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Topological Deformability in Architecture, or How to Learn About Differences

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Abstract. The main question of this paper is related to whether and in what way we understand the notion of topological deformability, which appears in numerous texts of architectural theory from the beginning of the 1990s until today. In general, the paper deals with the problem of the denotation of concepts from other scientific fields, and shows how the architectural discourse changes the meaning of a mathematical concept, determining it within its own discipline. The transition of the term topological deformability is set as an example of how architecture uses and improves its inherent interdisciplinary dimension, as well as an example of how the way we research in architecture could make a tangible social impact.

The first part of this paper will focus on introducing and analyzing the concept of topological deformability and its transition from mathematics to architectural theory.

In the second part, it will examine how, through different theoretical approaches, the term topological deformability influences the transformation of the thinking modality in architecture, and how it traces the narrow path through architectures' knowledge toward the wider audience. Therefore, architecture's dominant as an instrument of plural social reality will be emphasized. The research will show how the term topological deformability through architecture opened the way to changing the idea of otherness, leading to the essential acceptance of differences.

Keywords: architectural topology · deformability · plural society · otherness · difference

1 Topology

The analysis of topology as a contemporary mathematical discipline requires a transition from the term place to the term space because mathematics does not recognize places with their contextual particularities but examines and describes abstract mathematical spaces and everything they comprise. The relevant literature in the field of mathematical topology explains that, in general, topology studies the properties of geometric shapes that are preserved under continuous deformation, such as connectedness or compactness, i.e., mathematical topology makes no distinction between two shapes or two spaces if it is possible to shift from one to other under continuous deformation. When it comes to these spaces, it is irrelevant whether something is large or small, round or square, if it can be changed by stretching or bending, for example. The difference between the two spaces is primarily related to the components that remain unchanged under the deformation [1].

Sergei Petrovich Novikov emphasizes that it is even intuitively clear that knowledge about the geometric properties of shapes does not end with data about their metric characteristics, such as length, height, angles, etc., i.e., that “there remains something beyond the limits of the old geometry” [2]. Regardless of the length, the line can be open, closed, tied in a knot, several lines can be chained in different ways, volumes can have holes, etc. These and similar properties of geometric shapes, but also of various mathematical objects that do not have geometric realizations, are characterized by the fact that they do not change during deformations without interruption. Some typical examples of topological spaces are the *Möbius strip*, *Klein’s bottle*, *tori*, *various knots*, and similar objects.

During the 19th century topology was developed by several mathematicians, among others, Karl Friedrich Gauss, Bernhard Riemann, etc. but it is considered that topology as an autonomous branch of mathematics was founded by Henri Poincaré at the end of the 19th century. In the following decades, its internal problems were solved, so that in the second half of the 20th century there would be a more serious breakthrough of topological methods into modern physics and chemistry, but also a more general interpretation of topology through the discourses of the social and humanistic sciences.

It is certain that the mathematical definition of topology, when separated from the main field of research, is difficult to understand and cannot represent a basis for further analysis of the appearance of topology in the architectural discourse. Partly it can be explained by the fact that it is a scientific field that requires more complete and greater mathematical knowledge, the subject of research is far from the perceptible world, and therefore it is difficult to explore its visuality. In order to comprehend the evolution of topology in architectural discourse, one must look deeper into the history of science, especially mathematics.

2 Toward Architectural Discourse

Morris Kline indicates that the first thoughts on topology can be found in the works of Gottfried Wilhelm Leibniz, in the book “*Characteristica geometrica*” from 1679, in which Leibniz introduces the term *Analysis situs* /position/, in order to oppose size and form, emphasizing the lack of an adequate term when talking about form [3]. Also, in the letter to Christiaan Huygens, Leibniz points out that: “We need another strictly geometrical analysis which can directly express *situm* in the way algebra expresses the Latin *magnitudinem*” [4]. In order to understand his idea to differentiate the properties of geometric shapes by position and by measurement, it is important to take into consideration the fact that at the same time, Leibniz worked on the invention of calculus. It is also known that, as a branch of modern mathematics, topology initially arose from the study of geometric problems, but its methods are based on Georg Cantor’s theory of sets as well as on modern algebra. The roots of topological phenomena can be found in Euler’s work on seven Königsberg bridges from 1736, but the first truly modern fundamental concepts of topology were given by Henri Poincaré in 1895 in one of the most significant classical works of mathematics - “*Analysis situs*” [5].

As more important for this research, it is the draft overview of relevant literature of the history of mathematics that shows that the development of topology runs parallel to

the achievements that will distance mathematics from the sensory world. Between 1830 and 1850, Nikolai Ivanovich Lobachevsky and János Bolyai published the first model of non-Euclidean geometry based on the understanding that Euclid's fifth postulate is independent and that there can be logically non contradictory geometries containing an opposite one [6]. In the 19th century, Bernhard Riemann developed another kind of geometry based on the generalization of Gauss's concept of "curvature". He also stated that information about points in space need not necessarily be obtained using the coordinate system, the ultimate transcendental space of the Cartesian system, but that it is possible to determine for each point its local properties contained in the space itself. Riemann thus clarified that mathematical objects can be released of the external reference system, i.e., they can be defined as fields of local information. For the broader interpretation of observed reality, a proof such as Beltrami-Klein's from 1868, which equalised two geometries, one that belong to the real world of human perception and one that does not, meant the absolute relativization of reality as people understood it so far.

Mathematics philosopher Stephen Francis Barker points out that when we talk about the curvature of space, we must not assume or imagine a visual representation of curved space. Although separated from observable reality, the consequences of discovering these geometries were fundamental to the epistemological status of mathematics and for its wider intellectual influence [7]. In general, the development of topology, along with other mathematical achievements from the same period, indicated that the prevailing philosophical platform of Immanuel Kant was being undermined, in which mathematics had a special status as the essence of all natural sciences but had to be applied. Zvonimir Šikić, in his book on the new philosophy of mathematics, discusses the problem of the relationship between the abstractness of mathematics and the reality of nature, i.e., the applicability of contemporary mathematics in reality, and emphasizes that the culmination of this concept can be found in the philosophical platform of Immanuel Kant at the end of the 18th century. It is based on the idea that abstract mathematics is always directed to the description of nature because mathematical knowledge is specific as knowledge of the *a priori* forms of space and time, which are also components of reality [8]. Despite being intuitive, mathematics was still necessary for Kant to refer to the sensible world. In this context, the new way of thinking that accompanied the discoveries did not rule out the applicability of mathematics. However, the discipline was no longer prioritizing it. As a result, over time it stopped being a priority for all sciences that rely on mathematics, and ultimately for the overall understanding and perception of the world that surrounds us.

The methodology of applying mathematical concepts to a broader range of knowledge often draws on specific knowledge in various fields, and Arkady Plotnitsky defines it with the term "quasi-mathematics"[9]. Although he does not question the philosophical influence of mathematics on the development of civilization, he states that quasi-mathematics enables the dissemination of certain mathematical concepts and principles which, although originating from it, are not exclusively defined by its tools and, as such, become possible and applicable outside its disciplinary framework. With the term quasi-mathematics, Plotnitsky explains the difference in the interpretation of algebra, geometry, and topology in a general sense. He interprets algebra as the ultimate concept

of formalization, be it the formalization of systems in the natural sciences, conceptual systems as in logic or philosophy, or the language system that exists in linguistics. In this sense, “algebra” means a set of specific formal elements and their relations. On the other hand, “geometry” and “topology,” although both deal with questions of space, are distinguished by their mathematical origins, “geometry” arises from the measurement of space as geo-metry. In contrast, “topology” ignores quantities and deals exclusively with the structure of space (*topos*) and the essence of the form of a shape.

Such reflections have shown that different transitions of concepts from mathematics to other discourses, and therefore to architectural, where possible, whether it is about exact application or flexible appropriation of notions. With the previously presented broader image of mathematics in the field of science, it becomes clear that the path from topology to architecture has become open. During the nineties of the twentieth century, this will become particularly significant in architectural theory.

3 Topological Deformability in Architectural Theory

Even though the dominant architectural style in the most of the twentieth century – Modernism was based on the standard elements of Euclidian geometry, there were examples that architects were familiar with the more organic, freely deformed architectural form, but that was never referenced in the topological terms. However, the small number of buildings and significant research work during this period indicate that architects did not have a aspiration to include topology in the dominant movements of architecture.

At the beginning of the nineties of the twentieth century, with the appearance of adequate digital tools in the architectural design process, the conditions for more extensive research of modern mathematical theories of space arrested. Thus topology has started to become an integral part of the architectural design methodology, and therefore the architectural theory. The first attempts to record and analyze the term topological deformation in the architectural theory appear in the historical and theoretical overviews of contemporary architecture using more general term, *topological architecture*.

Mario Carpo explains the new architectural avant-garde at the beginning of the new millennium, known as topological, as an architectural response to the new digital technologies that were flourishing at the time. “Topological” architecture, as it was called then, was seen for a while “as the quintessential embodiment of the new computer age - and we all remember the excitement and exuberance that surrounded all that was digital between 1996 and 2001” [10]. Branko Kolarević uses the same term while classifying digital architecture: “This new fluidity of connectivity is manifested through folding, a design strategy that departs from Euclidean geometry of discrete volumes represented in Cartesian space, and employs topological, “rubber-sheet” geometry of continuous curves and surfaces” [11].

The similar term *topological tendencies* in architecture were introduced by Guiseppe Di Christina in her doctoral dissertation “Architecture and topology: for a theory of space in Architecture” in 1999 at the Faculty of Architecture in Rome [12], where topological tendencies were explained as “the topologizing of architectural form according to dynamic and complex configurations that lead architectural design to a renewed and often spectacular plasticity, in the wake of the baroque and of organic expressionism.”

Furthermore, she started defining the appearance of topology in architectural design in the domain of creating dynamic variations of form. The focus of her research is directed towards the formal vocabulary of buildings, where topological methods are primarily used to achieve the desired dynamics of the architectural form. Di Cristina also indicates a theoretical problem related to the question of to what extent the forms obtained by the dynamic process of topologizing are dynamic in the domain of architectural work. As the main protagonists of this, for her progressive tendency, she cites Peter Eisenman, Greg Lynn, Daniel Libeskind, and Bahram Shirdel, as well as the influence of the theoretical works of Bernard Cache, Jeffrey Kipnis, Brian Massumi, and other authors, crucial for the development of topological architectural forms.

As seen from the beginning, the use of the term topological deformability in architectural discourse pointed to the problem of formulating a comprehensive definition, because the interpretations were constantly shifted between the field of architectural theory of form and the field of architectural design theories. The first half of the 1990s was evidently dedicated to the “fascination with topological objects”, where for example, the project for the Guggenheim Museum in Bilbao from 1997, by architect Frank Gehry, was cited as a typical example of using the “deformation made possible by flexibility of topological geometry” with “forms that bending, twisting and folding” [13]. Moreover, the term *topological architecture* [14] is mentioned in some historical reviews, even as a strategy to create the new contemporary architectural paradigm, or a new architectural style.

As architectural criticism advanced with these tendencies, concerns about the idealization of form were raised. The majority of theoreticians and authors who influenced the development of the term topological deformability in architectural theory at the end of the nineties were directly confronted with the criticism of the idealization of geometry, that is, that placed deformability as a representative of the idea of diversity is placed exclusively under the framework of phenomenology. Referring to Di Cristina’s research, Michael Speaks underlines that the topological form technique, which is based on continuity and movement, is entirely negated by the finitude of the end product [15], additionally moving the problem into the domain of the experience of the architectural space. Mario Carpo sees it as a cause-and-effect relationship between digital technologies and complex geometry. He emphasizes that generalization has led to delusion and that many projects with computer-generated formal characteristics have become inconspicuous, almost banal architectural objects, and the use of digital tools, as well as the reference to topology, did not give objects validity. Antoine Picon emphasizes an additional problem arising from the topological treatment of form, which refers to the aesthetic valorization of deformed amorphous architectural forms. He sees part of the problem in the lack of an established aesthetic evaluation system for evaluating the aesthetic characteristics of new forms and another part in the process of their creation, which he underlines with the question of what in the process of form transformation determines when it will end [16]. Similar observations are made by Michael Meredith when he says that the result of using the topological method during the nineties is reflected in isolated physical and aesthetic models, which do not have broader significance but remain within their framework [17].

However, in the end of the nineties with moving away from the theory of form more towards the theory of design, some other interpretations of the term topological deformability have been developed, which will influence the architectural projects on a much deeper and more significant level. One of the basic definitions was given by the architectural theorist Kostas Terzidis in the book *Expressive Form, a conceptual approach to computational design*, introducing the term “topological operations” which includes twisting, stretching and compression of the architectural form, excluding cutting and tearing. Any type of operation that deforms the form by hollowing out, creates two topologically different entities, which leads him to the conclusion that “topology should be used in order to achieve the unity of the form, because it preserves the integrity of the endlessly transformed geometry” [18]. He implies that certain formal properties remain unchanged, even when the geometric shape undergoes intense distortions, resulting in the loss of its metrical and projective properties. Apart from mathematical precision, the great importance of Terzidis’ definition lies in the clear distancing from traditional architectural methodologies that were based on addition and substitution of forms. Similar explanations of the topological method speak of a departure from the Cartesian geometric model in architecture towards a more complex, non-linear logic of space, with which it is possible to express the flexibility and continuity of an endless number of variations.

The transition from “making form” to “finding form” occurs at the moment when the question of curvature is left aside, and along with the complex network of influences mentioned above, the topological deformability has become an integral part of architectural design methodology. This phase of development implied that the topological deformability should be considered as a comprehensive spatial system, where topology is understood as a flexible structure formed by specific and clear relations, which remains unchanged as a result of transformation and deformation. To design topologically, it was implied to emphasize specific relations or certain “conditions” which are key to the logic of organization, whereby geometry is flexible when it comes to dimensions, distances, or form. By the end of the nineties of the twentieth century, the topological deformability was no longer interpreted as the geometry of architectural objects, nor its prototype, but as a demonstration of certain geometrical principles. Topological thinking implies that spaces are not about a specific form but rather about relations. The authors explain this by stating that topological principles can be manifested through various forms where “the concept of continuity is obtained only by applying algorithmic logic” [19].

Over time, these types of definitions resulted in a more diverse understanding of topological deformability, leading to a more liberated and broader interpretation of the term in various contexts. It will turn out that evident heterogeneity in use, without a clear system or unique definition, has spread the term far beyond the limits of architectural discipline to many contiguous scientific fields, showing clearly the inherent architectural interdisciplinary dimension. The more the term was used in the domain of design methodology and less in the domain of form design, the easier and faster it started to increase its social impact.

4 Transformation of the Thinking Modality

As demonstrated, the outcome of the shift in the scientific paradigm from a determined and stable to temporal and complex, which resulted in a distinct comprehension of the contemporary cultural context, brought the increasing complexity in diverse domains of architectural theory and practice. Although criticized from many aspects, its formalism, lack of relevant space logic, a fixation on digitalization etc. the topological deformability as methodology appear in the architectural discourse as a response to the more comprehensive scientific and cultural context.

On the one hand, the complexity of the spatial structures encountered by the users of the built objects undoubtedly influenced their relationship to the space, as architectural form remains inseparable from the way we experience the world, which involves our senses and perceptions. The complex relationship of people to architecture is an intimate and longstanding one, and it is strongly linked to the relationship of the human body to the wider cultural context. This relationship has evolved over time to reflect the philosophical and architectural discourses that shape both.

On the other hand, with the development of computer technologies, there has been a change in our notion of materiality. Our age can be defined as a flow of information, and architecture captures this flow, creating more complex conceptions and interactions through the space. In this regard, it cannot be ignored that aspects that influenced the occurrence of topological deformability in architectural theory were strongly supported by the development of digital technologies at the end of the twentieth century. It is clear that only with the development of technological tools has architecture become interested in these types of complex spatial relations, primarily through the research of the medium itself - software. Upon examining the chronological progression from craft to engineering and to the digital design of virtual or natural spaces, it is evident that the study of medium has consistently dominated architectural practice. However, when discussing topological deformability in architecture, is it simply dealing with the medium, or is it something else?

The overall picture of the emergence and evolution of the concept of topological deformation from mathematical abstraction to the creation of architectural space suggests that the essence of the influence originated from a change in the thinking modality. The phenomenon of topological spatial structures where the sole relevant factor is their deformability refers to the idea that it is possible to tolerate, but initially endure, the most diverse types of deformation. This research argues that topological deformability through architecture opened the way to the essential acceptance of the different, to the changing the idea of otherness. If architecture, together with natural sciences, contributes to the creation of a specific system of world perception, then the predominant role of topological deformability in architecture is to serve as an instrument of expressing plural social realities.

5 Idea of Otherness

Otherness can be viewed as an articulation of diversity as well as a definition of differences. According to Jean-Francois Staszik, difference belongs to the realm of fact, and otherness to the realm of discourse. The notion of otherness mainly examines the idea

of a criterion that allows humanity to be divided into two groups: one that embodies the norm and whose identity is valued, and another that is defined by its faults and devalued [20]. Hence, the concept of otherness is attributed less to the distinction between the other and the other person than to the perspective and discourse of the individual who perceives the other as such. Since topological spaces deal with relations and connections with a given spatial context and not a specific form, it is clear that a particular topological construction can manifest itself through numerous forms. It is more spatial relation than a spatial determinism. Furthermore, through the relation with topological spaces, one can become aware of the variability of form and, therefore, the possibility of the existence of other forms. It is possible to create an idea of a space that is subject to change, which can lead to a different environment for users. If such spatial structures also belong to the multifunctionality, where numerous activities are interwoven or possible, then the idea of finality and certainty of the space is changed.

Moreover, it is possible to assume that there is not only duality, the opposition between self and other, but that many spaces in many forms with the most diverse activities are possible. To put it differently, despite the inherent tendency of humans to make categorical distinctions, the categories themselves and meanings associated with them are social construction rather than natural processes. Therefore, it is possible that topologically designed spaces may open the way to the diversity of multifunctional deformable spaces rather than to construct a new architectural typology.

According to the theory, the notion of otherness originated in a spatial form, arising from the idea of difference that is associated with the geographical nature of segregation. This approach implies that groups are divided into territories or spatial units with clearly defined boundaries that are difficult or impossible to exceed. However, topological constructions fundamentally change the relationship between the outside and the inside because, for those types of spaces, it is impossible to determine their boundaries. The only relevant characteristic of the structure is its ability to deform. In general, the notion of the boundary of space in mathematics, even when viewed chronologically, is closely associated with the notion of distance between two elements. The idea of metrical space corresponds more closely to the idea of Euclidean space, as it relies on understanding of spatial relations, such as the notion that the distance between two points is always positive. At a higher level of abstraction, the distance between two elements must be understood as a transition from one element to another, which, in the context of topology, is continuous.

As previously demonstrated, in architecture, the interpretation of purely mathematical definitions moves away from the original model. Hence, the treatment of the relationship between exterior and interior, wherein one can simultaneously be both the exterior and interior of the architectural space, requires that the users permanently change their relationship to the space. In the architectural discourse, the hierarchical treatment of the structure can be precisely discerned through the outside-inside relationship. With a model like the Möbius strip, the boundaries and images of a hierarchical structure are weakened. At the end, it becomes evident that one of the primary characteristics of topological spaces is the ability to blur the distinction between territorial boundaries, as well as to examine the traditional spatial duality between interior and exterior, employing methodologies that involve integrating the structure with the immediate environment.

6 Conclusions

This paper examined a widespread problem in architectural discourse, the denotation of concepts from other scientific fields, which, due to the interdisciplinarity of architecture, have become an integral part of the design process.

The beginning of the paper provided a brief overview of the term topological deformability within its native field - mathematics. Since topology is difficult to understand and appropriate, it has remained highly abstract to the architectural discourse. Nonetheless, taking into account its potential for expansion into other scientific fields, a multitude of interpretations appeared, along with a multitude of topological propositions that expanded the boundaries of topology beyond its native field, thereby bringing it closer to architectural theory and practice.

With an undeniable social impact, architecture traces the way of topology to a broader audience, with a specific impact on understanding the potential of the term deformation. Endless changes of form were understood as a potential to perceive transformability and to accept the differences in architecture. The significance of deformability was heightened, and it was imperative to clarify the limitations imposed on society as those that society ought to be able to tolerate. The paper examined how topological deformability in architecture, in a very subtle way, teaches us about and how to accept the differences.

