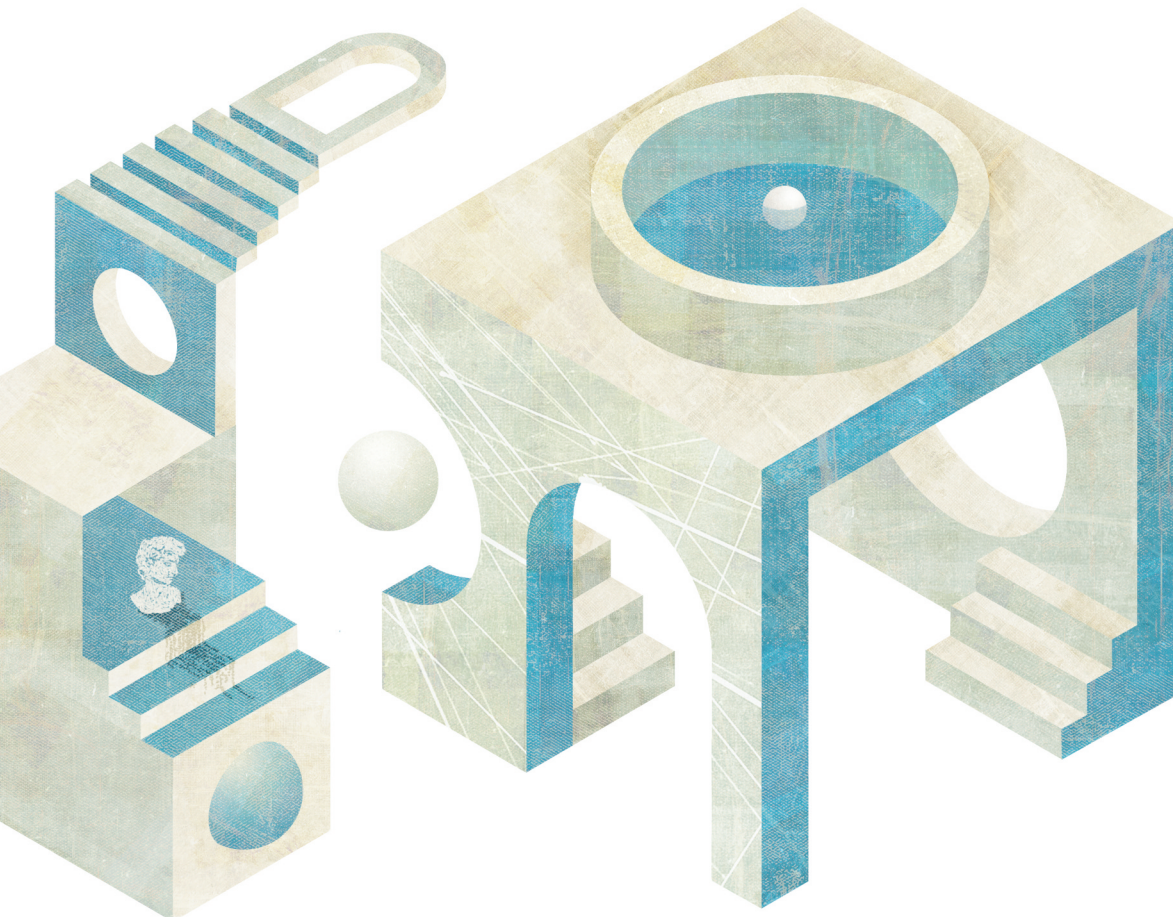
DESIGN CULTURE MATTERS

Embracing cultures and cross-cultures
through design perspective and matters

edited by Giampiero Bosoni, Marta Elisa Cecchi



D.I. FrancoAngeli
DESIGN INTERNATIONAL

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General introduction

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In an increasingly uncertain and indeterminate era in which tangible and consolidated solutions seem to vanish into a "liquid" and blurred horizon, as multiform as it is mutable, does it still make sense to discuss the value, in the sense of property and quality as substance and essence, of the design culture after establishing a different perception of the materiality and power of the mediums used? More precisely, what "matters" does this culture specifically use to express itself now, especially in light of recent environmental global changes? In this sense, how does design culture confront, in the most critical way, with the changed context, and how does it react and respond "creatively" to emergencies?

Considering matter not only as a subject of materials, but also of contents and, above all, as the essence of our relationships, this book investigates the space and context of these connections, examining how they are expressed in different actions, approaches, processes, tools, and methodologies. Altogether, this collection of essays aims to explore how design culture has changed through time, both historically and now, and how it will likely change in the future. Hence the term matter is considered in all its possible declinations, moving from a metaphysical entity to an object, from the immaterial to the material and vice versa, from processes to solutions, and from a traditionally defined medium to a dynamic virtual tool.

In this perspective, contemporary design culture manifests itself through different modes and 'substances', on different scales and in various locations and contexts, but changes systematically over time. The proposed **Chapter One** is an *introductory essay* by the volume's

curators focuses on the matter par excellence of interiors. This includes emphasis on atmospheric matter, an elusive and intangible spatial substance that is challenging to grasp and comprehend, however when used as a hermeneutic tool in the (interior) design culture, it enables the delineation of a contemporary new aesthetic and ecological approach. Continuing through the central chapters, it is possible to distinguish three sections that address the matter of culture and its significance in different ways. The first two chapters emphasise approaches to design culture, i.e. **Chapter Two** calls for digital innovation in cultural institutions, fostering an alternative model of experiencing culture through the digital transformation of museum collections and services due to the cultural scenarios changed by the recent pandemic emergency. While **Chapter Three** investigates the fruitful relationship between society and material culture, given social actors' involvement in the product life cycle.

Subsequently, **Chapter Four** and **Chapter Five** identify an educational method of teaching material culture and historical design culture, aiming to raise awareness for a different way of learning and practising the notions conveyed. Specifically, Chapter Three focuses on the contribution of material research both in academic studies and in the practice of the contemporary designer since materials, as essential and transdisciplinary elements, allow us to explore the 'design matter' in a new and innovative way. Similarly, Chapter Four proposes an alternative educational method to bridge geographical and cultural distances during the pandemic period by combining two apparently distant fields, namely the virtual visualisation of complex data with the study of Italian Design history.

Ultimately, an interesting critical reflection is proposed through a research project that intends to broaden the reach of design culture and thus trigger a new educational and cultural paradigm of knowledge transmission. In this respect, **Chapter Six** presents the MUSE – Mobile Urban Studio Experiment project, a new educational approach that connects the university with the urban context, between physical and digital space.

The present volume is deliberately a collection of very different contributions in terms of content, approaches and modes of expression. The aim is to bring together expressions of different voices, sometimes with similar results and sometimes with opposite visions.

The writing style of the contributions also differs, with more academic and traditional chapters leading to general and reproducible outputs. In contrast, other chapters are more discursive and 'personal', referring to specific experiences but allowing for collective and shareable insights and purposes. Even this aspect of language aims to express and emphasise themes and approaches that are distant yet united by the same sensitivity to the subject.

The great variety of viewpoints and approaches to the subject of matter, considered as the substance of design and at the same time as the relevancy of conveying specific values, makes this field of research extremely broad and complex but at the same time also potentially fertile and flexible for different uses.

On the other hand, "design culture matters" plays on the ambiguity that the term 'matter' encompasses within it. Hence, the contributions of the authors here unveil the changing and multiple facets of this ambit.

Indeed, the authors could freely interpret the call's subject and align it with ongoing reflections and research involving them in the university and professional spheres.

It is impossible to enclose the matter in a precise framework. Moreover the great freedom of styles and characters that delineate the theme in multiple declinations was preferred rather than forcing the contributions towards a single definition, as limiting as it is distant from the reality in which we live.

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1. The atmospheric culture and matter of Interiors

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Matter as "Invironment Atmosphere"

The notion that the human being is not only what he/she consumes but also what he/she breathes and everything in which he/she is immersed on a daily basis has expanded through time due to cultural evolution and, more significantly, scientific evolution. In this sense, it has become evident that both environment and space are fundamental fields to be investigated and understood from a renewed and sensitive perspective.

In the cultural debates that began in Italy in the 1970s and had significant influence around the world, Tomás Maldonado's book-manifesto, *La speranza progettuale* (subtitled *Ambiente e Società* – Environment and Society), called for a sort of "desperate hope", or constructive pessimism, in the design world in which environmental issues are proposed as the objective toward which the project should be aimed for the necessary survival of humanity. The core of this theory, which envisages a systemic vision of the environment, is represented by the notion of environmental design, which Maldonado elaborated on during the 1960s, between the conclusion of his Ulmian experience and his teaching period at Princeton University.

Based on these reflections, which have been developed by other relevant thinkers and researchers over time, it is becoming more common to see how various disciplinary fields are focusing on and being largely influenced and susceptible to environmental issues, especially the most recent global changes. An increasing number of studies and research are developing in this direction aimed at raising aware-

ness of environmental issues, including the connection between the environment and how living beings are perceived emotionally and perceptually, thus developing a renewed contemporary aesthetic and a deeper ecological consciousness. Therefore, never before have the fields of academic research and environmental sustainability been interconnected. Indeed, we can no longer speak of 'nature' and 'culture' as two separate spheres but as intrinsically connected and mutually dependent; where 'materiality', interpreted in this context as the totality and relationship of perceivable qualities in space, represents the common ground.

In this perspective, the ever-present relationship of interconnection and osmosis between inside and outside, can be explored both in terms of space as well as in a philosophical and biological sense, and the atmospheric matter that characterises the spaces in which we live is progressively becoming the critical concept and phenomenon through which this can be achieved. Due to its apparent lack of 'substance', atmospheric matter, or the dimension of incorporeal, intangible, emotional, and sensory, is often associated with negative, ambiguous, and ephemeral concepts. It offers a theoretical as well as procedural option to attempt the investigation of the environment interaction fundamentals that sustain the main activity of interior design. Although the atmospheric matter is considered a topic that has already been investigated extensively in the history of design culture, there is still insufficient knowledge of its scope and effects in contemporary design culture. This renewed atmospheric sensibility, enriched by the most recent discussions in the philosophical and aesthetic spheres, has the ability to trigger an alternative way of approaching the spatial matter in perceptual terms rather than procedural and design terms. Hence, atmospheric 'matter' resides in the spatial disciplines as a reality that has always existed but has not yet been decoded and sufficiently deepened in contemporary theory and practice. Its potential has not yet been adequately explored in design, particularly in interior design.

In this regard, the branch of Aesthetics, also referred to as New Phenomenology or Neo-phenomenology, has a strong connection to contemporary design culture, stimulating research and theoretical reflection across and within design disciplines more than ever. Indeed, this philosophical thinking has provided an effective method for

charting a new philosophy of perception to investigate the more elusive and enigmatic aspects of the human experience (Oliva, 2015; Griffero, 2018). Aesthetics was first coined and developed by Hermann Schmitz to reclaim a sensitivity to the nuanced realities of lived experience (Schmitz *et al.*, 2011, p. 241, cited as Julmi, 2017, p. 134). Gradually over time, particularly in the last two decades, a specific conceptual thread has been delineated as the *Aesthetics of Atmospheres*, refering to the original meaning of aesthetics, namely 'aìsthesis', i.e. the doctrine not of what is considered beautiful but of all that is perceptible through the senses. This new 'atmosphererereological' strand contains a large number of 'activities', disciplinary fields and 'productions' that, in traditional aesthetics, occupied a marginal, secondary place or were considered as minor declinations of 'applied art' (a typical label given to the world of design).

In today's society, where everything is designed, culture is extended to different fields. Aesthetic works range from architecture to stage design, from design to communication, and as a result, each action has a clearly controlled 'aesthetic' value that is implemented through the search for a 'method' (Böhme, 2008). The scene, the environment, the living and inhabitable space and the character of the place are the main considerations in interior design and exhibition design. In these fields, the atmosphere serves as the primary implicit 'material' and the explicit target of any aesthetic action aimed at revealing (or liberating) it.

Hence, the evolution of our understanding and sensitivity to the atmospheric matter could help us implement our aesthetic capacities, through which we 'breathe' the places we encounter in new or revised ways (Alison, 2020). This consequently aligns with a greater environmental and ecological sensitivity. Moreover, it should be emphasised that the present atmospheric issue related to interiors is not intended as the mere use of recyclable, eco-sustainable and renewable materials. It is more of a tendency to think of and perceive space as a living environment where one might engage into a symbiotic relationship, or in other words, through 'breathing'. In fact, focusing just on recyclable or sustainable materials would pose a risk of pursuing a stereotyped approach or acting as a publicity stunt, or *greenwashing*, which would confine the project in almost exclusively normative and technocratic terms. On the other hand, the progressive explication of

atmospheric matter, despite how broad and pervasive it is, compels us to focus in particular on the breathability of air, first in the literal sense of 'breathing' and then, increasingly, in the metaphorical aspects of 'breathing' in cultural settings.

Hence, the question that arises is how to develop a 'real' atmospheric approach for the understanding and definition of designed space?

In the current interpretative paradigm defined by some as the *Anthropocene* (Crutzen, 2002), there is no distinction between an 'inside' and an 'outside'; there is no longer an external nature with which the living being is confronted and in which the inside is solely that of the subject. In this perspective, it is possible to introduce a notion of environment, alternating and transforming it semantically, into that of '**invironment**', i.e. a space conceived as an 'interior' with which human beings are substantially intertwined and interconnected, thus overcoming the binary division between what is inside and what is outside and between interiority and environment. The concept of 'invironment' is further explored in the recent volume *Breathe* (2021) by considering how the process of breathing allows for the nullification of the inner/outer division and that it represents the embedded flowing medium through which we recontextualise our spatial presence (situation) within the aerial realm. As suggested in various experimental and cutting-edge scientific publications, the cultivation of breathing represents the cultural and physical future means of exploring and understanding the environment and space in which we live and inhabit, but above all, the 'invisible' atmospheric matter. Thus, our breath can be interpreted as a "seismograph of our emotional states" (Life, 2022, p. 129). By observing ourselves as we breathe, we may become aware of how our breathing patterns often mirror our state of mind and often indicate how it reacts to or connects with the environment.

The cultivation of breathing (Irigaray, 1999) appears as an alternative to the conventional method of understanding, especially in the field of design, which deviates from Western norms and calls for acute context-sensitive participation. Alongside this reasoning, it is also true that the air we are constantly immersed in is an element we can never entirely appropriate. We can exist within it, use it to support our bodies and share it with others. For this reason, breathing connects us to others and lived space, generating and emphasising our individuality and estrangement at the same time. The immersive property of

aerial matter stands in contrast to modern inclinations to limit agency to a small number of 'visible', tangible actors, and it supports ideas that transcend beyond this rigid division and antagonism.

How can the atmospheric 'invironment' thus be understood in interior design? This question is raised by the concept of atmosphere, which is intense as the temporary spatial condition between resonance and interpenetration – physical, cognitive, and emotional – involving the perceiving subject and the environment (natural or built).

The premise is as follows: since no one can be systematically separated from the surrounding environment within the global atmosphere, the human sphere is the atmosphere of the world. The human sphere is clearly what it creates, breathes and is collectively interwoven with. With this ontological shift, reality is conceived from an environment 'out there' to an atmospheric reality in which we live, therefore a concrete, environmental matter, which is real and tangible since it is perceived and not a purely abstract concept. The designed atmospheric matter and the air around us are increasingly seen as essential aspects of a wide and unique interior in which everyone lives. Indeed, in regard to a unique interior, it is essential to focus on understanding the renewed notion of the environment in an 'invironment'. The impact of the preposition 'in-' within the notion of 'invironment' is itself an inclusive and connective element. In this way, the conjunction of the atmospheric realities of aerial matter opens up the imagery of a unique planetary interior, densely inhabited and worth sharing. By rejecting the epistemology of the traditional environment, one can thus understand the contemporary environment, made up of designed spaces and defined or undefined places, as an extended interiority. The notion of *atmospheric invironment*, if incorporated into the design culture, would allow a different approach to the environmental issue through changed design thinking.

It is important to emphasise once again how the relationship between interior and exterior has been and still is widely discussed in the discipline of interior design, often with the result of highlighting their differences rather than their connections. This is especially true in the field of exhibition design, which deserves to be explored in depth for its intrinsic qualities in relation with atmospheric matter and its relationship with the environment. In this field, the ambiguous oscillation between interior and exterior, fiction and reality is even more evident has the designing

expressions (from the architectural box to the exhibition itself) are layered. The ultimate aim of each exhibition design is to build particular airs and auras – the exhibition's atmosphere – within existing ambient containers. In other words, the museum's cultural context. Hence, this hybrid and atmospheric in-between perspective is inherent in the design culture of temporary exhibitions that 'work' with the atmospheric matter by shaping space to perceive and interact with the displayed pieces. It has already been dealt with on other occasions "the coherent or estranged relationship that is produced between the interior and the exterior of a designed exhibition space, which relationship is particularly heightened, if not distorted, by the speed and variety with which the different arrangements produced in the same place continually modify the perception of its interior space, compared to the constant non-modification of its exterior" (Bosoni, 2019). Franco Albini grasped the most essential sense of this relationship in his famous academic lecture of 1954 when he evoked with great sensitivity and clarity the substantial values of "atmosphere" and "emptiness" and "air" as founding elements of inhabited and narrative space: "It is sometimes fundamental for the success and interest of the exhibition to detach the visitor from the external reality and introduce him/her into an environment of a particular atmosphere, which helps him/her to focus attention on the works on display and sharpens his/her sensitivity without causing him/her fatigue (…) To achieve this result, I think it is necessary," Albini states, "to seek spatial solutions rather than plastic ones (…) I believe the voids need to be constructed, air and light being the building materials"[1].

