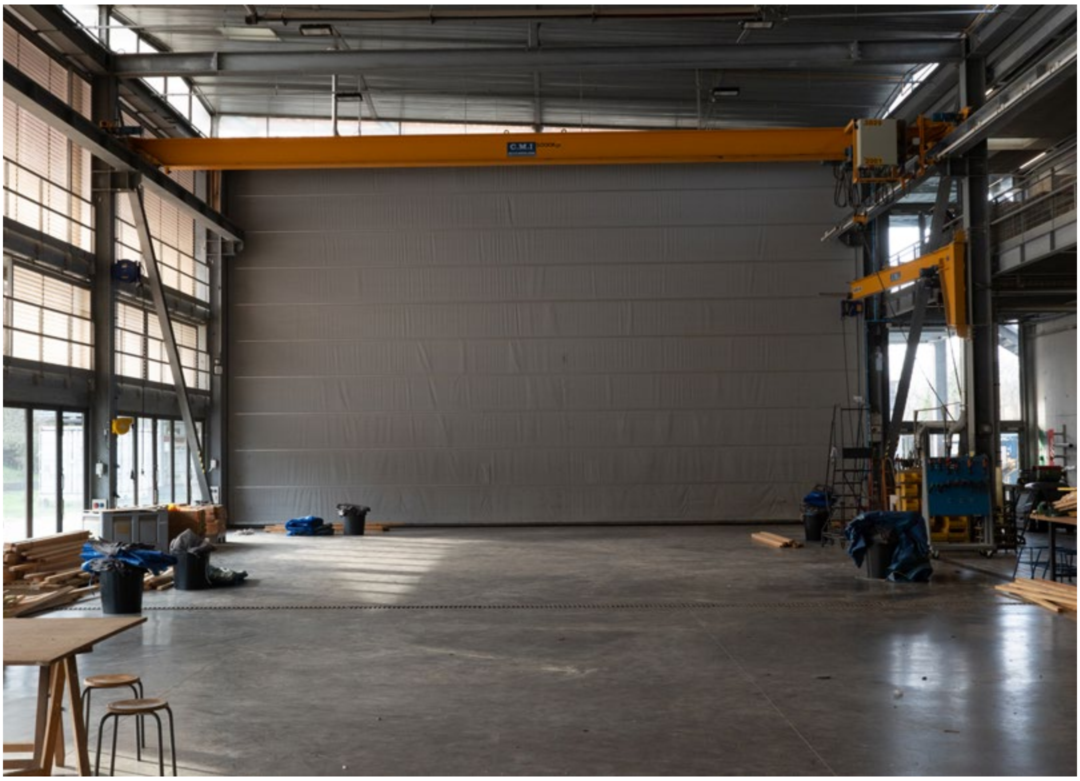
The nature of the activities generates a continuous cycle between order and disorder. Spaces shift from a state of cleanliness and organisation into moments of productive chaos during exercises, before returning to order once the work concludes. Cleaning is an integral part of this rhythm, supported by specific infrastructural features such as integrated gutters and floor ditches, as well as a large-scale spray cabin equipped with high-pressure cleaners for tool maintenance.



The assembly hall serves a dual purpose, functioning both as a venue for conference talks and as a workspace for making activities. All furniture within the hall is fully mobile and has designated storage, allowing the space to be quickly and efficiently reconfigured according to the needs of each activity. →

The pedagoical balcony. →

Finally, the facility is designed to support a seamless transition between interior and exterior spaces. Sliding walls and roofs allow interior spaces to open outward, and all construction halls are located on the same level, ensuring an uninterrupted flow of materials throughout the site.



← The boundary between indoor and outdoor is easily transformed through the use of movable façades. A double-membrane curtain system provides insulation during the winter months while allowing the space to be fully opened during the summer.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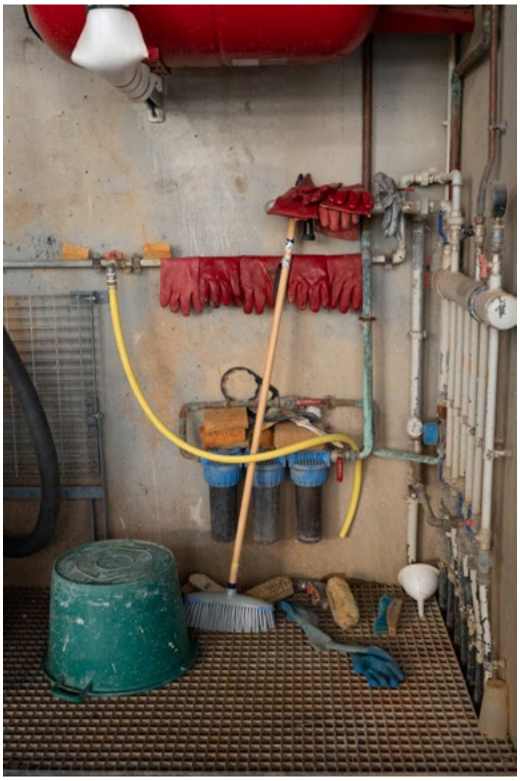
← At the heart of the facility is a large open storage rack that houses all the materials available for repeated use in the various exercises. This centralised rack functions as a visible and accessible material repository.