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The Complexity Conflict in Research and Practice: The Case of Public-Private Interface Configuration

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Abstract. The disassociation between research and practice in architecture and urban design is a recognised issue, leading to an ongoing academic debate on the credibility of the field. Most authors agree that the irreducible nature of the practice, the complexity of the built environment itself, and its indirect and multidisciplinary shaping processes render the applicability of gained knowledge problematic, as researchers are inherently confronted with the dilemma of rigour vs. relevance. This paper explores the relevance of architectural research and constraints to the application of theoretical knowledge in practice in a particular case of urban interface. It discusses the benefits and limits of planning and design tools derived from the theoretically described causal relationship between the physical configuration of the public-private interface and its social effects on users of the adjacent public space. Through a conceptualization of the process, the article illustrates that the application of theoretical knowledge in urban design and planning can be significantly improved by considering the factors of scale and spatial context as well as the forming forces, values, and motivations of the actors involved. This theoretical dissection aims to clarify the contradiction between theoretical values and subsequent practice to help promote not universally good but, more essentially, adequate, sustainable, and equitable spaces.

Keywords: Urban Interface · Public-Private Interface · Urban Planning · Urban Design · Research Applicability · Research-Practice Gap

1 Introduction

1.1 The Divergence of Research and Practice

There is a widely recognised problem of persistent disassociation between research and practice in the field of urban studies. The most influential text shaping urban design and planning practice has limited scientific rigour and relies on a normative interpretation of subjective observations. [1–6]. This gap has been addressed in almost every research paper dealing with the urban environment in the past two decades, regardless of its main topic, indicating the gravity of the issue.

Most authors agree that the greatest challenge to the application of theoretical knowledge lies in the practice's irreducible nature, which arises from its two distinguishing

traits. First is the complex nature of the object of inquiry—the urban environment itself. The practice of urban studies is typically multilayered and multiscalar in structure and explores the intertwined relationship between urban form and its social implications. The second challenge stems from the dynamic nature of the city, the indirect and multidisciplinary forces that form the urban environment, and the reciprocal relationship between its social and spatial conditions.

1.2 Challenges in the Study of Complex Urban Environments

The different layers and scales of urban structure, the interplay between space and human behaviour, and the complicated and indirect process of its formation and transformation make research of the urban environment extremely challenging. When confronted with the complex and dynamic urban reality, the pursuit of rigour, validity, and consistency in research design poses a challenge to the practical application of knowledge due to the inherent loss of information. Researchers often grapple with the trade-off between data quantity and granularity and the dilemma of rigour vs. relevance [7].

This article highlights the need to actively address the complexity of the urban environment and its formative processes. It relies on the author's background in both theory and practice to identify the limited applicability of theoretical claims due to the spatial and procedural complexity of today's cities. This applicability of theoretical knowledge can be significantly improved by considering the factors that relate the uncovered principles and patterns to their adequate spatial and procedural context.

2 Case of Urban Interface

2.1 The Interface as an Intersection of Different Realms

In order to illustrate the challenge that the complexity of the urban environment poses to the application of normative research in the field of urban theory, this article focuses on a particular element of the environment: its interface. "Urban interface" is a term used in this paper to describe the spatial configuration delimiting a public space from a building block. The broad theme of the urban interface appears in the theoretical literature under different terms ranging from "street edge" to "transition zone." This field of urban theory and the topic on the interface itself have become more prominent in past decades due to the increased interest in public spaces in general. The specific social and morphological role of the interface was discussed in the most influential texts in urban planning theory, as the details of its configuration, for example, its permeability, articulation or setback, can have a major impact on the liveability of the space on both sides of the border [8–10]. The interface is one of the elements that co-shapes the image of the city [9, 11–14] and can be interpreted as a reflection of society.

Interface is a place where opposing interests tend to collide—a physical manifestation of a dividing line—but also a vibrant zone shared by the two realms in between which it stands. The public/private interface can be viewed as a symptomatic space for many current urban issues, as it is conceptually a space between public and private interests characterized by shifts of values and powers. Transversing different spatial scales from

architectural detail to urban macro-morphology and extending across different realms of influence, the public/private interface illustrates both abovementioned challenges: 1/ the process of balancing interests of individual actors and the public interest, and 2/ the consideration of the local and global context.

2.2 The Causal Relationship Between Interface Configuration and Human Perception and Behavior

The majority of available literature on urban interface focuses on the causal relationship between the physical parameters and spatial configuration of the interface and its social effects on users of the space—both their perception of the space and their behaviour within it.

Two examples of influential theoretical claims concerning interface attributes and configurations were analysed for their practical applicability using urban planning and design tools. These claims were selected based on previous literature reviews and represent different spatial characteristics and perceived values.

- “Ground floor visual permeability and the frequency of openings reinforce safety.” These features allow for natural surveillance and deter potential criminality through a concept described by Jane Jacobs as the “eyes on the street” [15, 16]. Transparency also increases the capacity for visual exchange between the public and private realms, which promotes social interaction and activity and creates a sense of openness [10].
- “Rhythm and articulation of facades can increase diversity and significantly influence a pedestrian’s perception of a space.” People naturally prefer streets with relatively shorter facades, as they conform to the “human scale” in relation to their walking speed [10, 17, 18].

2.3 Conflict and Contradiction

Despite the progress in planning theory, it seems that the practical application of such knowledge is rather underdeveloped. The aforementioned theoretical understanding of the impact of the public-private interface on urban social life has led to the development of specific design and planning tools. These tools span from the overall spatial and functional regulations promoting the legibility of a space, such as a “building line” and setback from the street line, to the detailed parametrical design codes promoting the human scale, which prescribe, for example, the maximal length of a façade or the number of entrances. Yet there are still many cases, even in very recent city development, where the interface configuration of new buildings does not positively contribute to the creation of a high-quality environment.

The problem is often attributed to a lack of knowledge or care on behalf of the planning authority, investor, or architect. Despite a general advancement in knowledge, the prevalence of such issues indicates that there might be inherent conflicts and misconceptions that can be avoided or at least mitigated when taken into consideration. Through analysing such cases, we aim to outline the most important factors that might have been omitted in the process.

Our investigation of unfavourable urban interfaces is divided into two main lines of inquiry that correspond to the two previously outlined problems, namely, the complexity of the urban environment and its indirect formative processes. The first question is connected to the issue of information loss in the description of a complex urban environment: If the theoretically defined principle was applied in urban development, why did the spatial configuration not have the intended effect? The second question concerns the complex spatial development process: Why do valuable characteristics not occur naturally within the new development?

3 Disregarded Factors, Limits, Moderators and Mediators

3.1 The Indirect Process of Translating Theoretical Knowledge into Practice

The research and theory that are so closely allied to the applied fields of urban design and architecture have a strong tendency toward a normative approach that is directly implemented in practice. Due to the inevitable information loss in scientific analyses of complex urban environments, it is crucial to avoid oversimplification. A typical pitfall of strictly morphological analysis is the omission of the role of non-spatial factors in the actual formation of an urban environment.

A declared objective of many research projects is “informing policy-making” or “developing a knowledge base for urban designers and planners,” with the overall goal of ensuring vitality, safety, comfort, etc., establishing best practices, or developing tool-boxes to help design a “successful” or “good” space. The idea is that gaining a better understanding of the particular effects of specific spatial configurations on positively interpreted human behaviour (for example, intensities of movement or visual engagement) by replicating or avoiding that configuration will have a positive effect on the urban environment. This process of implementation is based on a prevalent but incorrect view of the design profession as applied planning theory. It assumes a similar approach to knowledge dissemination through the “translation model” that is typical in the natural sciences, where theory can be directly applied to new technology, as opposed to the more indirect “enlightenment model,” wherein knowledge is disseminated to multiple relevant audiences [1].

The specifics, overlaps and ambiguities of a rather new theoretical field [3] that is, at least partially, in the process of development of its general theoretical framework and vocabulary [2]. The specific knowledge from focused inquiries lacks a rigid theoretical anchor and is vulnerable to seemingly opposing interpretations, misconceptions and improper uses. The aim of theory should be to develop a more robust and inclusive method for building up a shared theoretical framework by synthesising particular pieces of knowledge. It is also imperative for the design of normative research to understand the formation and adaptation processes shaping the urban environment and the limited role of a practising architect or planner within these processes. The following simplified diagram outlines the complexities of the mechanism linking the research outcomes with their impact in reality (Fig. 1).

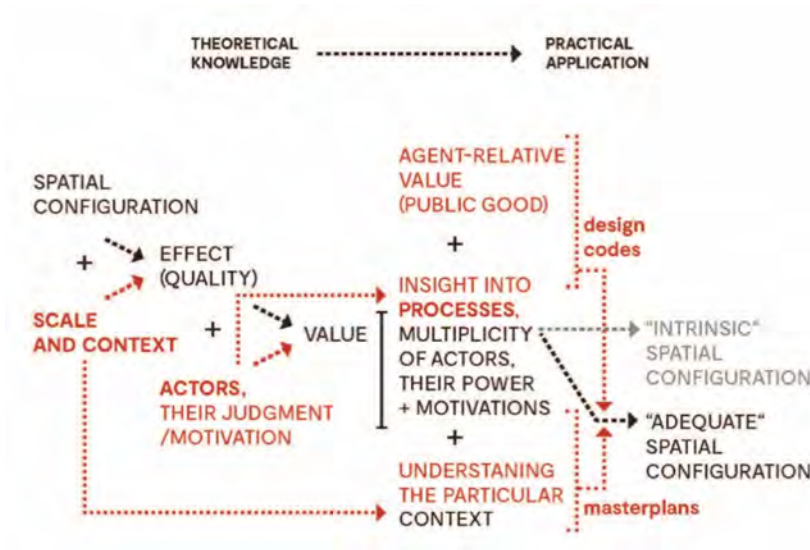


Fig. 1. A conceptual diagram of the theoretical knowledge application process in urban planning and design. By author.

3.2 Scale and Context

The answer to the first of the previously formulated questions, “*If the theoretically defined principle was applied in urban development, why did the spatial configuration not have the intended effect?*” is shown on the left side of the conceptual diagram. There is a possible omission of scale and context moderator in the relationship between space and effect, as the configuration might have been applied in the wrong scale or context.

The instinctive tendency to use design codes and effectively apply specific knowledge as a universal problem-solver leads to the overuse of specific regulations or designs in larger areas without considering specific spatial or functional settings, morphologies or land-use regulations. For example, there are cases of planning documentation prescribing a specific setback across entire municipalities. It is also not unusual to encounter such suggestions within the research papers or theoretical literature. For example, the usage of active frontage is recommended “*whenever possible*”, while other studies suggest that “*the more windows and doors into the public realm the better*”[19]. Such recommendations disregard the actual urban context or land use of a ground floor. The application of too-specific or too-universal rules might prevent planners and designers from finding the right solution at the right scale.

3.3 Actors and Processes

The second question connected to the process of spatial development, “*Why do the valuable characteristics not appear naturally?*” is slightly more complex and touches on the role of the urban planning and urban design professions among the conflicting interests of specific actors. The answer lies in a confusion of effect and value— notions

often used interchangeably despite the relativity of value according to different actors, judgments and motivations. The motivations and intentions of different actors naturally do not perfectly align at the borderline. Given the multiplicity of roles and meanings of an interface, it is only natural that numerous contradictions and paradoxes arise. The diagram illustrates the necessity of professional insight into the formative processes and the multiplicity of actors, their power and motivation. These elements are crucial to balancing the interests in a particular context, safeguarding the public good, steering the architectural process, and mediating the discussion to achieve a balanced, adequate and sustainable spatial and functional configuration.

4 Illustrative Case Studies

To further explain the contradiction originating in a misconception of the role of factors such as “scale and context” and “actors and processes”, the claims about urban interface configuration derived from the theoretical literature, as outlined in chapter 2.2, will be examined. It is, however, important to mention that the cases were not selected to disprove these statements but are extreme exceptions to the rule, outlining the limits of simplified fragments of theoretical knowledge taken out of context. By studying limits and outliers, we can better understand the intricacies of the research–practice interaction and help formulate a corrective mechanism. The following cases also show the importance of “relational” research.

4.1 Case Study 01: Limits of Visual Permeability



Fig. 2. Case 01: Ground floor visual permeability and the frequency of openings reinforce safety. Left: Amsterdam, 2018; right: Prague, 2020 (Photographs by Šárka Jahodová)

Scale and Context: The macro-morphological setting is critical to many safety-improving strategies. Permeable façades do not achieve the intended impact in quiet, low-density residential areas or service side streets (Fig. 2 right) that lack sufficient through-movement [15, 20] and tend to reinforce the preceding concept of “defensible space” [21]. More extensive studies also indicated that critical micro-morphological

aspects such as inter-visibility, entrance density and orientation, topological distance and ground floor use have a substantial impact above and beyond the transparent façade [16].

Actors and Processes: This case also shows that there is no singular “client” in urban planning and design. The interface can be interpreted in two directions: on the one hand, it protects the public space from private interference, and on the other hand, it protects the private, intimate space from outside views [13], so the people occupying the different sides may have opposing perceptions of privacy, usually resulting in the adaptation of the physical form by blinding and covering the openings (as seen in the right part of Fig. 2). The balance at the borderline also varies based on a particular cultural context.

4.2 Case Study 02: Rhythm and Scale



Fig. 3. Case 02: Rhythm and articulation of facades can increase diversity. Left: Malmö, 2016; right: Prague, 2020 (Photographs by Šárka Jahodová)

The excessive pursuit of architectural articulation and formal detail without understanding the mechanisms of human perception or the underlying economics of large-scale development can result in paradoxically mismatched urban scenes (Fig. 3).

Scale and Context: Visually, there is a tipping point where the rhythmic articulation of a façade passes from a structural property to an indefinite decorative pattern uniformly coating a building. That threshold is relative to the observer’s distance and speed of movement. Recent research points out the need for a shift in focus from formal façade design and detailing towards the structural aspects behind the subdivision of a street edge [18]. In this approach, the segmentation of a ground floor façade is linked to distinct territorial units [22].

Actors and Processes: The aesthetic motivation for a short façade usually does not align with the current economic and operational reality of most prevalent typologies. The concern with human scale is a rather recent movement within urban theory, originating as a reaction to the increase in large-scale development and the economic aggregation and densification that go hand-in-hand with a major shift in ownership structure. A wide

range of design codes and policies regulate the maximal length of a façade and support its detailed articulation, often disregarding the building structure and volume and its typological and economic reality. It is important to choose the right tool that conforms to the economic and typological context, as any fragmentation could increase the cost of a project, complicate the usability of a building or lead to a decorative pastiche resulting in a “Potemkin village” effect.

5 Conclusion and Summary

The implicit pursuit of rigour, validity and consistency in research design poses a challenge to its subsequent applicability when the confronted with a complex urban reality. The examples presented above indicate that the information loss inevitable in scientific analyses of complex urban environments can be mitigated by considering scale and context through relational, multiscalar, or multidisciplinary research. Complementing the investigation of urban detail with the impact of its wider context and enriching macro-morphological research with information about configuration at a micro-morphological level can help to indicate their interrelationships. Such an approach can be beneficial in consolidating the theoretical framework by linking specifically focused inquiries and thereby increasing the scientific integrity of the broad field of architectural and urban design theory. Moreover, a prerequisite for the successful application of acquired knowledge is consideration of the actors and processes affecting the urban form. A conceptual understanding of the tools and methods used in practice and an acknowledgement of the different actors, motivations and priorities within the development process increase the relevance of the applied knowledge.

The aforementioned systematic, incremental enhancement of both theoretical and practical perspectives can further clarify the apparent contradictions between theoretically defined values and subsequent practices. The presented case studies indicate that the implementation of theoretical knowledge in urban design and planning can be significantly improved by considering factors relating the discovered principles to their spatial and procedural contexts. Such act of refinement can help in practice to create not just vaguely good but more thoughtfully adequate and sustainable spaces.

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Regenerating Public Housing in Italy with the Support of the Next Generation EU Fund. Lessons Learned from a Research by Design Experience

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Abstract. In Italy, the Next Generation EU instrument has made it possible to launch what could be optimistically defined as a new season for public housing after at least three decades of decreasing financial support. The PINQuA (National Innovative Program for Housing Quality) was supported with 2.8 billion euros, prompting a race among eligible public bodies to submit a proposal. Thanks to the funding, 159 projects of 271 presented were selected and are currently in the implementation phase. Quality and innovation, two concepts prominently featured in the programme's title, encourage a sense of optimism. However, they also require critical examination to understand how the issues related to these concepts have been interpreted in terms of proposal development, evaluation, subsequent selection, and implementation. If we focus on aspects related to the culture of design, can we consider this programme an opportunity for architecture as a discipline? The research approach undertaken involved a direct participation in one of the projects: the urban regeneration of the Piazzale Visconti housing complex in Bergamo. The article reports the outcomes of a "reflection in action" [1] gained from a privileged observation point. Although referring to a single case, the research-by-design activity was an opportunity to get to the core of general issues, triggering a reflection on two complementary dimensions (1) the verification of project potential, expressed by the programme, (2) the understanding of the opportunities and certain problems intrinsic to the process.

Keywords: Public Housing · Regeneration · Quality of architecture · Process dimension

1 Research Perspective

1.1 Introduction

Through a design experience this contribution integrates a set of research activities conducted at the Politecnico di Milano regarding the quality of contemporary design in public housing. The proposed reflection adds a voice to the emerging debate on the results

of the National Innovation Programme for Housing Quality (PINQuA). The text presents considerations that emerged during a design action, addressing both architectural and procedural issues.

1.2 A New Season for Public Housing

In Italy, the Next Generation EU instrument has made it possible to launch what could be optimistically defined as a new (short) season for public housing, focusing on the regeneration of existing stock, and with an intense experimental orientation, after at least three decades of decreasing financial support [2]. The PINQuA (programme acronym) was launched in 2020 and supported with 2.8 billion euros, prompting a race among eligible public bodies to submit a proposal. Thanks to the funding, 159 projects of the 271 presented were selected and are currently in the implementation phase across national territory (the ranking list of projects accepted for funding was published in October 2021). The projects are scheduled for completion by March 2026, which is the extremely limited timeframe imposed by the conditions for accessing the funding – a key aspect with a profound impact on the entire experience. This occurred when the program – initially set up with fewer funds – was expanded and absorbed into National Recovery and Resilience Plan resources. This compression of design time, which exceeds any rational logic, puts significant pressure on the involved stakeholders and announces considerable fallout on the quality of the proposals, which are often critically deprived of the time for reasoned development and for exploring concepts that differ from routine expectations. As a further consequence, this condensed timeline hinders the possibility of engaging the local community in meaningful participatory processes.

According to the numbers released by the ministry, the program will involve renovation, replacement, and new construction of 16,500 housing units [3] – approximately 2% of all Italian public housing stock estimated at 806,146 units [4]. Quality and innovation, two concepts prominently featured in the program title, encourage a sense of optimism. However, they also require critical examination to understand how the issues related to these concepts have been interpreted in terms of proposal development, evaluation, subsequent selection, and implementation.

In other words, if we focus on aspects related to the culture of design, can we see this programme as an opportunity that has also been designed for architecture as a discipline and not solely for architecture as a technical service? It would thus provide space for experimentation beyond business as usual. In the absence of actual results, it is too early to formulate a definitive answer at this stage. Although most of the design decisions are already taken, the outcomes will only be visible after the projects have run their entire course. Only then we will have a comprehensive vision and be able to start a meticulous evaluation phase. We will then understand whether this major investment has enabled Italy to contribute to the international debate on social housing design, bridging the current gap compared to major European countries – a gap confirmed by the almost complete absence of projects carried out in Italy in major specialist European literature.

Today, however, by taking part in one of the interventions, we can anticipate some of the themes and questions that may fuel the debate in the future. In parallel, even in the absence of a systematic collection of official detailed material from other interventions, a brief report published by Mims (Ministry of Infrastructure and Sustainable Mobility)

allows us to draw up a shortlist of the 159 projects, similar in scale and program, that will be worth comparing in the future when in search of successful solutions and possible failures – some of these projects are: Ri-Abito qui in Potenza; ex SAIRO area in Udine; ViviBusto 2030 in Busto Arsizio; Ponte San Giovanni in Perugia; San Giovanni: un quartiere verde, inclusivo e smart in Trieste; Pinqua Vallette in Torino; Nuove Ca.Se. in Calenzano e Sesto Fiorentino; Librino Città Moderna in Catania; Terra in Andria; Contrada Torregiana-Fontescodella in Macerata.