Architect and design theorist, Andrea Branzi, made the following statement a few years ago in reference to the subject of interior design and, more specifically, the area of temporary and installation space design: "This new dimension of design [interior design] thus plays a major role in the functioning of contemporary cities, of continuous retirements, changing functions and the new structural role of micro-scale economies. In other words, interior design and exhibition design, specifically because they are provisional and interstitial, today constitute one of the most important activities in the phenomenology of the liquefaction of the solid bodies of the contemporary city" (Branzi,

1. Prolusion given by Franco Albini at the inauguration of the 1954-1955 academic year at the Istituto Universitario di Architettura di Venezia. Typescript kept at the Fondazione Franco Albini, fully published in "Casabella", 370, February 2005, pp. 9-12.

2002, p. 100). Branzi employs the word "liquefaction" in the same article and several other works, clearly alluding to the well-known book *Liquid Modernity* by sociologist Zygmunt Bauman, which interprets and unfolds postmodernity using the metaphors of the liquid and the solid as two extreme and opposite poles. However, in this aerial approach, it is possible to accelerate the discussion and introduce an alternative spatial paradigm related to our time, hence moving from the concept of liquid modernity to an "aeriform contemporaneity" (Cecchi, 2020, p. 75) as a natural evolution of the state of matter and cultural approach. Thus, alluding to a de facto hybrid nature, somewhere between the two poles. The aeriform state is even more challenging to contain and define in its limits and characteristics, changeable, contaminated and contaminable from countless points of view and scenarios.

The contemporary atmospheric turn in different fields of knowledge can hence be introduced and explored, especially in terms of design and aesthetic perception in an attempt to renew our relationship with the environment.

However, the atmospheric paradigm seems to have only just entered the design culture. Indeed, one of the central questions in many discussions of the atmospheric matter is whether design practices are catching up with the current thinking that has been developing over the past few years. This also includes questioning whether today's practices pursue Gernot Bohme's (2017) initial call for a new atmospheric aesthetic that is grounded in design culture within the different fields of design practice.

As Loenhart points out, it is noteworthy that the design disciplines themselves have not yet explicitly and openly applied this comprehensive operational framework, even though they present themselves as ideal fields of experimentation. Therefore, it is indisputable that, "When we design spaces, we also design, whether we want to or not, atmospheres" (Hauskeller and Rice, 2019, p. 147).

It is only by placing atmospheric matter at the centre of the cultural discussion that it is possible to reconceive the agency of the human being within it and its relationship with the surrounding environment. As a result, if design culture is able to interact with alternative approaches, it may serve as a 'creative' solution to the current social, economic, and ecological crises. Ultimately, leveraging our sensory perception to approach the aerial medium in an aesthetic-aisthetic sense would be one of the potential ways to discover more than human-

environmental reality. “A fundamental element of this process is the different way visual perception is solicited, which, from being static and Euclidean – with classical, rational, uniform, static and permanent properties- becomes increasingly dynamic and somehow non-Euclidean in the sense of multiverse, merging empathically. As Marshal McLuhan observed in 1973, the more uncertain and extended spatial dimensions related to or emanating from the sensory properties of touch, taste and hearing. McLuhan observed that visual space is a figure without background because it is abstracted from the context of the other senses. Acoustic space, for example, has completely different properties from visual space. The acoustic sphere is discontinuous, not uniformly dynamic. Tactile space, on the other hand, is the world of the intermission or gap of experience, and one can ensure it as the relationship between the wheel and the axle, in which the interplay between the two elements is the crucial structural factor, without which there would be neither wheel nor axle” (Bosoni, 2012). However, the conception/perception of atmospheric matter should not be limited phenomenologically to the detection of the human senses exclusively (for example, through the mere dramatisation of spaces or the hypersensitivity of certain technological devices), but expanded by refining our perceptual faculties through design practice. To develop a framework of atmospheric matter, the surrounding reality must be recognized, not only as an objective fact and its sensual perception not as a marginal condition of design disciplines, but as an inescapable groundwork.

Therefore, the role of cultural sciences and design disciplines at large as well as interior and exhibition design today are to make the conditions and states of the air and atmospheric phenomena explicit from perceptive, meteorological, physical aspects, but also metaphorical, poetic and aesthetic perspectives.

The relevance of atmospheric issues in the design culture

History is composed of documents because the document is what remains.

Jacques Le Goff (1992)

Exhibition design is still considered a minor part of spatial design culture. This is particularly evident from the number of publications

dedicated to this specific field and the quality and quantity of sources available in public and private archives. As seen in design publications, journals[2], and online sites, many designers do not seem to consider this practice as essential as traditional architectural design, both in interiors and on a wider urban scale.

It is also true that the exhibition project is a complex system determined by an articulated and concatenated process of activities and actions, often changing significantly during production and in progress. In addition, the exhibition project is usually structured in an intensive process of preparation and coordination activities covered by as many other professional figures and experts.

However, this valuable part of design culture risks being lost over time as attention is often focused solely on the result and the exhibited content of an exhibition design and not on the spatial conformation and the communication and engagement methods employed in it. Indeed, this is the 'atmospheric substance' used in exhibition design.

The exhibition experience, moreover, does not end once the exhibition set-up realised, i.e. the physical construction of a temporary 'place', but continues to solidify both in the minds and souls of visitors long after the event. This includes the imaginations of the many scholars and enthusiasts who for various reasons (chronological and geographical) were not able to pass through these temporary spaces with their 'eyes'. Therefore, there are two aspects to be taken into consideration, namely: the importance of documenting exhibition projects in terms of their content and, most importantly, their design; secondly, the importance of enhancing this documentation through theoretical and conceptual perspectives that are alternative to the traditional ones and are capable of reinterpreting these materials in a contemporary way, thus discerning further and new semantic and formal nuances.

As a matter of fact, the value of documents and historical research in archives and study institutions is still fundamental for contemporary

2. Some architecture and design magazines occasionally have dedicated sections or even monographic issues on exhibitions. In any case, it seems appropriate to recall that there have also been interesting attempts to create magazines specifically dedicated to the theme of exhibitions and displays. Among these, the magazine *Progex – design & exhibition architecture*, edited by Giampiero Bosoni with Italo Lupi as art director, deserves special consideration for the quantity and quality of the historical design material, having produced ten issues from 1988 to 1994.

(design and curatorial) exhibition practices as they represent the cultural substratum behind them.

In the specific field of the temporary exhibition project, the temporal limitation can be at times a limitation, and on the other hand, can be the authentic potential of such actions.

Indeed, the exhibition and its setting can create images of extraordinary revelation of an era and its culture through the display of iconic, fleeting and unrepeatable visual forms. The exciting power of persuasion of the temporary exhibition takes place in the authentic experience of the 'here and now'. The haloed uniqueness of the space, traversed in the 'here and now' determines the '*quid*', the atmospheric matter and the element of 'difference' that also resides in this substantial impermanence.

Although atmospheres are always and everywhere present, they are often not perceived as such, except when these particular airs determine a strong and different emotional and sensory effect in the person who encounters them. Every installation and exhibition has its own unique, sometimes profound, and lasting atmosphere of its own. This encounter determines a sense of wonder, amazement and curiosity that enables the *quod* (the content on display) which, in turn, determines the specific *quid* of that space. This also includes the visitor's involvement and aesthetic appreciation. Thus, the atmosphere of the 'here and now' suddenly emerges from the 'nothingness' of the environment and is 'transformed' into a place charged with emotion and meaning, distinct from the rest. Similar to the temporary exhibitions that inhabit the present place and time, the atmospheric matter of a space emerges and creates a divergence in the general architectural environment and towards the subject that perceives and experiences it.

Within this perspective, it is evident how the documentation of exhibitions and exhibition culture in general needs to be implemented, especially through new theoretical and practical perspectives that can enhance a disciplinary field too often considered peripheral and collateral. Unfortunately, as has been repeatedly stressed, there is no coherent and structured historical documentation of many past and present exhibitions, of greater or lesser recognition among the general audience. This is often due to their perception as cultural settings whose conformation is deemed subordinate to the narrative and content arranged and selected therein.

New perspectives closer to modern concepts of space and environment can shed new light on past events and diversify the critical apparatus on (almost) completely forgotten historical exhibitions, revealing their distinctive features and design qualities.

The main concern is losing information and knowledge about disciplinary fields that are not sufficiently investigated by the academic, design community, and the public at large.

The aim is, therefore, to encourage methodical dissemination and archiving of the documentation of exhibitions and exhibition spaces and thus preserves the diverse and varied 'atmostories' (Loenhart, 2021) they embody. It is possible to imagine an 'atmospheric legacy' of exhibitions and exhibition culture and practices to be passed on to future researchers, students, enthusiasts, and practitioners. In this way, these ephemeral and lightweight creations and productions of design culture could be preserved and made 'tangible' through a broader range of documents such as images, sketches, technical drawings, interviews, articles, and project reports. As has already been attempted in the embryonic project of a Virtual Museum of 20th Century Italian Exhibitions collected in the unique web portal open access *Exposizioni.com*[3], where one can delve into the history of some of the most significant projects of the great Italian masters in the field of exhibition design, through the online consultation of all existing documentation (photographs, drawings, letters and various records) found in the several archives in which they are stored.

In this sense, the challenge is to elevate exhibition culture to an equal value with other spatial and design disciplines.

Therefore, it is required to recover historical documentation and to establish an alternative and innovative approach that leads to a sensitivity in research that is capable of preserving and narrating the ephemeral and poetic atmospheric matter of these environments.

3. Exposizioni.com was founded in 2013 under the patronage of the Fondazione Franco Albini and the association of exhibitors ASAL. Giampiero Bosoni, full professor at the Politecnico di Milano, has been the scientific head of Fondazione Franco Albini since its foundation.

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2. Envisioning museums on-chain: a designerly inquiry on blockchain-based digital transformation

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Abstract

Blockchain technologies have been referred to as potential drivers for paradigm shifts in the arts and cultural sector. Their multiple applications in the cultural and creative industries have recently started to be discussed by scholars, mainly coming from social and computer science disciplines. From crypto-collectibles for archiving and documentation purposes (Valeonti *et al.*, 2021), to virtual exhibitions (Franceschet *et al.*, 2020), rights management and digital protection, fundraising (De Filippi, 2015), and decentralization purposes: the potential use cases of blockchain technologies are varied, so as are varied the actors in the cultural and creative ecosystems that have started experimenting with these disruptive technologies. Nevertheless, despite the turmoil experienced from the practitioners' side, cultural institutions, and museums, in particular, remain largely skeptical about the expected benefit. Museums refrain from engaging with decentralized technologies like blockchain due to their perception of the numerous risks involved (Vacchio and Bifulco, 2022), as well as to the inevasible barriers to entry and managerial implications.

The present Chapter relies on the hypothesis that design knowledge, methods, and tools may foster the envisioning of valuable applications of blockchain technologies within cultural institutions, and museums in particular. We aim to reckon on design knowledge, and the intrinsic principles of a designerly approach, to stimulate reflection on alternative, and future-oriented ways of experiencing culture and cultural assets, providing museums and their stakeholders with a fulfilling

cultural experience and with novel revenue sources. Since speculative approaches necessarily pervade any current discussion happening on blockchain technologies (Patrickson, 2021), the objective of the present work will be pursued by delineating possible (Jégou and Manzini, 2006), near-future design-orienting scenarios, in which cultural institutions and museums could engage with and proactively manage to inform a blockchain-based digital strategy.

Introduction

The pandemic phenomenon has, albeit involuntarily, accelerated the digital transformation process in cultural institutions and museums worldwide. Digital transformation has been defined as "*both the process and the result of using digital technology to transform how an organization operates and delivers value. It helps an organization to thrive, fulfill its mission and meet the needs of its stakeholders*"[1]. Digitalization has certainly brought several opportunities to cultural organizations, supporting the preservation and accessibility of culture (Bertacchini and Morando, 2013; Agostino and Costantini, 2021). Indeed, museums increasingly found themselves needing to adapt to a volatile environment, which pushed for the emergence of internal learning processes and renewal mechanisms. The experience of the pandemic for museums certainly urged new flexibility and learning capabilities for managing the rising uncertainty (Taormina and Baraldi, 2022). It thus nourished the digital focus in cultural institutions which goes back to the 1990s (Agostino, Arnaboldi, and Lema, 2021). Digital transformation has the potential to deeply affect not only services and customer relationships, but also cultural institutions' internal organization, and cultural processes. The digital shift has also represented a change in collective narratives (Curtis, 2019), allowing museums to bring people closer to cultural heritage, through plural interpretations and interactions (Lupo, 2021).

Alike other technologies, the narratives and dominant discourses around blockchain technologies (Woodall and Ringell, 2020), non-

1. McNeilly, N. (2021) *Defining digital transformation for the Cultural Heritage Sector*, *Europeana Pro.* Available at: https://pro.europeana.eu/post/defining-digital-transformation-for-the-cultural-heritage-sector.

fungible tokens and cryptocurrencies, and decentralized web frameworks have been shaped either by criticism, partiality, or "hype" by the various actors in the cultural domain. According to Vacchio and Bifulco (2022), future academic production should develop guidelines for cultural professionals willing to adopt a blockchain-based digital strategy in their institution. At the same time, a review of the applications of blockchain in the arts and cultural sector revealed a consistent gap between the empirical profusion and variety of experimentations on a practitioner's level and the current state of the art of academic research. According to Whitaker (2019), this gap is worth to be addressed, as ignoring the blockchain phenomenon empowers those actors outside the art and cultural field to undertake paths without the field's participation. This is even more relevant for a technology whose decentralized infrastructure disrupted the finance industry, which underpins its logic.

Empirical evidence showed how a design-driven approach can support strategy development and execution, through the integration of design knowledge into the practice of strategic management (Verganti, 2009; Simeone and D'Ippolito, 2022). Scholars are starting to inquire how can design knowledge contribute to supporting digital transformation in the cultural heritage field, in particular in museums (Avram, Ciolfi, and Maye, 2020; Mason and Vavoula, 2021; Mason, 2022), and to what extent design research and practice can innovate cultural management – but these attempts have still not touched the possibility of blockchain technologies' adoption through design. The design research community is thus still lacking empirical testing of its methods and tools with blockchain technologies in the cultural heritage domain, even though its contribution could be dramatically precious. Therefore, the underlying research question is:

How can a design-driven approach support museums in the meaning-making, and envisioning of a valuable application of blockchain as a disruptive technology and therefore to implement a digital strategy?

The Chapter addresses the opportunity for the introduction of blockchain technology into cultural institutions and museums. It first briefly outlines applications and use cases of blockchain technology in

museums, as a result of a dedicated literature review. It follows a short methodological section, clarifying the appropriateness of the design approach to address the issue at stake, and the assumptions on which design-orienting scenarios have been structured. As regards their content, these have been developed from intertwining evidence from the mentioned literature review and empirical material collected from a set of semi-structured interviews; these involve a sample of cultural professionals currently operating with blockchain technology. The two examples of design-orienting scenarios, which envision valuable use cases of blockchain applications in museums, will be then illustrated with the attempt to reframe the meaning attached to this technology through design.

Fostering a designerly discussion on blockchain in the cultural heritage field

Digital creative industries tend to embrace new technologies and are referred to as *early adopter industries* (Patrickson, 2021). The arts and cultural industry's earliest approach to blockchain technologies concerned the possibility of using this publicly accessible distributed ledger to track provenance and establish authenticity. In 2014, during the Seven on Seven Conference at New Museum, artists Kevin McCoy and Anil Dash created the first digital art token – NFT; in the following year, the Austrian Museum of Applied Arts (MAK) became the first museum to buy a digital artwork using Bitcoin from Dutch artist Harm van den Dorpel[2]. However, around 2015, blockchain had not entered yet a phase of diffused adoption. This started to change with the development of the Ethereum ecosystem, which stimulated a plurality of applications far beyond cryptocurrency trading; the Initial Coin Offerings (ICOs) in 2017 are also believed to be a pivotal evolution. The same year saw the official launch of OpenSea platform as the first decentralized exchange marketplace for digital collectibles[3]. The actual NFTs boom coincided with the pandemic and was driven mainly by collectibles and the opportunities they offer for virtual commu-

2. M.L. Ostachowski, History of Crypto Art. Available at: https://mlo.art/research/history-of-crypto-art/.

3. *Ibidem*.

nity-building and socialization. For digital artists, in particular, NFTs offered a precious circumstance for benefitting financially from their work: artists are indeed easily able to claim royalties of their artworks from secondary-market sales while building online collector communities around their artistic digital practices (van Haaften-Schick and Whitaker, 2022).

Blockchain has core use cases in the arts and cultural industries, including enabled digital scarcity for new media (O'Dwyer, 2020) and generative art (Franceschet *et al.*, 2021), fractional equity (Whitaker and Kräussl, 2020), and new forms of copyright registry (Whitaker, 2019). A more recent literature review by Vacchio and Bifulco (2022) listed *a)* provenance and authenticity, *b)* tokenization and fractional equity, *c)* rights management and digital protection as the key themes emerging from the academic literature concerning blockchain adoption in the cultural heritage field. Among these areas of application, the authors confirm that blockchain technology is still, at present, mostly applied for ensuring the authenticity and intellectual property of artworks. Nonetheless, blockchain technologies can offer more: they are indeed intensely stimulating the discourse around new reorganized social settings and diverse economic paradigms, leveraging on its polycentric and decentralized governance system. Indeed, for Catlow and Rafferty (2002): "*for people interested in an expanded idea of culture and global democracy, DAOs, not NFTs, are the bigger blockchain story*"[4].

