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Integration of Art-Based Research in Design Curricula

Integración de investigación basada en el arte en programas de diseño

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Abstract
This paper focuses on the use of art-based research to enrich active methodologies in design curricula. Based on the analysis of two case studies, it argues the need to further explore a hybridisation of methodologies and disciplines to foster disruptive and innovative design practices within academic programmes in the expanded architectural field. The case studies articulate temporary spatial design with artistic practices through a radical approach to materiality, which is posited as the starting point for each project. Rather than seeing materiality as a second-tier decision addressed after a design concept has been formulated, materials are tackled directly, and the working process then defines the design concept and its detailed resolution. A crucial result of the case studies is the active enactment of new forms of authorship, straddling the space between the autarkic author of post-romantic models and the dissolution of authorship of some contemporary collaborative models.
***Keywords:** art, design, disciplinarity, materiality, authorship, projective criticality, agency of matter, strategies of indeterminacy.*

***Thematic areas:** project and design, active methodologies, experimental pedagogy [proyecto y diseño, metodologías activas, pedagogía experimental].*

Este artículo se centra en el uso de la investigación basada en el arte para enriquecer metodologías activas en planes de estudio de diseño. Basado en el análisis de dos casos de estudio, argumenta la necesidad de explorar una hibridación de metodologías y disciplinas para fomentar prácticas de diseño disruptivas e innovadoras dentro de los programas académicos en el campo de la arquitectura expandida. Los casos de estudio articulan la arquitectura efímera con prácticas artísticas a través de un enfoque radical sobre la materialidad, que se plantea como el punto de partida de cada proyecto. En lugar de entender la materialidad como una decisión de segundo nivel que se aborda después de haber formulado el concepto de proyecto, ésta se aborda directamente para definir el concepto de diseño y su resolución detallada. Un resultado relevante de los casos de estudio es la exploración activa de nuevas formas de autoría, a caballo entre el autor autárquico de modelos posrománticos y la disolución de la autoría de algunos modelos colaborativos contemporáneos.

Introduction: Art-based research as critical spatial practices

The following paper is intended to stimulate a debate about art-based research in design curricula and its ability to foster critical spatial practices at the intersection of aesthetics, matter, and pedagogy (Jokela and Huhmarniemi 2018, Hickman 2008). It will argue that the incorporation of art-based disruptive methodologies into design curricula develops dynamics which subvert disciplinarity though projective criticality, activate the pedagogical agency of matter through direct material operations, and introduce a collaborative environment conducive to resilient modes of authorship explored through strategies of indeterminacy.

Discipline: Projective criticality

In this age of complexity, characterized by conditions of crisis (environmental, economic, social, ethical) (Fraser 2014) and a presumed exceptionalism of the human subject (Turpin 2014), spatial practices need to be renewed through acts of constructive critique in order to update their operativity and maintain their relevance. A critical interpretation of the existing reality and material culture is crucial to the articulation of novel pedagogical approaches that can expand the field of spatial design practices. There is a need to apply theories and practices that recognize the threats, possibilities, and peculiarities of our contemporary reality and harness them in a creative projective exploration. This pragmatic critical approach focuses on performance and propositive action, and it channels critique as a creative attitude, fostering design approaches that prioritize vitalist affirmative change over passive commentary and negative criticism (Allen 2000, 60). This evokes a projective methodology (Somol and Whiting 2002) that focuses on sensibility, affect, ambience and atmosphere. Moreover, it introduces the idea of projective criticality as a design approach that questions the socio-spatial context in which it operates and problematizes disciplinarity through practice. In this sense, projective criticality expands design by proposing alternative methodologies of socio-spatial intervention based on the consolidation of a disruptive design attitude. This attitude suspends rigid disciplinarity by interrogating reality from a plural and counter-disciplinary perspective. It is based on performing critique through direct action and positive change, and it fosters an active interventionist approach. We consider it necessary to incorporate this ethos into contemporary design curricula, in terms of both content and methodology.

Projective criticality is a core strategy in the case studies presented in this paper. Approaching the educational process as a critical spatial practice rather than a unidirectional transmission of established knowledge draws on the ideas of Jane Rendell, who argues that criticality articulated through space opens up “a place between art and architecture” (Rendell 2006). In this sense, introducing art-based approaches is fundamental for design curricula, because they articulate an alternative terrain that can provide a critique of existing design methodologies, thus triggering a rethinking of design’s aims, results and societal role. Disrupting established design approaches with art-based strategies articulates a critical spatial practice in a constant state of shift, which operates as a “work that transgresses the limits of art and architecture and engages with both the social and the aesthetic, the public and the private” (Rendell 2006). Projective criticality subverts the disciplinarity of conventional design approaches by cross-pollinating them with art-based strategies, which open a space of constant disciplinary reinvention through immediacy, affectivity and intersubjectivity.

Materiality: The agency of matter

Projective criticality brings us to the idea of situated knowledges, or knowledges achieved through direct imbrication between human agency and the socio-spatial components of the context.

Donna Haraway defines this dynamic of emancipation through action as “the apparatus of bodily production, a more adequate, richer, better account of world, in order to live in it well and in critical, reflexive relation to our own and as well as others’ practices of domination” (Haraway 1988, 579). In this regard, the production of bodily knowledge through improvisation and immediacy implies a direct negotiation between human agency and matter, canalizing an epistemology of active presence (Dillon and Howe 2007). This fosters both practical and intellectual engagement by reorienting conventional representational epistemology in design education towards a process of active entanglement with both the physical and relational aspects of the human habitat. It reveals how materiality has the agency to transmit, create and drive knowledge.

This idea connects directly with the understanding that operations with matter are critical interventions in the political ecology of things (Bennett 2010), in which human and non-human agents interact in an affective network. These interventions are encompassed under the concept of sociomaterial practices, comprising actions of organizational sense-making like “cognition, knowledge, learning and perceiving” (Carlile et al. 2013, 2). Their high operativity is studied by a wide range of authors like Timothy Morton, Bruno Latour or Karen Barad (Morton 2017, Latour 2005, Barad 2003), who acknowledge the performative role of materials in social interactions, and in particular, in knowledge production. Thus, hands-on material experimentation becomes an important component of design curricula. Approaches like “doing by inventing the way of doing” (Gherardi and Perrotta 2013) or design/build (Hinson 2007) stimulate pedagogical settings founded on constant transactions with the agency of matter. Thus, the relationship between matter, space and human agency articulates a performative pedagogical environment, one which enacts expanded design attitudes, suspending conventional design logics through affective negotiation with the context and operating between different fields like architecture, design, art, and other forms of spatiotemporal interventionism.