1.3 A Reflection in Action

Having refined the goal of the investigation, there are several possible research approaches that can be more suitable for acquiring an understanding of the change potential and challenges of this tool, as well as for testing its ability to guide outcomes toward the best possible results. The approach undertaken within the framework of research-by-design [5] involved direct participation in one of the 159 PINQuA projects. Thus, it was possible to conduct – and produce – a “reflection in action” [1] from a privileged observation point. Although the experience relates to a single case, it was an opportunity to get to the core of general issues, triggering a reflection on both the design and process dimensions: two complementary aspects. The study of the first dimension makes it possible to test the program’s design potential, also in response to the current challenges in the implementation of low-budget housing solutions. The study of the second dimension examines the main opportunities and problems intrinsic to the PINQuA process that impact the physical results, as they prepare the ground. This contribution seeks to bring together these two interdependent levels that influence architectural results.

1.4 A Point of Observation: The Case Study of Piazzale Visconti in Bergamo

The project that prompted this reflection focuses on the urban regeneration of an area facing various challenges: the Piazzale Visconti housing complex, located on the southwest outskirts of Bergamo and separated by the consolidated part of the city. The area, commonly known as *Villaggio degli Sposi*, traces its roots back to 1955 when the local parish initiated a self-managed housing project financed by subsidised mortgages aiming to provide housing for young couples – hence the name of the quarter, which means Newly-weds Village. The outcome was a low-density neighbourhood comprising single-family homes, rowhouses, and small apartment buildings, each comprising two to four storeys. The site being regenerated lies 500 m north of the neighbourhood centre, where a few local services and micro-commercial businesses can be found around the church. The five public buildings occupying this area are in a state of decay. In particular, two have reached the end of their life cycle and are currently empty. The central public space, characterized by a monotonous functionalist design, serves mainly as a parking lot, with the only positive quality provided by the presence of a few trees. Size-wise, the plot is relatively compact, approximately 5,000 sqm, bordered by public roads. Of the five buildings, two are linear blocks perpendicular to each other (owned by ALER, the regional public housing authority) and three are standalone buildings (owned by the municipality). The aim of the intervention, in line with the program, is to reverse the decay in progress and define a new focal point for the entire neighbourhood through the

creation of a pedestrian square, with addition of public functions on the ground floors; replacement and increase of social housing stock (a 60% increase in volume is planned); and the energy and seismic upgrading of the remaining buildings.

Our contribution – a scientific consultancy for the Technical-Economic Feasibility Project provided on direct commission of the company awarded the design services contract, Progettisti Associati Tecnarc s.r.l., in partnership with Mythos S.C.A.R.L. – falls midway in the overall process, bridging the gap between the administrative phase, (started with the publication of the call for proposals and concluded with the allocation of funding), and the competition for the assignment of design services (which, in turn, precedes contracting of execution of works), providing an overview of the entire process. In this specific case, it should be noted that the transfer of responsibilities from the public authority to the design holder was facilitated through a document of intent. The public authority, during the drafting of the proposal and for the subsequent development phases, engaged in a scientific consultancy provided by Politecnico di Milano (responsible for the consultancy: O. E. Bellini, Department of Architecture, Built Environment and Construction Engineering) with the aim of creating a Design Guideline Document (Documento di Indirizzo Progettuale – DIP) containing directives for objectives, themes, innovative aspects, and quantitative requirements to be adhered strictly in the design phases. This procedure, a virtuous attempt of the commissioner to protect the design scope, does not represent a mandatory step but arises from the initiative and civil responsibility of the single decision-maker.

2 Two Complementary Research Dimensions

2.1 The Project Dimension

The first reflections on the actions carried out have made it possible to verify the real transformative capacity of the PINQuA programme, which is partly determined by an adequate match between the initial ambitions (as declared in the call and included in the goals set by the DIP) and the financial resources allocated. While this might seem obvious, past national experiences with the so-called *Contratti di Quartiere* (Neighbourhood Contracts) programme, for example, revealed a misalignment in this sense, resulting in a downsizing of the originally envisioned scope during the implementation phase [6]. Secondly, we had the chance to highlight the main issues arising from the specific context and to relate them to problems common to other fragile areas targeted by the program, together with a range of possible responses. In this regard, the case study allowed us to observe how the program offered designers flexibility to develop adequate solutions, in line with the most recent experiments in housing design.

These findings, grouped below into six themes, are then an example of what the implementation of the PINQuA can enable, allowing for some elements of design experimentation while respecting strict constraints. The following thematic paragraphs identify problems common to any similar intervention and provide a starting point for addressing equivalent challenges [7].

Advantages and Consequences of Densification (1). Given the acute shortage of social housing, when involving such estates, regeneration tends to include the issue of volume

increase: a more intensive use of already available and urbanized land is absolutely advantageous for increasing housing stock and/or expanding the user base attracting higher-income households [8]. This phenomenon is common in other European contexts, like the practices of housing associations in the Netherlands. Here, regeneration serves not only to increase the supply of social housing but also integrate a proportion of open-market housing, thus fostering social diversity [9].

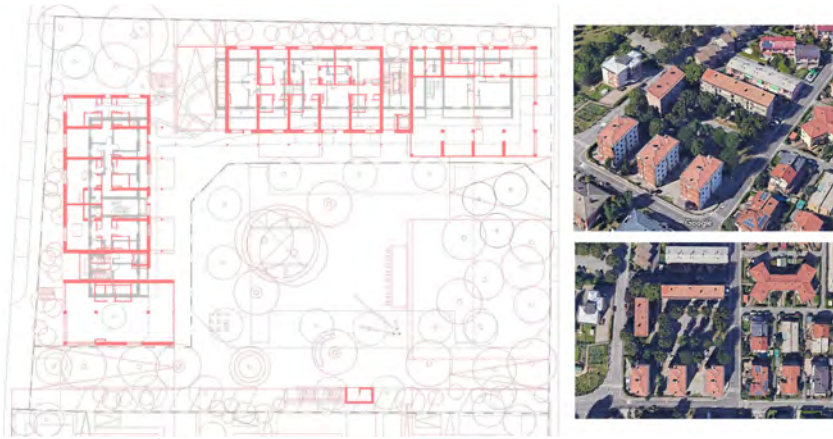


Fig. 1. Preliminary hypothesis of the ground floor plan for the feasibility study (left), comparing the building to be demolished with the new construction (pink), accompanied by images of the neighbourhood (right), 2023. (Drawings reworked by the authors of the paper. Images ©Google.

Beyond its primary objective, a net increase in density can, however, become challenging for settlement and typology, especially in small, highly constrained areas like that under consideration. These difficulties are often accentuated by the conservative attitude that permeates many urban planning regulations, requiring compliance with existing settlement criteria or restricting maximum building heights. An initial hypothesis was to consolidate additional volumes within a tall building located at the end of a low L-shaped structure. However, this option was dismissed since a derogation from local regulations was required, despite its typological advantages. So, to preserve the original building heights and adhere to land constraints, the only viable course of action for increasing density was to construct thicker buildings. This led to the development of residential structures with deep typologies, achieved through the design of three parallel bands. The central band contains bathroom and kitchen, while the two lateral bands house the main rooms – as will be explained later. (see Fig. 1 and Fig. 5).

Opportunities for Reactivating Urban Quality (2). While addressing the issue of monofunctionality and underutilization of open spaces, a common problem in most mass-housing contexts, urban spaces can be transformed into welcoming and inclusive places by rethinking the ground floor. This can be done by increasing types of use (not solely residential) and strengthening the permeability of the outward-facing frontage – this principle is well expressed in the words of Aldo van Eyck: “Forty doors make a good

street” [10], referring to the inseparable relationship between home and street rooted in the Flemish tradition (Fig. 2).

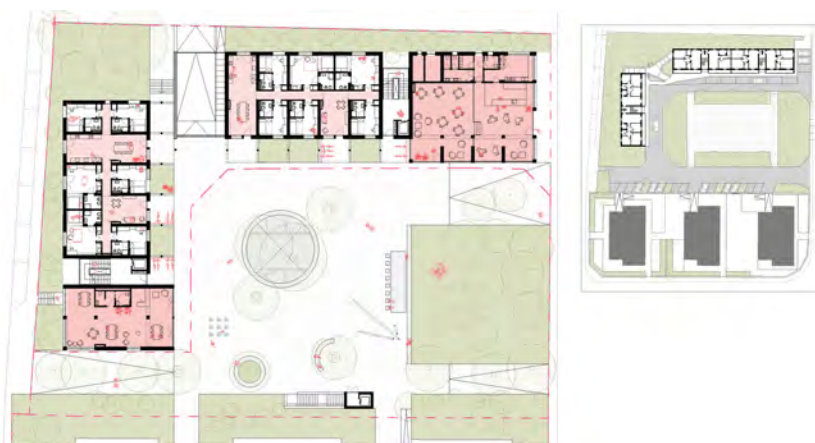


Fig. 2. Preliminary hypothesis of the ground floor plan for the feasibility study, with communal areas highlighted in pink (left), and ground floor plan of the building before intervention (right), 2023 (Drawings reworked by the authors of the paper).

In line with these principles, the design strategies to make Piazzale Visconti a vibrant place included concentrating commercial or community spaces in the most accessible corners of the ground floor; placing only specific shared residential types at the urban level (such as temporary co-living or student accommodation); and providing direct access to all ground floor spaces from the square. In particular, in the case of Bergamo, the project included ground floor housing intended for collective living, organized as Cluster-Wohnung [11], a typology better suited to extending the outdoor part of shared domestic life (see Fig. 1).

Impacts of Regulations on Parking Spaces (3). The current national regulation requires the provision of parking spaces for new residential constructions in proportion to the volume of the building, without considering potential future decrease in private mobility. This regulation contrasts with recent European initiatives where incentives for shared transport have led to the minimization of parking space provision. For example, in the Mehr als Wohnen cooperative neighbourhood in Zurich, residents agree to give up private car ownership to become members of the cooperative. Other projects, such as the Sonnwendviertel in Wien and the Résidence Rosalind Franklin in Paris-Saclay, tackle the issue with above-ground, removable, or reconfigurable structures that envision a car-free future. In the case at hand, there is no viable alternative to designing a conventional underground garage to meet code requirements. However, fulfilling parking needs on such a small site demands significant compromises, which unfortunately have a deep impact on environmental aspects.

These compromises include reduced soil permeability, removal of existing trees, and challenges in finding suitable locations for new plantings. Such conditions have

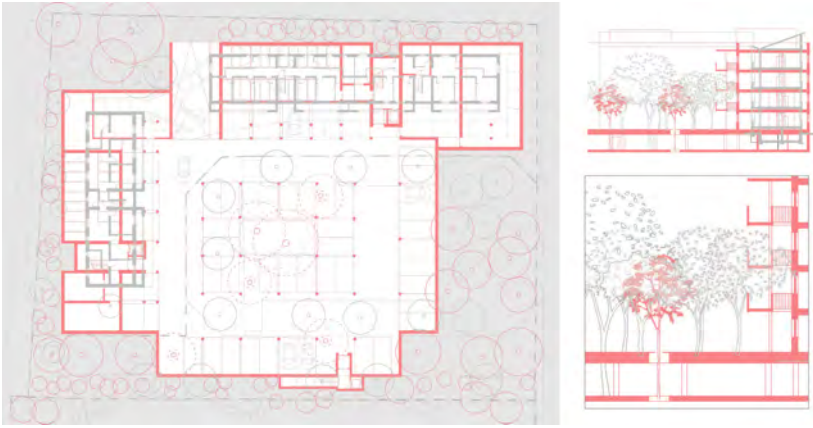


Fig. 3. Preliminary hypothesis of the underground floor plan (left) and section (right) for the feasibility study, comparing the building to be demolished and the new construction (pink), 2023 (Drawings reworked by the authors of the paper).

led to some compensatory solutions that allow some trees, planted at the underground level, to emerge on the square after crossing the garage in section. Two prominent trees emerge from a central patio, as in the CasaNova district in Bolzano, designed by Fritz van Dongen. Additionally, others are individually scattered between the parking spaces, corresponding to an equal number of holes drilled in the ceiling that allow the trunk to overhang the public space above – an innovative approach previously tested in the Het Kastel residential complex in Amsterdam. The combination of these options allows the square to be shaded and to contain heat islands, although it is a compromise solution. (see Fig. 3).

Solutions for Efficient and Welcoming Distribution (4). The choice of how to implement the internal distribution of a social housing building can contribute strategically to controlling the amount of construction and operating costs (a burdened for tenants), allowing an efficient use of the limited resources available without compromising the spatial results. An example of efficient distribution is the gallery solution as it provides access to a large floor area per level without multiplying staircases and lifts, and without limiting the double exposure of the dwellings. Although this option is considered taboo by many because of the well-known window privacy issues, its use can be strategic in terms of efficiency and spatial opportunities – even in a renovated version, as proposed in the case of Bergamo. In addition to increasing costs, a solution with two staircases per building would have meant missing the opportunity to characterize the access to home as a place for fostering social relations and to consider circulation spaces as urban spaces, reinterpreting the Smithsons' idea of a 'street in the sky'.

Numerous contemporary examples of social housing, moreover, have effectively experimented with the inclusion of welcoming and generously proportioned circulation spaces to improve the overall living environment, while also cutting down window privacy issues through specific design solutions. Of the cases analysed during the design process, the Briesestraße housing project in Berlin (EM2N studio) and the Fratelli di Dio



Fig. 4. Initial design render image of the external corridor distribution for the feasibility study, 2023 (Drawing reworked by the authors of the paper).

complex in Sesto San Giovanni (Giancalo De Carlo) shared several similarities with the project. Like these two examples, in Bergamo the gallery depth is bigger than usual and makes it possible to distance walkways from windows to respect privacy; it also makes the spaces in front of the individual entrances habitable, transforming the system into a large loggia. (see Fig. 4).

Advantages of a Modular and Flexible Floor Plan (5). Ongoing social changes that affect domestic life encourage the concept of buildings capable of adapting to possible changes over time. Adaptability becomes a way to sustainability. The lines of research active in this field respond with multipurpose or flexible layouts, the former understood as spaces that can adapt to different uses because of their geometrical conformation [12]; the latter understood as structures composed of a permanent part completed by versatile elements – a theory initially developed in the 1960s with the term “support” by Habraken [13] and the SAR group. Among the various recent experiences, particular interest has been directed on interventions in Catalunya. For example, the Peris + Toral social housing projects in Cornellà were built with a strict structural grid that gave origin to same-size rooms that could be combined in different ways and rearranged in the future; or the project by Lacol for La Balma cooperative housing, which features a longitudinal tripartite block, where a central band, accommodating bathrooms and kitchens, separates two bands that host the main rooms of the house.

Similarly to the second case, the Bergamo project develops a modular plan that accommodates a wide variety of housing types and, at the same time, is easily reorganizable in the medium to long term. The regular cadence of the wooden structure, in addition to guaranteeing simplicity of construction, divides the building into regular spans, determining a basic module useful for current and future aggregations. The depth of the building, which is dictated by settlement factors, is resolved by a central strip of bathrooms and kitchens – analogous to the reference – that subdivides each span into two equivalent spaces, drawing a pattern of juxtaposed rooms that can be easily reassembled (see Fig. 5).

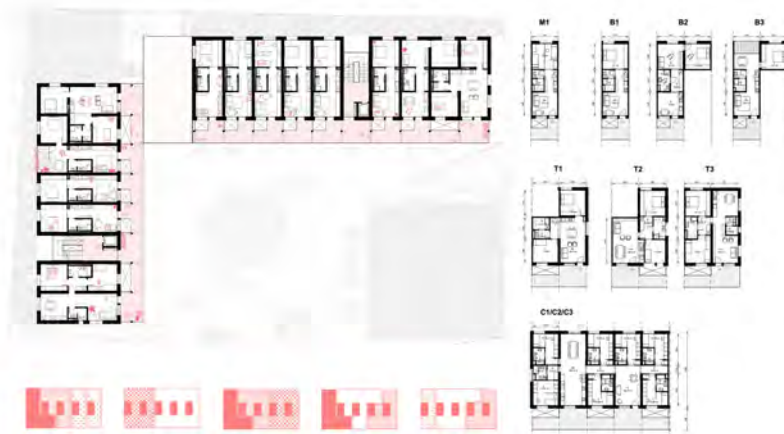


Fig. 5. Preliminary hypothesis of the standard floor plan for the feasibility study, accompanied by typologies layout and diagram of possible future configurations, 2023 (Drawing reworked by the authors of the paper).

Language Responding to Criteria of Necessity and Durability (6). When it comes to figurative and material choices, designing with limited economic resources favours solutions that respond to principles of necessity and durability, foregoing any non-essential elements, sophisticated materials, or fragile fixtures. Also, designing with limited economic resources implies a strategy which relies heavily on geometric choices, eliminating the superfluous. This is probably the foundation for an aesthetic appropriate to the theme of public residential construction. According to these principles, the figurative character of the Piazzale Visconti complex relies on the meticulous composition of a limited number of standard components, and not by adopting customised, sophisticated elements or by using noble expensive materials. The façades are of two types: hermetic toward the exterior of the plot; porous toward the public space. The former defines an apparently random pattern, with four types of windows arranged on a plastered background (see Fig. 6). The latter – the gallery front – is a direct expression of the structural steel elements: cantilevered beams and pillars set back from the outer edge, joined by metal railings (see Fig. 4). Most interventions, however, share that they were carried out after the 2008 crisis, a time that prompted many designers to look towards more elementary solutions, which coincided with an increasing focus on envelope design to meet specific energy performance requirements.

2.2 The Process Dimension

As for the reflections on the potential, criticality and risks of the process, the feeling is similar to what has already been noted by other experts: that we have focused on “how much”, without finding indirect measures that could control the “how” [14]. Despite the transformative potential and the centrality given to physical makeover, at least three weaknesses emerge, all related to the preservation of the quality of architectural and urban design. Firstly: the time available to prepare proposals, which required a rather

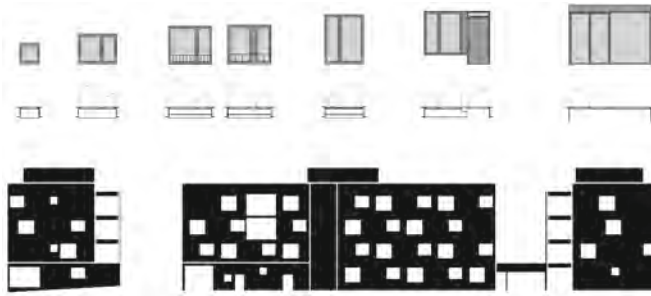


Fig. 6. Preliminary hypothesis of elevation and window typologies for the feasibility study, 2023 (Drawing reworked by the authors of the paper).

advanced level of complexity, was extremely limited, especially when considering the ambitious objectives to be achieved, particularly for a sector that has been under-funded for years and is no longer accustomed to addressing the theme of new design [15]. This key factor could have a negative impact on the quality of proposals, which may result sometimes from the revival of projects developed in the past and then abandoned for various reasons, sometimes from new projects stripped of the necessary breathing space to innovate. A side effect that cannot be reversed, even if the timeframe for the completion of the proposals is reconsidered. Secondly, the evaluation of the preliminary proposals, entrusted to a ministry-appointed High Commission, is centred on measurable criteria and quantitative parameters. This reflects an attempt to make the proposals comparable, based on an unquestionable system, but at the risk of losing effectiveness when faced with predominantly qualitative issues. None of the seven criteria, moreover, places architectural and urban design value at the centre of the evaluation (here is the list of criteria: Quality of the proposal and consistency with the purposes of the program; Scale of the interventions with respect to ERP properties; Recovery and promotion of cultural, environmental and landscape resources; “Zero balance” of soil consumption; Activation of public and private resources; Involvement of private operators; Application of BIM methodology, and of innovative management models). The third issue concerns the selection of professionals. This is done through a public tender based on the proven ability to complete the assignment, expressed through a technical offer influenced by an economic offer. There is no explicit evaluation of the architectural and urban quality of the project to be developed, implicitly emphasizing architecture as a technical service. This does not necessarily lead to a negative outcome but rather places the quality of the result in the hands of the awareness, culture, and capability of the tasked professional (or team). This selection is based on entirely different criteria, however, as if it were a secondary aspect, overshadowed by the correctness of execution.

3 Final Considerations

3.1 The Project Dimension

The experience conducted allowed us to test the potential and understand some structural weaknesses of the entire PINQuA program, which can be pinpointed in the seemingly secondary position afforded to the quality of architectural and urban design. The successful results – as one would expect given the number of proposals – will owe their achievement to fortunate coincidences, rather than to the will and/or ability of the process to direct the outcomes towards the best possible results. Thus, beyond the words that accompany the call, there is a significant risk that exceptional opportunities, such as those made possible by PINQuA, may result in ordinary responses that fall short of their full potential.