Blockchain-based systems are defined as socio-technological "assemblages" (De Filippi, Mannan, and Reijers, 2020) made up of different actors, from miners, validators, programmers, cryptocurrency and token holders, to end-users, and, even if still to a lesser extent, regulators. This technology enables the trust of each actor towards the whole aggregation of network actors contributing to operating and maintaining the system. It is not by chance that the most recent developments of blockchain have cultivated the possibility to engage with infrastructural experiments within cultural organizations, thus impacting their cultural and socio-economic dimension through

4. Catlow, R. and Rafferty, P. (2022). Introduction: What is a radical friendship made of? in Radical Friends. Decentralized Autonomous Organizations and the Arts, Edited by Catlow, R. and Rafferty, P., Torque Editions, pp. 26-51.

Decentralized Autonomous Organizations[5]. These recent explorations have the potential to challenge the very meaning of "public value" within the web3 economy. Cultural ecosystems, in comparison to the more instrumental infrastructures of finance and industry, are indeed porous and experimental spaces, being the ground for more horizontal and collaborative imaginaries.

The analysis carried out by Vacchio and Bifulco (2022) shows that there are not yet academic contributions offering clarification on how the procedures that guide the operations of the actors involved in the management of cultural heritage (operators, collectors, curators) have changed for the adoption of blockchain technology. As the authors underline, all technological revolutions have undeniably brought with them a paradigm shift in terms of working methodology, and organization-wise. Moreover, blockchain technologies in particular are struggling to develop precisely due to internal resistance within the cultural heritage domain. To the best of our knowledge, there are no studies at the moment that clarify how and if the introduction of blockchain in museums has changed their organizations, strategies, and business model (see Valeonti *et al.*, 2021; Vacchio and Bifulco, 2022). Moreover, the current empirical evidence to properly address this gap of knowledge is currently scarce. Given these premises, a survey or statistical analysis of the blockchain in the cultural heritage field would merely describe past adoption or current attitudes toward a technology that still holds the potential to change the field. Thus, the approach for this Chapter draws on the "opposite" direction, through future scenario envisioning, to consider the unfolding uses of blockchain technologies for cultural institutions.

Futures thinking and scenario development are one of the primary activities of design research. Design research practices within cultural institutions and museums are increasingly maturing, especially as the

5. "*Later iterations of DAOs can be viewed as software tools that encourage coordination through decision-making mechanisms and allocating funding. As peer-to-peer institutions, DAOs have the potential to significantly decrease the barriers to and costs of starting an organization*" by K. Kreutler (2022), Eight Qualities of Decentralized Autonomous Organizations, in Radical Friends. Decentralized Autonomous Organizations and the Arts, ed. By Ruth Catlow and Penny Rafferty. Torque Editions. Pp. 94-101.

sector undergoes transformation due to the tendency of museums to embed digital activity within their practices (Mason, 2022). Digital cultural heritage design practices are driven by the production of integrated physical and digital visitor services, which need to be supported by the digital upskilling of museum professionals (Royston and Parry, 2019). Museums have always been "hotspots" of digital transformation flourishing, even if this increasingly requires new skills and *envisioning* capabilities to pursue novel digital strategies (Wiebe *et al*., 2018). A design-driven approach can represent a driving force within the wider outlook of museum digital transformation[6]. Design brings into the organizational routines new mindsets, capabilities, and practices (Bertola and Teixeira, 2002; Verganti, 2010), enabling museums to embrace change.

Therefore, we are asking how can design practices, methods, and tools contribute to supporting museums' blockchain-based digital transformation, and how can design knowledge contribute to underwriting museums' ability to catch the opportunities enabled by this technology, taking into consideration the numerous related complexities and challenges. According to Mason (2022), human-centered design can be an agent for digital transformation. We are thus hypothesizing how a people-centered, in contrast to merely technology-driven, and problem-framing, in contrast with problem-solving, approach (Dorst and Cross, 2001), can enable museums to foresee and experiment with blockchain technology, with a holistic perspective fuelled by design.

Hence, in this Chapter we are attempting a "theoretical prototyping" exercise, to encourage the evaluation of viable solutions from the museums' perspective. We are approaching the possibility of the cultural heritage domain adopting blockchain as a decentralized technology by narrating the selected theoretical prototypes in the form of Design-Orienting Scenarios. The aim is to envision through scenarios possible alternative future use cases where blockchain technologies shape the internal operations and activities of cultural institutions and museums, and their ties with stakeholders.

6. See the work by Cooper Hewitt, Smithsonian Design Museum (2021) to transform museum experience through design.

Further Methodological considerations

Design-orienting scenarios allow the development of articulated and motivated pictures (Jégou and Manzini, 2006), which should be meant as shared visions that, in our case, museums, cultural institutions, and society as a whole require today. One way to proactively manage possible future scenarios is to explore them through design fiction (Dunne and Raby, 2013; Lindley and Coulton, 2014). The method of science-fiction prototyping has been implied for dealing with emerging technologies by Dourish and Bell (2014) as tools for design research that could not only anticipate but also actively shape the technological futures, being tools to orient today's decisions and inform future strategies.

The following scenarios will be short narrative descriptions (McCabe *et al.*, 2012) divided into steps (see Manzini, 2001) of how users, which in our case are museums and their stakeholders, might interact with blockchain technology in the possible future. The scenarios are constructed through the triangulation of their basic elements (Manzini, 2001), the reality layer and the story layer (Lindley and Coulton, 2014), to balance the current state of the art of phenomena and knowledge related to blockchain technologies' applications, and the extrapolation of facts to enhance them into a plausible fiction dimension.

The content informing the future scenarios is the result of the combination of what emerges from both the academic literature previously considered, and empirical data collected from a set of eight interviews with curators, artists, and tech providers who are currently engaging with blockchain technologies in their practice and institutional activity. The composition of the sample is summarized in the following Table.

Table 1 – Sample of Interviewees of the semi-structured interviews

Interviewees	*Actor*
#1	Crypto Artist
#2	Curator, Virtual Museum
#3	Curator, Public Art Museum
#4	Curator, Public Art Museum
#5	Crypto Artist
#6	Curator, Public Art Museum
#7	Provider
#8	Provider

The "*possible future*" scenarios that follow will have the characteristics of plausibility and disputableness (Jégou and Manzini, 2006), picturing what could exist, and favoring a discussion by the different actors involved. Indeed, the purpose of using design-orienting scenarios is to engage multiple users (visitors, stakeholders, internal departments of the museum), creating ideally a collaborative environment within museums in the context of a digitalization process through blockchain.

Scenario 1: Shared Ownership

Premise: Blockchain technologies are leading to novel project financing patterns, such as fractionalized ownership, crowdfunding mechanisms, and automated financial distribution. Moreover, the separation between ownership and access to digital assets allows the same artwork to inhabit parallel "economies": for it to be traded for its financial value, but to remain accessible to other users as a piece of public data on the blockchain.

What if…? What if artworks in museums and cultural institutions could be held as NFTs, employed as assets, and split into shares, so that they can belong partially to the museums, and partially to the collective community and its representatives?

Vision: The NFTs of the artworks belonging to the collection of a museum are held as fractional tokens in part by the museum itself, and in part by its members and communities. The museum stimulates through its digitized and tokenized collection the collective participation in the activities of the institution: the tokens involve stakeholders in collective curatorial and exhibition choices (as it is already happening for virtual exhibitions in the metaverse), and in fundraising, to crowdfund for restoration purposes. The NFTs are the digital version of both digitally-native artworks provided by crypto artists, as well as minted versions of already existing artworks, thus contributing to the valorization and preservation of already existing cultural heritage.

Motivation: This scenario is grounded on the possibility to foresee potential new investment sources, including the option of collective

and micro sponsorship, micropayments, new funding schemes (e.g. "pay what you want"), and peer-to-peer finance (Patrickson, 2020). Indeed, the development of new payment, funding, and revenue models is urged by cultural institutions, especially after the Covid-19 pandemic. Moreover, blockchain technologies enable the exclusion of intermediaries, facilitating peer-to-peer payment models, which may include new approaches to raising capital, such as crowdfunding (De Filippi, 2015).

Proposals: For conservation purposes, the museum records on blockchain all the previous pre-restoration states of the selected artworks from its collection, and the related minted NFTs can document the process of its restoration, as well as other data (provenance, collectors, etc.), thus increasing the perceived value of the artwork. The museum pursues this process so that "*information should be transparent and visible to all. And then, of course, cultural institutions sell the NFT to raise money for the restoration of the next work. They make this permanent certificate of ownership for the state of a painting that they're about to restore. Cultural artifacts can be commodified through NFTs and cultural institutions can come up with these fundraising solutions*" [Interviewee#1]. The ownership of the NFT representing the artwork is fractionalized (F-NFT, see Valeonti et al., 2021), and split among community members: in this world, citizens, members, and communities, both online and offline, engage with the museum and take part to its mission. The museum has already decided upon how to distribute the revenues from the royalties. The museum pursues a strategy that is both aimed at raising funds to be reinvested into its operations, and on the other side at involving and developing potentially new audiences (e.g. digital collectors). This protocol "*allows these NFT artworks to circulate, and benefit many, around virtual worlds that people can increase not only individual wealth but the collective community, public wealth… The idea of a share that goes to the museum is great for conservation purposes, the original vs the copy: the copy can be a sort of 'caretaker' that sends money home*" [Interviewee #3]. In this world, the proceeds from the selling of the tokenized artworks can be devolved both to conservation purposes, to which participants of the collective community can actively contribute, but also to fund other community-based projects pushed by the museum.

Scenario 2: Collective Intelligence

Premise: Decentralized Autonomous Organizations[1] development already exists in the art world as collectives of artists, collectors, curators, and other cultural actors, that are exploring new rules for distributing agency and resources, simultaneously communal and decentralized.

What if…? What if the recent outbreak of decentralized experiments in cultural institutions yields tools to imagine polycentric forms of organizations that are socially, politically, and financially sustainable?

Vision: In this world, the cultural institution implements a DAO to experiment with a new collaborative data-sharing "*and more open 'collective intelligence' business models*" [Interviewee #2]. The cultural institution is willing to be part of a social agenda where traditional organizational patterns and power structures are transformed: by designing networks based on blockchain, new patterns for social infrastructure are pushed and favor bottom-up socio-political organizing. Cultural institutions benefit from the co-creation strategy pursued with stakeholders and other members of the network in the public space.

Motivation: The aim is to build a peer-produced digital infrastructure for museums, and to create a new environment for collaboration and support in the cultural sector. Cultural institutions and their stakeholders share the production and organization of resources, and DAOs are a safe way to commit funds to a specific cause[2] in the web3. In this application of blockchain, multi-signature crypto wallets are becoming a default tool for collectively managing crypto assets by members of the DAOs.

1. DAOs are an evolution of Decentralized Autonomous Corporations, proposed in 2013 to co-create shareholders actions. DAOs are a form of internet-based organizations enabling people to coordinate their work wherever they are in the world. Collectively owned and member-managed, everyone in the organization contributes to the decision-making process through a system of voting (e.g., Quadratic Voting). The software of the DAO manages memberships and distribution of resources, according to the pre-agreed rules of its members: smart contracts are the secure software where these rules are written and they cannot be changed by any member once the contract is live on the blockchain (Catlow and Rafferty, 2022).

2. Ethereum (2022). Retrievable at: https://ethereum.org/en/dao/.

Proposals: In this world, users (museum professionals, stakeholders, visitors, etc.) shape their technological tools, in contrast with top-down systems that may not act in their interests. Museums can engage with collective and curatorial DAOs, but also with commissioning DAOs to establish a stronger relationship with artists and creators. The DAO "belonging" to the cultural organization is a decentralized community of interest where tokens can be generated through citizens' engagement with the organization, which can be used for a variety of purposes: to co-develop topics for discussion in the DAO for the museum curatorial program, to participatory cultural mediation activities, or to enable museum visits for diversified members of the community. The cultural organization is co-created with the community: this community is decentralized and collaborative, it brings people together from around the world, and increases the international reputation of the institution [Interviewee #4]. In this way, "*the tokens allow the community to help shape the museum: the more one gets involved, the more one can participate in decision-making processes*" [Interviewee #6]. In this world the museum is opened to democratic participation by digitally integrating different visitor groups, but also connecting them: networking is meant to be hybrid and connect online and analog communities to shape the DAO experience together.

Concluding remarks

The present Chapter has explored the role that design research can play in envisioning future scenarios for the adoption of blockchain technologies for cultural institutions and museums. The described scenarios treated two different applications of this technology, which are both grounded on the current state of the art of technological development; nevertheless, they are far from being accepted and spread in the arts and cultural domain.

The scenarios are flawed by the omission of technical details, for example regulatory, legal, and copyright issues, which go beyond the scope of this Chapter, but that would be necessary to deal with an occurrence of an actual implementation as project constraints. From a practitioner's standpoint, these limitations currently represent a concern for museums that do not (still) have on a large scale the

internal structure to behold the changes affected by blockchain. At the same time, the design-orienting scenarios are inspired by experiments and visions already existing in the empirical field of inquiry. Indeed, the cited hindering factors are only partially linked to technology: more specifically, blockchain technologies bring up the social, economic, and organizational challenges connected to digital transformation, and need to be inquired within the breath of a broader cultural process.

Here is where a design-driven approach can give its contribution. A further development of the present Chapter will be the understanding of how present choices can affect the future through further design research tools, e.g., future backcasting: given the pictured scenarios, the objective will be to identify the strategic steps to be made to connect that specific future to the present, represented by the cultural institutions and museums' ecosystem. This action led by design knowledge will require to be done simultaneously with in-depth multiple case studies to provide relevant information about the state of the art that may affect the future.

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3. Materials and Society: Advancing the Material Culture of Design

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Abstract

This contribution focuses on the reconsideration of the relationship between society and the material culture of design. It includes the impact on environmental contexts, contemplating living and non-living elements as social bodies and where materials are an active part in continuous transformation. From this assumption, we want to indicate the material culture of design as an ally of the history of design, where society, environment, technology, and materials are integrated into the complex network between human beings and artefacts. The theoretical path is presented considering the approaches taken by the social sciences for a more in-depth analysis of society and material issues, as well as by studies on innovation. It integrates the history of materials in design, not only in socio-economic but also environmental contexts, which have permitted specific developments and where the materials are active elements in continuous transformation. Indeed, it is necessary to develop more contextual, and culturally situated epistemic beliefs to allow for multidisciplinary collaboration between design and other disciplines.

We will start our study with a brief review of material culture advancement in humanities and social studies. Then we will introduce the multidisciplinary approach focusing on the social, technical, and environmental network involving the 'use and development of materials with a focus on the Italian approach. Finally, we'll draw up conclusions and prospects, although our reflections are of a general nature.

Introduction

Material culture is the realm of things that human beings make and exchange or possess, being the pillar of our consumer culture. It is a subject of great interest in social sciences because these objects, also known as artifacts, provide information about our habits and our technological knowledge, both in the past and in the present days.

Research into material culture is a well-recognised field of study in the design sphere, although it does not yet have an exhaustive body of literature that clarify the complexity of the approach to materials and the different facets that this area of study should cover. We will indicate it as material design culture and will include social, technical, and environmental aspects.

The reason for the lack of adequate literature lies above all at the young age of design as a formalised and autonomous discipline, and in its foundation on a totally different practice compared to the traditional, artisanal ways of making objects, and constantly evolving following social and technical innovations.

In each temporal and geographic context, the influence of other disciplines on the material design field has been different. In the Italian academic context, material design research has integrated the skills of engineering of materials and industrial processes with which it has been sharing basic techno-scientific knowledge within the so-called polytechnic culture (Riccini, 1999, 2013), as well as in the companies "integrated process", attentive to the technical aspects of the product, and more generally to "a strategy that cannot separate the know-what from the specific know-how of the company" (Morello, 1984). In this scenario, the material design culture has been more influenced by design practices and by the relationship with companies and their needs, and less oriented towards a theoretical reflection on approaches to be adopted in design research.

This advancement towards a specific material design culture and methods was partly based on retracing theories and research practices from the history of design that have given to materials a leading role in the design process. Following this path, design material theories are still indebted to nineteenth-century approaches and the history of design framework which have isolated the study of design in the restricted of

its processes, divorcing design from the worlds 'outside' it, i.e., society (Dilnot, 2015).

In the last few decades, material design research has started to experiment with its own specific approaches, advancing from a position of a more passive approach towards consolidated materials and methods to being an active protagonist of a new material design culture (Ferrara and Ceppi, 2017). There are various motivations that move the research of material design today.

The first motivation is a renewed interest in crafts knowledge, that emerges in terms of the reappropriation of traditional technical processes bridging a gap between understanding and making, industrially mediated process and direct appropriation of technics, digital and physical, reflecting on the process of doing (Sennett, 2008; Schön, 1983). The understanding of material and techniques is extended through physical exploration, experimentation of processes, and manufacturing of models or materials.

The second motivation is the challenge that the climate crisis poses to design to counter human actions that negatively influence the living conditions and the planet. These include the extraction and fabrication of materials, the release of enormous concentrations of pollutants into the atmosphere, waste from industrial processes and consumption: all activities that have undergone a gradual and constant increase since the industrial revolution (Galimberti, 2016, p. 356).

Currently, with the beginning of the ecological transition (Manzini and Cullars, 1992), material design is called upon to face epochal challenges: to help limit and resolve the global climate crisis to which the negative consequences of industrialisation, and dependence on fossil fuels and mineral resources which have contributed. Challenges, such as circular products, green technologies, and sustainable consumption require a maximum understanding of the material fabrication, manufacturing, and their social impact. It is important to consider factors of consumption and use of products: real needs and value attribution processes, on which the design and the mediation have a deep role influencing the processes of signification, the ways in which the products are accepted, understood, and appreciated (Ferrara, 2022). Design is called to rethink its sensuous horizon (Manzini and Cullars, 1992). The History of design can give to this goal a significant contribution reconsidering the character of design-society relationships.

The contemporary relevance of the relation between society and materials. The cultural study paths

Today, an extensive understanding of the design-society relationship is crucial (Dilnot, 2015). The design research shall face a big change to give shape to a renewed material design culture, advancing a new framework on the base of the society-materials link as this dramatic moment requires.