Authorship: Strategies of indeterminacy

The articulation of expanded design attitudes entails the need to understand the pedagogical environment as an intersubjective terrain of creative autonomy, rooted in contextuality, improvisation and open-endedness. These ideas are directly related to problematizing authorship through “strategies of indeterminacy, self-regulation, and autonomous emergence” (Waldheim 2006). In this sense, self-regulated design processes that work with the contingencies of the context and its inhabitants require plural and transversal creative agencies. According to Anthony Giddens, “agency means being able to intervene in the world, or to refrain from such intervention, with the effect of influencing a specific process or state of affairs” (Giddens 1984, 14). By fostering students’ ability to intervene directly in the context, the pedagogical process opens up a terrain for the trans-linear interaction of agencies, or as Giddens defines it, a terrain of “mutual knowledge”, where agents act “in exchange, in negotiation, out of hunch, out of intuition” (Awan, Schneider, and Till 2011, 32). In this regard, the educational formats we are researching enable processes of collaborative knowledge development, in which weak or displaced authorship (Waldheim 2006, Ortega 2017, Paez in press) is a main vector of the pedagogical dynamics.

Collaboration creates an open-ended setting for improvisation and uncertainty (Dell 2019), which offers opportunities for the emancipation of the students’ agency; indeterminacy leaves creative space for a constant projective renovation through intersubjective contributions. This approach brings us back to Joseph Beuys’ ideas on radical pedagogy. Beuys opted for transgressive formats that could dismantle the codes, methodologies, or ideals of normative teaching in order to try to "recognize, explore and develop the creative potential that each of us has" (Maiz and Müller 2010). From this perspective, art-based collaborative educational formats trigger an

emancipatory pedagogical environment based on strategies of indeterminacy and learning through direct action, which disable traditional hierarchic forms of authorship. Intuition, inventiveness, interrogative disposition (Danvers 2003) and a projective take on antagonism (Paez and Valtchanova 2021) become main principles in these educational approaches and constitute a performative context for supple authorship.

Pursuant to these ideas, this paper presents two case studies developed over a five-year period: *Només Paper* and *Beautiful Failures.* Both case studies apply art-based collaborative methodologies to design curricula and show how aesthetics, matter and pedagogy can foster diverse critical spatial practices, which reinvent the design field by expanding it.

1. Art-based practices in design curricula: case studies.

Please spare me all of your futuristic visions | 'Cause I gotta get some action | Gotta get some action now!

The Hellacopters, 1995

The case studies presented in this paper were realised in the context of two different collaborations between a university postgraduate course in spatial design (MEATS Elisava) and a private not-for-profit institution devoted to artistic production (Cercle Artístic Sant Lluc: *Només Paper*) or a public foundation devoted to architectural research and outreach (Fundació Mies van der Rohe: *Beautiful Failures*). These collaborations resulted in four different projects (*Paper Geographies [PG], One and Many Lines [OAML], Moving Paper [MP]* and *Beautiful Failures [BF]*).

All projects were co-led by an artist and an architect in order to maximise the cross-pollination between art and design and to articulate different sensitivities, working methodologies and design instruments within a single transdisciplinary pedagogic setting. The author (Roger Paez) participated in each case in the role of architect, and three different artists were invited and gave their unique signature to each year's different proposal (Stella Rahola Matutes [*PG* and *BF*], Mar Arza [*OAML*] and Luz Broto [*MP*]). Each course lasted between four and five weeks and culminated with an installation designed and built by the students and faculty, located at a site open to the public: either an art gallery or a modern heritage building. The roles of students, teachers, expert consultants and various stakeholders were reformulated in each case, as the collaborative co-design process implicitly and explicitly relates multiple agents, often with diverging views on the issue at hand that need to be taken into account and integrated into the design process and the final results (Zamenopoulos and Alexiou 2018). This complex setup raises relevant questions regarding expertise, authority and collaboration, and fosters forms of co-responsibility and alternative authorship, as opposed to conventional top-down hard authorial control (Paez 2019a, 312).

Integrating arts-based practices into design curricula is a powerful way to foster methodological approaches such as learning-by-doing and design/build that help students situate design knowledge and develop skill sets in a specific time and place (Hinson 2007). The academic activities are split between the classroom and the intervention site so the specific spatio-temporal, socio-cultural and perceptual logics of sites can be directly experienced and understood by the participants. Actually materialising the project through a design/build format provides a high level of student implication and satisfaction, while generating a very visible result in the form of site-specific installations which have an impact both through direct audience experience and media communication.

The main instrument used is hands-on material experimentation (Mäkelä and Löytönen 2015). Starting from a specific material, we propose an open-ended experimentation unfettered by any spatial or programmatic brief. Building from this initial phase, themes and techniques are honed to further explore the capabilities of materials to inform the design proposal. Collaborative brainstorming sessions are used to identify the research hypotheses. A carefully curated documentation phase ensues and allows the team to distil the initial open exploration into formalised research with a clear narrative and a strong sense of archive. Subsequently, and through direct interaction between all participants and the specific site, the materiality, construction logics and logistical implications of the project are addressed. The construction phase culminates the feedback process between participants, site and narrative. Finally, the built proposal is communicated through graphic documentation, film and photography, by participants themselves and invited artists who give an added layer of meaning to the project through their idiosyncratic gaze.

The academic content is thus organised into four different types, corresponding to the different phases of the course described above: experimentation, documentation, construction and communication. The results achieved are basically of two kinds: a site-specific installation and the publication of research material. While the installations differ greatly in many aspects, they share a remarkable plastic quality and a strong critical spatial strategy (Deutsche 1996). The research material generated during the courses is carefully edited and published in book format, together with photographs of the installation.