In this, as in other circumstances, the absence of a law for architecture in Italy is keenly felt – a law capable of defining, for example, the ways in which projects must be evaluated and professionals must be selected. Such a law, widely discussed but without tangible outcomes, would aim to create regulatory conditions for architectural culture to assume a decisive role in the processes guiding the transformation of the built environment (The MAXXI National Museum of 21st Century Arts has recently added fuel to the debate about this law). This would allow Italy to regain an active role in the contemporary architectural debate, proposing solutions that seek interaction with current international best practices. A law should help to ensure that this does not happen as a result of positive coincidences (as the PINQuA experience will hopefully be able to demonstrate), but as a systematic result of a political will, properly regulated and included in the tools and mechanisms behind every public work. This would require, upstream, a greater recognition of the role of the discipline of architecture in proposing innovative solutions that can respond more effectively to initial objectives, understanding current and anticipating future needs.

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Interscalar and Interdisciplinary Approaches for a Valley Community. The Case of Sappada

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Abstract. Our research aimed to explore an inter-scalar field in which architectural design tools are intertwined with urban and territorial scales. The case is an enclave between different limits: a valley near the border with Austria, located on the edge of north of Veneto region with an ethnic-linguistic heritage of Germanic matrix, administratively migrated in 2017 to Friuli Venezia Giulia region. Due to this specific geographical identity, local communities and municipal administration needed to define new sustainable development models of their territory. This gave us the chance to fine-tune a design exploration process holding territorial plan, with its analytical and programmatic categories. Additionally, it allowed us to address prefigurations, of a dispositive and dimensional nature, that enable the definition of thematic aspects through urban and landscape tools in various locations. Through discussion tables with local communities, various stakeholders, and interdisciplinary experts, as well as cross-referencing data provided by the administration itself, we elaborated open web-based GIS tools. These tools allow for the interrogation of data at different levels. From this analytical phase, five main themes emerged: naturalistic system, tourism resources, local economies, territorial infrastructures, and historical identity heritage. These themes represent the inter-scalar field within which different design explorations at urban and landscape scales intend to interweave possible relationships with territorial and urban plans.

Keywords: Inter-scalar field · Enclave · Spatial Prefigurations · Geographical identity · Local communities · Territorial plan

1 Architecture Beyond the Plan

The research work within which this project was developed aimed to explore an inter-scalar field in which tools of architectural composition intertwine with those of the project on an urban and territorial scale.

The Alpine landscape constitutively includes a spatial complexity that can only be explored through the interaction of different cartographic and representation tools, which often only partially allow to reflect this complexity.

The territory of Sappada is already in itself an enclave between different borders: terminal valley whose northern mountain crests mark the border with Austria, located on the edge of the Comelico belonging to the high Veneto Cadore in which an ethnic and linguistic heritage of Germanic matrix since 2017 administratively migrated to the territory of the Friuli Venezia Giulia region.

These specific identity traits have determined on the one hand the need to redefine the models of sustainable development of the territory, on the other hand the opportunity to develop a design exploration process. This process is capable of intertwining different tools: cartographic instruments of the Plan, with its analytical and programmatic categories; prefigurations, by arrangement and size, that the urban and landscape project has allowed to define in the various places and themes identified; definitions of individual architectural elements serving mobility networks and public spaces.

This analytical phase unfolded in parallel and in constant interaction with a participatory discussion process, comprising various open discussion tables for the local population, stakeholders, and municipal administration, delineating a series of fundamental shared themes and strategies. From the elaboration of these themes emerged five thematic axes enabling the intertwining of potential relationships with the Plan.

The Plan, therefore, besides conventionally synthesizing analyses and summarizing urban regulations and operational tools, in this instance, selects and indicates short- and medium-term strategies through spatial prefigurations, which the Municipality of Sappada intends to translate into planning phases at different levels. In the wake of a tradition intertwining the Plan and studies on the city with urban design [1], this research experience potentially broadens the scope from Alpine landscapes to other territories, experimenting with a theoretical dimension transcending the Plan, through the exploration of the form as a precise sign that is placed in the reality and meanwhile is the measure of a transformation process. [2].

2 Themes and Methodologies

These distinct identity traits mentioned before have led to two significant outcomes. First, they have explored a redefinition of sustainable development models for the region. Second, they have provided an opportunity to start a design exploration process that integrates the cartographic tools of the Plan (Figs. 1, 2, 3).

These tools include analytical and programmatic categories [7], incorporating the prefiguration of arrangements and scales enabled by urban and landscape projects. [3, 5] They are defined across various locations and themes. Moreover, the endeavor involves crafting individual architectural elements impacting mobility networks and public spaces. Following this analytical phase, conducted with participatory discussion panels addressing issues such as natural resource management, culture and education, tourism, employment development, and social inclusion and safety, five thematic axes emerged. These axes, encompassing the naturalistic system, tourist resources, local economies, territorial infrastructures, and historical identity heritage, facilitated the structuring of a specific proposal for a strategic plan.

The naturalistic system is formed by three main areas, the first one is Piave river park. The second one is Sesis Valley, that represents the higher course of Piave river



Fig. 1. Orthophoto of the Sappada territory, Sappada, 2023 (courtesy of the Municipality of Sappada)

until its springs. Thus, the Plan not only organizes conventional analyses, compiles urban regulations, and outlines practical tools, but also goes a step further [6]. In this instance, it specifically identifies and recommends short- and medium-term strategies by means of spatial prefiguration.

The Municipality of Sappada aims to convert these strategies into various planning stages across different levels. In case of the lodges located in this mountainous area, that provide shelter and basic amenities to hikers, climbers, skiers. And this wider network of infrastructure will serve plateau of Sappada 2000, that show many potentials for these users. In summary, the key themes that shape this area of study are the Piave river branch, the Val Sesis Naturalistic Oasis, and the naturalistic system of Sappada 2000. These three areas significantly contribute to establishing the prominent “environmental axes” of Sappada. The potential for the community’s future lies within these three natural systems: the envisioned path involves strategically linking them with the town center and its associated services, along with the municipal and territorial infrastructure hubs.

Within a broader perspective, the Plan operates on two fronts: firstly, intervening within the three natural systems by structuring a mobility framework, with a specific focus on sustainable transportation and public transit services, and enhancing their utility through the addition of new service infrastructures. Secondly, efforts are directed towards fostering connections between the three overarching systems and the town center.

The first phase of the research allowed an analytical reading of the territory from multiple disciplinary viewpoints: from the geographical to the naturalistic-environmental dimension, from the historical-cultural to the socio-economic aspects. This initial phase was conducted parallel to the development process of the participatory Strategic Plan “Sappada/Plodn 2050,” undertaken by the administration in collaboration with ComPA FVG (a public body focused on strengthening the institutional, planning, organizational and management capacity of local authorities, bodies and of public companies in Friuli Venezia Giulia region), aimed at gathering input through open work tables involving citizens, local stakeholders, and external references. [4].



Fig. 2. Map of the Sappada territory with its three naturalistic macro-systems, Sappada, 2023 (image created by the research team and owned by the authors)



Fig. 3. The urban organization of Sappada along the east-west axis, parallel to the river Piave, Sappada, 2023 (image created by the research team and owned by the authors)

The elaboration of the general map of the river landscape, illustrating the overall state of existing elements, reaches a basic definition that includes, superimposed in layers, all the systems relevant to the park project: morphological, hydrogeological, and fluvial, both natural and anthropic. Alongside the research process, five thematic tables were organized in response to the aforementioned issues, conducted by the Municipality of Sappada with the University of Padua, enabling a better understanding of Sappada's critical issues and potentials through dialogue between citizens and experts, aiming for a more calibrated solution to the emerging problems. The role of the administration has been to participate without guiding the choices of local participants, but rather by introducing the issues discussed from time to time, contextualizing them within the social and political landscape of the community.

The thematic tables are integral to the understanding process of Sappada's territory and have been divided according to the different areas of interest indicated above. They also conclude the elaboration of the programmatic framework, aiming to obtain a concrete response to the critical issues raised for each theme, addressable and achievable over the next 10 to 20 years through properly planned interventions. Once the addresses and research topics have been collected and specifically identified, and subjected to content synthesis, the main macro-themes have been further explored, covering various territorial problems and potentials of Sappada on several fronts, to achieve their full recognition and development, leveraging their resources and opportunities.

For each macro-theme, cartographic elaborations have been identified to allow direct comparisons, seeking the broadest spatial understanding of the local reality, and to realize proposals that adequately meet the needs of the community and citizens of Sappada. Georeferenced files, photos, and images from municipal archives, including existing data in initiated and ongoing plans and projects over the past 20 years, have been collected for the construction of this diagnosis. To enable a direct comparison with research conducted in parallel, each macro-theme has been juxtaposed with analytical data on project initiatives emerging from discussion tables (Figs. 4, 5, 6).



Fig. 4. General map of the river Park of Piave with the three project focuses, Sappada, 2023 (image created by the research team and owned by the authors)



Fig. 5. General map of the Val Sesia Oasis with the four project focuses, Sappada, 2023 (image created by the research team and owned by the authors)



Fig. 6. General map of Sappada 2000 with the three project focuses, Sappada, 2023 (as above)

2.1 First Focus: Piave Park

This first focus, which frames an extension of about one kilometer, includes the access point to the Piave Park, the expansion of the craft area and the first thematic place represented by the vision of an Art Park.

The vision of an Art Park within a river basin, which provides for the semi-immersion of the stalls, guarantees an unprecedented type of tourist and cultural use. Within an aquatic dimension, the installations will take on a significant landscape value, which will create an authentic pole of cultural production capable of attracting new categories of users throughout the year.

The development of a linear park with specific functional areas, distributed throughout its extension, requires specific modular service blocks within the route, as indicators of a change in the landscape, capable of reverberating the material-environmental characteristics of the river landscape.

A second focus is dedicated to an eastern area along the Piave river, where will be possible to reach directly the river for bathing and walking.

A third focus is centered on food products coming from local agricultural activities, in connection with a previous dismissed military area.

This area was involved in a teaching activity in University of Ferrara since September 2022 to February 2023: students of 3rd year attending Master degree course on Architecture have developed architectural design exercises for the reuse of this area and its surroundings to get different scenarios, as outlined in a further chapter (Fig. 7).



Fig. 7. Art Park along Piave river. Axonometric view, Sappada, 2023 (image created by the research team and owned by the authors)

2.2 Second Focus: Val Sesis

The main element that characterizes the Nature Oasis of Val Sesis are the springs of the Piave River, as well as the river itself in its first stretch that descends with a torrential character until the height of Cima Sappada. It is precisely from this first village that a paved path starts, parallel to the riverbed that connects the town center to the springs, located at the foot of Mount Peralba.

The entire naturalistic compartment has an extraordinary landscape value that nevertheless presents few elements of tourist, recreational, receptive and cultural. The Piave springs themselves appear to be choked by parking lots, are barely visible, small in size and marked by a precarious arrangement of elements commemorative, protective, urban and landscaping totally inadequate to a monument with a very strong historical, cultural, symbolic and identity value for the entire nation.

The general project strategy begins with the intervention in the village of Cima Sappada, which is to be decongested from car traffic through a new parking area and

the activation of a public transport service by bus-shuttle that solves the connection with the springs, maintaining the stops in the intermediate shelters. A specific stop module is designed at these points, also equipped with support equipment for cyclists. Then there is the provision of some parking lots for all the periods in which the service of public transport is not provided. The intervention on the springs of the Piave River involves the complete redesign of the area to give a wider scope to the springs themselves, attempting to simultaneously restore dignity and sacredness to the site (Fig. 8).



Fig. 8. The new access and reorganization of the Piave springs. Axonometric view, Sappada, 2023 (image created by the research team and owned by the authors)

2.3 Third Focus: Sappada 2000

The naturalistic territory of Sappada 2000 limited to the peaks arranged on the northern side of Sappada, develops only at high altitudes, bordering to the north, along the crests of Monte Lastroni, with Austria, to the east with the first virgin stretch of the Piave river, to the west by the Monte Ferro line and to the south by the town of Sappada. The intervention envisaged in this naturalistic context must develop in a scenario of amplification of the offers inherent to the high altitude, admitted only by the elaboration and implementation of the strategy for connecting the historic center to Sappada 2000.

The general objective is to structure a program no longer based only on sport users, but extended and aimed at family groups, at children, therefore, at all those activities generated in the recreational-sports-excursion field (Fig. 9).

The first focus of the intervention envisages the restructuring of the Sappada 2000 refuge, through some interventions: a system of naturalistic residences, built on the same



Fig. 9. The new sports and recreational infrastructures of Sappada 2000. Axonometric view, Sappada, 2023 (image created by the research team and owned by the authors)

ridge, together with a covered observatory; new playground built on the natural slopes of the land, near the refuge itself; a zip-line with departure at high altitude and arrival at the valley station; a paragliding starting point, with dedicated platforms, built just east of the Chapel dedicated to the fallen soldiers in Russia.

The design of the new panoramic service module for the entire territory of Sappada 2000 is the result of a sophisticated thematic development, supported by a severe need for adaptability to the context, from a geological, structural, meteorological and, above all, identity point of view. It is a module that can be positioned in different points of the high-altitude region, a decision resulting from the desire to restore the extraordinary visual observation potential in some of these places, thus enhancing those naturally generated panoramic points.

3 Didactic Experience

The didactic experience conducted in the Design Studio 3 of the University of Ferrara, within the framework of the Master Degree Course in Architecture, focused on the adaptive reuse of the site of the former Alpine Barracks Fasil in Sappada (Fig. 10).

The Studio, structured into three ateliers, engaged 133 third-year Architecture students, organized into 39 design teams. These teams grappled with formulating a design approach that meticulously considered the urban and landscape configuration of the Sappada region. Under the guidance of 7 instructors, the projects were geared towards three primary functional scenarios: innovative tourist accommodations; educational facilities rooted in the region's excellence; pioneering residential and coworking spaces. The projects developed challenged the conventional approach to existing heritage, particularly the abandoned barracks building. These proposals presented design solutions where the interplay between the existing structure and the new intervention was encapsulated



Fig. 10. Exercise on adaptive reuse of former Alpine Barracks Fasil in Sappada. Model, Ferrara, 2023 (photo by Alessandro Tessari, owned by the author)

within two overarching morphological strategies: “inside” which focused on the barracks building itself and involved processes of addition and subtraction, and “outside” which focused on extensions and clusters of new buildings.

This didactic experience underscored the complexity in intervening within a multifaceted landscape, rich in identity, urban and architectural significance and memory. The multifarious nature of the solutions presented underscored the complex features of the site, offering a glimpse into a multitude of potential adaptive reuse scenarios.

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Architectural Design Studio: Embracing a Transdisciplinary Approach

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Abstract. The co-creation design studio at the Department of Architecture, University of Cyprus, has been acting as a meeting place for students, educators, researchers, citizens, and external stakeholders since 2021, aiming to bridge gaps between architectural research, pedagogy, civil society, and local governance bodies through a transdisciplinary pedagogical framework. Acknowledging that many societal challenges are complex and multifaceted and cannot be adequately addressed by any single discipline or sector alone, the studio focuses on the co-production of knowledge with stakeholders outside of academia. This entails involving them from the outset of the project as well as co-designing design activities and proposals that are relevant to their needs and interests, ensuring a grounded process in real-world challenges. The studio's pedagogical framework and methodology have been designed, implemented, and evaluated three times until now through participatory action research methodology, investigating the impact on the design result, the development of skills for the students, and their attitude towards their role as future professionals. The paper highlights the findings of these three years of research in a reflective way, suggesting future steps for improvement. Its long-term repetition will gradually build a knowledge base, aiming to revisit existing educational methods to respond to current and future challenges in an efficient and inclusive way.

Keywords: Architectural Design Studio · Transdisciplinarity · Community Engagement · Architectural Pedagogy · Architectural Research · Participatory Action Research

1 Introduction

1.1 Current Approaches to the Planning of Cities and Neighbourhoods

As cities around the world have been radically and continuously changing in response to diverse challenges, urban planning and city development need to evolve into complex and multidimensional processes that place urban resilience, social sustainability, and a sense of 'belonging' at the forefront. Understanding urban environments as places with different actors and stakeholders requires the collaborative involvement of many and diverse stakeholders in their design. Transdisciplinary cooperation in decision-making, co-creation approaches in the design process, as well as innovative initiatives regarding urban commons, city and neighborhood planning, appear to be more important than ever.

Urban resilience has become an important goal for cities, particularly in the face of contemporary challenges [1]; it has to do with recovering from crises and is directly related to the concept of sustainability, as the two concepts are recognized as interrelated, highlighting the potential to achieve sustainable urban development [2]. Social sustainability is acknowledged as an important part of sustainable development as a process that improves a community's quality of life [3], resulting in their happiness, security, health, and quality of life [4]. Social relationships and a sense of "belonging" are important factors in a community's social sustainability and resilience [5, 6], contributing to shared emotional connection through interaction with others, strong shared values, shared norms and codes [7, 8]. Educators, scholars, practitioners and activists among many others, have been highlighting inclusion and participation in the decision making and design processes regarding urban space, as a vital element towards achieving and sustaining urban resilience [9, 10]. This argument illustrates the importance of transdisciplinary approaches in knowledge production and of co-creation practices in the design of urban spaces.

Transdisciplinary and transdisciplinarity are relatively recent terms, meant to highlight the need to transcend disciplinary boundaries and create holistic problem-solving approaches for city planning through the combination knowledge, tools and methods stemming from both the academic and non-academic world [11]. A transdisciplinary approach supports bottom-up collaborations, and creates a nurturing environment for mutual learning and cross-pollination between different participants [12]. Such a setting is a prerequisite for a co-creation process to flourish. In urban planning, co-creation can be described as the last steps on Arnstein's ladder of participation, "delegated power" and "citizen control" [13]: co-creation is defined as a process where participants can have active and prominent decision-making roles, exhibiting traces of self-organisation, increased commitment and a sense of ownership of the process [14].

Recent research is exploring new methods of urban planning in which citizens and municipalities co-create new planning rules or collectively shape and prioritise actions related to urban space [15], as is the case of the Co-Cities initiative in Bologna, a co-governance scheme between citizens and municipal authorities that provides a transdisciplinary, co-creation framework for joint decision making in matters regarding the city's services, policies and spaces [16]. Such practices highlight a continuity in engagement and a level of delegation of power that are crucial in fostering a sense of ownership and belonging among citizens and community members, towards both the urban spaces, and the processes that shape them. Therefore, the urban commons paradigm becomes an increasingly relevant model for urban governance. The term urban commons refer to urban resources (commons) that are managed by their users collaboratively (commoners), through collectively agreed-upon rules in a non-profit-oriented way (commoning) [17]. As a co-governance model, the urban commons paradigm highlights the importance of redefining urban values in contemporary cities while, in parallel, helping to build creative and open processes that foster experimentation, collaborative knowledge production, and trust among those involved.

1.2 Architectural Research and Pedagogy Having a Social Impact

The need for continuous, inclusive, and pro-social practices in urban design, development, and governance should also be reflected in the way future design professionals, specifically architects, are trained. Consequently, the need for a more responsive architectural pedagogy raises questions about the relevance of knowledge and research in architecture as an educational discipline and as a profession [18]. The traditional role of the architect, as well as the knowledge and skills required of a future architect, are being called into question. According to academic Ashraf M. Salama [18], there should be a continuous focus on the skills required for successful practice by incorporating scenarios that involve real interaction with the everyday environment into architectural pedagogy programs to promote critical thinking. Various architectural educational methods focused on community engagement, situated learning, and transdisciplinarity are now at the center of discussion in this framework, supporting the student's active role in the process of learning [19]. Since the beginning of the 21st century, a wide range of different pedagogical architectural approaches and methodologies that propose the architectural design studio to be embedded in the real environment through a co-creation framework have been widely discussed, applied, and criticized, such as community design [20], "live projects" [21, 22], and "design-build projects" [23].

Moreover, universities have a civic responsibility to the cities of which they are a part, both in terms of sharing the expertise and knowledge they produce [24] and in terms of their role as "significant institutional actors" in urban development processes with great power and visibility [19]. Communities and universities, according to Sara and Jones [24], can develop a twoway collaboration between citizens, architects, students, and academics by co-creating new knowledge. This knowledge co-production makes the university "an urban agent with transformative potential for co-creating more sustainable, resilient communities" and has the potential to be transformative as the city and its residents become change agents for the institution.