In this paragraph, we follow the development taken by social sciences to open to new perspectives on material-society relationships. The rhizomatic sedimentation of post-structuralism and non-modernism theories of the second half of the last century has come to produce the base for a collective and active response in the design system nowadays, such as the design activism and the post-craft movement (Coles and Rossi, 2022; von Busch, 2022).

Since Aristotle's theory of hylomorphism – *hylo* (matter) and *morph* (shape) – where the shape and the active idea of it is given to the passive matter, philosophers and intellectuals have entrusted this postulate. A turning point has been given from the 60's by the disruptive position of French philosopher Gilbert Simondon that sees in his central postulate the process of ontogenesis in which form is ever emergent from matter rather than given in advance (Simondon, 2005). Therefore, by this perspective, form itself emerges as transitory equilibrium of the matter which is always in a flux of change and movement, with the consequence that this matter-flow can only be followed (Deleuze and Guattari, 1980).

With *Cultural Materialism* anthropologist Marvin Harris[1] (1979) identified the most significant forces behind the evolution of a practice known as material culture, technology, environmental conditions, and production development, naming them 'ethical and behavioral infra-

1. Marvin Harris investigated his entire life to build a scientific method to study cultural developments in different geographical areas. Following the 'ethical and behavioural infrastructure', Harris points the 'ethical and behavioural structure' with social relations; the 'ethical and behavioural superstructure' with the symbolic and ideological cognitive models shared in society such as arts, rituals, science, and religions; the 'emic and mental superstructure' that includes conscious or unconscious cognitions such as goals, categories, roles, values and philosophies. Structure and superstructures are considered regulatory mechanisms of the system. *Cultural Materialism: The Struggle for a Science of Culture* (1979) is considered his most important study.

structure' and considering them as the base of the cultural construction. From this perspective, environmental factors, materials, and artifacts assume an active role in social regulation and cultural development. In pursuance of Harris's theories, anthropologist Tim Ingold (2012) further stresses the concept of considering artifacts as organisms with characteristics of growth and transformation.

In the relationship between humankind and artifacts, a fundamental approach is the analysis of the interaction between materials and society, considering all human societies as material ones where artifacts are shaped by social actions within a given culture (Dant, 2005). In this scenario, design culture has an essential role in shaping material culture itself, embracing technical and humanistic cultures: deeply entangled with society and all that it concerns, not only production and processes but also human networks and cultural layers where materials are perceived as a founding element that expresses sustainability, intention, communication, meaning and empathetic.

Regarding this last focus, philosophers, anthropologists, and sociologists have investigated the design as a viral phenomenon (Colomina and Wigley, 2016), embedding design in systemic global issues such as environmental concerns, human and non-human exploitation, and wealth polarisation, considering non-human species and non-living elements as social actors of the material use and development in design action.

Thus, if earlier designers were interpreters of social needs in a broad sense, today, the trajectory towards co-design sees designers allied to social and material activism. *Cleaner technologies and materials* (Myers, 2012) are the focus of a new transdisciplinary engagement between design and other disciplines such as art, biology, chemistry, STEM, social sciences, and geopolitics, which has triggered what is now a common practice: design activism (Julier, 2013) as a possible response to the threat that production/consumption/waste is causing to our ecosystem and habitat.

In this scenario artifacts and all that they concern, including material experimentation, found a key role in the investigation of their agency in our habitat, everyday life, and actions (Diaz-Kommonen, 2004). From this perspective, they unfold various layers of interaction with abstract subjects such as context, politics, cultural development, and intersectionality (Biggs, 2002). On the artifact's abilities, mate-

rial properties are perceived by humans as qualities, through which we experience the sensual, visual, tactile, physical, and embodied ways in which social lives are lived.

In summary, there has been a substantial change in social studies where artifacts and materials are considered active agents of a cultural system instead of being just the result of it. Artifacts and their materials become a medium of cognitive contexts, conventions, and outcomes in the shared reality the designers and the users are immersed in, also shaping actions of everyone in late modern societies by supporting or preventing coordination between communities and organisational functions (Dadderio, 2011).

Towards a new material design culture

In the light of a sociological reflection, it appears very important to adopt a systemic vision on the relations among the social, technical, and environmental actors, networks and discourses involved in the application and use of materials and their development, instead of an exclusive focus on the design process. Design research should involve the integration of insights gained from exposure to different disciplinary perspectives, recognising the complex problematic nature of materiality in the modern era, concerning the production – consumption – waste cycle. Following our analysis, the centrality of social, technical, and environmental dimensions defines the value chain and the Social Life Cycle Assessment (S-LCA) of products and materials.

Following the success of the Life Cycle Assessment (LCA), S-LCA is a novel method "*to assess the social and sociological aspects of products, their actual and potential positive as well as negative impacts along the life cycle. This looks at the extraction and processing of raw materials, manufacturing, distribution, use, reuse, maintenance, recycling, and final disposal. S-LCA makes use of generic and site-specific data, can be quantitative, semi-quantitative or qualitative, and complements the environmental LCA and LCC. It can either be applied on its own or in combination with the other techniques*" (Traverso, Mankaa *et al.*, 2022).

Therefore, S-LCA does not replace LCA, but it might question it at its core (Birat, 2022).

In terms of design research, a good starting point to think about the integration of a similar approach expanding the analysis and the historical discourse on materials to their social life is the triad defined by the historian of architecture and design Dennis Doordan (2003). His framework is based on three main areas of the materials cycle: *fabrication, application*, and *appreciation*. However, his perspective seems partial to us for the purpose of adequately expanding the framework of design research and materials in the current context.

Doordan defines the *application* as a "familiar terrain for design historians" dealing with "transformation of materials into products", and "traces the role of designers in the product development process". As regards the relationship between the development process, technical and social dimension, we know that technical knowledge of materials plays a key role in the object. Design acts as a bridge between the world of production and that of consumption and use in social life: until a material has been designed and has become a product with a value of exchange, it has minimal cultural content (Sparke, 2013). Design has enormous power in the culture of technology and its communication, conferring value on materials with multiple meanings (Sparke, 2013). So, the design skills play an important role in terms of materials competition and "user reception". Moreover, the term of *appreciation*, does not mean only the consumption of the goods but also the willingness to appropriation by the recipient. The realisation made by the user who gives life to the work goes under the name of *aesthetics of the reception* advanced by the school of Constance and by Jauss (1972). Discourses on ecologies, ecosystems, their associated networks, and related cultures, tease out today's complexity of material design, where the designer ethical responsibility is more and more relevant. Although of great support for the advancement of the design research, Doordan's triad nevertheless remains limited exclusively in the relationship between technique and society, not considering the post-consumption phase, the non-human species, and the non-living elements.

To define a better understanding of our material culture and our relationship with artifacts, as a species we must encompass the entire gamut of organic life-forms along with the sunlight, moisture, air, and soil on which all life depends. Included in the category of the non-human are only those material objects and artifacts thanks to which some humans can assert their way of being in the world. If animals and

plants are included in this process of design research making at all, it is as either quasi-humans or pseudo-objects (Ingold, 2012).

As Ezio Manzini states (Manzini and Cullars, 1992), within this new horizon, the environmental problems we are living in can generate a new approach to design and can be the source of a vast series of cultural transformations and contemporary societal practices, including technology development and precisely, starting from inevitable discussions about society's values. Thus, design research has moved to the study and creation through practical experimentation of new materials to give answers to environmental problems.

We already have examples of design research on the material implication where the environmental concern is the core such as 'Ore stream', a study led by design studio Formafantasma questioning the electronic production processes in relationship with the ore's extraction, and the current state of e-waste management; or even 'Red Mud' by Studio ThusThat, where environmental transformations and alumina production waste are at the centre of the research. In Doordan's terms, we are in front of design research on the *fabrication* phase, where a broader systemic vision of the "actants" is included in the discourse (Latour and Callon, 1981).

Implications on History of Design research

A reflection on a new design historiography that includes the expansion of design history into more disciplinary histories, especially the history of materials, material design and materiality, should begin by considering the development of historical studies in the 80s during an overall process of change. Here, for the sake of brevity, we propose only a few points to be deepened on future occasions, referring to the Italian contribution, such us Vittorio Gregotti expanding the History of design towards new strands of study, and the theoretical framework proposed by Tomás Maldonado to understand design in the contemporaneity.

Vittorio Gregotti, editor of *Il disegno del prodotto industriale. Italia 1860-1980* (1982), had the merit of having brought to the attention of historical research certain key elements of the 'industrial' design as a professional practice in its continuous modification: among these are the relationship with technologies, materials, economic factors, the

tension toward innovation, and the formal control of objects and the environment. Another merit is that of having initiated the construction of an 'open' disciplinary historiography by identifying relevant design phenomena in its contemporaneity to be read historically. As a designer and actively engaged in the profession, he has been engaged to better understand the new questions and to be able to adequately respond by design. He stated: "The idea of design has now existed for more than a century: during all this time it has continued to broaden the front of the interests it invests, at the same time shifting the conceptual centre of the meaning of design itself" (Gregotti, 1964). And more: "The real possibility of using historical teaching therefore consists in becoming aware of the essence of the tradition in which we operate and, through it, of what we consider to be the directions of transformation; in the capacity therefore to criticise our intentions, to participate by adhering from within to that particular historical condition that is actuality" (Gregotti, 1965).

In 1983, Gregotti dedicated an issue of the magazine *Rassegna*, which he directed, to "The Materials of Design", with the contribution of Giampiero Bosoni and Manolo De Giorgi. At a time when the hyper-production of new materials was bringing about evident changes in industrial practices and products, the magazine traced an initial framework, on an international level, of historical research interested in the relationship between design culture and the history of materials, initiating a new strand of historical studies.

Another fundamental contribution is Maldonado's theory of design. According to Maldonado, the culture of design is expressed in a process of "social modelling" of form, the use of objects and technical systems (1991). For this reason, its study and analysis cannot be separated from a complex, systemic, dynamic, and temporal vision. Complex because it must be able to consider the set of "different factors" that design "coordinates" and "integrates". Systemic because it must consider the negotiation process with multiple actors with which each technique is "oriented" and "concretized" in the technical-design choices of an artifact. Dynamic and temporal because design is always strongly conditioned "by the way in which production and consumption of goods take place in a given society" (1991, p. 12). As Stefano Maffei stated (2010), in the design discipline with Tomás Maldonado the formal component "form" started to coexist with other fundamental aspects such as materials, manufac-

tures, artifacts production, social interaction, and other scientific and technical issues. Moreover, according to Maldonado, we can state that objects have agency, in the sense that they influence the things around them in relation to each other. They develop into the *population of wastes* which on its turn as well, develop into the *population of pollutants and man-made erosion factors* (Maldonado, 1970, p. 72).

The heritage of Gregotti and Maldonado – who both worked at the Politecnico di Milano – is the base of a multidisciplinary vision of design and what it concerns, however it opens to important questions, as Vanni Pasca (2004, p. 8) highlighted, such as the domination of technology among applied arts and design. He also stresses the importance of a multilinear history of design where the relationship between technology and aesthetics is essential. In fact, the theme of materials in the history of design is insufficiently explored and opens the way to new stimulating questions.

Another contribution to be reconsidered is Renato De Fusco's theory of the four-leaf clover (1985) based on "design, production, sales, and consumption" which extends the analysis towards the downstream base to be able to arrive at until the post-consumption phase of products.

Starting from these considerations, paying attention to the integration of society, environment, technology, and materials into the complex network between man and artefacts, it would be worth reconstructing "the Italian way to plastic materials" (Bosoni, 1983, 2006). An eventful and culturally connoted story would emerge that from the second half of the nineteenth century reaches the present day through the plastic materials evolution – since natural materials to synthetic and forward until the current new bio-based and compostable plastics – and their relationship with the changing society. The evolution of plastic materials intertwined with the stories of some of the major Italian companies of the golden years of Made in Italy. These last were committed to research unprecedented applications of synthetic materials, involving the social technological development of that time with the rise of figures such as the designers and the creative's working in the name of the union between art with the industrial world. As well as the scientific research and the political commitment of intellectuals and environmentalists towards the environmental issues in the time of the pervasive circulation of synthetic plastic materials and the new everyday use of them promoted to consumption by cultural mediation.

While some stages of this history have already been investigated, others are unknown and many of their aspects are still hidden. Particularly missing is a focus on a historical turning point, the 1970s with the first major oil crisis (1973), which brings to light the unsustainability of petrochemical plastics, and the Seveso disaster (1976) one of the worst in the history in which dioxin leaked from a factory and affected the population and the surrounding environment. Since these events, a new history of material design phase took place that must be investigated.

Concluding remarks

Historicizing the technological and material development in design discourses is an important identity pursuit that involves several aspects of the society and the environment in question, giving impetus to what defines the research in the material design culture nowadays. Science, technology, artifacts, and material design must be treated simultaneously as material and semiotic. 'Significant materiality' nowadays becomes an element to be recovered to restore value to objects (Ferrara, 2022). Also, reception and consumption are part of social and environmental development, where artifacts become a medium of cognitive contexts, conventions, and outcomes in the reality humankind is immersed in. Thus, design and its history cannot deal only with design and production processes but with the consequences of its work – social, and environmental impact and to do so it must open more and more to multidisciplinary work. De facto, it appears particularly important to consider a history of design that embraces an evolved approach to contemporary issues, connecting the relations among the social, technical, and environmental actors involved in materials 'use and development. The centrality of these aspects is fundamental within the design research processes, defining the value chain and the social life cycle assessment of products and materials.

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4. The Material: An Active and Dynamic Medium in Design Education

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Abstract

In design education and practice, the material is considered one of the essential and transdisciplinary elements. New materials' various properties, attributes and applications attract designers' attention. The investigation and exploration of materials inspire and help designers achieve better design results and improve their hands-on ability and design intuitions. In the past years, although the material in the field of design education involved much knowledge from the engineering field, it developed its own approach for designers to dialogue with the material world. In some design classes, students learn and attempt to place the material in a privileged position in their design process, putting materials at the beginning, and exploring their infinite potential from their characteristics, applications, and future evolution path.

The discussion on the relationship between materials and objects, human beings, the environment, systems, and the planet has been booming. Nowadays, many designers choose to develop their careers in the material field to promote healthy and eco-friendly material selection and development. The material designer has become an emerging profession dedicated to designing material strategies and anticipating future impacts on material choices in the intersection of art, culture, technology, and design. Although material education in design has different layers and it is not aimed at making every young student become a material designer, it is essential to understand the dynamic material world and materials' evolution process for design students. Design educators are gradually aware that material can be an active and

dynamic medium to facilitate designers' cognitive sensitivity and hands-on ability to all the world's substances. In other words, the material can be an effective medium for design instruction.

This chapter will elaborate on the changing role of materials in design education during the decades and discuss the future pedagogical functions and approaches materials can have in the field of design.

Introduction

The phenomenon of designers using and exploring materials in various approaches over the years is thought-provoking. Regarding materials and design, it seems that for many people, 'choosing the materials that have the best properties for product design' is still the most supported and valid approach. Although this approach endures, the relationship between materials and design is far more complex and multi-dimensional than it might first seem. In 1986, Ezio Manzini proposed that an ever-increasing number of materials empowers designers to have more initiative to think and choose the materials used (Manzini, 1986). Subsequent research on designers' material selection processes in the late 20th and early 21st centuries led to larger quantities of engineering-derived materials knowledge being adopted in design decision-making and, consequently, becoming established as required for design education. With material selection having become a taken-for-granted topic in the design field, especially in product and industrial design, the opportunity arose to pay greater attention to peripheral and supportive material issues for improved material selection, such as sustainable or aesthetic value or expressive qualities. The engineering properties of materials thus became complemented by new design-relevant information, whilst materials and design as a topic grew new design perspectives and values. By embracing these new perspectives and values, many designers began to design in a 'reversed' way: instead of selecting materials for design, they use existing materials as inspirational sources for design, or they create new materials that form a radical new starting point for the design. As designers actively explore materials, these activities lead to new trends in work practices and bring more inspiration and insights to a new generation of designers. Phenomena like DIY-Materials (Rognoli *et al.*, 2015) show the willingness of designers

to challenge mass production and question the way we are designing with materials in a provocative way. As a new trend in the sphere of materials and design that offers great opportunities to positively contribute to product design through material experimentation as well as distributed and shared production processes, the DIY approach built on designerly intentions is starting to become influential.

In design schools, activities are taking place that are burgeoning the exploration of materials in contemporary design. The Bauhaus – still an important reference for many basic design curricula today – led the way, over one hundred years ago, in treating material itself as an important learning medium for design students to develop their creativity and enhance their hands-on intuition. Fast-forwarding to the current era, where material engineering knowledge has been dominant in foundation courses in design, a 'modern revolution' is starting to take place. At some progressive design schools, transdisciplinary material courses with an explorative and research-based approach have emerged, focusing on learning and exploring contemporary values and perspectives on materials, such as: experiential characterization, circularity and sustainability, smartness, democratisation of resources and making, and critical discussions on how materials will be created and used in the future (Zhou, 2022). The consensus is that the discussion on materials cannot be limited to a specific design field because the material is a transversal theme that serves as a means to build connections, materialise design concepts, or even more simply bring inspiration. Designers of different backgrounds can use the same language in their communications regarding materials, for example to exchange knowledge on material selection and processing, for discussions on material performance, and for sharing sensorial understanding of materials and how to explore material attributes, shapes, and creative functions.