The experience of the five-year cycle presented in this paper shows how an initial multidisciplinary setup (people from different disciplines working together, each drawing on their specific knowledge) can become a transdisciplinary effort (a research strategy crossing several disciplinary boundaries to create a holistic approach (Bernstein 2015)), which can be systematised in order to enrich the hybrid domains of practice-based architecture, design and arts research.

Només Paper (Santlluc+MEATS Elisava)

The first case study presented includes three distinct iterations of the same question: How do we work with paper as the fundamental material for a spatial proposal? Paper is usually understood as a support for artistic expression, hardly ever as the primary source of inspiration, reflection and experimentation. The Cercle Artístic de Sant Lluc (Santlluc), a venerable Barcelona artistic institution, known mostly for being the epicentre for drawing in the city, was the perfect partner to work with. Over three years, the same question and the same academic format was iterated, changing only the students and the artists that led the course as core faculty. The differences in each project's results allow us to validate the initial hypothesis that art-based research helps to introduce continuous projective critique and experimentation into design curricula with the end-result of expanding design's disciplinary boundaries. For further information, see the book published following this collaboration (Paez 2019b).

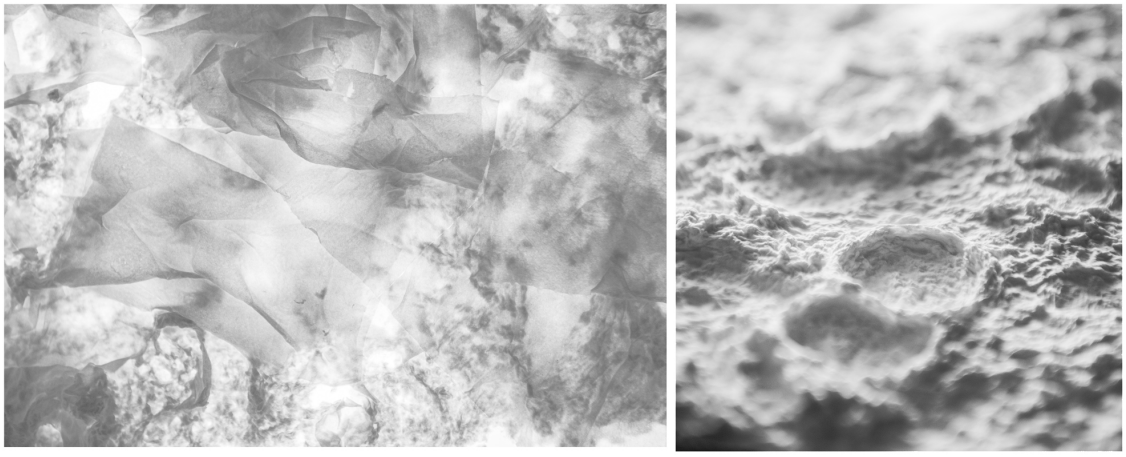

Fig. 1 Detail of paper textures. Paper Geographies (MEATS, Stella Rahola Matutes, Roger Paez), 2017. Source: Ardila

Fig. 2 Fabrication process. Paper Geographies (MEATS, Stella Rahola Matutes, Roger Paez), 2017. Source: Ardila

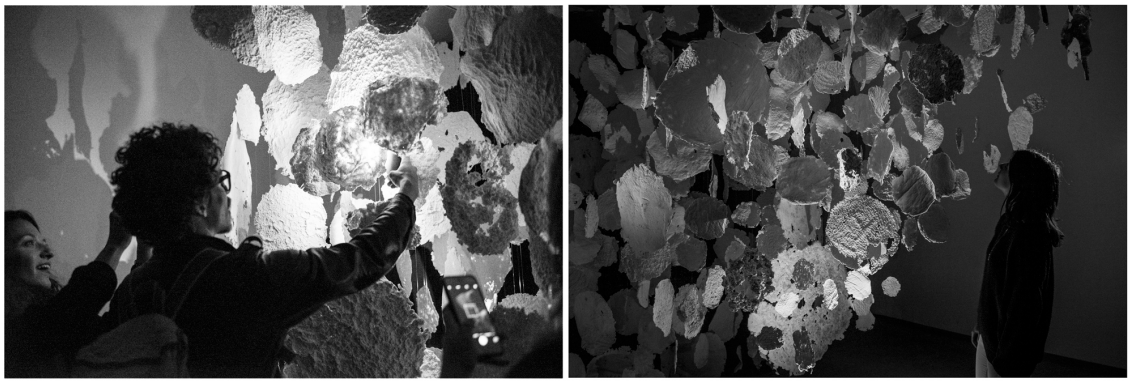

Fig. 3 Immersive space. Paper Geographies (MEATS, Stella Rahola Matutes, Roger Paez), 2017. Source: Ardila

Paper Geographies

The project's first move was an open-ended material experimentation exploring multiple ways to transform toilet paper through a hands-on workshop held at Arts Santa Mònica in Barcelona. After the initial exploration, papier mâché was chosen as showing the most promise, and the team kept exploring different formats, sizes and mixtures of paper, water and glue. It soon became clear that the objective was to craft as many elements as possible to be used as pieces in a still-unspecified spatial installation. Most of the time was thus devoted to transforming toilet paper rolls into the papier mâché moons that gave the project its title [Fig.1]. All formal decisions were the

result of actively addressing the temporal, material and logistical constraints. The round shape, for instance, was derived from the forms of the vast majority of available containers such as bowls, buckets or vats [Fig.2]. The thickness of the material responded to what was needed to ensure the structural stability of each piece. The total number of pieces came from what the team could produce in the allotted time of the workshop.

The second move was to transport the papier mâché pieces to Santlluc, and once there, test their onsite behaviour. The direct transaction between the available material and the available space helped to inform the spatial decisions for the installation. It is important to highlight the fact that the installation format and the spatial solution were not addressed beforehand but were the result of a direct onsite negotiation between material availabilities, logistic affordances and collective desires—a radical trait shared by all projects presented in this paper. This approach (first producing the elements, then thinking about how to work with them spatially) avoided conventional design approaches based on first conceptualising, then designing, and finally building. After lots of trial and error, the basic decisions for the spatial arrangement and the experiential atmosphere were taken collectively. They amounted to four main decisions: to group all the pieces in a single mass to undercut the aggregative logic that a sum of discreet elements tends to have, to shape the mass so it allowed visitors to be surrounded by it to avoid an object-like perception and foster an immersive experience [Fig.3], to fix all the paper elements so that they would move with the slightest draft to generate an environment responsive to the visitors, and to totally darken the exhibition space so that the perception of the paper geographies would depend on the visitors' own devices (smartphones) [Fig.4].