In this framework, the co-creation studio at the Department of Architecture at the University of Cyprus (<https://www.instagram.com/cocreationstudio.ucy/>) was established and implemented in 2021 in an attempt to put a higher priority on social sustainability issues during the architectural design studio and systematize research and its relationship with pedagogy. It embraces a transdisciplinary framework and incorporates community-engaged approaches and situated learning. Simultaneously, it examines the impact of the approach through participatory action research and knowledge co-production with stakeholders outside of academia, linking research with teaching and learning. Since 2021, the studio has been implementing co-creation activities in three different Nicosia neighborhoods (Fig. 1).



Fig. 1. The design of a small public space in Mylou neighborhood in Latsia Municipality, (Work by Co-creation Studio UCY, 2022).

2 Methodology

In the execution of this research and the attainment of its objectives, Participatory Action Research (PAR) is employed. Its participatory nature allows all involved stakeholders, to actively contribute to knowledge production, and its cyclical development, characterized by iterative phases of planning, action, observation, and reflection that bridge theory with practice, fosters continuous improvement and change [25]. Educators-researchers engage in a form of “self-reflective teaching” with the overarching goal of fostering improvement and change [26]. The reflective framework and cyclical nature of continuous improvement and review establish meaningful connections between research findings and practical educational applications. The implementation of this research unfolds in three consecutive phases-cycles of exploration (2021–2023). Each phase-cycle is grounded in the theoretical framework and methodology of Urban Living Labs [27, 28], as well as in the iterative cycle of action research proposed by Kemmis and McTaggart [29], consisting of four main stages: framework design, implementation, co-evaluation, and reflection and re-design (Fig. 2). Anything occurring during the framework implementation is fluid, non-linear, and susceptible to changes, primarily following a non-linear three-stage process without clear boundaries: a) Co-identification stage: Co-assessing and understanding the existing situation, identifying issues or needs; b) Co-creation stage: Co-development and co-selection of solutions and scenarios; c) Co-design and implementation stage: Implementation of the optimal solutions are implemented in the agreed form, scale, and degree of implementation.

The first phase of research is embedded in the 2nd-year architectural design studio at the University of Cyprus during the Spring Semester of 2021, involving 28 s-year architecture students. Due to the COVID-19 pandemic, the studio is exclusively conducted online. The thematic focus centers on contemporary living concepts, including “collective housing,” “cohabitation,” and “sharing,” explored in Pallouriotissa, Nicosia. The second phase unfolds in the Spring Semester of 2022, with 30 s-year students and a summer workshop in June 2022 involving 32 participants. The emphasis remains on

“collective housing” and “sharing” in residential and public spaces. Students are tasked with designing collective housing forms in specific plots within a Latsia Municipality neighborhood, Nicosia, near a small public space. Detailed planning of the public space occurs during the summer workshop, alongside the implementation and evaluation of specific constructions with the support of the University of Cyprus Fab Lab. In the third phase, during the Spring Semester of 2023, 29 s-year students participate. Concurrently, a Spring course engages 20 students (third-year and fourth-year). This phase critically explores “collective housing” and “sharing” within the neighborhood, examining the school’s role and its relationship with housing in Latsia Municipality, Nicosia, adjacent to the Latsia Lyceum. Parallel groups in the studio develop ideas for collective housing, while the students of the parallel course are tasked to design a structure in the schoolyard as a connecting link with the neighborhood. Both courses are followed by a summer workshop in June 2023, involving 21 participants, implementing one of the proposals for construction in the schoolyard with the assistance of the University of Cyprus Fab Lab.

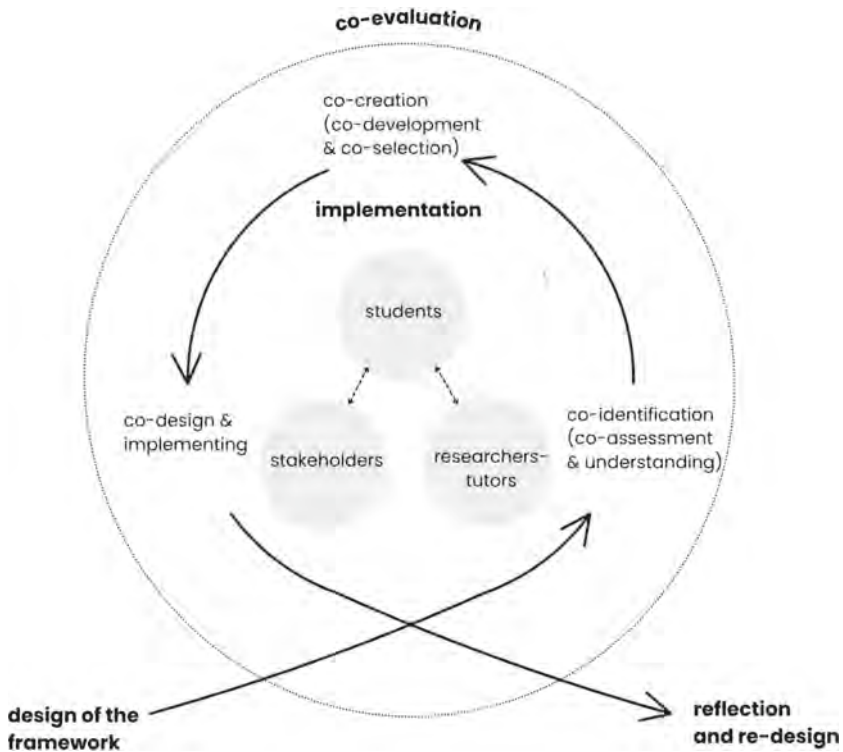


Fig. 2. The circular methodology of the Co-creation Studio, consisting of four phases: design, implementation, co-evaluation, reflection, and re-design (© Panayi Christina, UCY Library, 2023).

Co-evaluation and reflection process takes place simultaneously with the implementation and is structured around three key axes: a) evaluation of the structure and

methodology of the studio as a teaching and learning process and a co-creation process; b) evaluation of the impact of the pedagogical approach on the students (skill development, learning outcomes, motivations, experiences, attitude towards their future professional role) and the design outcome; c) evaluation of participatory action research as a methodology for co-creation of knowledge. Data collection and analysis aims at yielding insights into the entire co-creation process, its effects on the various stakeholders involved, and the overall effectiveness of the pedagogical framework. The co-evaluation process involves data collection from the educators-researchers, students, and other stakeholders (e.g., citizens). Students participate in focused group discussions held at specific moments during the process to capture emotions, thoughts, and informal opinions. They are also required to respond to specific questionnaires, typically before and after each course, focusing on their motivations, experiences, roles in the process, self-reflection of the design outcome, skill development, and achievement of learning outcomes. Students also take part in semi-structured interviews, primarily consisting of open-ended questions, aiming to record emotions and spontaneous reactions. During the interviews, they are asked to comment on their overall experience, the design outcome, their gains, recommendations for future improvements regarding the learning process, and their general thoughts and ideas. The educators-researchers continually monitor the process to document students' spontaneous behaviors and reactions, collecting data through observation and recording them in a reflective diary. Additionally, continuous evaluation of the design outcomes delivered by students occurs through individual tasks and presentations at regular intervals. Lastly, the participating stakeholders are interviewed, expressing their opinions on their experience and gains and evaluating their involvement in the process. They also play an active role in assessing the design outcome through interviews and their participation in intermediate or final presentations.

Both the data collection tools and the overall process of co-evaluation are adapted to each semester's program, learning objectives, and the students' potential. The validity of the data is ensured to a considerable extent through triangulation, both in terms of using different tools and collecting data from different sources. The data are qualitatively analyzing, aiming to identify common elements within each of the three axes. After the second year of implementation, to confirm hypotheses and identify any recurring patterns over the years, the analysis also aims to find horizontal connections and correlations between the years in each axis. Finally, the analysis method also aims to identify correlations between the three axes.

3 Co-creating Knowledge Over These Three years of Research

Several outcomes about the co-creation framework as a participation, teaching, and learning process, its impact on students, and the design result(s) have emerged incrementally over the three years of research, with the process being updated through improvement actions from year to year. The outcomes of 2023 are still ongoing and have not been completed. Some of the most important ones are summarized below, concerning students' attitudes toward their role as future architects, their perspectives on urban commons and architecture's social responsibility, their gains and motivation, as well as the researcher's/tutor's role.

Students' exposure to real-life settings and engagement with other people enabled them to explore their role in a diverse team and view negotiation and conflict as opportunities for productive and fruitful discussion. Throughout the process, students often changed their roles, from passive listeners to discussants, leaders, and negotiators, learning to use arguments to defend their point of view. They also started to explore the multiplicity of the roles of the professional (architect, urban planner), understanding the complexity of urban environments and urban actors. Interestingly, when students were asked about how they perceive the role of the architect in contemporary urban processes and consequently their own role as future professionals, the answers varied considerably. Several students viewed the architect as needing to have a central role in the design process(es), leading the discussions and developing the design vision based on the input from prospective users. Others perceive the architect's role as that of a mediator, someone who facilitates the design and co-creation processes and is in continuous negotiation with the involved stakeholders. Few saw the role of the architect as that of an ally to local communities, emphasizing the importance of enabling community-engaged or community-initiated processes and mildly highlighting the political aspect of a co-created urban development (Fig. 3).



Fig. 3. Designing and implementing a meeting place in Latsia High School yard (Photos by Effrosyni Roussou, 2023).

Regarding urban commons, the majority of the participating students stated that they recognise their value as a way to counter the high individualisation of contemporary societies. They regard positively the potential of the urban commons to foster social and environmental values as well as create mutual learning hubs for communities. Their own role, as many of the students highlighted, is to be active both as citizens and architects and act as “a unifying force” between the various stakeholders.

From 2022 onward, additional (optional) design and build activities were introduced as intensive summer workshops, the built outcomes of which would then be handed over to the communities that participated in their conceptualisation during the semester.

Through these activities, students were exposed to the complicated world of architecture's interdependencies; from material costs and delivery times to navigating design for 1:1 scale, they were able to realize the complex and volatile chain of actions necessary to transition from paper to reality. Through hands-on, building activities, they were able to empathize with and acknowledge the contribution of those involved in a construction process (construction workers, engineers, material suppliers, etc.), have increased commitment in the process, and exhibit aspects of increased collaboration, communication, and self-organization, anchored in the belief that they are working on something meaningful but also in the joy stemming from playful creation.

Regarding the researcher's/ tutor's role, the inherent reflexivity of the action research process and, in this case, the double role of educators as researchers led to personal changes, re-evaluations of the individual pedagogical practices, and positioning towards the students, as well as -ultimately- to personal growth. The tutor's role is thus under question in terms of how intrusive it can be, the amount of advice or support it can provide, and the ways that reviewing and assessment can take place in such a co-creative approach.

4 Discussion

Live pedagogies offer the opportunity to transcend the boundaries of the classrooms and consequently reconfigure the predefined hierarchies of teacher-student. In processes of co-creation and design and build, the clear boundaries between learner and teacher, as well as the clearly defined "roles" and behavioral "etiquette", are more easily blurred. This allows for instances of informality and sharing to permeate the process, which create bonds of trust and cooperation and ultimately engage both students and tutors as whole-people in a nurturing and caring learning environment. The disparity in the students' responses in regards to their perception of the role of the architect in contemporary urban development processes is indicative of the limits of "isolated" pedagogical efforts. In order for meaningful and profound change to occur in students' attitudes and perceptions, one course or studio will likely not be enough. What is needed is broader collaboration between the teaching staff, aligning agendas and complementing topics and methodologies, as well as collectively trying to expand beyond disciplinary boundaries both academic and non-academic partners.

Finally, architecture schools need to become active stakeholders and actors in urban processes as hubs of knowledge and experimentation that open up new possibilities and visions. Both research and pedagogy can and should have a tangible social impact that is substantial for communities and people. The social and political dimensions of architecture should be at the forefront, highlighting the need for a socially sustainable, community-engaged and politically aware design practice that could counteract the deregulatory dominance of the global market. In this manner, the participation of communities and actors beyond academia in architectural research and pedagogy is significant, involving civil society in conceptualizing and structuring the research process and knowledge co-production. Establishing and maintaining long-term relationships between academic institutions, governing organizations, and civil society for urban decision-making can be transformative for all participants and the city, cultivating a

sense of responsibility for urban living environments. Thus, the city may be viewed as a change agent for the university (research and education), while the university can be viewed as a change agent for the city [24].

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Mountains in Motion, Visions in Nutshells. The Alpine Way for Common Living

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Abstract. Architectural research is defined as community practice and for communities. Architecture has always been constituted as an action of territorial settlement and domestication for the community liveability of places.

This article, referring to the concepts of resilience and transformability of mountain systems, proposes to reflect on how rural mountain areas have always been able to adapt to changes thanks to the ability of communities to conceive common and shared design directions.

The paper reflects on the conceptualization of commons and how they can be a model for resilient development in socially inclusive contexts. For this reason, an extensive review of historical palimpsests was conducted to understand how to start from the roots of the operating models.

The article includes a field approach in Trentino's valleys. The results are exploratory, as the process cannot be concluded and requires a long time for validation. From it, some working hypotheses are derived to be explored in further studies, such as reintroducing the commons into projects and societies in transformation.

Architectural research in these contexts contributes to orienting knowledge through fundamental collaboration with other disciplines, which is helpful in defining regenerative processes consistent with specific environmental contexts.

Keywords: Regeneration · Commons · Community engagement · Alpine region · Trentino cultural landscape

1 Domesticated Mountains

The mountains result from a lengthy process of human domestication aimed at rendering them inhabitable.

This adaptation is closely tied to the various forms of exploitation that have emerged from the study of the knowledge of these spaces, with their inherent natural and environmental characteristics. In this regard, collective practices have fostered a transformative relationship between architecture, landscape, and community actions within these mountainous territories. In this line, the value of the mountains lies in their capacity for self-regeneration, and today, the existing connection with the local community remains a foundational practice that imbues these places with meaning, transforming them through new relationships (Fig. 1).



Fig. 1. Abandoned Masi in Celado, Tesino Valley (TN) (©Tognon 2023)

The paper focuses on the ongoing research¹ which deals with understanding how new regenerative possibilities on the mountain's territories emerge from the interaction of ecological, cultural, and social criteria that underlie mountain civilization and appear to be fundamental to living and producing in the mountains and, therefore, non-negotiable. Envisioning a future for mountains means basing it on the reestablishment of a strong relationship between communities and the land by integrating what Pazzagli refers to as the three "P's": "landscape," "villages," and "products," which are endogenous elements for the long-term care of the area. It is necessary to direct the narrative towards a conscious appreciation of the territory, investigating and emphasizing latent knowledge capable of including the individual, uniting the community, generating sustainable economies, and reconstructing a history while containing the future one. In this perspective, the concept of "fragility" [1] as a lens for examining the territory seeks to explore the specificities that can be related not only from a natural perspective but also from a social, economic, and architectural standpoint.

The research focuses on the alpine region, a "unique region at the center of Europe" [2], to which special attention must be paid. Operating in a design logic on these territories, it is not necessary to limit to a national perspective, but it is essential to think of the territory in a transnational key [3] since the Alpine territories belong to the same mountain range, although with their regional peculiarities. Moreover, the Alps geographically range from high snowy peaks to the sea, resulting in a rich complexity of interconnected variables: different topographies or orographic masses, variations in the shapes and environmental conditions, and unique conditions imposed by life [4]. Overlapping with these geographical components is the immaterial aspect defined by their close relationship with humanity.

2 Alps, Common Ground

As Ferrari [5] states, defining the Alps could even lead to tautology: the mountain is what is perceived as such. In other words, the mountain is perception and representation and what we perceive in our minds through our eyes. How to view the Alps is a complex

theme that has evolved over the years because it encapsulates the ability to create a mental geography that transcends the physical aspect. The changes in perceptual direction have portrayed them in muted ways over the years: from inhospitable places inhabited by wilderness communities to valleys as romantic expressions of a new Arcadia for regenerating city dwellers, from John Ruskin's "cathedrals of the earth" for explorers, to playful places with ski total resorts [6]. Even today, the challenge lies in the multiplicity of perspectives from which we view the Alps. Nevertheless, it is essential to understand the implications these interpretations have on the physical landscapes and the future. In this context, the Alps should be recognized as having an intrinsic value that goes beyond economic considerations [5] while avoiding falling into an ideologically driven environmentalism that disregards the necessary balances for human life in a region that has been historically influenced by human activity.

Humans in the Alps should be seen as active participants in the natural balance, historically shaping and preserving this equilibrium. The Alps could be described as an anthropogeographical landscape, the result of millennia of gradual transformations. Initially, the Alps were covered with dense and almost impenetrable forests up to high altitudes, while the extensive and flat valley bottoms were often marshy, threatened by floods, and only passable and usable during dry seasons [7]. Only the alpine meadows above the tree line were suitable for immediate exploitation, albeit to a limited extent.

To establish permanent settlements in this region, humans had to intervene in the ecosystems and transform them according to their needs, shaping the alpine region as an architecture.

2.1 The Vertical Dimension

The alpine territory, analyzed systemically for design purposes, should be scanned and considered not only in the horizontal connection of valley systems but mainly in the vertical relationship between bottom valleys and peaks. The vertical component leads to reading the valley system as a tomographic series of cross-sections. This analytical, interpretive key stems from the vertical structure of the valleys, which required the inhabitants to cope with natural catastrophic events that threatened settlements both downstream and upstream. This made settling the land and its use for people's livelihoods challenging. Nonetheless, human interventions also took the form of modifying plant species and individual ecosystems, as well as landscape structuring to mitigate the discontinuous dynamics of natural risks into more manageable and controllable events.

In a general sense, according to Bätzing [2], the transformation of the Alpine ecosystem can be categorized into three levels of interventions: (a) creation of the Alpine pastureland - expanding pastures through clearing and transforming vegetation cover via deforestation, and other related activities; (b) creation of valley farmland - clearing and cultivating land in the valley areas; (c) reclamation and clearing of large valley bottoms. This involved drainage and clearance of extensive low-lying valley areas. These actions led to the development of an architectural landscape, the signs and features of which can still be observed today [2: 111–126].

This type of landscape is an ideal vertical section, which reflects the construction of an artificial space divided into three parts to make it habitable. This scenery is referred to a cultural (or anthropized) environment and is situated alongside the natural land

in dynamic and intermediate stages, and it is often described as a “semi-natural” or a “semi-cultural” landscape. Aligning with Bätzing’s definition, the “cultural landscape” is understood as an area in which human activities have shaped the natural ecosystem in such a way that an ecosystem has replaced it with a cultural imprint. The stability of this new ecosystem is now the responsibility of humans, as the new ecosystem is not inherently stable [2: 117].

This landscape was also shaped by a collective management model, which has been fundamental in caring for the territory in the Alps by land (agricultural, pastures, forests) and maintaining the built environment associated with them. As already highlighted, the regulation of the mountain territories is an ancient process that began around the XII Century in the Alpine region, where ecological and social systems have historically co-evolved and become deeply rooted [8, 9]. Traditionally, highland areas have been regulated by “civic use”, and these models of collective management [10] were developed to address local populations’ need to manage resource scarcity autonomously and collectively. They created specific norms of land use to ensure their livelihoods while maintaining a balance between productive activities and environmental preservation.

From a spatial perspective, it is interesting to note how these management models have been physically translated into spatial contexts and, consequently, into environmental and social palimpsests deeply ingrained in local traditions [11]. We highlight that preserving these practices has facilitated the care of the material and immaterial cultural heritage over time.

The model continues to serve as an essential historical and cultural framework for local development in mountain regions [12]. Indeed, within the context of mountain societies and ecosystems’ changes and management challenges today, commons represent unique habitats. They warrant not only in preserving traditional knowledge but also in upholding ecological resources and in their ability to anticipate future scenarios.

2.2 Rural Commons, the Palimpsest of the Alps

The cultural relevance of this approach to territorial management for the Alps also reverberates in contemporary principles of local administration. In fact, within the evolving concept of economic development, “commons” have established themselves as foundational areas of interest, defined as “sustainable local economies” [13].

In the ongoing research we consider commons not as a mere subsistence economy but rather as a rational mode of resource management and utilization [14], where the use of local natural resources, combined with a system of mutual management, enables the creation and survival of communities even in challenging and isolated territories [15]. The “Regole” [16] created a connection between the collective of inhabitants, known as “vicini”, and the territory on which they lived. This regulation established a link between people and territory (understood as a natural reality), the assembly of household heads, and individual local entities within the broader valley context. The purpose of the administration under these regulations was to control the standardized exploitation of common lands and safeguard small private holdings, referred to as “divisi”.