Through such diverse practices and new areas of focus, the theories and methods of material-related content in design has transitioned from a position of technically-oriented selection processes to a more expansive and explorative activity emphasizing the relation between 'people' and 'materials'. Focusing on the attributes that describe personality or character, rather than the technical attributes of materials, plays to designers' interests and capabilities: an aesthetic perspective (e.g. sensed

visual and tactile properties), a cultural perspective (e.g. constructed meanings and associations), and a psychological perspective (e.g. evoked emotions) (Karana, 2009; van Kesteren, Stappers, and De Bruijn, 2007; Lefteri, 2005; Rognoli and Levi, 2004; Zuo *et al*., 2004). Bringing these varied perspectives together, the term 'materials experience' was coined in 2008 (Karana, Hekkert, and Kandachar, 2008) and expanded upon in 2014 (Karana, Pedgley, and Rognoli, 2014) and 2021 (Pedgley, Rognoli, and Karana, 2021), referring to the experience that people have with and through materials. Materials experience exists across four interconnected levels: sensorial, interpretative (meanings), affective (emotions), and performative. Using the materials experience framework is not only inspiring for designers' material explorations in different aspects but also beneficial to modernizing design education's relation to the phenomena of materials. As Rognoli and Levi (2004) said, in design education, it should be possible to supply knowledge that allows one to choose the most suitable material in a project regarding the technical performances and the expressive-sensorial characterization; this is what turns the idea into reality. The materials experience framework has formed the basis for various tools and approaches to support such decision-making. On the matter of how to learn materials, and in particular how to elevate materials experience, Pedgley *et al.* (2016) point out that active learning principles can deliver a good foundation for student appreciation of materials and design action, benefiting from classroom verifications.

These initiatives are helping to raise the importance of materials in design and education, from a background consideration to an active part of ideation. Accordingly, the role of materials as an inspiration resource is becoming more defined and growing in importance. ' The experiential implications of materials resonate with both designers and users and must be planned with care. To this end, material considerations by designers appear not only in the middle and end stages of a design process but now, increasingly, at the beginning. As Van Bezooyen (2013) said, including the material from the beginning is like turning the design process upside down; it can provide new definitions, concepts, discussions, and results. This new design process can be a start for a critical investigation, a hands-on journey, or a great communicative storytelling. Moving materials or material decision-

making to the front of a design process requires designers to adjust their material perspectives and become cognizant with person, material, product, environment, and system relations. In education, such material learning is supported by meaning-driven approaches, which emphasise the significance of the humanistic and environmental value attributes of materials in design, and uses materials-centric design methods to trigger students' active learning through questioning, experimentation, and investigation. On the broader level, it helps the improvement of design intuition and comprehensive competencies by building a non-anthropocentric way of design thinking and strengthens designers' awareness of social and environmental responsibility. It facilitates the expansion of design culture through more ecological and sustainable scenarios and might provide a stronger foundation for the careers of future material designers (Zhou, 2022).

Today's material and design field

Today our human lives are complex and connected. The combination of ever-expanding new technologies, massive open-access knowledge, and new (online) social forms, allied to increasingly urgent concerns for the wellbeing of the planet, place new demands on design and design education. Environmental and social values of design, including their circularities, impacts, cultural expressions, and their relations with human beings and the planet, are major influences on design decision-making and design practices. Materials are at the heart of the decisions. Every substance in the world is a material, being a vital aspect in configuring the natural and artificial worlds and therefore the environment and life. Materials ensure humans and all the other species thrive; they are interwoven within our realities and carry all the forms, functions, and changes (Cleries *et al*., 2021).

Circularity of materials

Designers are playing a vital role in the current transition towards a circular economy, by defining and finding disruptive design solutions that can put circularity theories into practice. Circular design can be

delivered not only by creating things which can be properly disassembled and recycled, but also through more holistic and radical design approaches where products are created using unused or discarded materials from technical or biological processes. These materials, in time, can be recovered from products and reused or recycled, thereby decoupling our economic activities from finite resources and minimizing overall waste and pollution. Unsurprisingly, material innovation is essential for designing circular products, with competencies in material circularity being developed at mining, extracting, manufacturing, recycling, and remanufacturing stages (Pollini and Rognoli, 2021). The mindset designers must possess is that products are never isolated: they exist in complex interconnected systems of materials and resources. A material that is treated as waste in one system or from one type of product may in practice be a precious raw material in another system or for another type of product, if properly designed.

There are many carbon-negative materials on our planet, found within the biosphere. Algae, fungi, and other biological populations offer multiple possibilities for improved carbon cycle management. This situation is one of the motivators for designers to work in the area of living materials and living artifacts, such as work presented under the theme *Alive. Active. Adaptive* of the EKSIG conference in 2017 (Karana *et al.*, 2020). Taking on a collaborative creative process with living biomass has already opened-up a new design section, biodesign, to rethink the human and non-human material relations in a post-anthropocene era (Rognoli, Pollini and Alessandrini, 2021). Another aspect of circularity impacting on designers is the preference for using local materials. Restricting material supply chains to local producers reduces the demand on centralized resources and lowers transportation pollution, whilst gaining positive local social impacts. Increased demand for local materials can facilitate a community's independence and boost local economies with higher self-sufficiency. Using local materials can drastically reduce the environmental impact of manufacture (Morel *et al.*, 2001).

The special place of materials in design

Alongside form, materials are a significant influence on the personality of a product. Differentiation via materials is an attractive propo-

sition: people appreciate materials with special or notable attributes. Designers can use materials to strengthen the connection of products to people, increasing emotional bonds and enriching dialogues provoked by material interaction. Artefacts and their materials from which they are made can also be meaningful and precious for people because of changes over time that are linked to lived experiences and memories. After our personal traces are left on a material surface, an emotional connection can be created, just like 'tame' and 'being tamed' relations between the Little Prince and the Fox[1]. Such material narratives bring a uniqueness – a valued imperfection – to the materials of our products (Rognoli and Karana, 2014), which raises discussions over the desirability or unquestionable nature of standardized industrial manufacture.. Materials have their age beauty, which has value with the passing of time (Parisi, Rognoli, and Ayala-Garcia, 2016).

Another unique value that materials of the current and future eras can bring is smartness and morphogenesis. Owing to transdisciplinary innovations between design and engineering, many interactive materials with unique attributes have been generated. They can be classified as ICS (interactive, connected and smart) materials (Rognoli, Ferrara, and Arquilla, 2017; Parisi *et al.*, 2018), being transformative (Brownell, 2017) and programmable (Tibbits, 2017; Johnston, 2017). Designers can give these materials different experiential attributes through electronic, chemical, mechanical, and biological means (Rognoli and Ferraro, 2021; Rognoli *et al.*, 2016; Ferrara *et al.*, 2018). ICS materials are designable as a single entity comprising physical and computational components, with the final composition forming a unit that is difficult to trace, opening-up more interactive, connected and smart dimension life experiences.

The democratization of materials, technologies, and 'tinkering' spaces

New digital fabrication technologies today bring people closer to the interface between end products and making processes. For designers,

1. The Little Prince is a novella by Antoine de Saint-Exupéry, first published in 1943. In the book, a dialogue generated between the fox and the prince reveals that taming can change something from being ordinary and just like all the others to being special and unique.

or indeed the general public, this phenomenon stimulates self-production and exploration of materials and materialization techniques. The democratization of materials and self-fabrication tools gives more agency to designers to fulfil a new role in material play, discovery and application. The growth and spread of Fab Labs make it possible to produce industrial and electronic projects with raw materials on a small scale (Diez, 2012). Moreover, this democratization of computational media and digital fabrication can support early-stage material-inspired ideation in design (Astrachan *et al*., 2009; Yasar and Landau, 2003), and spark discussions within a co-working atmosphere (Mostert-Van Der Sar, 2013). Such 'making' facilities in a lab setting – contrary to the 'analysis' facilities in science labs – enables designers and design engineers to make interdisciplinary coordination with machines and materials a mainstream activity (Blikstein, 2013; Mostert-Van Der Sar *et al*., 2013).

Alongside materials being elevated to a more active role in designers' decision-making, designers have also established physical resources to help them understand, select and explore materials from a more humanistic, first-hand, and experiential way. Material libraries, similar in concept to book loaning or reference libraries, collect and display physical material samples to raise awareness of novel and sustainable materials, adjusting the content and presentation according to student or professional designer needs. Usually, material libraries do not sell materials, but disseminate new material concepts and provide consulting services to help designers or other R&D staff find the best material for their projects. Material libraries are physical spaces where material suppliers, material developers, manufacturers, design companies, and designers can connect through their common interest in materials. One such example is the Materioteca located on the Bovisa campus of Politecnico di Milano. As a material library in higher education, Materioteca provides a valuable educational resource where students can touch, select, and get inspired from materials. In principle, material libraries and fab labs can have a synergistic relationship based on the common point of learning design through materials.

Many scholars have discussed the value of material libraries in design schools, emphasizing that the material collections can be used as tools for interdisciplinary study and research in design (Wilkes and

Miodownik 2018). Also, with material libraries, design students can access and handle material samples, which is valuable in helping to personalize and contextualize material information learned through other channels. As Akin and Pedgley (2016) elaborated, direct experience with material samples can expedite students' understanding and exploration of the material experience. Besides, the material library itself can be organized and managed according to design strategies of needs, for example having special emphasis on materials for circular design (Virtanen *et al.*, 2017).

Shifting to a meaning-driven approach for materials and design education

The exploration of new materials in design is catching-on in practice and education, whilst new approaches are being developed to educate designers through investigating, understanding, and using materials. In design education, a new phenomenon for teaching and learning materials is emerging. The new courses are neither like the traditional hands-on workshops where material knowledge and skills are developed through making, nor like the traditional engineering lectures or labs where material knowledge and appreciation are developed through testing, characterization and linking to material properties.The new courses emphasize the dialogue between designers and materials to explore and excavate the meaning of materials in design, which lead to the creativities or criticisms of the environmental, social, and cultural context of design activities. They usually advocate a change in mindset, where the material is considered early on, or even from the outset, of designing. Courses of this type use a meaning-driven approach to understand materials, their applications, and their most profound values (Zhou, 2022). They enhance the understanding and support the rethinking of the relevance of materials in different contexts, by reconstructing the relationship and dialogues between designers and materials.

In the new courses, material is the main medium through which design students can develop, contextualize and synthesize their design practices. Differentiating from a traditional making-focused learning-by-doing approach, the new material education activities

supplement hands-on experience in materials with various critical design practices such as speculation, experimentation, and digital interventions. They integrate materials as active actors in a bigger picture where technological, cultural, and environmental contexts are taking place.

Cultivating material designers

According to some critics, the combination of increased awareness of how circularity relates to materials, material's unique meanings, and accessibility and flexibility brought by the democratization of technologies, a new kind of materials expert, a 'materiologist' or 'material designer', is emerging (Brownlee, 2016). In a time where there is a need for a more responsible role of design in environmental, technological, and social issues, the 'material designer' may become a widespread and influential role. As a general remit, the material designer merges circular design, materials experimentation, and new creative processes to evaluate, ideate or develop materials. Moreover, the material designer is also maker-oriented, concerned with establishing processes to manufacture materials that must meet specialized design and performance specifications. In recent years, the Material Designers (MaDe) project co-funded by the Creative Europe Programme of The European Union (http://materialdesigners.org/) focused precisely on this point: providing professional material designers with the right context to boost their skills by addressing them towards the design of circular materials. The project showcased how a specific profile of materials designer is emerging, working in one of several categories: Grown Materials, Wasted Materials, Zero Waste Materials, Domesticated Materials, and Technocraft Materials (Cleries and Rognoli, 2021).

The emergence of material designers and the requirements from the industry, circular economy, and the environment fertilized the emergence of some new design education courses and programs that support the new material designer role. A common point amongst these is to include pedagogical activities that help designers realize their social responsibility for a more sustainable future. Witnessing the multiple roles materials have, such new 'material-centered' courses can guide

students to design, redesign, reform, reuse and redefine materials in ways that can help achieve circularity and step away from anthropocentric dominance. The learning outcomes can be various, such as researching, advising, communicating and educating what materials are and what they can be, as well as implementing positive social, economic, political, and environmental change across all sectors towards a responsibly designed future.

Concluding remarks

Design education has a long history of integrating or embracing other disciplines, as it evolves its themes and methods to adapt to the times: for example, showing a transformation from teaching basic design principles to guiding students' innovative exploration, from traditional industrial product design developed by applied art to the space and environmental design with larger scales, from the individual design objects to the systematic consideration of research and development. Starting from the traditional design field, the territories of design are constantly expanding with new approaches, no matter from which category it is viewed: art and craft, science and engineering, industrial production, and process and system design. As a transversal element within design education, materials can act as an active and dynamic medium through which skills in design thinking and design action may be developed. Materials can be used to help prepare the next generation of designers for today's ever-changing world.

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5. How to Discover a Design Culture?

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Abstract

In this chapter, what characterizes a design culture is examined and a method is presented to discover new insights in the operations and procedures of disciplinary practices within the cultural domain of Italian Design.

Examination of how students gained cultural insight in the seminar *How to Discover the Italian Design* will be two-fold, using concepts applied from the discourse on cultural studies, and utilizing a *list of actors* to guide the inquiry. The seminar was an opportunity for students from countries outside of Italy to discover facets of Italian Design. Students were introduced to the discourse in cultural studies and utilized multiple sources to examine five design disciplines: fashion, furniture, graphics, interior, and product design. Within each of the professional and disciplinary domains, students focused their research on *designers, companies, product output, history and theory*, and *social media influencers*, as well as the *technologies, materials, tools*, and *methods* used within the disciplinary domains.

Relying on data visualization, students learned by *seeing* their research visualized into infographics, which helped them *discover* facets of Italian Design. *Discovery* is defined and presented as an important concept in the process of learning.

Introduction

Learning about a design culture can be challenging, specifically when trying to understand intangible operations, processes, and tools within a new cultural domain. Intangible aspects shape cultural identity but are difficult to *see* and design disciplines rarely have clear indicators. At a basic level, culture has been defined as shared symbols, norms, and values in a social organization (Walsham, 2002). However, consideration should be given to the question: *which symbols, what norms, and whose values are the most useful to understand the culture of a design discipline, or of a larger domain such as Italian Design*?

Learning is influenced by the questions asked, the resources utilized, the contextual boundary of the inquiry and of the inquirer. How research data are gathered, organized, and synthesized also matters.

In this chapter, questions guide the reader to consider concepts related to learning a new design culture. A personal journey of discovering Italian Design is presented to connect the learned concepts with a process of discovery. Finally, there is a case study which demonstrates an effective method for researching and discovering a design culture using data visualization techniques. The conclusion reflects upon a methodology used for discovery. We begin with the first question.

What Constitutes a Design Culture?

According to Guy Julier, a shared set of values comprised of human behavior, material culture, and societal norms or conditions constitute a design culture (Julier, 2014). He has also previously described design culture as "*collectively-held norms of practice shared within or across contexts*" (Julier, 2006). Both descriptions articulate thoughtful definitions of design culture. His contributions of *context-informed practice* influenced others, including Ezio Manzini's *emerging design cultures* (Manzini, 2014).

I hold the point of view that context-informed practice does not necessarily need to be geographic, ethnographic, nor time dependent and I view professional practice using processes and operations and disciplines in a more general, theoretic realm. Therefore, a focus will

include both context-informed practices and design domains and seek to understand their contributions to the discourse.

The formation of a design culture by its very nature establishes *context-informed boundaries* created by tangible output and intangible operations. A *domain* can be formed by any organized structure, organization, or society such as a discussion, a firm, a discipline, or a country. Domains can be large or small, their output tangible, or intangible and are shaped by the contextual limits in a field of inquiry.

A *frame of reference* is a unique type of boundary that offers a comparative reference between two or more domains. *Paradigms* that a group holds in a specific contextual domain influence how the group thinks and behaves outside of its contextual domain.

Thomas Kuhn wrote about paradigms in *The Structure of Scientific Revolutions* (1962). He presents the idea that paradigms are understandings about how people in a shared societal group think about and do things, sometimes without being conscious of how specialized their behavior or norms may be (Kuhn, 1962). It is helpful to consider an important concept that Kuhn has discussed: before introducing a new paradigm shift related to a particular society, one should first identify the society values of the person or group introducing the paradigm shift. No matter how empathetic one may strive to be in placing ourselves in the societal domain of others, we are bound by the limits of our own context.

Within frames of reference, there are useful and creative methods available to identify typologies of design culture. One can use conventional constraints of ethnographic locality, for example, Milano, Brianza, Friuli / Udine, Torino, or Rome, and time, such as 1930-1950, 2020-2022 (Sparke, 1996). Design movements often reference regional-cultural geographies and time boundaries. French Art Nouveau from Nancy and Paris 1750-1914, German Design Bauhaus, Dessau 1925-40, Danish Design from Copenhagen and the Royal Academy 1950-1970, Design from the US Midwest (Cranbrook and Grand Rapids 1940-60s), and China, Beijing, 2000-2015 (Manzini, 2014).

Regarding Italian furniture design, the region of Brianza has long been marked as a specific, historical, and cultural region in northern Italy. Brianza has had a history rooted in crafted making, specifically making wooden furniture in thousands of small shops (*botteghe*) operated by skilled *artigiani* or crafts people.

During the time of my visits to Milan and Brianza in the 1980s, the number of Italian furniture companies and their capacity for production was a formidable reality. According to Promosedia, in 1989 half of the total number of chairs produced in Europe were made in Italy. Of those produced in Italy, approximately 65% were made in Friuli, 25% made in Brianza, and the remaining 10% scattered throughout the Boot. The size of the Italian furniture industry was achieved, in part, by the increases in production during the 1970s which saw production skyrocket, mainly due to increased exports. Furniture exports grew from 74 billion lire in 1970 to 1,856 billion lire in 1980 and reached a staggering 6,000 billion lire in 1990.