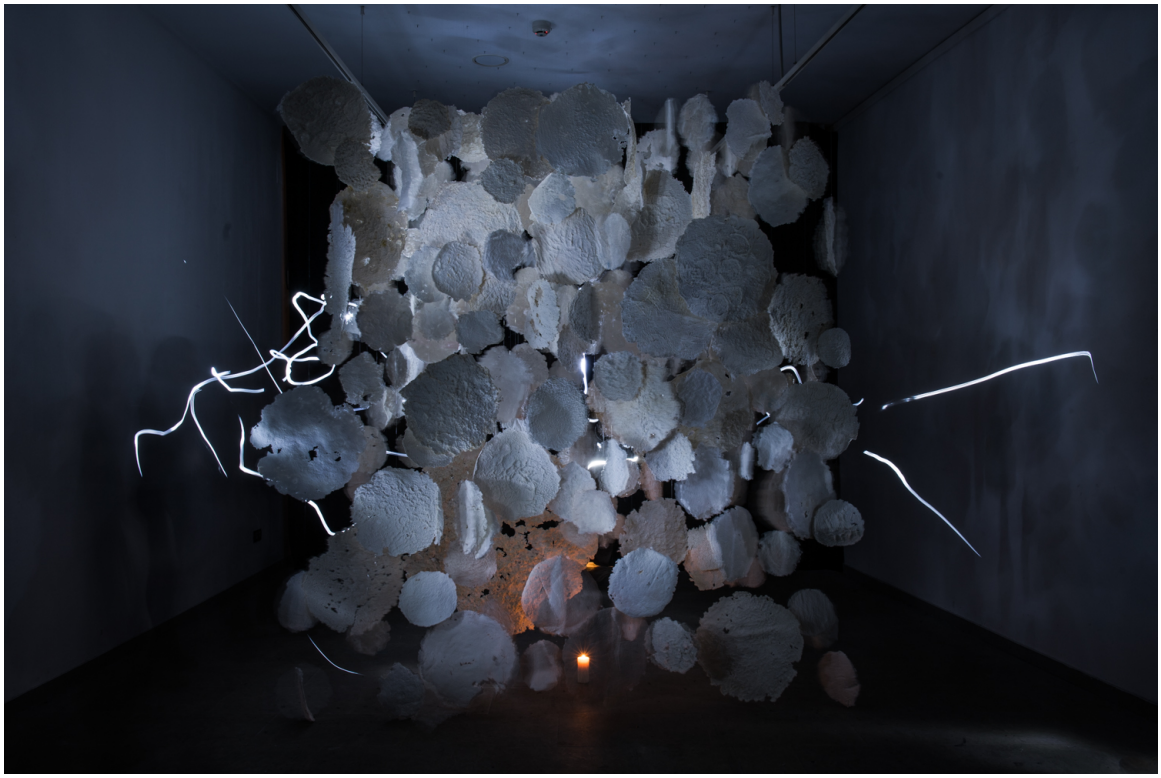

Fig. 4 Overall installation, long-exposure photography. Paper Geographies (MEATS, Stella Rahola Matutes, Roger Paez), 2017. Source: Ardila

Fig. 5 Exhibition space, three aspects of the same line, exhibition leaflet. One and Many Lines (MEATS, Mar Arza, Roger Paez), 2018. Source: Ardila and MEATS

One and Many Lines

The project's first move was to radically limit the material choice to A4 white printer paper and to explore the possibilities granted by this highly conventional paper material. Through a hands-on material experimentation process, many techniques were tested (e.g., folding, creasing, ironing, burning, sewing). Finally, the team opted for a controlled crumpling technique that made it possible to give volume to flat paper sheets.

The second move was to engage in live model drawing, one of the classical drawing formats practiced at Santlluc. Rather than the human body, the "model" was a typical element from an art centre: a metal wire sawhorse. The drawing exercise consisted in quickly sketching ever more complex configurations of this simple furniture element: first a single sawhorse, then two, then three, and so on up to 10. This exercise led to using drawing to incorporate accumulation in a more complex and subtle way than simple aggregation, an aspect which was seminal to the final wall frieze.

The third move was to conceptualise the main lessons learned from the experimental workshops through verbal expression and written language. The final idea was to work with a single line, the most basic of drawings. One line was proliferated into a manifold in four steps: a single line drawn on an A4 paper sheet, a micrograph (taken in a lab at the Life Sciences faculty) of that same line printed on an A4 paper sheet, a large-scale wall frieze made from crumpled paper reproducing the topographies of graphite shown in the micrograph [Fig.5], and a spatial setup inviting visitors to draw the frieze on A4 paper sheets that were then pinned to the wall of the exhibition hall [Fig.6]. The proliferation of this single and simultaneously multiple line offered critical entries into the question of individuality and collectiveness, both of the material (A4 sheets) and the human participants (design team [Fig.7], visitors [Fig.8]).