Over the years, the methods of utilizing natural resources, based on communal use of common assets, have remained essentially unchanged. Cultivable plots of land belonged to families, although even privately defined areas of cultivated fields could be subject to

limitations in favor of the community. According to Nequirito[16], analyzing the community's territory, four distinct levels are structured. (a) The village represents the private side of each family unit and worked as core of the housing area. (b) Cultivated lands, typically located near the inhabited centers, consisted of fields and meadows defined by hedges, fences, or dry-stone walls. The route is allowed during unproductive seasons for all the community. (c) Forests: broadleaf forests were situated in areas bordering the village settlements and were used for firewood. Meanwhile, coniferous forests at higher altitudes provided timber for trade. (d) Pasturelands were collectively exploited at various altitudes and utilized according to the seasons. They were overseen by common huts ("malghe"), where those appointed by the community, including herdsman and shepherds, produced milk from flocks or herds brought to pasture. (Fig. 2).

In addition, the infrastructure of the territory was structured, and the water system was planned by the community, which were involved maintaining canals and embankments, monitoring the purity of water sources, regulating water flow, and managing its use through mills and sawmills, among other facilities. The road system was also a matter of mandatory contributions from the community or those with property along the roads. The "regola" defined specific control regulations and imposed strict penalties for those who damaged public roads and places. Additionally, essential activities such as butchery or baking, as well as specific aspects related to religious life regulations, were governed and managed by the "Carte di Regola" (trad. Regulation Charters).

The long life of these "regole" has left visible traces in various Alpine areas. The forms of land use for silvo-pastoral assets are reflected today in the toponymic heritage of places, a reminder of ancient customs and methods of using Alpine resources. This historical legacy is also visible in the landscape's configuration and the enduring institutions.

The Trentino case

The two autonomous Italian provinces of Trentino and South Tyrol are a peculiar case in the Italian Alps, since historically encompass the highest number of collectively managed lands, covering a significant percentage of their territory [14]. Together the provinces create a region where the concept of "common good" has been expanded not only to material assets, but also to a substrate of traditions and practices of intangible heritage.

Looking specifically to Trentino, the commons as management model are still strongly present in several valleys (e.g., Magnifica Comunità of Val di Fiemme, Regola of Spinale and Manez, etc.), defining a model of virtuous land management, but also identifying a community closely linked by a strong sense of identity with the land in which they live over generations [17].

As profit motives did not drive these communities, all proceeds were reinvested for the benefit of the territory, with fair resource distribution. Due to their ability to self-regulate, these local communities have achieved a degree of autonomy, which still reflects in local autonomy of Trentino South Tyrol. Over the past 60 years, both the Autonomous Provinces have invested in policies to preserve the social and cultural fabric and safeguard natural resources [18]. They recognize the intangible value of collective institutions, which play a fundamental role in shaping the landscape [19]. In accordance with this, the legacy of the collective management model is still prominently evident in a

participatory planning approach involving the local community, predominantly indigenous, who can identify with the region's agricultural and production systems. An illustrative example is the presence of cooperatives for community production of goods (e.g., Melinda, Mezzacorona, Famiglia Cooperativa, etc.), which are a manifestation of this cultural heritage.

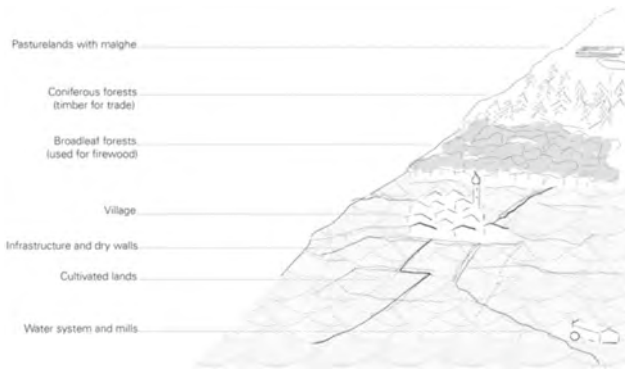


Fig. 2. The sketch translates into imagery the analyses that Nequirito has read regarding the subdivision of the community's territory into four levels, elements, and infrastructure (©Tognon 2023)

3 The Community as the Driving Force of Territorial Development

As illustrated in the previous chapters, communities have long been the driving force behind the domestication of complex regions such as mountainous areas. Therefore, even today, when architects and researchers investigate how these territories can be resilient and capable of meeting the challenges related to climate change and ecological transition through innovative approaches, it is essential to understand how communities traditionally found internal solutions to ensure their adaptability.

Over the past three years of research on mountainous areas, particularly in the Trentino province, we highlighted how architecture, in its dual form of discipline and utility, becomes a conspicuous part of the “solid memory”, which becomes a tool for understanding how to operate in a regenerative manner. From this perspective, architectural research, thanks to the multiplicity of its meanings, works in the present, establishing a systemic relationship between the territory and the community, which is seen as a driving element. This becomes an essential combination for transmitting values from one generation to the next and is crucial in regeneration processes.

As discussed in the previous chapters, through the analysis of the historical significance of collective properties in Trentino, the Separate Administrations of Civic Use (ASUC) are today considered the heirs of the ancient rights exercised over the territory by rural or village communities since their origins. However, it is difficult, except in a few cases, to reconstruct their history philologically due to various political and

administrative upheavals. Indeed, apart from well-known cases such as the Magnifica comunità della Val di Fiemme, Regola Feudale di Predazzo, and Regola di Spinale e Manez, which have survived over time, most collective properties have been lost along with their archives too. Their gradual disappearance is linked to political changes from the enlightened absolutism of the XIX Century through the despotisms of the fascist period. Subsequently, the first ASUCs were established within the municipalities, and over time, they multiplied and are now unevenly distributed across the provincial territory (numerous in Val di Sole, almost absent in the Valsugana land).

As reflected in the temporal analyses carried out on certain valleys², the survival or demise of collective properties also reflects the care they exercised in maintaining the territory. Signs such as spontaneous reforestation, the loss of pastures, the thickening of forests, and the disappearance of profitable trees such as chestnut groves, are indicative of the broader trend of abandoning productive mountain areas. Conversely, it is evident that the presence of collective properties serves as an irreducible stronghold that cares for and preserves the land. However, we can assert that, although the model of collective resource management has been deeply rooted in the Alpine region, current socioeconomic changes are challenging how resources are conceived, utilized, and managed by communities, as well as the very concept of community as a reference for a collective resource. As Della Torre et al. ii [20] point out, few studies have focused on the transformation and adaptation to ongoing changes, such as the gradual penetration of global economic and demographic megatrends at the local level, to decode the new tension between community needs and societal demands.

However, among the initial outcomes of the studies conducted on the territory, it is essential to acknowledge that there is a particularly fervent vitality within valley communities to implement “bottom-up” actions toward regeneration processes, as stands in chapter 2.2. These initiatives are promoted by the commitment of administrations, decision-makers, and stakeholders (valley communities, tourism boards, etc.), who actively involve the community in defining future visions.

The methodologies adopted during the community engagement processes since 2022³ range from “visioning” to “capacity building”. This alternative depends on the objectives set by the project leaders and the collaboration approaches with varied communities from different backgrounds. The translation of ideas into tangible, spatial, or directive results is always entrusted to specialized external mediators (research centers, universities, specialized companies). Using various tools such as brainstorming sessions, workshops, debates, interviews, drawings, and keywords, whose outcomes have been recorded and translated into mappings, the bottom-up process requires a varying degree of community engagement. Additionally, the translation of stimuli from fragments into a coherent system of actions and spaces requires several months of evolution, while a series of follow-up meetings with the community integrates the visions for the territory.

Indeed, the aim of the engagements is to establish a conscious connectivity between the community and the territory through a guided questioning of the current state, with the goals of viewing the territory from innovative and holistic perspective. This involves identifying the needs of the community, as well as preserving biodiversity and safeguarding the cultural heritage and the identity value of the places.

Within this experimental framework, ongoing research considers the model of “commons” as collective practices and strategies of care that can aid in the revitalization and enhancement of the territory and its resources, deemed important by a community of people. The fundamentals are the “community” that recognizes certain “common goods”, both tangible and intangible, which are collectively understood through actions and agreements of “ommuning,” where rules are established by the community for the collective management of the good [21]. In this way, especially in contexts often considered marginal, the commons promote the enhancement of tangible and intangible heritage, triggering transformative capacities through social innovation actions, space regeneration projects, and measures to counter abandonment at various scales, as well as fostering diversified economies.

3.1 Two Experiments in the Trentino Context

The application to the Trentino case has allowed work over the past two years on a territory characterized by a completely mountainous landscape⁴. The urban areas of Trento are matched by peri-urban areas, regions with significant infrastructure (Valsugana), areas with intensive tourism (Val di Sole), and areas impacted by intensive monoculture (Piana Rotaliana Königsberg). Despite their diverse characteristics, these zones share the feature of being in an Italian Alpine region, peripheral to main urban centers and interconnective nodes, and characterized by small-scale planning.

A consideration of the participatory design activities underway highlights the significant European interest in creating resilient communities through bottom-up actions.

This paper selects the pan-European project SATURN [22] which aimed to explore the value of the landscape in the context of three European regions (Italy, United Kingdom, Sweden) and to create tools and methods to support places pursuing climate resilience. In the Italian context, the case studies are developed in three areas of Trentino (Pergine, Valle dell’Adige, Arco). Fostering on the success of the SATURN approach, several other experiments have been conducted in various areas of the province of Trento, including the “Participatory Pathway for Creating a 2050 Vision for Borgo Valsugana” (February 2022). The team consisted mainly of experts who had participated in the SATURN project, using the “vision” method as a participatory and co-creation tool. Through a multi-phase participatory process, the goal was to develop solutions to improve specific areas of the Borgo in Valsugana territory, reducing negative impacts and increasing the overall well-being of residents and visitors (considering the impact of Arte Sella). The “vision” tool proved effective in involving local stakeholders in the development of policies and actions for territorial or strategic planning. However, at the time of writing, it is still unclear what the concrete impacts on pragmatic administrative planning have been.

A second case study is currently being tested in the Piana Rotaliana Königsberg area, where the tourism consortium began a series of workshops in 2021 (with various monthly follow-ups), coordinated by an external consulting agency. Specialists from different sectors (agricultural, tourism, entrepreneurs,...) and associations were invited to work together. The goal is to build coordination among the various individual needs, envision a sustainable and “beautiful” future for the “wine garden of Europe” through

the development of innovative ideas. For this reason, with the association of Politecnico di Milano (DASStU), the project was presented in Brussels and partaken in the NEB Festival [23] fully embracing the three pillars: “sustainability,” from climate goals to circularity, zero pollution, and biodiversity; “aesthetics,” quality of experience and style beyond functionality; “inclusion,” from valuing diversity to securing accessibility and affordability. In this latter case, the process is ongoing, and it is not yet possible to provide an initial assessment. However, the multidisciplinary nature of the three partners (Politecnico di Milano – DASStU, Fondazione E. Mach CTT, PRK Tourism Consortium) allows for constant consideration on the objectives set for the next three years.

4 Consideration

As previously noted, the limited time available for leading community engagement experiences does not currently allow for testing their efficiency in terms of their decline rate. However, when compared with the historical model of commons, it is already possible to recognize how the activation of a shared and inclusive design process contributes to the construction or reinforcement of identities, reinterpreting territorial values. By starting from the (even latent) resources already present in the territory, possible alternative futures can be imagined, protecting the collective interest. Furthermore, in the creation of “communities of communities”, it is also possible to reflect on the complex interdependencies between rural and urban areas and to negotiate forms of hybrid coexistence between humans and nature that respond more effectively and resiliently to current challenges.

Moreover, the motivation to include these projects within European research and the interest shown by Europe ensure the broad scope that alliances and network building can create through fruitful collaborations with territories facing similar challenges and finding common solutions. By recognizing these interdependencies, communities and commons can become catalysts for a concrete and feasible alternative for territorial management and governance.

Notes

1. This paper presents some experiences that were conducted by the authors in the field as research fellow for the Territorial Fragilities Project [2018–2022] at DASStU “Departments of Excellence” (L. 232/2016), Ministry of University and Research (MIUR); as Assistant Professor (RTDa), DASStU, Department of Excellence 2023–2027 (MUR); as Associate Researcher [2022–2026] at LabiSAlp USI Mendrisio (CH), with a research project titled “Rural Commons, Spatial Relationships, and Memory in the Contemporary Alpine Landscape: The Trentino Case”.
2. The analyses conducted are part of the research at LabiSAlp and the Politecnico di Milano, specifically focusing on two areas (Adige Valley and Valsugana) between 2022–2023. These analyses involved comparing historical archive maps with the evolution of orthophotos between 1972 and 2015, aiming to assess the permanence and mutations in the territory over time.

3. Projects with communities have been carried out in different valleys and municipalities located at altitudes with peculiar environmental characteristics and economies. These include Val di Sole, Valsugana, Valle dell'Adige, Piana Rotaliana Königsberg.
4. The classification by degree of mountainousness, which provides for the subdivision of municipalities into "totally mountainous," "partially mountainous," and "non-mountainous," is the outcome of the application of Article 1 of Law 991/1952 - Determination of mountain territories. This classification was transmitted to Istat by UNCEM.

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Research on Environmental Perception and Preferences of Traditional Villages from the Perspective of Local Gaze: A Chinese Case Study

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Abstract. The advent of mass tourism has endowed traditional villages with multiple identities as heritage sites, communities, and tourist attractions. As hosts, local villagers have begun to introspect and reevaluate the village environment that was once a part of their everyday landscape, giving rise to new spatial perceptions. As the primary stakeholders in village communities, indigenous inhabitants' perceptions, preferences, and identifications with village spaces hold significant significance in preserving rural characteristics and sustaining village vitality. Using Hongkeng Village in southwest Fujian Province, China, as a case study, this study investigated local villagers' perception of traditional village daily life space and activity paths from three dimensions: cultural cognition, emotional preference, and behavioral activities through observation, questionnaire surveys, and cognitive maps. The results show that villagers generally have high cognitive and low emotional perceptions of the exhibition space and the former staging space; they have high emotional perceptions of the neighborhood interaction space and the collective memory place; the activity path spreads from home to the surrounding area, and there are gender differences in the scope of activities. The study suggests that the development of the tourism industry has often overlooked historical context and the spirit of places. It emphasizes the need to rekindle the identity of "home" within the Tulou clusters of Hongkeng Village while maintaining a balanced distribution of public facilities and enriching residents' leisure lives. This study is expected to provide insights for improving the living environment of tourism-oriented villages in China.

Keywords: Traditional Villages · Local Gaze · Environmental Perception · Villagers · Cognitive Mapping

1 Introduction

In recent years, an increasing number of traditional Chinese villages have adopted a coexistence model of heritage conservation and tourism development, gradually evolving into popular tourist destinations. However, behind this tourism boom, it is essential

to recognize that traditional villages, despite assuming the roles of tourist attractions and heritage sites, fundamentally remain crucial communities for local residents' residence, production, and daily life, and the agency of indigenous inhabitants should be emphasized. Prior to the influx of tourists, the landscapes of traditional villages were often overlooked by villagers due to their everyday familiarity. Nevertheless, with the arrival of mass tourists, villagers have begun to retrospect and reevaluate the once-overlooked village landscapes, giving rise to new spatial perceptions. How to start from the perspective of the villagers' main body to evaluate the current use of the village environment and improve the quality of the village habitat is an issue worth studying at this stage. Given this context, this paper selects Hongkeng Village in southwestern Fujian, China, as the research subject. Established approximately 500 years ago and home to numerous well-preserved Tulou buildings, the village was inscribed as a World Cultural Heritage Site in 2008 [1]. It has since adopted a development model that simultaneously emphasizes heritage conservation and tourism development, serving as a quintessential example of tourism-oriented villages in China. This study combines survey questionnaires and cognitive mapping to explore local residents' perceptions and preferences of the village space.

2 Theoretical Foundation

2.1 The Theory of Local Gaze

In 2006, Israeli scholar Darya Maoz introduced the concept of the "local gaze", building upon the theory of the "tourist gaze" proposed by British sociologist John Urry [2], which shifted the focus from tourists to local residents [3] 2. It can be understood as follows: in the process of tourism development, local inhabitants typically consider the natural and cultural landscapes of their region as ordinary facets of daily life. However, with the continuous influx of tourists who identify with these local landscapes, local residents often begin to reevaluate their own environment [4]. Under the tourist gaze, local hosts present their culture, including their own identities, as commodities showcased to tourists, leading to a certain degree of "Staged Authenticity" in the social living spaces of the local hosts. The "front stage" of a tourist destination refers to the space for local exhibitions and performances to promote local economic development, while "the back stage" refers to the cultural reserve, i.e. the space for indigenous culture [5, 6]. On this basis, Yang proposed a transitional "curtain zone" as a cultural buffer between the front stage and the back stage [7]. Today, the "gaze theory" has gradually evolved into a prominent analytical tool that finds widespread application in various research domains [8–10].

2.2 The Theory of Environmental Perception

Environmental perception refers to individuals' recognition and understanding of their surroundings, encompassing their inner representations or cognitions of structures, entities, and spatial relationships within an environment [11]. As people enter a traditional village, they will establish subjective judgments and evaluations about the environment

and spatial features of the village through cognitive information and decide their own behavior in the space. The primary research methods for studying environmental perception include the semantic differential method and cognitive mapping, with the latter first applied by American urban planning expert Kevin Lynch [12, 13]. Research on environmental perception covers a diverse range of subjects, from macro-level urban conglomerates to micro-level individual village spaces [14]. Research subjects have primarily focused on tourists [15], while studies on the spatial perception of local residents have often revolved around spatial transformations and identity identification [16, 17]. In conclusion, there remains a need to further explore research related to the environmental perception of traditional village residents, taking the perspective of the local gaze, and placing villagers as the primary subjects of investigation.

3 Selection of the Case Study Site

Situated in the southwestern part of Fujian Province, China, Hongkeng Village boasts a substantial number of Tulou buildings, characterized by their historical significance and well-preserved state. In 2008, this village was inscribed as a UNESCO World Heritage Site. Subsequently, it adopted a development model that combines heritage conservation with tourism development. As a result, the tourism industry in the village has experienced rapid growth, leading to its recognition as a 5A-level national tourist attraction in China in 2011 [1]. However, this development has also brought about challenges, including the transformation of living space into consumption space and the difficulty in maintaining the original authenticity of the village, and the villagers’ feelings towards the village have also undergone subtle changes. Therefore, using this village as a research case on the environmental perception problem of traditional villages is highly representative.



Fig. 1. Site Plan and Key Nodal Spaces of Hongkeng Village (Source: photos by the authors)

Hongkeng Village stretches along a river, featuring a narrow and elongated layout. The villagers used to take the Lin Family Temple as the center point, dividing the village into two parts, the upper village and the lower village (Fig. 1). The most famous one in the village is the cluster of Tulou buildings represented by Zhencheng Tulou, known as the “Prince of the Tulou buildings”. To cater to tourism development, the ground floor of Zhencheng Tulou has been converted from residential space into retail shops. Additionally, daily performances are conducted outside, rendering it a “Cultural stage space” in the eyes of the villagers. Furthermore, Fuyu Tulou has been transformed into a hotel and restaurant, while Kuiju Building still maintains its residential function. The entrance to the village is marked by the Mazu Temple, and the village center hosts the Lin Family Temple, both serving as essential places of worship and repositories of collective memory for the villagers. The most frequented location for social interactions among village residents is the banyan tree square, situated near the central dividing point of the village and adjacent to the waterfront. This square serves as a gathering place for villagers to socialize and seek respite. Lastly, the century-old “Rixin School (Hongchuan Primary School)” within the village bears witness to the enduring influence of cultural and educational ideals in the village’s history.

4 Research Design

4.1 Questionnaire and Cognitive Mapping Design

Based on the local gaze theory, this study classifies the spaces in Hongkeng Village into “front stage”, “back stage”, “curtain space” and daily life space. In order to better describe the local villagers’ perception of different spaces, the survey design draws on the research method of Place Attachment theory from three dimensions: cultural cognition, emotional preference, and behavioral activities [18]. Since the cultural cognition dimension shows the degree of individual cognitive understanding of the place, the emotional preference dimension shows the degree of individual emotional connection or integration to the place, and the behavioral activity dimension shows the degree of familiarity and dependence to the place.