Today, Brianza contains large, clustered industrial manufacturing facilities that utilize innovative technologies and new materials in the making of products extending well beyond furniture. Brianza's material culture has evolved from hand tooling processes utilizing wood-working skills to CAD/CAM manufacturing technologies using new materials that include wood composites, hybrid ceramics, and biopolymers.

Material culture is primarily identified through the technologies and new materials used in the output of products such as in modernism, arts and crafts, parametric design, and human computer interaction design. Cultural identities can range in scale from firm-based to city-based, from regional to global. The bi-polar scales of local and global events are referred to as *glocalization,* a term coined by sociologist Roland Robertson. In the Harvard Business Review article, he described *glocalization* to mean "*the simultaneity, the co-presence, of both universalizing and particularizing tendencies*" (Robertson, 1980).

International exhibits and publications have contributed to the global discourse of Italian Design as a specific design culture. In 1972 at the MOMA in New York City, Italian Design was branded through an exhibit titled *Italy: The New Domestic Landscape* curated by Emiliano Ambasz (Bosoni, 2008). Many have considered this exhibit the zenith of Italian Design because it helped shape cultural identity of the Italian domestic landscape resulting from new ways of living, embracing furniture, graphic, product, interior, architectural, and urban design disciplines all contributing and advancing the cultural discourse. The timing of the exhibit aligned with the beginning of an economic, societal, and political resurgence fueled by a genuine interest in the concept that Italian Design was embracing new technologies and new materials. The

exhibition grew the exportation of Italian products and values which originated from the 1950s branded campaign *Made in Italy.*

Why is it important to reexamine *Italian Design* now, 50 years after the exhibit *Italy: The New Domestic Landscape*? The answer lies in the fact that the societal values held by Italians have changed significantly, and innovative technologies, new materials, and new products and services have achieved new levels of quality, responding to new and evolving societal and environmental challenges facing the 21st century. This leads us to a second question related to discovering a design culture.

How might the processes and operations of *making* shape a design culture?

Consider the Latin origin of the word manufacturing, *manu factura,* to mean *made by hand* (Etymonline, 2021). Production is a process of making, using one's hands and hand tools. Also consider the accelerated technological innovations of CAM technologies, digitally programmable robots, and AI that are shaping new products and innovative manufacturing processes. It seems reasonable to speculate that innovation in technology, production processes, and new materials have brought significant change to the output of designed products and to the discourse of *material culture.* Focusing purely on manufacturing processes and outputs fails to fully explain a design culture and its interconnection with societal values. There are processes and outputs in design that exist beyond the machination of making. Nonetheless, innovations in how things are made have changed how people live.

In striving to understand a holistic and contemporary view of Italian design culture, it is helpful to seek an understanding which encapsulates the nature of the working relationships that lies within both the technological context (realms of making) and societal context (realms of use and users). One place to start are paradigmatic producers and actors of design.

Combining producers and actors in the *realm of making* with those in the *realm of designing* and *use/user* categories results in a broad network of individuals, companies and interconnected sub-domains. Consider the following list of *actors*:

DESIGNERS and their ideas, ideations, trials, creations, methodologies, and output.

COMPANIES and manufacturers are closely intertwined with evolving innovative technologies and new materials.

DESIGNED OUTPUT is traditionally used to identify a design movement. A design discipline is primarily known through its designed (conceived) and produced (realized) output.

TECHNOLOGIES AND MATERIALS are the engines of Material Culture. How things are made includes the operations and material processes which are used to produce the products and designed output.

HISTORY AND THEORY are the discourse of a cultural domain, documented in public and scholarly forums which include journals, books, articles, blogs, interviews, videos, and exhibitions.

INSTITUTIONS include academic programs and professional organizations. A curriculum is an important tool giving value and order to the knowledge and skills required to enter a design discipline. Academic programs contribute to the formation of a Design Culture through research and the quality of skilled graduates. Organizations become hubs for professional discourse and development, often driven by societal needs and desires.

SOCIAL MEDIA AND INFLUENCERS serve as a megaphone to market-trending issues in a Design Culture. Social media influencers link trends, values, and branded messages of a company or product with the public and potential consumers. Popular formats include Facebook, Instagram, podcasts, Twitter, and Meta spaces yet to be developed.

The actors, processes of making, and institutions listed above do not constitute an all-encompassing group. They serve however as a framework of co-dependent components developed from a personal journey to discover Italian furniture design in the mid-1980s and updated to reflect societal changes. We will now explore how the visualization of data can serve as intermediaries to discover facets of *Italian Design.*

How can a Design Culture be *discovered* and what role does discovery have in the learning process?

Before tackling this question, consider how one learns. Learning can be achieved through several distinct methodologies such as immer-

sion, direct experience, empirical study, by doing, and through second-source research.

Discovery is an important concept, whose definition and conceptual meaning can inspire insightful methods and processes of learning. *Discovery* is the act of learning something (*seeing something*) unexpected or new, but it requires a method.

How to discover a design culture remotely is a new reality due to the COVID-19 pandemic, and a challenge for many reasons. Some challenges arise because cultural learning through immersion or direct experience is directly related to travel; access to the Internet is not guaranteed; and time zone differences translate to some people attending meetings in the middle of the night. Remote learning indirectly limits discovery by placing emphasis on the design and cultural discourse through online sources due to the absence of physically seeing and touching products and the inability to experience physical exhibition spaces. Therefore, an alternative methodology to experiential learning is required to create discovery. The method of choice proposed for our class was visualizing research data and creating infographics. The value of mining data from online sources, although limited and potentially misleading, became a tool for researching. Creating information maps to visualize research data would enable new discoveries and describe the online discourse.

How to Discover the Italian Design was an elective seminar offered in the School of Design at the Politecnico di Milano in 2020. Thirty-three international Erasmus students from thirty global design schools, along with three native Italian students were enrolled. Collectively, students in the seminar were organized to study five design disciplines because the majority came from programs of fashion, furniture, graphic, interior, and product design, though some students were studying architecture, textile design, and transportation design.

Objectives of the course were two-fold. One was to develop a broad understanding of five design disciplines driven in part, by research and personal inquiry into the culture and history of Italian Design. In this context, students explored tangible and intangible contributions to the larger global culture of design. The second objective was to synthesize the research data in a collective manner and develop an exhibit to promote the infographics for others to explore the discovered cultural domain of Italian Design.

The course was taught by me, an American professor and architect who had recently joined the faculty at the Politecnico di Milano in the School of Design. The seminar course was developed to offer a flexible roadmap to help students research the histories, networks, and operations of Italian/Italic Design, and to encourage discovery through the visualization of their research data.

Days before class began in March 2020, the COVID-19 pandemic hit the city. Expectations for the course were revised when the university transitioned from in-presence learning to online instruction. Most of the students continued with the course despite limitations caused by the pandemic. *How do you transfer knowledge about a particular design culture to those outside of its cultural geography, learning remotely, and limited to online methods?* In response to this question, the seminar was organized into three phases: 1) Preparation and study, 2) Research guided by individual inquiry, and 3) Group synthesis and teamwork.

Phase 1: Preparation and Study

The first phase in the seminar introduced concepts and characterizations of cultural identity, directing students to selected readings to understand *Italic-Italian* distinctions and research methods. Students were assigned two initial readings, each requiring written responses helping students reflect on concepts. In the beginning of the course, the phrase *Italian Design* was substituted by *Italic Design*, inspired by the article ITALICITY: Global and Local (Bassetti, 2002). Bassetti distinguishes the concept of "Italic peoples" from that of Italians and his ideas resonated with the goals and learning outcomes of the seminar. The term "*Italicity*" delineates *Italian* in the broadest cultural sense; not limited by ethnic or linguistic belonging as with those of Italian origin or even with those who speak the Italian language (Bassetti, 2002). It served as an entry portal with the task of introducing concepts and typologies of cultural identity.

The second reading was an unpublished paper entitled, "*Furniture Design in the Midst of Architecture*" (Postell, 1990) which presented a personal journey into learning about Italian Design in the mid-1980s.

Phase 2: Research Guided by Individual Inquiry

During this second phase, the backgrounds of the students enabled them to decide which design discipline they would research with the aim to balance the class into five equal disciplinary domains. While online lectures continued weekly, students refined their personal inquiry and developed their research studies. Examples of personal inquiry included:

- where and how designers received their design education;
- gender-social relations stemming from cultural history;
- materials and technologies in the making of projects.

The following figures present the visualization of personal inquiry and their unique approaches.

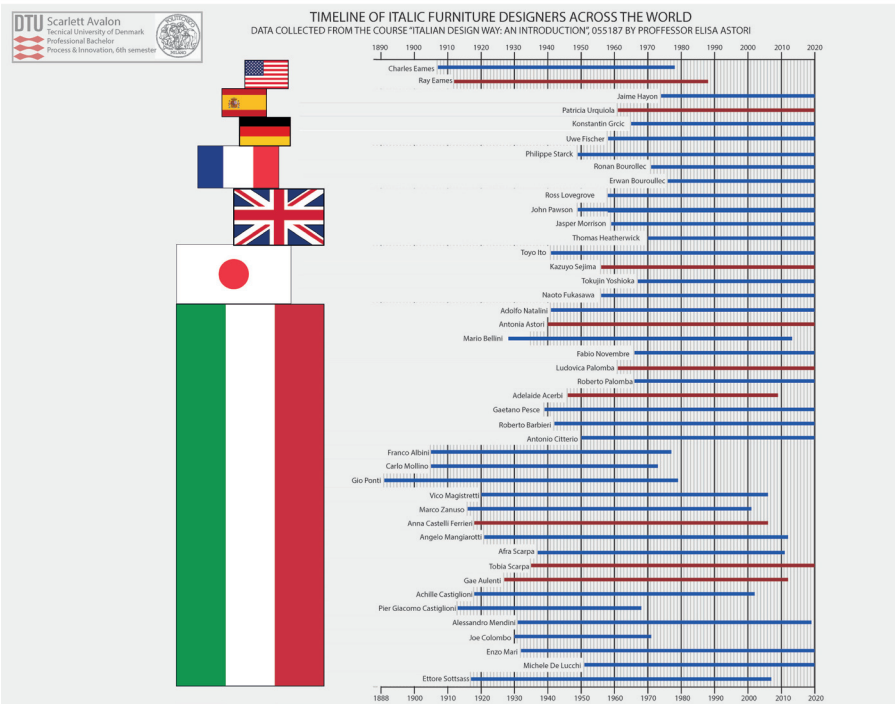

Fig. 1 – Timeline of Italic furniture designers from across the world. Scarlett Avalon

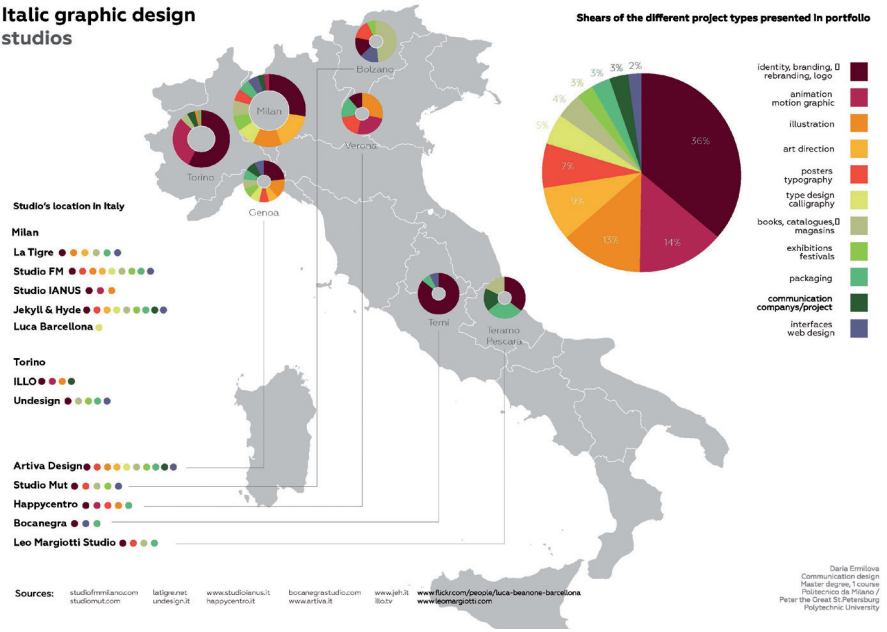

Fig. 2 – Geographic mapping of Italic graphic design studios. Daria Ermilova

Through a process of creating infographics following the data visualization methodologies of Edward Tufte (2001), students presented their work, and in turn, the professor provided real-time, online critique to each student, in addition to the weekly emailed and personalized comments. Not only did students learn from the online class exchange, but they also improved their understanding about Italic Design by *seeing* work by other students. Students soon began to perceive the information/visualization exercises as tools for "*seeing*" an inherently complex and dynamic Design Culture. Decisions such as selecting variables challenged students to examine specific data and discover why it was *Italic* and what was being told about a design discipline.

Output from the second phase generated six actor-oriented digital pdfs by each student, complete with some level of visualization of data and documented sources. It took significant time to gather and synthesize the data by each student due to the diaspora of time zones caused by the pandemic.

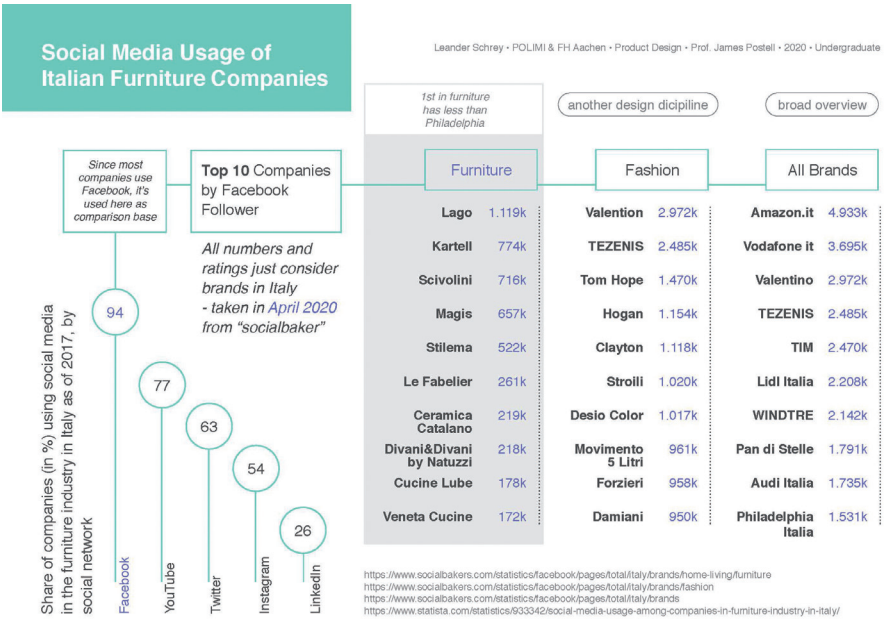

Fig. 3 – Social Media used by Furniture Companies. Leander Schrey

The goal was for the data to speak clearly through visualization and give voice to the research. *Figures 1-5* are examples of visualizing research data with personal inquiry. This exercise was both challenging and liberating. If students needed further time to sharpen their inquiry and explore more research, they were granted more time so that they could visualize their info graphics with enough data. The opportunity and encouragement to revise each research work based upon critique of data gathering and interpreting helped refine the work and focus the learning.

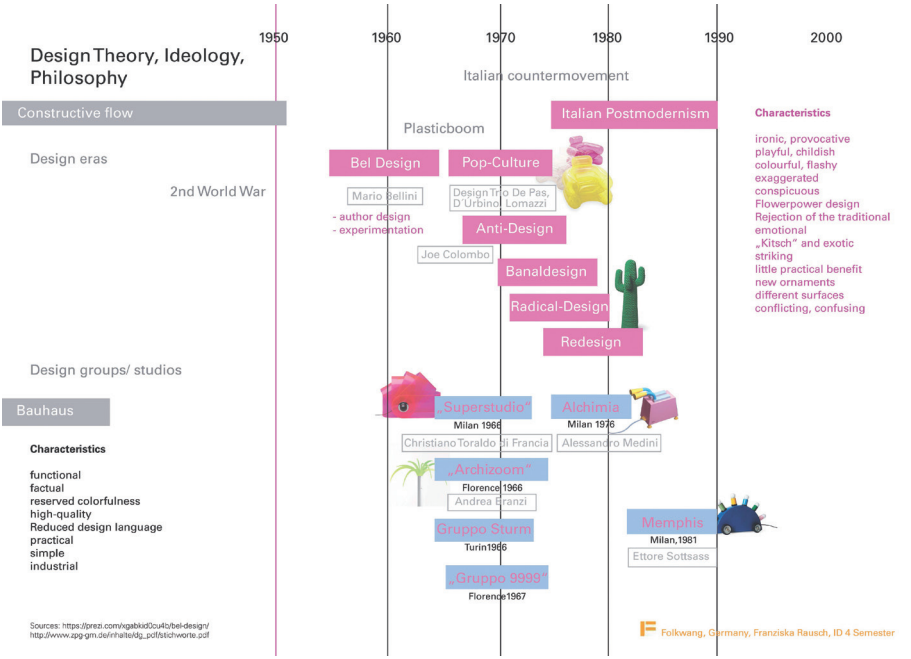

Fig. 4 – Design Theory, Ideology, and Philosophy. Franziska Rausch

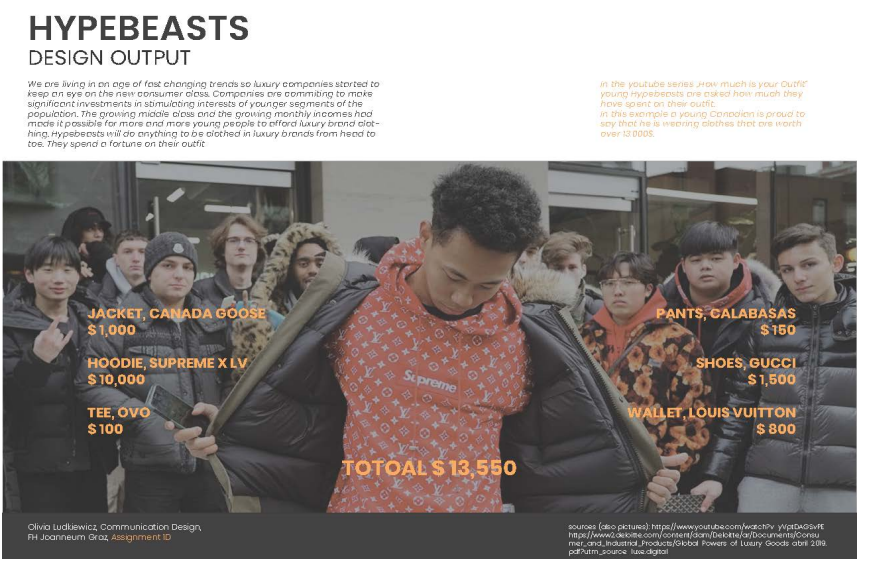

Fig. 5 – Visualization of data, fashion HYPEBEASTS. Olivia Ludkiewicz

Phase 3 & 4: Group Synthesis and Teamwork

The third and fourth phases of the seminar required students to work in small interdisciplinary groups, to edit the disciplinary research and prepare the content for an exhibition. These steps enabled third-person edits to the work, and through the exchange, the work evolved once again to a more poignant level of understanding of Italic Design adherent to a specific design discipline like Fashion Design or Product Design. Components were disassembled, reassembled, and uploaded into a built interactive site, whose graphic organization served as a framework for the collection. On the last day of class, everyone took part in an online walk-through of the website exhibition.