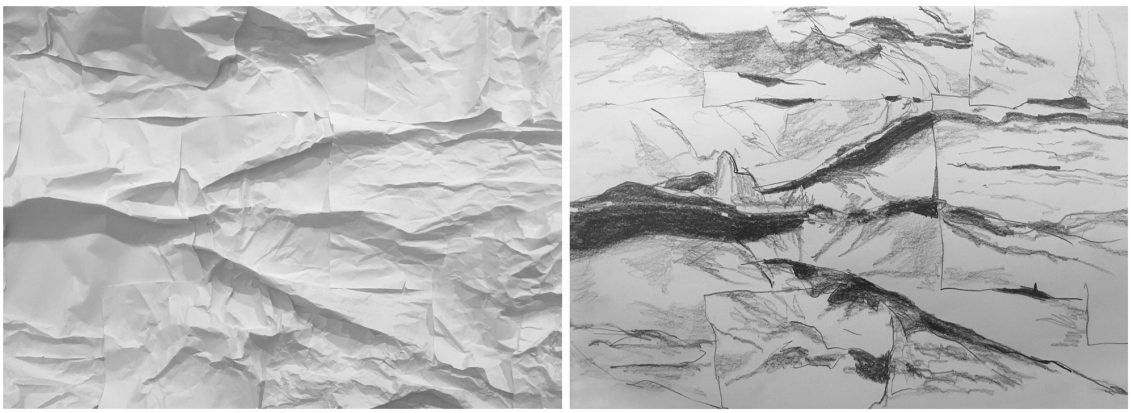

Fig. 6 Paper frieze (detail) and visitor drawing. One and Many Lines (MEATS, Mar Arza, Roger Paez), 2018.
Source: Roger Paez

Fig. 7 Building the paper frieze. One and Many Lines (MEATS, Mar Arza, Roger Paez), 2018. Source: Ardila

Fig. 8 Students and visitors drawing the frieze. OAML (MEATS, Mar Arza, Roger Paez), 2018. Source: Ardila

Moving Paper

The project's first move was to radically explore Santlluc's unique character in order to use this understanding as the main leverage in the project. This was achieved in two ways: first, the trip from the design school to the host institution was transformed into a *dérive*, prompting each student to articulate a (serendipitous) narrative of Santlluc's physical location in the city; second, all the paper elements present in Santlluc (e.g., artworks on paper, bank notes, archives, administrative paperwork, books, toilet paper, printing paper, paper trash) were painstakingly mapped, classified and catalogued [Fig.9].

The second move was to expand on the meaning and potentialities of paper. This was achieved in two ways: first, through a quick exercise of looking at every paper element carried by each team member (e.g., notebooks, bank notes, cards, tickets) and generating personal narratives from them; second, by reflecting on the different roles that paper plays in society as deduced from lexicalised uses of the word 'paper' in different languages (e.g., paperwork, *perdre els papers*, *fazer papelão*, *sur le papier*, *traspapelarse*, *Бумáга всё смéрпит*).

The third move was to negotiate with Santlluc's management (a contentious affair, understandably), work out the logistics, and execute the act of moving *all* the paper from the host institution into the exhibition hall [Fig.10]. That radical decision responded to the idea of working through subtraction, i.e., generating spaces not by adding anything but by removing. The project included both the positive space of the exhibition halls, teeming with papers of all shapes and sizes [Fig.11], and the negative space of the rest of Santlluc, stripped of all its paper elements [Fig.12].

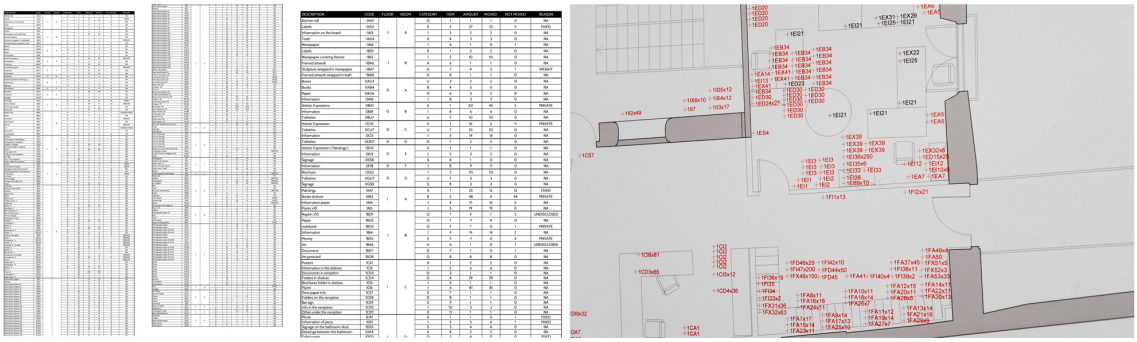

Fig. 9 Excel sheet catalogue of all paper elements in Santlluc and CAD file showing their precise location (details). Moving Paper (MEATS, Luz Broto, Roger Paez), 2019. Source: MEATS and Ardila

Fig. 10 Work in process, moving all Santlluc paper elements to exhibition rooms. Moving Paper (MEATS, Luz Broto, Roger Paez), 2019. Source: Ardila

Fig. 12 Detailed views of paper removed from Santlluc's walls and replaced with cards indicating where to find them in the exhibition halls. Moving Paper (MEATS, Luz Broto, Roger Paez), 2019. Source: Ardila

Fig. 11 Overall view of exhibition halls. Moving Paper (MEATS, Luz Broto, Roger Paez), 2019. Source: Luz Broto and Ardila

Beautiful Failures (Fundació Mies van der Rohe+MEATS Elisava)

The second case study is the result of two years working with the Mies van der Rohe pavilion in Barcelona, originally built by Lilly Reich and Mies van der Rohe in 1929 and rebuilt in 1986. It investigates fragility and vulnerability through two of the most delicate materials used in the construction of the pavilion: glass and the travertine pavement. Seventeen travertine paving stones lifted out of their spaces in the pavement reveal seventeen holes [Fig.13]. Around them are placed a series of defective glass pieces collected from artisan glass workshops around Barcelona [Fig.14]. Understood simultaneously as a ritual of burial and exploration, the temporary intervention in the pavilion sets up a cycle of birth, death and rebirth in which all the elements play an important role: from the history of the pavilion—understood not just as a replica, but as a living entity, implicit in the actions involving the travertine—to the life force concentrated in each of the pieces of glass [Fig.15].

The project's first move was to engage in hands-on material experimentation with the chosen materials: offsite borosilicate glass pieces discarded from artisan workshops in Barcelona (collected by the design team over a period of several months) in the first year, and onsite travertine pavement slabs in the second year [Fig.16]. Material experimentation included multiple formats (e.g., video, music, photography, drawings, maps, scores, archives, text) and techniques (e.g., frottage, moulding, modelling, surveying, recording, breaking). All the results were compiled for publication (pending).