← Auxiliary functions are housed in smaller adjacent rooms, including a spraying room for cleaning tools and several spaces containing supporting machinery. Notably, the machines are not central to the programme; rather, they serve a secondary role, providing support to the primary focus on hands-on making activities.

lessons for a stimulating making environment

conclusion

Across the three visits, a number of elements emerged that contribute to the productive nature of these making ecologies. However, two key elements stood out as particularly significant and are worth highlighting in the conclusion of this chapter.

The first is the continuous presence of materials embedded within thoughtfully designed material cycles. At Stadsatelier de Ville, clay follows a clear trajectory from construction sites in Brussels to the facility, where it is processed and transformed into building materials suitable for the mainstream construction industry. Within this cycle, opportunities for experimentation are organised, offering visitors and participants the possibility to explore the material's potential. At Hooke Park, the cycle centres on timber sourced from the surrounding forest. Here, students engage in harvesting the material themselves, resulting in a sense of responsibility and a deeper appreciation of its value. In contrast, Les Grands Ateliers does not focus on a single material, but has established an extensive infrastructure to accommodate a wide variety of materials and their assemblies into 1:1 architectural mockups. In the context of architectural education, I would argue that this flexibility is especially valuable. As material interests shift over time, a system capable of adapting to different materials ensures that the space remains relevant to evolving pedagogical and experimental needs.

The second key element is the presence of a clear spatial organisation of served and servant spaces. At Stadsatelier de Ville, the arrangement of containers and tents enables a variety of uses: the containers not only serve as structural components but also provide secure storage of the tools over night. Hooke Park similarly maintains a distinction between its fixed-layout wood workshop, which is equipped with workbenches and machinery, and the adjacent "big shed," a large, open space intended for flexible use. Les Grands Ateliers follows a comparable model, with expansive construction halls supported by adjacent service spaces that house machinery, classrooms, and storage. While the allocation of generous open spaces, both indoors and outdoors, may initially appear excessive, such spaces are key to the productive nature of a place, as they act as spillover zones for activities that cannot be confined to designated workshops. Their availability plays an important role in enabling spontaneous, large-scale, or unconventional making processes to unfold.

seven unresolved questions

discussion

I would like to conclude this research with a collection of seven thoughts and questions that emerged during the course of this graduation project. They are not final statements, but rather open-ended reflections, threads for discussion, further consideration, or perhaps future practice. Each of them touches on an aspect of making in architectural education, drawing from both conceptual exploration and hands-on experience.

1. Is architecture made with the brain?

This question, posed by Shelley F. Martin during the Explearn 2.0 symposium, stayed with me throughout the year. At the beginning of the design phase, I aimed to challenge my usual way of working by integrating making more directly into the process. I wanted to approach the project not only through reading and thinking, but also through the hands and through materials. However, I struggled to carry the joy I had experienced during the research phase into the design phase. Engaging with craftspeople and discovering materials through their knowledge had been very enriching, but I found it difficult to translate that experience into the actual act of designing. Unsure how to proceed, and feeling the pressure to make progress, I noticed myself returning to the tools I was most comfortable with, developing the project through sketches, plans, and sections, even though I was fully aware that I was operating at a level abstracted from the material reality I wanted to explore.

2. Can we benefit from material alienation?

This question is closely linked to the previous one. As the process unfolded, I came to recognise not only the value of hands-on making but also the importance of abstract thinking, discussion, and reflection. A spontaneous conversation with Oscar Rommens, a teacher in another graduation studio, stayed with me throughout the process. He described how good engineers and architects develop the ability to move fluently between scales and levels of abstraction. You start by encountering a problem in the real world, then you step back, abstract the problem from its immediate context, translate it into drawings and calculations, before finally returning to the physical world to test and refine the idea. This made me realise that academic education and physical making are not opposites, but can be complementary modes of learning.