Each team wrestled with critique about effective storytelling, data-sets, visualization, and organization. They were aware their work held bias and was on some levels incomplete. The personal inquiries, how they were visualized, and the quality and citation of sources used for the data were important and resolved. Students were able to synthesize their design discipline research, while at the same time generate learning lessons about the power of visualizing data. Collectively organized, the answer to the question *What is Italic Design?* became visualized.

In response to the pandemic lockdown, exhibiting the work was decided through a student-led effort to create a website domain (https://10757209.wixsite.com/italicdesignpolimi). While teams were working on organizing each design discipline, one team was tasked with the platform design and thematic template for displaying the work. This team envisioned the interactive website, required each team to follow formats, and ensured the functionality of the website.

During the final class, when the website was presented in its final form, students saw all the disciplines and links between actors together. It provided a learning opportunity to see their discourse into the *Italic Design* Culture presented by design discipline, as interpreted through the eyes and work of the students. The website aptly substituted the physical classroom as a productive and inspiring space for critique and learning.

Students discovered how to use a pedagogical tool within the research assignments through the poetics of making data visual. It is anticipated that those who visit the website will discover Italic Design through the *corporeal imagination* enhanced by the visualization and interaction of the digital platform.

Fig. 6 – How to Discover Italic Design, website-homepage created by students in the seminar course. School of Design, Politecnico di Milano. June 2020. *(https://10757209.wixsite.com/italicdesignpolimi) courtesy Scarlott Avalon*

Concluding remarks

Learning about a design culture is a daunting and challenging exercise that requires curiosity, empathy, patience, and a process to discover tangible and intangible operations and procedures from various domains. It goes deeper than simply studying the actors or the output from a discipline or domain. Introducing interconnected domains within the design disciplines of Italian Design was useful to research and visually *see* through the infographics. The shared roadmap and stringent use of multiple sources for gathering research was important for the group work to recreate a whole (the website) out of the parts (individual research).

The seminar resulted in students seeing the design disciplines and the discourse on Italian Design culture afresh and holistically, despite the uncertainties, weakness, and criticism that stem from utilizing such a method. Instead of being consumers of data they were interpreters of data. Reflecting, thinking, learning, and discovering a design culture (remotely) can build understanding of a cultural domain and gain deeper knowledge about a design discipline.

This chapter sought to demonstrate that learning is enhanced when students are actively engaged in creative, generative activities (Hall, Bailey, and Tillman, 1997; Chi, 2009). Generative activities have been shown to benefit comprehension of domains involving invisible components. Wittrock's generative theory (1990) stresses the importance of learners actively constructing and developing relationships between pieces of information, knowledge, and experience.

This teaching methodology has proven it can be done within the time span of a semester. The results of this didactic experiment illustrate that this method of teaching and learning is justifiable for future educational models. Further exploration using this methodology will develop more evidence to expand learning and discovery tethered to visualizing data.

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6. MUSE – Mobile Urban Studio Experience: in the city, of the city, for the city

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Abstract

The **Mobile Urban Studio Experience (MUSE)** is a provocation and proposal in, and beyond, education. It contributes to current discussions and processes on physical and digital space, education, and university life before, during, and post pandemic, and for a re-examination of the relationships between the academy and the city/community, between the academy and the professional communities, and between the academy and the broader world. Hopefully MUSE might contribute to more nimble, responsive, resilient, and facile relationships amongst the creative professions and local and global communities in an ongoing manner of varying durations and in moments of peace, prosperity, crisis, or war.

MUSE can be an active contributor in the matter, and matters, of design culture. MUSE could create new cultures in design as well as affect issues, processes, and production of design and design culture. Further, MUSE underlines that design culture matters. And that the issues surrounding and forming design culture can be as important as the products, processes, people, and materials of design.

At this moment, MUSE, especially in its fullest and most complex triad modality, is still an embryonic creative tool, method, and system… a sort of creative Swiss-army-knife for education, professional practice, and social/humanitarian efforts and actions.

After four decades of writing fiction… my method has entailed, more often than not, the subtraction of weight. I have tried to remove weight from human figures, from celestial bodies, from cities. Above all I have tried to remove weight from the structure of the story and from language.

When I began my career, the duty of every young writer, the categorical imperative, was to represent our times. Full of good intentions, I tried to become one with the ruthless energy that, collectively and individually, was driving the events of our century. I tried to find some harmony between the bustling spectacle of the world, by turns dramatic and grotesque, and the picaresque, adventurous inner rhythm that spurred me to write. ***I soon realized that the gap between the realities of life that were supposed to be my raw materials and the sharp, darting nimbleness that I wanted to animate my writing was becoming harder and harder for me to bridge. Perhaps I was only then becoming aware of the heaviness, the inertia, the opacity of the world – qualities that quickly adhere to writing if one doesn't find a way to give them the slip.***

Six Memos for the Next Millennium, Italo Calvino, 2016 (edits by author)

+

No school is a school without an idea. *Every school embodies an inheritance at least and at most is an invention rising out of its inheritance. By inheritance and invention, I mean the transmission and transformation of a creed, of a technique that animates the hand, of a thought about the consecration of knowledge as it individuates the self and enhances a community, a network, many communities and many networks. An ethics of knowledge is the foundation of any school in its essential definition as a gathering place, but the complexity of what that knowledge should be, how its production is configured and unfolds, who translates it across the bridges of generations and time, whether its structure is rigid or limpid in its willingness to change, whether it is resistant to external mandates or longs for the imprimatur of an outside authority, and what status and success signify for its teachers and graduates – all of these define the place of gathering, it's ethical complexion, its reasons for being, and what learning means there.*

Art School: Propositions for the 21st Century, Steven Madoff, 2009

Introduction

In its simplest sense, and previously realized by the author in summer study abroad programs in Paris and beyond in the 1990s, MUSE is a design studio/lecture course typology, process, and experience. It is hoped that for other academics, it could continue to be an educational experiment if there is enough interest to warrant its undertaking and development. And in its most complex, fullest configuration in the future, MUSE could be a scalable, transversal (transdisciplinary), and transferable product_system_service design that could be embedded in an (educational) institution or an independent, entrepreneurial offering with, and for, various constituencies. This chapter will explore the origins and foundations of MUSE, and only briefly touch on various configurations that can manifest independently, or in an interrelated manner. These and other aspects will be developed in future publications and ventures.

The proposals stem from the author's direct experience in executing diverse design studios, and other design initiatives, in various physical and conceptual ways over time, place and culture. Specifically, these include places such as Paris, Barcelona, Berlin, Ahmedabad, Los Angeles, and Milan; in other words, these modalities have been tested and developed over time and place.

MUSE also has tangential references to things like the successful "Albergo Diffuso" model in Italy, the new "Uffizi Diffusi" project, Baudelaire and Benjamin's writings on the "flâneur", the search for 'lightness' and 'quickness' in Calvino's Six Memos for the Next Millennium. Other Italian and international trends and movements will be touched upon in this foundational introduction.

We know well that things change over time, that things will continue to change, and hence there are always new possibilities. Hopefully, as Le Corbusier prompts, we have eyes that see. A current confluence engulfs us, as with the early modernist. Our circumstances and the early modernist, and other time periods, contain both similarities and differences. Many will choose to engage, if not the embrace emergent opportunities and possibilities.

EYES WHICH DO NOT SEE
A great epoch has begun.
There exists a new spirit…
Architecture is stifled by custom…
Our own epic is determining, day by day, its own style.

Our modern life, when we are active and about has created its own objects: its costume, its fountain pen, its eversharp pencil, its typewriter, its telephone, its admirable office furniture, its plate-glass and its "Innovation" trunks, the safety razor and the briar pipe, the bowler hat and the limousine, the steamship and the airplane.

The history of architecture unfolds itself slowly across the centuries as a modification of structure and ornament, but in the last 50 years steel and concrete have brought new conquests… If we challenge the past, we shall learn that the "styles" no longer exists for us, that ***a style belonging to our own period has come about; and there has been a revolution.***

Our minds have consciously or unconsciously apprehended these events and new needs have arisen, consciously or unconsciously.

Towards A New Architecture, Le Corbusier, 1982 (edits by author)

Confluence/convergence_foundations_principles_links

The following list attempts to articulate some of the facets of the convergence affecting us now and, in the future, and that allow for modalities like MUSE to become much more possible and relevant. The list is preliminary and is therefore not intended to be definitive or exhaustive… rather it intends to promote more thought, conversation, and refinement, as well as development in future publications.

- **Technology**
- **Economy / Economies**
- **Work and workplace issues and attitudes +**
- **Mobility / Transportation**
- **Globalization / Internationalization**
- **Population + societal / cultural trends (i.e., climate change)**
- **Covid pandemic +**

The most important principle of MUSE is direct, sustained immersion. 'In situ' engagement, over time, is critically important to achieve

a primary, embedded experience that will lead to a fuller and deeper understanding of place, people, and things. Being actively attentive and engaged in the context and content over time is crucial for a robust and conscientious analysis and synthesis. There must be intense interest and curiosity. Intimacy and sensitivity need time to ferment, to develop. A place, society, and culture need time and sustained immersion to be understood. And from this, our ability to design emerges, as well as our ability to do relevant research. Focused design and research merge, and become complimentary, responsible actions.

Beyond immersion and direct experience, the foundational points include:

- **Intimate**: First-hand, primary experience in research and design. This includes direct processes that engage all aspects of the context and content directly and fully, ideally in a diffused and diverse manner that is driven by passion and *curiosity.*
- **Untethered** engagements merge with unbiased and unfiltered actions, movements, investigations, and explorations. Being open, flexible, and free leads one to discovery, revelation, and knowledge.
- **Nimble**: being nimble is another facet of being mobile, responsive, relevant, and resilient. It involves being light, and having a looseness of actions, freedom and quickness in movements, thinking and working. *Serendipity* may enter, inviting the unexpected, unplanned, and unknown.
- **Openness** is the base prerequisite. Open minds and bodies, open eyes, and the ability to see – really see – are required. All senses must be open. There can be no prejudices, preconceptions, or predetermined outcomes… Openness includes *suspension*… including the deferral of beliefs and of self. By losing oneself it is possible to become open to others and other things, become in tune, receptive, and perceptive. Through the loss of self, other things can find you… even your muse.
- **Simultaneity and multiplicity** of inputs, influences, and actions are needed. Full engagement is needed in finding the place and its being (the *genius loci*) and developing a layered understanding. Time is incorporated. One finds the past, present, and future senses and

sensibilities, the opportunities and needs of a place and a situation, and of a people and a culture… and of oneself.

- **Connections**: Connect things: Observe… sketch, diagram, photo, record, analyze, synthesize… draw… and make things. Think… but not too much, nor too early! Be confident, receptive, and connected. *Work*.

These foundational principles are linked with various external influences and references, some are more obvious and more broadly known, and some engage a particular Italian context. Living and working in Italy, and specifically at Politecnico di Milano, it seems appropriate, responsible, and important to mention some of the current issues and initiatives in Italy, and engage Calvino and others, in specific relation to ideas in this chapter, but also in a broader Italian and European cultural context, and the context of this publication.

For example, the ideas and programs of the 'Albergo Diffuso', 'Università Diffusa', and 'Uffizi Diffusi' share the desire to diffuse and decentralize components that previously were concentrated in a singular location. The liberation of elements formerly centralized may spring from different motivations and circumstance, but they all share the sense and ideology of openness and expansiveness, and direct connections and contact. The 'Albergo Diffuso' originated in the context of the decline of smaller villages and locals in Italy, as both a business opportunity and a way towards economic recovery. The 'Uffizi Diffusi' project was unveiled during the pandemic and intends to distribute the museum's collection from Florence to many locations in Tuscany and beyond. A CNN article from 2021 quotes Director Eike Schmidt about his intentions to "deliver an all-enveloping experience of the art". Schmidt continues: "You don't look at a work of art in isolation… The bodily context and landscape context matters a lot, and this will give the opportunity to perceive these artworks in a very different manner". But it is not only about the experience of the art, and its 'in situ' nature, he is proposing a more comprehensive and interconnected vision. Like MUSE, he is seeking to embed art more directly into the context in a decentralized, diffused manner. MUSE also shares Schmidt's intentions towards sustainability, and also more localized economic enhancements by spinning off previously centralized services and systems. Schmidt continues: "At the moment of reopening the city and country, we have

to give a signal for a new kind of tourism… we need to transform tourism into something more ecologically and socially sustainable. And that means the decongestion of hotspots such as Florence, by spreading the visitors around… In essence, everybody wins. Tourists and residents will get the opportunity to see remarkable art away from the crowds, businesses throughout the region will see revenues grow, and residents of Florence may get a little respite" (Buckley, 2021).

The 'Università Diffusa' at PoliMi is particularly manifested through Polisocial, the social responsibility organ of the university, and its emerging 'Off Campus' hubs dispersed in various parts of Milan. (link: www.polisocial.polimi.it/en/off-campus-3/) It is a decentralization of the academy into the very fabric, activities, and lives of the city, and will result in innumerable advantages for everyone. Universities can retain their centralized campus, but also realize dispersed and diverse locations, often in unused spaces, under-utilized places, and lesser served communities, in the city and beyond. This presents enormous opportunities for students, faculty, staff, and the communities. These embedded urban locations will provide important and comprehensive sustainable influences – including economic, ecological, social, and cultural aspects.

However, the **Mobile Urban Studio Experience (MUSE)** is perhaps more 'progressive,' and is much lighter, than the 'Università Diffusa' concept outlined above. Rather than having permanent diffused and diverse physical locations in and around the city, MUSE has no singular or permanent physical location, as we will see in the Paris background story below. Like the 'flâneur', it is both in and of the city, but not tied or limited to any specific location in the city. It is, at least initially, untethered. It is freer, lighter, and more open to the various forces and factors of the city… and ultimately finds its area of specific focus through an analytical, investigative, iterative, and immersive process.

Baudelaire alludes to the flâneur as a sort of objective observer and recorder of the city and its life, he continues: "His passion and his profession is to merge with the crowd… for the passionate observer, it becomes an immense source of enjoyment to establish his dwelling in the throng, in the ebb and flow, the bustle, the fleeting and the infinite. To be away from home and yet to feel at home anywhere; to see the world, to be at the very centre of the world, and yet to be unseen of

the world, such are some of the minor pleasures of those independent, intense, and impartial spirits…" (Baudelaire, 2010, p. 15; text edited by author).

In Product_System_Service Design (PSSD) and current design parlance (with a specific nod to IDEO's *Method Cards*), we can see the above as very similar to tools and processes labeled as "Fly on the Wall, Shadowing, Cross Cultural Comparisons, Cognitive Maps, User Interviews, etc." (IDEO, 2003). Another intention is for MUSE to activate numerous tools, processes, and design proposals in a direct and primary manner. Occasionally 'going to the site' is vastly different from being immersed and embedded in the site, and its context and content. Sustained, first-hand interviewing, observing, analysis, case studies, diagramming, and mapping in situ add additional dimension and depth.

Returning to foundational principles, links, and references through Calvino's work and a broader Italian cultural context merged with a sense of Italian literary history, assists us with the broader context of this book on design culture matters. Calvino's iconic contributions to Italian and international creative culture is profound, and hence provides a direct link to this book's title and intention to explore design culture matters. Calvino simultaneously understands the pulse of Italian creativity, especially in literature, and is a fundamental aspect of that pulse. It is a time well spent.

Calvino's opening quote in this chapter establishes a critical tone and vital characteristics that underline some of the conceptual and operative foundations of MUSE. Calvino's memos shed light on issues surrounding design and education. A restatement of the last two sentences therefore seems to be an appropriate reminder to underline their importance. Calvino's growing awareness of the "heaviness, the inertia, the opacity of the world" reinforced his increasing desire to pursue "the sharp, darting nimbleness that I wanted to animate my writing" (Calvino, 2016, p. 4). MUSE shares these sentiments, perspectives, and intentions, it offers a possible lightness to education and practice.