Fig.13 Mies van der Rohe Pavilion installation details, inside and outside. Beautiful Failures (MEATS, Stella Rahola Matutes, Roger Paez), 2021. Source: Noelia Failde and Alba Yruela

Fig. 14 Mies van der Rohe Pavilion installation details, above and below. Beautiful Failures (MEATS, Stella Rahola Matutes, Roger Paez), 2021. Source: Alba Yruela and Stella Rahola Matutes

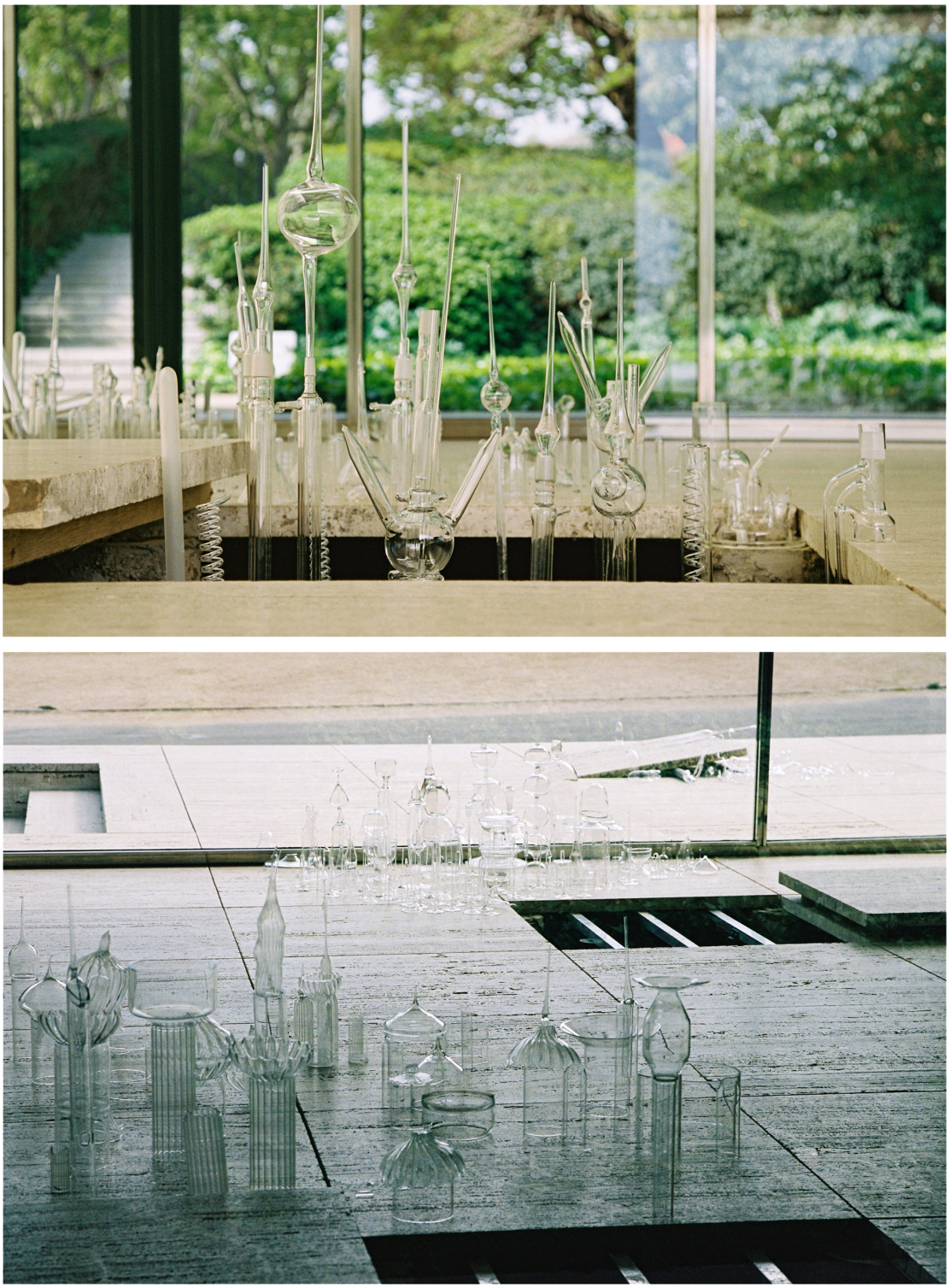

Fig. 15 Mies van der Rohe Pavilion installation details, inside looking out. Beautiful Failures (MEATS, Stella Rahola Matutes, Roger Paez), 2021. Photography: Alba Yruela

Fig. 16 Mies van der Rohe Pavilion installation details, outside. Beautiful Failures (MEATS, Stella Rahola Matutes, Roger Paez), 2021. Source: Alba Yruela and Ardila