3. Abundance vs efficiency?

This question was raised by the team at Hooke Park, who are exploring how to make use of the vast amounts of offcut wood produced by the timber industry. Working with leftover materials can be promoted as a cost-effective approach, but it requires a different kind of organisation in both the design and construction process. Within a school context, such experiments are possible because they are often free from the constraints of the building industry. Time, labour, and resources can be invested in ways that are rarely feasible in professional practice.In the building industry, renovation and reuse often lose out to demolition and new construction, largely because the latter is more familiar and has been developed into a more streamlined and cost-effective process. If efficiency remains a driving force in mainstream building culture, then we must ask: how can we make resourceful, experimental approaches more efficient as well? Experimenting in school is exciting and valuable, but unless the industry evolves alongside these educational practices, there is a risk that these experiments remain isolated from wider impact.

4. The school as a resonant space?

This question is closely tied to the previous one and is informed by Hartmut Rosa’s ideas on resonance. It reflects a recurring doubt I encountered throughout the project: Is it the role of the architecture school to facilitate the making activities, or does this risk reinforcing the “architectural bubble” that separates us from the realities of practice? At first, I believed such activities should be fully integrated into the architectural curriculum and housed within the school itself. But when I reflected on my own experience, I realised that all of my most meaningful material explorations happened outside the school, where interactions between material, tool, and body were shaped by different contexts, craftspeople, and forms of expertise. This movement outside of the institutional setting was also very valuable. At the same time, schools have the unique potential to bring many voices together, to be a "resonant space" and serve as safe testing grounds where students can experiment without the constraints of real-world consequences. As Dewey suggests, schools should function as “social instruments focused on harnessing young people’s impulses to make, create, and produce” (Lefebvre et al., 2021, p. 45). By bringing the making into its building, a school could potentially dissolve the rigid boundaries between learning, working, and living.

5. How relates making to the ongoing climate crisis?

At first glance, encouraging more material experimentation might seem contradictory in an era defined by environmental limits. However, I would return to the reasoning from the previous question: if the school is seen as a testing ground, where materials can be explored at a relatively small scale and without serious consequences, it becomes a valuable space for innovation. Such experimentation has the potential to generate insights and strategies that could influence the wider construction industry, which remains one of the most polluting sectors today. After decades of relative inaction, the urgency of the climate crisis is impossible to ignore. For emerging generations of architects, sustainability is no longer a choice; it has become a necessity. In this context, I would argue that deeper material knowledge and hands-on experience are not only justified but essential. In the broader conversation about the role of making in architectural education, the climate crisis may actually be an ally; pushing us to explore new methods, develop better tools, and build with greater care.

6. The holy grail of making sits in developping your own tools.

This thought follows from questions three and five. At present, many of the tools required for alternative, more sustainable approaches to architecture (understood here in a broader, metaphorical sense as processes and systems) are still underdeveloped. This often leads to inefficiencies and higher costs, which make these approaches less competitive in mainstream practice. Therefore, I believe there is a real challenge, and opportunity, in inventing new tools rather than relying solely on the ones we already have. Rethinking the tools we design with, build with, and organise with may be essential if we are to make sustainability, repair and reuse both viable and widely adopted.

7. Are architects craftspeople?

This is one question to which I did find an answer: no. The myth of the lone genius architect is outdated. I would argue that the so-called "homo universalis" figures of the past were probably surrounded by a strong network of good craftspeople. Architecture is, and always has been, a collaborative act, one that draws on the expertise of many hands, many voices, and many forms of knowledge. Quality architecture arises from these collaborations, not despite them.

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SGB

colophon

Since this research is all about the transfer of collective knowledge and skills, I am incredibly grateful to the following people for sharing their knowledge and helping me throughout this process.