Calvino does not simply recognize the duality between lightness and heaviness, between nimbleness and inertia, but also the transitional nature of these domains when he writes that "I sometimes felt that the whole world was turning to stone: a slow petrification, more advanced in some people and places than in others, but from which no aspect

of life was spared. It was if no one could escape Medusa's inexorable gaze" (Calvino, 2016, p. 4).

While my mind jumped to Ionesco while first reading the memo, Calvino never mentions *Rhinoceros*, perhaps as it does not share the actual literary qualities (nor the Italian lineage) of lightness that he is trying to reveal, instead his first example is Perseus as presented in mythology and through the writings of Ovid. He writes that "When the human realm seems doomed to heaviness, I feel the need to fly like Perseus into some other space. I am not talking about escaping into dreams or into the irrational. I mean that I feel the need to change my approach, to look at the world from a different angle, with different logic, different methods of knowing and proving" (Calvino, 2016, p. 8).

This leap is also at the foundation of MUSE. It presents options in education, learning, teaching, practice, and interaction with the world. If needed, it may bring an antidote to a possible lingering 'heaviness' or inertia of the academy, the professional community, and global institutions and instruments. MUSE is fully committed to fairness, equality, and equity, but not necessarily through the means of 'sameness' and meaningless restrictions. It is, in a simple way, a change of approach, a different modality that employs "different methods of knowing and proving".

Observing, recording, and adjusting student learning, processes, and production in stationary, traditional studio environments over many years, and also in lighter and more flexible models, has led me to understand that the educational value in each modality is valid, as is the productivity of the students and faculty. The type of learning and productivity may vary, but frankly not too significantly, and the added diversity is extremely important. With tethered, rooted, and traditionally based education, there is clearly room, if not need, for diversity. I am certain of the value and impact of lighter models, such as MUSE, and feel strongly that more experimentation and research into these modalities would be of great benefit.

Lucretius's *De rerum natura* is the first great poetic work in which knowledge of the world leads to a dissolution of the world's solidity and to a perception of that which is infinitely small and nimble and light. Lucretius wants to write the poem of matter, but he warns us from the start that the reality of matter is that it's made of invisible particles. He is the poet of physical concreteness, seen in its permanent, unchanging substance, but he begins

by telling us that empty space is just as concrete as solid bodies. His greatest concern seems to be preventing the weight of matter from crushing us. As soon as he lays out the rigorous mechanical laws that govern every event, he feels the need to allow atoms to deviate unpredictably from the straight line, thereby ensuring the freedom both of matter and of human beings. The poetry of the invisible, the poetry of infinite unpredictable potentialities, even the poetry of nothingness, originate in this poet who has no doubts about the physical reality of the world. (Calvino, 2016, p. 10)

Calvino immediately follows this succinct exposé on Lucretius that stresses the importance of not allowing the 'heaviness' of things to suppress or stop us, by turning to other critical touchpoints concerning 'lightness' through the work of Ovid's Metamorphoses, written 50 years later. Calvino writes that "For Ovid too everything can be transformed into new forms; for Ovid too knowledge of the world entails dissolving the solidity of the world; for Ovid too, there is among everything that exists an essential equality that runs counter to all hierarchies of power and value". And that in Ovid's lexicon, everything, and everyone "can change itself into radically different forms" (Calvino, 2016, pp. 10-11). And so, surely, design studios, lecture courses, professional practices, and how we interact and engage with the world can transform as well… especially if we do not permit precedent, inertia, prejudice, and bureaucracies from crushing us.

Before we break the spell, and move onto some other facets of MUSE, we should at least touch on the second memo by Calvino entitled 'Quickness'. Calvino begins by discussing and sharing some legends, fables, and folktales, and points out that the sense of time is much more abstract, open, and not very 'heavy' or constraining… and hence the significance and frequency of devices like 'once upon a time' for example. There is a quickness, a sort of magic, that transfers, and transforms, us to another world. And this world has other rules, and other qualities. "The chief characteristic of the folktale is economy of expression; the most extraordinary adventures are recounted in terms of their bare essentials" (Calvino, 2016, p. 43).

MUSE too is about confronting, and working with, bare essentials in an unfiltered and untethered way. It is not about a beleaguered, cerebral process that overpowers the place, people, and things that we, in fact, came to, and should, work with…! Calvino continues that "Quickness of style and thoughts means above all nimbleness, mobility,

and ease – all qualities that go with writing that is prone to digression, to leaping from one topic to another, to losing the thread a hundred times and finding it again after a hundred twists and turns" (Calvino, 2016, p. 55).

Lastly for now in this 'foundational' section… I have had the most success in the execution of the immersive, untethered, in situ nature of MUSE through dedicated, intensive workshops and fully integrated and independent study abroad programs. These are not the mainstream typologies for lecture courses or design studios in traditional, university-based, semester formats… but they certainly do exist. Perhaps I have been attracted to workshops and more atypical programs due to their incredible effectiveness and impact. Their focus and intensity, often arising from their brevity, and perhaps their inherent alternative and experimental nature have been important to me and have proven to be an excellent educational experience for students. Maybe Calvino is also drawn to these modalities and typologies when he writes that "The demands of the publishing marketplace are a fetish that should not prevent experimentation with new forms. I hope here to wave a flag for the richness of short forms, with all they presuppose in terms of style and density of content" (Calvino, 2016, p. 60).

A couple of additional notes on MUSE

This chapter serves as a basic introduction of MUSE and its underpinnings, and specifically brings some focus on its educational modality. It will be developed more fully in subsequent publications. So, while it is inappropriate and impossible to dive into details of the educational modality of MUSE in this chapter, and few notes on time-frame, duration, and scope may be useful. The following points include different scenarios, benefits, and complications. They also reveal that the first two, shorter and independent modalities, are 'easiest' to plan, execute, and sustain, and that they are perhaps ideal for initial instigation of, and experimentation with, MUSE:

Modality ≈ Duration ➤ Comments/Characteristics

- Workshop ≈ 1 week +/– ➤ concentrated, focused, and intense; best if independent of other courses and commitments.

- Summer sessions ≈ 8-10 weeks ➤ typically 'off-track' and independent of other courses and commitments, or with all units (beyond the studio) in the MUSE program.
- Semester ≈ 14 weeks ➤ typically 'on-track' with all units in the MUSE program or other units at the university, 'online,' or blended.
- Annual ≈ 8-9 months ➤ stand alone and 'off-track', and independent like a study abroad program, Erasmus, etc. or integrated/blended with the university.

\+ possible 'professional' participation (maybe also internship) and government/institution/NGO participation and partnerships…

And one backstory may be relevant: In Los Angeles in the early 1990's, I initiated Woodbury University's Paris program, the first educational offering beyond its campus. In Paris, the upper-level architecture design studio initially had a fully dedicated, 24/7 accessible studio for all the students in the program. It was equivalent to the studio space offerings in Los Angeles due requirements to meet accreditation standards set by the degree accrediting agency (NAAB). However, this created a 'detachment' and removal from the city since the location of the studio was in the periphery of Paris, and because students spent so much of their time there. It was in contradiction to the main idea of 'full and direct immersion' of the program. However, the lecture class on urbanism and urban theory that was offered simultaneously with the studio in Paris, and also lead by me, never had a formal classroom… the city, streets, parks, and plazas were the classroom.

The rational for the fully dedicated studio space in Paris was in a sort of blind reflex to basic 'conventions' and NAAB requirements. These were bureaucratic and preconceived weights to the initial realization of the full idea of the program… constraints of convention, norms, and bureaucracy. NAAB had articulated the amount of space and furnishings needed for each student in a design studio, reinforced by precise analytical breakdowns required for accreditation. And, even though it was said that schools 'should be themselves' and that 'standards should not be equated with standardization', the reality and pressure felt very different.

We were a new architecture degree program in Los Angeles, and I was a young faculty member. Accreditation was extremely important to everyone, and critical to the school's future. But, eventually, after

losing spaces yearly, including a diminishing reality of them being real 'studio' spaces, I simply stopped getting any formal space for the studio… and nothing changed. The work was always very strong, and it remained strong, and became even more focused and nuanced… and the students did not complain… nor did anyone else. So, the studio simply faded away, and we achieved the fullness of the idea of direct immersion with, and within, the city. It, ultimately, was that easy… a simple decision based on clear intentions with proven results over time.

While there is a 'lightness' and freedom of movement associated to MUSE, ultimately, after initial investigations and analysis, each student, or each group of students, will become embedded in a selected community, institution, or urban typology to bring focus and design specificity to their work. Various "toe-holds" and a sense of grounding in the communities deepen the immersive experience and work of the studio. The studio can be hosted by a variety of institutions and locations, and there could be a small 'basecamp studio' in the Bovisa campus for at least logistical links to production labs and other university centralized facilities, and possible links with Polisocial's Off Campus outposts.

The main idea is simply not to stay in a remote and abstract studio space, but rather to engage the city and *to have the city become the studio*… to be *of* the city, community, institution, and/or typology… a sort of local 'Erasmus' program. This extends finding and understanding the sense of 'place' and 'history' directly to *society, culture, and community* over time. It includes tangible and intangible aspects. The direct relation to the community and culture is critical, as is sustained participation. MUSE engages, informs, educates, and empowers the community. This is achieved through direct collaboration employing co-work and co-design methodologies.

Lastly, and very briefly for now, beyond this educational module, MUSE can also be a model for professional 'untethered' work that may leverage the 'digital nomad' and distributed companies of recent times. Additionally, it may also serve as a model for emergency and disaster relief activities, including war, that need agility and nimbleness for rapid response and mobility to assist communities.

MUSE merges the Academy with the professions and with the local or global community. It is a system and a network. MUSE engages,

evolves, and extends design culture and design culture matters. It articulates our time and fuses design domains, contingencies, locations, disciplines, professions, communities, cultures, and circumstances. It unites and connects.

MUSE is an independent or embedded entity and can exist in a singular or in a triad form. It is a linked, transversal, interconnected, distributed network of various scales and typologies.

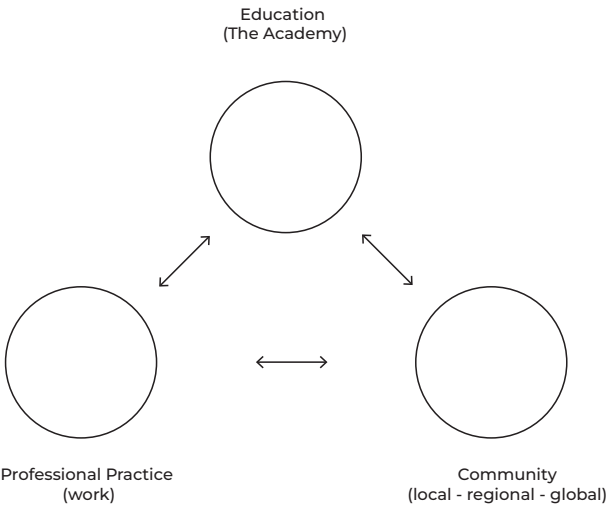

Fig. 1 – Primary branches and domains of MUSE, designed by authur and produced by Claudia Mastrantoni, 2023

In the fullest state, MUSE links nomadic, untethered, diffused, and distributed people, students, professors, and retirees to universities, professional practice, institutions, corporations, governments, NGOs, and communities. This ultimately transcends a simple notion of MUSE as only an educational offering or platform, and even the relationship with it to the academic institution. MUSE may live beyond the Academy due to clear relationships with professions and professional practice as well due to relationships and partnerships, including funding opportunities, in emergency and disaster relief situations and warfare.

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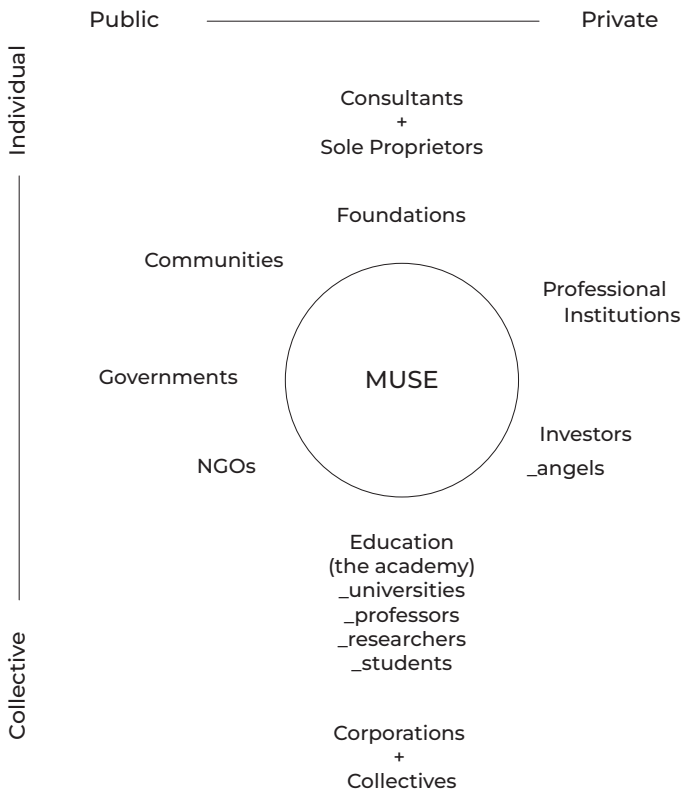

Fig. 2 – Primary constituiencies of MUSE, designed by authur and produced by Claudia Mastrantoni, 2023

Concluding remarks

MUSE is really about preparation and exposure, and ultimately choice, to new ways of studying, working, and living… and being an active and contributing participant in the world. It synthesizes the current confluences in life and work of our times. It leverages and artic-

ulates our times, our context, our content. It balances or compensates for the 'separateness' and perhaps 'aloofness' of the academy, professions, and governments – in their worst-case scenarios, or remnants from their past that may simply be unconsciously continued into the present. It is about choice and opportunities, about being in the world and of the world. It merges the academy with the professions and with the local or global community. It is an educational program, and more… it is a system, a network.

MUSE is a network_ service_ system navigating various realms:

Local _ National _ International	(scope)
Small _ Medium _ Large	(scale)
Singular _ Multi(ple) _ Trans(versal)	(disciplinary)
Academic _ Professional _ Community	(based)

Design culture matters very much… and hence creating, nurturing, and developing a design culture and 'variances' of the design culture is critical. Especially for the designer, how one does things matters… let alone 'what, when, why and where' one does things… and hence structural inclusion of not-so-normal offerings like MUSE matters. If possible 'undercurrents' that may promote or affect mainstream design culture are present, or if we allow new variants to emerge and exist that add a palpable sense of diversity, experimentation, and 'lightness' that is sanctioned and supported by the university, then a strong and broad message is delivered to all members of the institution and the community. It is important that pathways to diverse and alternative things are present and available, and that diversity and inclusion becomes part of the culture. MUSE fundamentally, directly, and intimately merges design and culture in ways that matter; it calls for innovative and inventive institutions to become lighter, and more open and unconventional. MUSE counters heaviness and inertia.

I hope that this essay will promote at least some reflection on the relevance and opportunities of the normative, concentrated – and often isolated – campus. It would be beneficial if its concentrated, collective aspects were leveraged further… including significant multi- and trans- disciplinary educational experiences, and increased openness and diffusion of labs, shops, gyms, etc. And hence achieving an even broader sense of community, contribution

and collaboration, and robust integration of economies and fuller economies of scales.

The final distillation of all of this is effective, impactful, and inspiring education, learning, practice, and contributions. It is the role of the professor, and practitioner, to inspire and challenge the students and community, to impart and extend knowledge and learning as best as possible. This includes utilizing a variety of formats, vehicles, and processes. MUSE is dedicated to this search, this intention… and to the 'extraordinary' via provoking, stretching, and empowering all.

MUSE is not radical, nor even new… it may in fact return us to a form of direct education found in earlier common experiences like 'Le Voyage d'Orient' (or the grand tour) by Le Corbusier and others… or like meeting Plato under the olive tree, or better yet, in the agora.

Extraordinary class projects are worth their weight in gold. *Those projects that, for years after they are done, students discussed, and teachers imitate are essential to successful design education.*
First, challenge the student: a project must offer sufficient variables and serendipity that students can test their skills and talents and, in the final analysis, surprise both the teacher and themselves.
Second, inform the student; A project must also provide enough unanswered questions that students are learning something new by doing something new.
Third, elevate the student: A project can propel students into opposing directions-either through success or failure.
Challenge, inform, and elevate are the building blocks of a solid education*, and to achieve this mix requires a selfless devotion on the part of the teacher and an intense willingness to learn on the part of the student. A good, or great, class project can make the education experience real.*
A good class project is combustible, it is the fuel that powers the creative engine; or put less metaphorically, it is the beginning, not the end, of an experience.

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We live in an uncertain, changing, hard-to-focus era in which traditional design approaches and methods can no longer respond to today's challenges that surface in varying degrees and intensity. Moreover, we are developing a different perception of 'materiality' and the mediums employed. Hence in this 'liquid' and blurry landscape, the question emerges: What is the importance of understanding the value of design culture, more precisely, the "matters" through which this culture is manifested and expressed today? Moreover, how design culture aligns with the changed reality by responding "creatively" to today's emergencies?

The volume investigates a wide sphere of issues referring to an extended concept of "matter" – the word matter intended not only as materials as such but also of content and relationships – through design actions, approaches, processes, tools and methodologies employed in different areas and with different objectives, yet united by the desire to intercept the current shift, sometimes reinventing and sometimes evolving programmatically over time to embrace the changed framework.

The matter is thus interpreted in its range of potential declinations, bouncing from concept to object, material to immaterial, process to solution, and traditionally defined medium to a dynamic virtual tool.

This collection of essays is dedicated to all those who wish to explore the value and "matter" of design culture between past inheritance, present time and foreseeable future mutations through the deepening and inspiration of new and alternative tools, approaches and design methods.

FrancoAngeli
La passione per le conoscenze