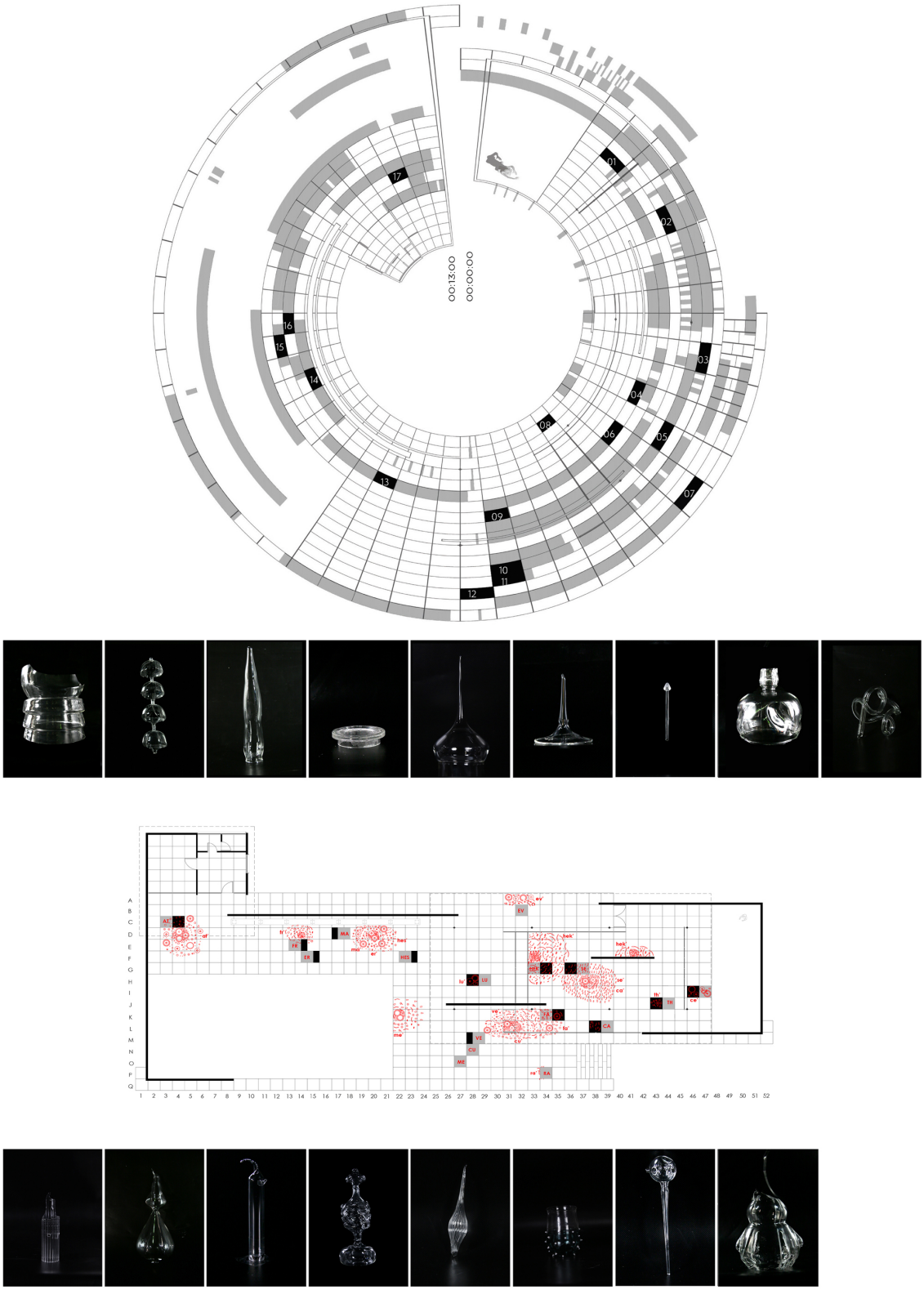

Fig. 17 Musical score overlapped with pavilion plan (polar array, black indicates soundscape's singular points and lifted travertine slabs), site-specific installation layout plan and samples of the 17 glass families. Beautiful Failures (MEATS, Stella Rahola Matutes, Roger Paez), 2021. Source: MEATS

The second move was to work out a site-specific installation in the Mies van der Rohe pavilion. The most relevant methodological move was to use mediation systems such as scores and maps to relate the wildly diverse findings from the first phase. Particularly significant was the precise definition of the installation, which used music to determine the spatial arrangement [Fig.17]. First, a taxonomy of 17 different glass families was developed for the 2,000+ borosilicate glass pieces that had been studied and catalogued. These families were determined based on formal and technical similarities, and subsequently given the attributes of mythical female characters related to their morphological properties. Second the sounds of breaking, scratching, clinking or caressing glass were recorded. Third, a musical piece was composed using only the recorded glass sounds. The musical piece was organized in 17 tracks, resonating with the 17 glass families. Each track had a singular moment (e.g., a sudden stop, a high pitch, an instance of maximum intensity). The musical piece was graphically translated into a 17-row score, in which the 17 singular moments were precisely identified. Fourth, the musical score was superimposed onto the pavilion's architectural plan (in polar array to indicate the continuous character of both space and soundscape) to identify the 17 travertine slabs that would be moved. Fifth, a few of the pre-chosen slabs could not be moved due to technical constraints. They were substituted with the closest slabs, and the musical piece was adapted to match with the score corresponding to the final spatial configuration. Sixth, moulds were made of the small crevices in the surfaces of the 17 chosen travertine pieces; they were then high-res scanned to show their intricate micro-topographies [Fig.18]. One such mould happened to have, precisely, 17 clear peaks. The seventh and final step was to convert that 3D mould into 2D contour lines, scale it up to cover the whole pavilion, and use the contour lines as the guide for distributing the glass pieces [Fig.19]. It is important to clarify that these steps were not planned in advance; they appeared gradually following a critical reflection on the ongoing results of the material experimentation.

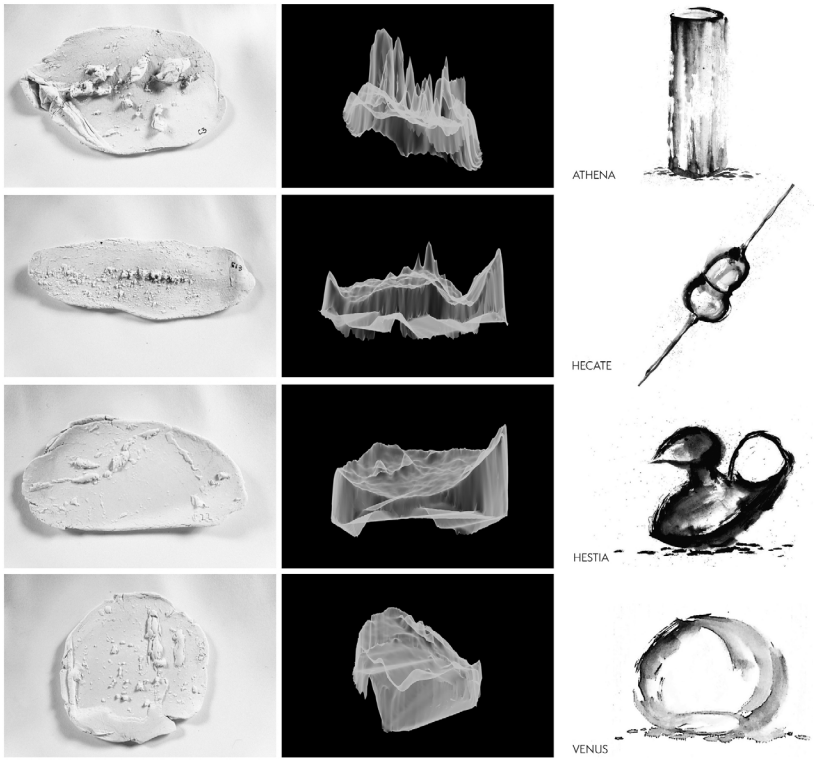

Fig. 18 Travertine moulds and scans, glass family drawings. Beautiful Failures (MEATS, Stella Rahola Matutes, Roger Paez), 2021. Source: MEATS