The research employed a combination of survey questionnaires and cognitive mapping. The survey questionnaire covered respondents’ basic information and inquired about their perceptions of the village environment in terms of cultural cognition (which spaces within the village are most representative) and emotional preferences (which spaces within the village they like the most). The dimension of behavioral activities was assessed through cognitive mapping. Villagers were provided with proportionally scaled printed village maps and were asked to mark the paths of their daily activities and the locations where they frequently engage in these activities.

Table 1. Statistics on basic information of villagers

Category	Variable	Sort	Quantity	Percentage
Respondents' background	Gender	Male	38	46.3%
		Female	44	53.7%
	Age	Under 17	4	4.9%
		18–45	33	40.2%
		46–60	25	30.5%
		61 and above	20	24.4%
	Living in Tulou	Yes	55	67.1%
		No	27	32.9%
	Local resident	Yes	63	76.8%
		No	19	23.2%
Behavioral characteristics	Engaged in tourism-related work	Yes	26	31.7%
		No	50	61.0%
		Both	6	7.3%
In total			82	100.0%

4.2 Data Collection and Processing

Table 2. Objects of high-frequency perception in village space.

Village places	PFCC	PFEP	Place type	Place function
Zhencheng Tulou	40	14	Front stage	External display and performance space
The banyan tree square	24	36	Daily life space	Villagers' daily life space
Kuiju Tulou	18	7	Front stage	External display, villagers' living space
Fuyu Tulou	18	10	Front stage	External display and commercial space
Tulou buildings cluster	12	–	Front stage	External display and performance space
Mazu temple	10	4	Back stage	Villagers' prayer space
Hongchuan primary school	9	9	Back stage	collective memory space
Lin family temple	7	5	Back stage	Villagers' ancestor worship space
Rusheng Tulou	6	–	Front stage	External display, villagers' living space
Fuxing Tulou	6	–	Front stage	External display, villagers' living space
Hongchuan river	4	16	Daily life space	Villagers' daily life space
Yue'e bridge	4	–	Daily life space	Villagers' daily life and farming space
Home	–	19	Daily life space	personal domain

(continued)

Table 2. (continued)

Village places	PFCC	PFEP	Place type	Place function
Chaoyang Tulou	–	6	Daily life space	External display and commercial space
Champions promenade	–	5	Curtain space	External display, villagers’ leisure space
Observation Deck	–	4	Curtain space	External display, villagers’ leisure space

(PFCC = Perceived Frequency of Cultural Cognition, PFEP = Perceived Frequency of Emotional Preferences)

The field research work was carried out from September 14th to 18th, 2022. Respondents within Hongkeng Village were randomly selected, and questionnaires were distributed. A total of 82 valid questionnaires were recovered. The statistics of the basic information of the respondents’ data are shown in Table 1. The survey questionnaire results were processed by organizing the data and ranking them based on word frequency. This process led to the identification of perceived frequencies for different locations. Locations perceived to have frequencies equal to or greater than 4 were defined as high-frequency perception targets. In this context, 12 places were identified as such for both cultural cognition and emotional preference, as shown in Table 2. Regarding the behavioral activity aspect, information was processed by plotting activity trajectories and marking stopping points based on the activity paths of different groups within the village. A total of 28 valid cognitive maps were collected.

5 Analysis of Villagers’ Environmental Perception

5.1 Analysis of Perceptions in the Cultural Cognitive Dimension

Tulou cluster is regarded as the most representative and well-known space by local villagers. Among them, Zhencheng Tulou is perceived most frequently, with a cumulative total of 40 times, and the building is also most favored by tourists due to better landscape maintenance, good publicity, and regular folklore performance activities. Additionally, historical buildings like Fuyu Tulou, designated as cultural heritage preservation units, are considered representative spaces by the villagers. The Banyan Tree Square was perceived 24 times in total due to its good location with the compound functions of sitting and chatting, as well as leisure, vending and praying for blessings. The Hongchuan River, closely related to villagers’ daily lives, is also deemed representative. Temples such as the Mazu Temple and the Lin Family Temple, which carry the collective memories of the villagers, have received high levels of recognition.



Fig. 2. Distribution of high-frequency perceived places in cultural cognitive dimension (Source: produced by the authors)

Based on frequency statistics, the Hongkeng Village map was imported into ArcGIS software, and the heat map analysis tool was used to create spatial distribution maps of perception levels for different locations (Fig. 2). According to the distribution map, the high-frequency perceived places in Hongkeng Village have obvious agglomeration and form two major grouping areas: the grouping space in series with Zhencheng Tulou and the Banyan Tree Square and the grouping space in series with Rusheng Tulou and Kuiju Tulou. The former has a high degree of functional complexity, including both the “front stage” for tourists’ cultural and entertainment performances, sales and displays, as well as the daily life space for residents’ living and leisure; while the latter mainly provides the “front stage” for cultural displays and consumption.

5.2 Analysis of Perceptions in the Emotional Preference Dimension

In terms of emotional preferences, villagers exhibit a greater fondness for daily living spaces that facilitate neighborly interactions and leisure activities. The Banyan Tree Square garnered the highest cumulative perception frequency, with 36 mentions. The Hongchuan River was mentioned 16 times. In addition, tree-lined corridors and Observation Decks with a wide view are the places favored by villagers. The concept of “home”, as an individual’s personal domain, was mentioned a total of 19 times, evoking sentiments of warmth, familiarity, and attachment among the villagers. As cultural exhibition spaces, the cluster of Tulou buildings hosts regular entertainment performances and light shows. Apart from serving as “Cultural stage space” showcased to tourists, they have also enriched the lives of the villagers to some extent. Spaces like the Lin Family Temple and the Mazu Temple bear certain symbolic significance, supporting the local and identity affiliations of the residents.

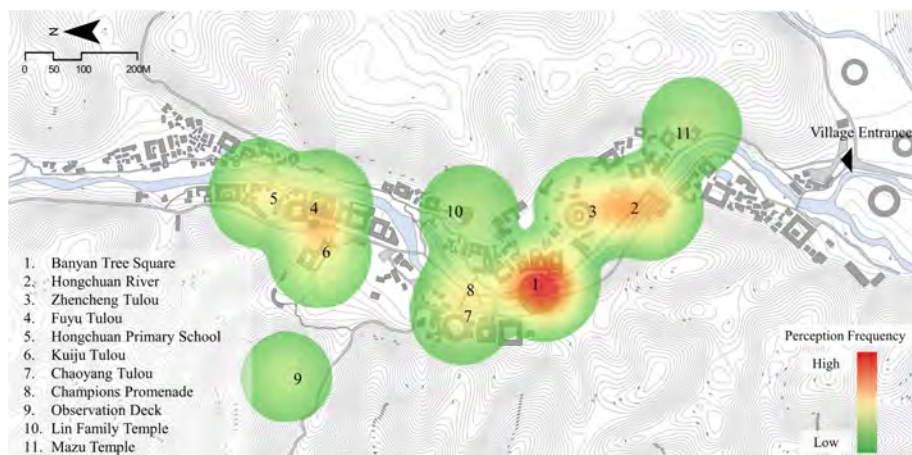


Fig. 3. Distribution of high-frequency perceived places in emotional preference dimension (Source: produced by the authors)

Using the heat map analysis tool of ArcGIS once again, it is evident that preferred locations are predominantly distributed in the southern part of Hongkeng Village (the lower village), forming a patchy pattern with a degree of clustering (Fig. 3). Outdoor activity areas, such as those interlinked by shaded banyan trees and Zhencheng Tulou due to their convenient locations, are associated with the diverse scattered daily activities of the villagers, carrying the function for leisure and interaction of the villagers. Groupings of spaces like Chaoyang Tulou and Lin Family Temple constitute a combination of linear passages and point-like nodes, attracting the gathering of neighboring villagers. While Fuyu Tulou and Kuiju Tulou have distinctive architectural features, and Hongchuan Primary School has a long history, the three are representative of the village's external display space.

5.3 Analysis of Perceptions in the Behavior Activity Dimension

Based on villagers' recollections of their daily behavioral paths and stopping points, a total of 28 valid path information records were obtained, comprising 15 female respondents and 13 male respondents. Among these, 12 individuals reside in the upper village of Hongkeng, while 16 reside in the lower village. On a broader scale, the segment of the route from the village entrance arch to Chaoyang Tulou, situated on the eastern side of Hongchuan River, witnessed the highest pedestrian flow. The segment adjacent to Hongchuan Primary School on the south side of the river bridge, known as Xibei Bridge, experienced the second-highest pedestrian flow. Simultaneously, this route serves as the main thoroughfare within the village. The area around the Banyan Tree Square witnessed the highest number of people stopping, with a predominance of females. The fields near Yue'e Bridge, which serve as agricultural spaces, and the banks of Hongchuan River utilized for leisurely fishing activities, also frequently attracted villagers' stopovers (Fig. 4 & Fig. 5).

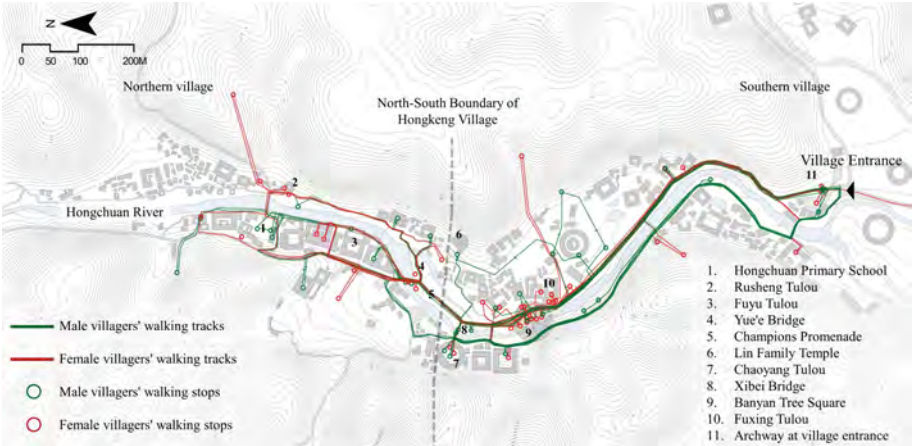


Fig. 4. Overall activity paths and stop locations of villagers (Source: produced by the authors)



Fig. 5. On-site photos (Source: photos by the authors)

Regarding activity ranges, residents from both the upper and lower villages tended to center their activities around their homes. Despite residing in the same village, an intangible boundary seemed to exist, demarcated by the route from the Lin Family Temple to Yue’e Bridge and Xibei Bridge, which divided villagers’ activity paths (Fig. 6 & Fig. 7). Upper village residents primarily focused their activities around the earthen buildings in the upper village and the vicinity of Yue’e Bridge, with a noticeable difference in the activity range between females and males. Lower village residents similarly seldom ventured to the upper village, with their primary activity path being the main thoroughfare on the eastern side of the Hongchuan River. However, the activity range of lower village female residents was comparable to that of male residents, with both genders inclined to take walks toward the village entrance arch. Additionally, upper village residents had fewer stopping points, often resting in the vicinity of their homes.

In contrast, lower village residents had a greater number of stopping points, which to some extent reflects the inadequacy of public facilities in the upper village.

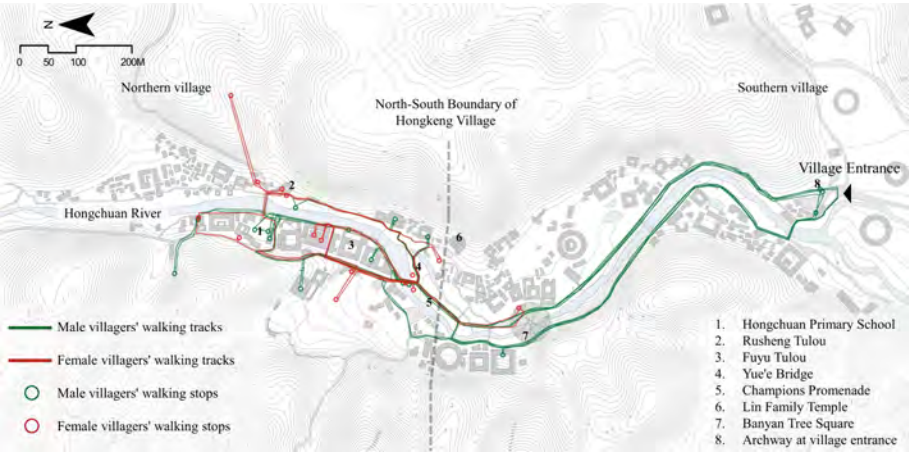


Fig. 6. Tracks and stops of upper village residents (Source: produced by the authors)

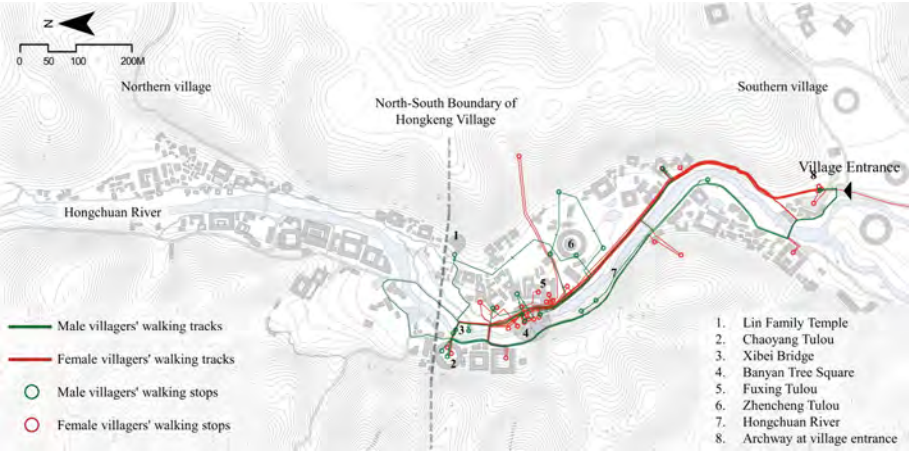


Fig. 7. Tracks and stops of lower village residents (Source: produced by the authors)

6 Conclusion

For traditional villages, tourism development provides economic support for heritage conservation but also triggers the neglect of heritage originality as well as villagers' subjectivity. This paper, using Hongkeng Village as an example, explores the environmental perceptions of villagers in a tourism-oriented village under the influence of the "local gaze" and discusses these perceptions across three dimensions: cultural cognition, emotional preferences, and behavioral activities. The research reveals that villagers generally exhibit high levels of cultural cognition in the theme display space, or named "Cultural stage space" within the village, but their emotional preferences for these spaces are low. Conversely, they show a strong preference for the everyday living spaces within

the village. In terms of behavioral activities, villagers' activity area generally extends outward from the center of their home. And, the activity area of female villagers is smaller than that of males, and the space of neighborhood interaction is of great significance.

The unique Tulou buildings in Hongkeng Village is an advantage, yet the current tourism development has neglected the historical lineage and the spirit of place, and is more of a symbolic interception and utilisation of the local culture [19]. Originally serving as living spaces for local residents and a bond for connecting with relatives and friends, the Tulou clusters have seen the concept of "home" gradually fade as they transform into commercial spaces. "Front stage" and "back stage", terms of cultural context, have led to physical spatial segregation in tourist destinations: the imbalanced tourism development between Hongkeng Village's upper and lower parts has resulted in disparities in the distribution of daily living facilities, leading to a split in the development of village spaces.

Based on the findings, this study suggests that tourism-oriented villages should pay close attention to the spatial perception of villagers. It recommends establishing a village environment that harmoniously integrates tourism development, cultural preservation, and the daily life of residents. This can be achieved by focusing on perpetuating the collective cultural memory of the inhabitants, enriching public life facilities, and enhancing interactions between villagers and tourists.

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Rethinking Architecture in the Digital Age: From Parametric Design Thinking to Philosophical Perspectives

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Abstract. We are currently living in an age where the advancement of digital technologies has been rapidly progressing. Simultaneously, the digital avant-garde has been flourishing in the field of architecture for decades. The emergence of design thinking has been significant in this era, especially with the rise of parametric design thinking in contemporary discourse due to the advancements in digital technology. In this context, particular attention is given to parametric design thinking in this paper, with a specific focus on the current trend and the concept of “social performativity”. Moreover, the current tasks in architecture are more challenging in dealing with its relationship with social diversity and even conflicts. Hence, this contribution questions the positionality of architecture in multiple interactions and explores the state and impact of architecture in the digital age, considering both material and immaterial aspects. To investigate this, the study unfolds philosophical perspectives on the relationship between humans and space by expounding on several fundamental ideas from Taoism and the philosophy of Martin Heidegger. The study’s results contribute to a deeper comprehension of the relationship between humans and space, shedding light on both the potential and the complexities inherent in architecture within the realm of parametric design in the digital age.

Keywords: Architecture · Parametric Design Thinking · Philosophy · Space

1 Introduction

We are living in the digital age where the digital technology is playing a much more important role. This is an age where the digital avant-garde has been blooming for almost three decades in the practice of the architectural discipline. This is an age when the inevitable march of digital technologies has increasingly gained momentum, whereas it is also even more challenging for architects and researchers to tackle their roles in this tendency. Nowadays, the tasks in architecture are more demanding on dealing the relationship with social diversity and even conflicts, which are becoming more and more complex. In responding to the call of EAAE Annual Conference 2023 “not just Architecture but Architecture(s)” in terms of the interdisciplinary dimension of architecture,

meaning that it is time to reflect the positionality of today's architecture, the paper comes up with the question "what is the state and impact of 'architecture' in our digital age?".

In parallel with the development of digital technology, the model of design thinking has transitioned from cognitive models to computational models to the model of parametric design thinking [1]. In this light, parametric design thinking has been given particular attention in this paper. However, can parametric design approach respond to the demands of contemporary social challenges? Consequently, the current work tends to revive the self-consciousness and self-reflection of architecture, by drawing on Patrik Schumacher's idea of architecture's "social performativity" as well as the well-known "parametricism".

Furthermore, from sociological aspect, architecture is not only about inhabiting people physically but also inhabiting the full sense of people whoever involved in. Wherever social activities take place, there is a sort of architectural and urban spaces, that is to say, space is always connected with society and people. Hence, another purpose is to reflect on the relationship between human experiences and the physical environment, by turning back to the fundamental ideas in the field of philosophy. This involves seeking philosophical engagement in architecture, focusing not only on the materiality but also on the immateriality.

2 Parametric Design Thinking

2.1 State of the Art: Parametric Design Thinking

Parametric design thinking, the earliest could be traced to 1st century BC and the medieval age. Mario Carpo emphasizes that there was a class of objects defined by generative rules mathematically, because some of Vitruvius' rules were like "procedural algorithm" what we would call today [2]. Parametric design thinking can be found in the work of Antoni Gaudí. Gaudí used to design by his exacting use of geometry and had a revolution on the fusion of intersecting hyperbolic paraboloids with hyperboloids. In this sense, his design was parametrically variable, flexible architectural design [3]. For Patrik Schumacher, Frei Otto is the only true precursor of parametricism, who applied physical processes as a design engine and simulations to find out forms rather than to draw invented forms [4]. Until then, parametric thinking is a logical approach on design regardless of the aid of digital techniques. The Italian architect Luigi Moretti was probably the first who conducted the approach of parametric thinking in architectural design and created three-dimensional architectural form using a complex set of parametric relationships resolved by digital computation. Moretti also coined the term "Architettura Parametrica (Parametric Architecture)" in the 1940s [5].

Nowadays, the explosion of parametric design trend in the field of architectural design is highly related to the aid of the widespread use of parametric modelling techniques and software. As a matter of fact, in the digital age the advanced computational techniques not only empower designers' abilities to realize but also arouse their ideas by simulating endless potential solutions and overcoming the constraints in the simulation of complex forms and patterns in the earlier age. In the recent fifteen to twenty years, parametric design approach has become a more attractive topic in architectural

design and research, especially when Patrik Schumacher, architect, and architectural theorist, unleashed “parametricism” to the world, at the Dark Side Club, 11th Architecture Biennale, Venice (2008), which can be seen as an avant-garde architecture and design movement [6]. Since then, parametric design became more and more fashionable.