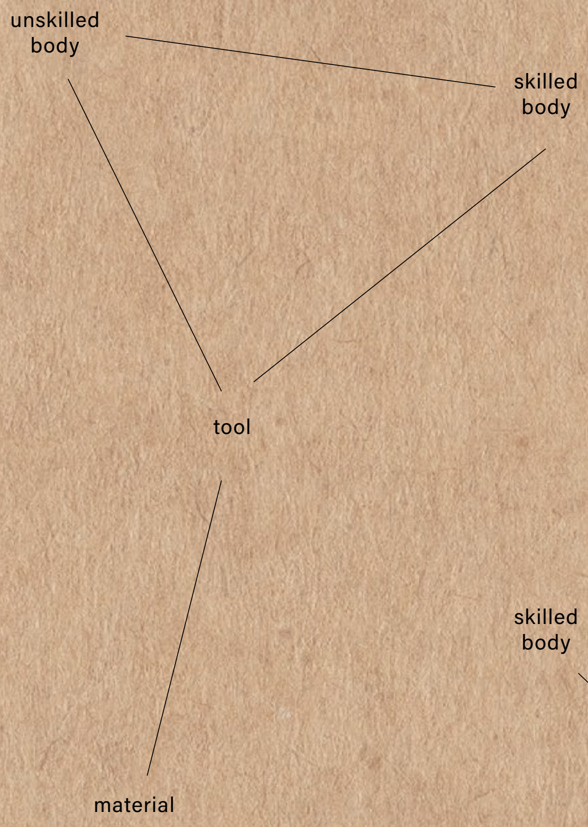
supervisors:
Eireen Schreurs (design mentor)
Mieke Vink (research mentor)
Georgios Karvelaz (building technology mentor)
Jorge Mejia Hernandez (previous design mentor)

material explorations:
bamboo greenhouse: Yoshiharu Tsukamoto, Lisa Sawada Petersen, Yoshitaka Suto
clay plaster wall: Paulien Bremmer & Marjan van Herpen
BC architects: Theresa Zschäbitz, Jasper Van Der Linden, Lara Winderickx
thatched roof: Dennis Raggers
clay plaster and fibres wall: Anais Saoudi
timber construction: Quentin Bourguignon
steel welding: Warre Van Putte
steel laser cutting and bending: Rik and Kato Deschepper
yakisugi: Nike te Brinke
mycelium: Emile Waterkeyn
workspace: Johannes Langkamp
hooke park: Francesco Anselmo, Yunni Cho
les grands ateliers: Pascal Rollet

additional feedback:
Salomon Frausto, Oscar Rommens, Suzanne Pietsch, Sam De Vocht, Bas Vahl

support & discussions:
Robin Ringel, Raf van Oosterhout, Jelle van den Brink & fellow Explore Lab students

research supported by:
Stylos fund, Fast fund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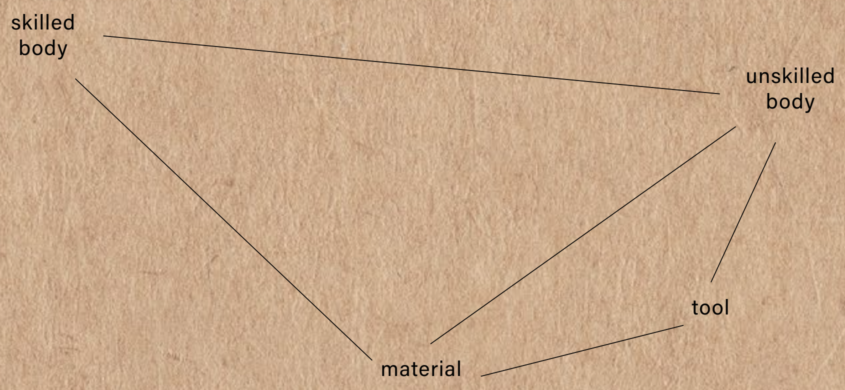
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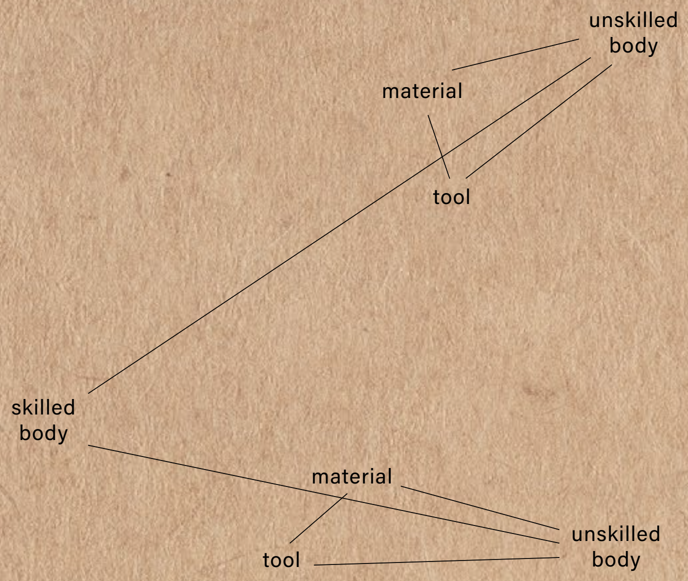
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