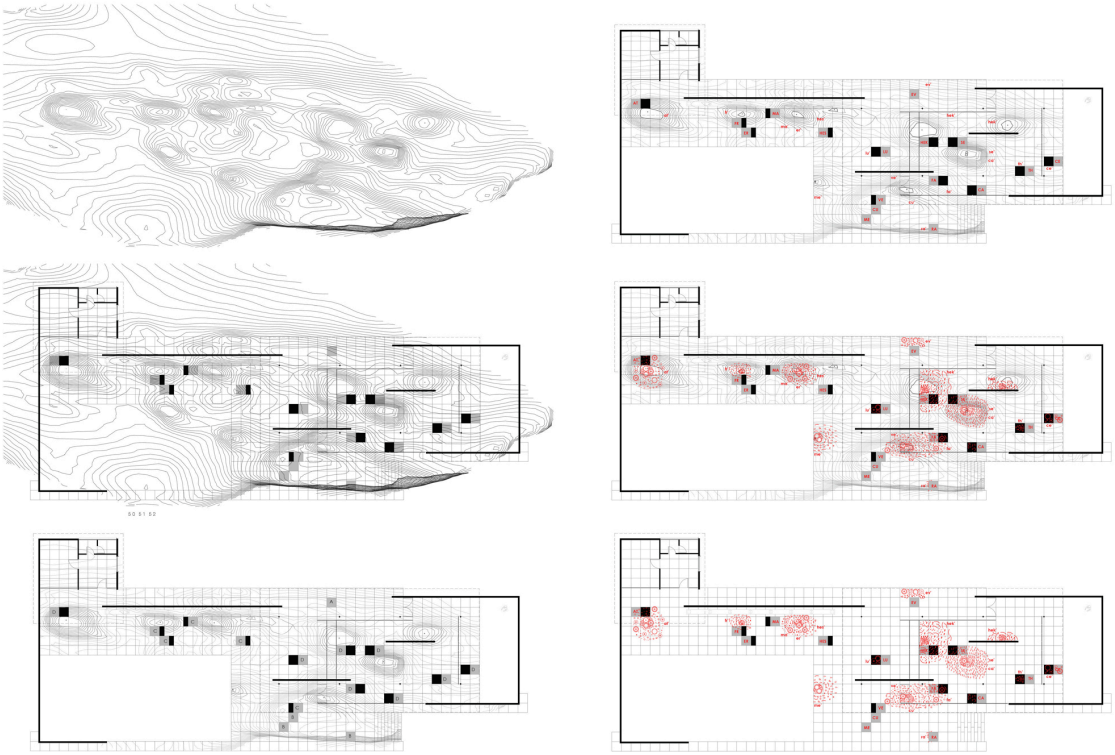

Fig. 19 Design process. Beautiful Failures (MEATS, Stella Rahola Matutes, Roger Paez), 2021. Source: MEATS

2. **Conclusions**

As the case studies have shown, the integration of art-based research in design is a very promising approach. Introducing art-based practices in design curricula fosters educational formats that draw on critical spatial practices, resulting in relevant explorations on discipline, materiality and authorship, as we can see in each of the projects described in the case studies.

With regards to discipline, PG uses a plastic art approach to explore the overlapping terrain of crafts, sculpture, installation and responsive environment; OAML uses a conceptual art approach to stretch the spatial design discipline in two opposite directions: scientific objectivity and anthropological subjectivity; MP uses an anti-art approach to play with the disciplinary domains of logistics and organisation; finally, BF collides industrial, mythical, cartographic, musical and cinematographic know-hows to enrich a site-specific architectural installation.

With regards to materiality, PG transforms toilet paper into a suggestive material, subverting vulgar associations with the poetic trappings of paper moons; OAML systematically uses the most common of paper formats, white A4 printer paper, to proliferate its material and scalar qualities, ranging from the support of the original pencil line, the large-scale volumetric frieze, to the frieze's final renderings by the visitors; MP subverts the conventional notion of paper as an arts material by gathering every single paper object into the exhibition halls; finally, BF proposes a dialogue between offsite and onsite materials (glass and travertine) simultaneously as the methodological lifeline of the project and its very materialisation in the Mies van der Rohe pavilion.

With regards to authorship, PG explores artisan-like techniques without authorial value and subsequently uses the resulting pieces in a single assemblage; OAML navigates the murky waters of multi-agent design by setting up a format calling for quasi-industrial handiwork that

articulates individual expression with collective purpose; MP all but denies authorship through the negative yet creative gesture of removal; and, finally, BF explores an upgraded version of displaced authorship by combining three distinct approaches, i.e., the de-hierarchisation of conventional professor/student or artist/assistant roles (common to all the case studies), the authorial transfer between two different teams of students, and the continuous negotiation with the pavilion's original authors, Ludwig Mies van der Rohe and Lilly Reich.

To conclude, it is worth reiterating three fundamental points. First, that art-based practices contribute to a continuous problematisation of the disciplinary limits of architecture and spatial design. Simultaneously, this desirable disciplinary explorative ethos has a pragmatic effect through the active role of projective criticality. Second, that materiality is the thematic vector that ties all the case studies together. Enriching design's take on materiality through art-based practices such as hand-on material experimentation and learning by doing help to conceive design as situated knowledge, opening up timely questions on the agency of matter. And finally, one of the obvious results of this type experimentation is a lively exploration of authorship in design. Superseding traditional design authorship based on an autarkic subject, art-based practices introduce contextuality, improvisation and open-endedness as valuable paths to explore supple but resilient modes of authorship (e.g., collaborative, weak, soft, displaced, open) based on strategies of indeterminacy.

3. Acknowledgements

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