2.2 The Social Performativity of Parametricism

The concept of social performativity in parametric design emphasizes the importance of considering the social functionality and performance of architectural designs. Patrik Schumacher, the proponent of parametricism, argues that the movement should shift its focus from foregrounding formal principles and design processes to the foregrounding of design research that is more strategic, applied, and performance-oriented, with a strong emphasis on social performativity [7]. This involves simulating the social functionality in design as a key aspect of architectural design. The performative design strategies in architecture also highlight the importance of considering social, environmental, and economic performances in the design process [2]. Parametric modeling is seen as a tool that allows for the streamlined testing of different values for variables, which can contribute to the consideration of social performance in design [8].

Patrik Schumacher calls Parametricism as a new style, which is “architecture’s answer to contemporary, computationally empowered civilisation, and is the only architectural style that can take full advantage of the computational revolution that now drives all domains of society” [9]. In 2016, “Parametricism 2.0” as a “self-critical redirection” was relaunched, aiming to reverse the increasing marginalisation of Parametricism. Schumacher argues about “anti-icon polemic” and “neo-rationalism” in his article. For him, the anti-icon polemic misunderstands that “parametricism” as an architectural new style that is rigorously developed on the basis of radically new, innovative principles becomes conspicuous by default rather than by intention. “Both the anti-icon camp and the neo-rationalist camp fail to understand that urban and architectural complexity are called for by the new societal complexity” [9]. Schumacher states that “Parametricism 2.0” not only covers up various infrastructural, economic and environmental parameters, but offers the promises of social functionality [7, 9, 10]. He points out parametricism’s obvious superiority, in terms of the built environment, is “social functionality” rather than technical functionality. “The built forms are not speaking their structural performance (which is of no interest to users) but about their social purposes, and this communication facilitates these very purposes” [7].

To face the increasing societal complexity, Schumacher emphasizes the importance of the supporting from new methodology and tools. With the concern of this, the design approach has shifted from foregrounding formal principle and design processes to “more strategic, applied and performance oriented, with a strong emphasis on social performativity [7, 10]”. Moreover, Schumacher and his group worked on this enhanced capacity—social performativity by semiologically empowered life-process simulations [7]. Therefore, the computational capacity of parametric modelling today would suggest a more potent opportunity for parametric design thinking to integrate with the societal complexity by ongoing research and practice.

2.3 Possible Social Impact Through Parametric Design Approach

In terms of social impact, parametric design can influence architecture by enabling the creation of innovative and sustainable buildings that reflect the values and culture of a city and its inhabitants [11]. Schumacher introduces the concept of design processes using evolutionary algorithms and agent-based life-process simulations with social interaction frequencies as success measures to optimize social functionality [7, 12]. This research, conducted at the University of Applied Arts and Zaha Hadid Architects, aims to expand the formal repertoire available to architects, leading to better design solutions [12]. In this study, Schumacher discusses the possibility of applying scientific methods to architectural design through simulations of social functionality. By simulating a design's social functionality, parametric design can contribute to a more performance-oriented approach in architecture, considering factors such as user interaction, urban setting integration, and spatial-social relationships [12]. The simulation process allows for the assessment of a design's social performance relative to alternative options, emphasizing the importance of understanding how occupants interact with parametric-based spaces and their impact on the built environment [12].

3 The Relationship Between Human and Space

In the digital age, the implications of digital technologies on human perception and the blurring of boundaries between the physical and digital worlds, have led to a reevaluation of architectural materiality and subjectivity [13]. This shift involves a renewed focus on environmental factors, as well as a redefinition of the human experience in the built environment [13]. In this context, Antoine Picon emphasizes the disconnect between digital avant-gardes and environmental concerns, highlighting the need to integrate the two domains for a more holistic approach to architecture [13]. Consider how parametric approach can be used to respond to socio-cultural contexts and diverse human experiences and how designers can employ parametric strategies to create spaces that reflect the values, traditions, and identities of different communities, thereby, it is essential to foster a sense of belonging and cultural continuity.

3.1 The Perspectives from Taoism and Heideggerian

Derived by Martin Heidegger's essay *Building, Dwelling, Thinking*, published in 1951, which centers on the question "what is the state of dwelling in our precarious age?", this paper questions "what is the state and impact of 'architecture' in our digital age?" Heidegger defines dwelling as more than just a physical structure, a place to live. Dwelling is an essential aspect of human existence and involves a deep relationship between humans and the world around them. In Heideggerian philosophy of dwelling, the "four-fold" refers to the interdependent relationship between the four fundamental elements of being-in-the-world: earth, sky, divinities, and mortals. Heidegger argues that these elements are not separate entities but are inseparable and interconnected, forming a holistic understanding of being and dwelling [14]. However, Heidegger did not originate with the idea of contemplating the relationship between humans and the world. One

might encounter a comparable notion in the *Tao Te Ching*, a seminal work of Daoism, established by the Chinese philosopher Lao-tzu but written down by later generations. In Taoism, four elements are human, earth, heaven, and Tao, following a fundamental principle: “Human follows the earth, the earth follows heaven, heaven follows Tao, and Tao follows nature [15]”. This principle emphasizes the importance of living in harmony with nature and following the natural order of things. By following the rules of nature, one can achieve balance and peace in life. Moreover, it suggests that everything in the universe is interconnected and should be respected and treated with care. In essence, this phrase encourages people to live in harmony with nature and to respect the natural world around them. The importance of the relationship between human and external space in terms of nature, has been addressed both in Taoism and Heidegger’s fourfold.

3.2 The “Bridge”: a Symbolic Connection Between Human and Space

In the essay *Building, Dwelling, Thinking*, “bridge” is well explicated by Heidegger as more than a location but a symbol that connects both material and immaterial things. Thus “bridge” answers to the question “what is the relation between human and space?” In Heidegger’s words, the bridge is “about the relationship between location and space, but also about the relation of humans and space... The bridge is a thing of this kind. The location lets the simple onefold of earth and sky, of the divinities and the mortals, into a site by erecting the site in spaces” [14]. He argues that a bridge serves as a symbolic connection between human and space. This notion resonates deeply within Chinese culture, where the concept of the lounge bridge embodies such philosophical depth.

Originating from the Song Dynasty, the lounge bridge or arched wooden lounge bridge 木拱廊桥, with its special form, served as more than a mere crossing point. In Zhejiang and Fujian provinces, the lounge bridge is a specific type of arched wooden bridge covered with a roof, and in some cases is also covered with wooden shadow claddings from top to bottom. Initially, the lounge bridge was designed to host and rest people who had to travel in mountains for long days in the past, while also serving as a temporary shelter from harsh weather conditions. Often, the timber structural elements of the lounge bridge, like beams and pillars, are frequently adorned with paintings and poems that convey the sentiments and dispositions of the travelers. Nowadays, lounge bridges, suspended between lush greenery on two banks, are still fully functional and present in everyday life. For instance, an ancient lounge bridge located in Zhejiang, China, known as the Lan Xi Lounge Bridge 兰溪桥 (Fig. 1) exemplifies the concept of Heidegger’s “bridge” by displaying numerous significant characteristics of a lounge bridge. Specifically, various window opening on the shadow claddings (hand fan-shaped or round) provide aesthetically pleasing frames for the views of the surrounding landscape. The lounge bridge presents both the materiality and immateriality of a space, as well as the relation between humans and the environment, in terms of tectonics, aesthetics, the use of local materials.



Fig. 1. Lan Xi Lounge Bridge, Zhejiang, China, 2023 (Photograph by Hongye Wu)

4 Conclusion and Discussion: Immateriality and Materiality of Architecture in Digital Age

The purpose of bringing Taoism and Heideggerian philosophy together is not to interpret the similarity on their thoughts but to bring out the importance of the relationship between nature and people, between space and people, from different cultures but with the same concern in a sense. The exploration on the question of the interaction between human and space aims to bring up that architecture has a profound impact on emotions, memories, and overall well-being, and should be designed with a deep understanding of human experience. “The architect must act as a composer that orchestrates space into a synchronization for function and beauty through the senses—and how the human body engages space is of prime importance. As the human body moves, sees, smells, touches, hears and even tastes within a space—the architecture comes to life [16]”. Consequently, the paper revisits several relevant fundamental ideas from Taoism and Heideggerian philosophy, such as ‘dwelling’, “fourfold”, “bridge” from Martin Heidegger on the one hand, four basic elements from Taoism on the other hand, aiming to reinforce the foundation and reveal the fog for the “architecture” for the future. Heidegger emphasizes that “the spaces, which we go through every day, are made for by locations; whose nature is grounded in things of the type of buildings. If we pay attention to these relationship between location and spaces, between space and space, we gain a clue to help us to think about the relationship between human and space [14]”. This is a hint in a way on design thinking and on how to concern about the environment, as well as the relationship between human and its context. Digital architecture has played a significant role in redefining human experience and understanding of the physical world by transforming sensory perceptions, challenging traditional distinctions, and raising questions about the human condition in the digital age [8].

The advanced digital tools enable designers to visualize the design ideas in short time so that designers can better modify, rethink, realize their ideas, by reviewing the result of the variations. In terms of parametric design, generally, it implies that the parameters as key elements and variations in the process of design, architectural design in this case. As Schumacher argued that parametricism's superiority is "social functionality/performativity" rather than technical functionality [7], Mark Burry suggests that the parametric inputs of architectural design should include multiple parameters, such as "environmental, political, social, cultural, practical, economic, theoretical, philosophical and behavioural parameters", and better to work parametrically across the full gamut of inputs so that there are abundant opportunities to enrich individual practice [3]. This contribution points out that, on the one hand, parametric design thinking has been practicing before the digital age, and on the other hand, parametric design approach in architecture can be both quantitative and qualitative. The advanced value of parametric design thinking, in this sense, is worthy of further exploring and sharing. Here, the purpose is to call for an interdisciplinary design approach, as well as to think differently, from different but interrelated fields. As Rivka Oxman emphasizes that, "parametric design thinking should exist as a shared design paradigm among all specific domains, producing holistic conceptual thinking processes from conception to fabrication. This is a new horizon of theory and pedagogy for the future of design thinking" [1]. In this sense, therefore, the model of parametric design thinking could be seen as a promising approach to future architectural design.

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Branches of Architecture: Ways of Practice



Branches of Architecture: Ways of Practice

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In the session dedicated to Ways of Practice, the contributions explored the domains of professional activity in architecture today. Starting from the investigation of the relationship between the different knowledge systems (not exclusively belonging to the disciplinary field of architecture) that characterise the work of architects in the contemporary condition [1], at least two levels, two complementary themes or questions emerge. On the one hand, the question of the redefinition of the very concept of architectural practice and the updating of the objectives of a professional knowledge that, while changing its physiognomy and expanding its boundaries [2], seems to maintain a certain relationship with the traditional education and teaching system [3]. On the other hand, a reflection on the role of academia, teaching, and design-based research in a panorama in the face of which the question of refuge in disciplinary autonomy or the dissolution of the figure of the architect within complex multidisciplinary processes could appear as the only possible paths.

The role of communities in the processes of evaluation, construction, and validation of design practice, as well as the interaction with stakeholders and thus their contributions to the project, are all issues that influence the two levels just mentioned. In this sense, the contributions have, through the presentation of case studies, investigated transversally from a methodological point of view the methods deployed by professionals and educators in order to succeed in integrating and holding together all these contributions, working on research topics, innovative functional programmes, the use and implications of new digital technologies and the two-way contamination between professional and academic research activities.

If these changes in everyday professional practice seem to be consolidated or seem to have been forcibly incorporated into the work of architects within architecture schools, the debate is animated and far from over. Several interventions, in fact, focus on the opportunity (or the possible effectiveness) of rethinking the curricula and the university educational offer in order to consolidate and develop the adaptive behaviour of the architect as a coordinator, solicitor and stimulator of design activities that go far beyond the boundaries that traditionally defined the architect's action within the processes of habitat transformation and global sustainability challenges.

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Level II Training and Development of Scientific and Didactic Content. The Case of Executive Master: Mountain-Able. Planning and Design for the Sustainable Development of Mountain

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Abstract. In a fast-changing society, training architects to be one step ahead of the challenges that policies and regulations impose on architectural design has become increasingly necessary. Schools of architecture began to address the training of architects of the future to face new challenges. However, the scenario appears more complex for all those architects already working in the professional field and requires training in specific topics. This situation requires the development of progressively more specialized courses, especially for postgraduates. In addition to knowledge, adequate skills must be acquired to face the challenges posed by the EU Green Deal and the new European Bauhaus. The key is to create a higher level of training system that frames specific issues and themes, with a learning curve that always keeps the role of architecture at its centre as the process and outcome of the transformation of places and as a tool for serving residents and the community. The essay intends to illustrate the specific experience of the Mountain-Able: Planning and Design for the Sustainable Development of Mountain Executive Master project, activated by the Polytechnic of Milan's Department of Architecture and Urban Studies. The themes and issues addressed by the suggested specialist training course will necessarily combine themes of scale, multidisciplinary, fragility, and community, which require the development of a very specific training platform to ensure students engage in hands-on specialist learning open to embracing contributions from other disciplines.

Keywords: Architectural training · Education · Multidisciplinary · Community · Fragility

1 Premise

Currently, the university curriculum for an architectural degree often follows the path leaning towards methodological training in which the working method acquired is even more important than the hard and soft skills developed. The training of an architect combines technical and intellectual knowledge and often requires specialization in specific themes and aspects that will be needed after graduation to navigate an open and constantly evolving market, connected not only to the world of construction [1].

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Despite the belief that modern architectural training focuses on increasingly specialized segments [2], the need often emerges to combine multiple segments of knowledge and expertise in specific subjects. This need comes to the fore - confirmed by ARCHITECTURE'S AFTERLIFE project research consortium survey - [3], above all when the architect chooses not to operate directly in the architectural design or urban space fields but is tasked with addressing actions, policies, or business decisions in communities in which the architectural, urban space or territory and landscape planning is only part of the design process. This often happens when the architect is sent to work in unconventional social, territorial, and urban contexts, facing problems whose solution requires a combination of subjects and disciplines on very different scales. This aspect is, in turn, linked to the need for architects to adapt their knowledge and skills to demands that society, environment, and policies activated at various national and European levels pose with respect to the impact on architectural design on different scales. Choices are thus put in place after completing the university degree, and another level of education – postgraduate – appears on the horizon. This should dictate a highly specialized path, not least because of the need to activate and systematize the skills previously acquired during an architecture degree course that are attuned to approaches that are often multidisciplinary and go beyond the field of architecture.

Hence, the need arises for high-level postgraduate training in terms of quality of response and operational capacity, with a constantly increasing number of cases impacting the field of architecture. The objective is to find a way for trained architects who wish to broaden their professional opportunities or specialize not only in order to access adequate training opportunities provided by schools of architecture but also further training delivered by professional associations of architects. For example, the mission of the Council of Architects of Europe includes working towards an enabling practice for architects to guarantee the existence of a network and a community able to orient themselves and interact with the demands that EU policies and regulations impose on architecture [4]. As far as the innovation and culture promoted by the New European Bauhaus are concerned, with architectural design restored to its central role in the challenges of sustainability, beauty, and inclusiveness [5], the question arises of which skills – in addition to general abilities developed during first and second level university education – can be transmitted to those who intend to specialize in very different topics and scales of design embracing a broad transversal, cultural, technical, and economic dimension. The need to specialize or acquire adequate skills, in addition to knowledge, for handling the challenges posed by the EU Green Deal and the New European Bauhaus is thus a fundamental requirement to guarantee effective and continuing training over time for architects, to allow them to deal with the challenges of the future. When considering the traditional Bachelor's Degree and Master's Degree path, it is therefore increasingly necessary to think about activating subsequent higher-level training, like Executive Master courses formulated for architects already operating as professionals. Ongoing training after graduation poses another stumbling block in the architect's learning. It would be useful to activate a synergy for postgraduate training, too, between the European Association for Architectural Education and the Council of Architects of Europe, as had been proposed in 2015 through the Erasmus + project *Confronting Wicked Problems: Adapting Architectural Education to the New Situation in Europe* [6].

1.1 The Context

Observing the current scenario of Executive Masters offered by schools and universities in the field of architecture, we see a broad choice for postgraduate architect training addressing mainly architectural project management or the use of state-of-the-art technologies. Less frequently, there are Executive Masters that deal with architectural design innovation, especially in territorial or urban contexts, which require extensive multidiscipline and multiscale design approaches. Mountain or rural areas are emblematic of these settings and suffered from a critical problem of underuse, abandonment, and depopulation throughout Europe as there was a growing need to guarantee their resilience and preservation to safeguard residents and the cultural, historical, and architectural heritage they express. The Commission's communication to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions states that rural areas account for almost 30% of the population and more than 83% of EU territory [7], of which about 30% is made up of rural mountain areas [8]. The same document illustrates a series of actions aiming to transform the EU's rural areas into stronger, more resilient, and connected districts by 2024 [9], enabling them to communicate with urban areas not in contrast but as an alternative model to metropolitan life. These actions impact the transformation of rural mountain space through new infrastructural works; regeneration of existing built heritage; achievement of energy and environmental sustainability; modernization of agricultural techniques for the economic and social evolution of the communities involved. With respect to these themes, there is a need to specialize architects – who usually operate in urban settings that are more robust in terms of resources and opportunities – to address the scales and themes that characterize rural districts, which are very different from those found in urban areas. Rural mountain districts have to combine architectural standards covering very different scales and disciplines, ranging from agricultural issues to energy, renewable sources, infrastructure, and community protection from natural risks such as floods, landslides, or earthquakes, not to mention those looming in the not-too-distant future deriving from lack of water resources. This long premise was required in order to illustrate the experience of the Mountain-Able: Planning and Design for Sustainable Development of Mountain project.

2 The Mountain-Able: Planning and Design for Sustainable Development of Mountain Executive Master

We will focus on one particular experience in this contribution, linked to the development of the “Mountain-Able: Planning and Design for the Sustainable Development of Mountain” Executive Master, put in place by the Polytechnic of Milan's Department of Architecture and Urban Studies. The project came to be in a specific scientific and training setting, relating to the Excellence Project developed by the aforementioned Department of Architecture and Urban Studies (DAStU). The Department is one of one hundred and eighty in Italy to have received the Ministry of Research award as a department of excellence in the approach to issues of territorial fragility for the five-year period 2018–22 and for the five-year period 2023–27. The DAStU conducts research, design

experimentation, and didactic instruction in architectural and urban design, territorial planning and land governance, urban policies, conservation and intervention on the built and natural heritage, historical interpretation and criticism of architecture and the city [10]. As part of the research venture, the need emerged for training architects to be specialists in issues related to emergencies, which is ever more typical of fragile areas like rural and mountain districts, often given scant consideration in research and teaching.

The objective of the Executive Master, therefore, is to specialize architects in the themes of design and planning for mountain and rural areas, focusing on the various sectors of fragility, from marginalization to abandonment of built and agricultural heritage, from prevention of natural risks to the decline of cultural memory. The Master was devised for architects and public administrators working for regional, provincial and municipal government, consortiums, institutions, subsidiary companies, etc., as well as all those professional profiles engaged in various ways in complex contexts and in charge of architectural design in rural and mountain territories. In these settings, the architect often serves as a social facilitator and as the organizer of procedures and actions shared with the community, which then flow into the regeneration project. These are, therefore, professional figures who activate processes seeking qualitative development of space, environment, and territory in complex factor combinations [11].

In Italy, it is not unusual to find professional figures being asked to assess the quality of a project despite having no specific technical or multidisciplinary skills or awareness of the interactions between the project's various components. Their task is often to verify the correctness of the procedural process; less frequently, they may express opinions on the quality of architecture in terms defined by the New European Bauhaus. Conversely, some architects are unfamiliar with the scales and needs of rural and mountain districts and struggle to bring forth adequate projects in terms of quality and sustainability. Architectural, urban space, and landscape design in rural and mountain communities include multiple cultural, technical, legislative, and economic aspects expressed on many scales. In these areas, the architect's role is often to build visions and perspectives for the regeneration and enhancement of the places and the communities that represent them. This vision must take into account the relationship established with the assortment of elements making up rural and mountain territories, which are road, hydroelectric, and sports infrastructure. But also, what is found in the agricultural landscape – small buildings for storing equipment or sheltering livestock, crop terraces, tiny, inhabited centres, and historical and architectural monuments that bear witness to a past rich in art and culture. A further factor is that of maintenance and management of the territory, increasingly impacted by the effects of climate change with the consequent repercussions on resident communities who are then forced to live with the impact of the loss of public services, abandonment of built heritage, depletion of environmental resources, and loss of memory.

These factors revolve around the decreasing number of communities, which must become part of a regeneration process as a shared system. So, what comes to the fore is the need to train both architects who operate not strictly in the construction field but who want to address projects for the transformation of space as a complex process in which policy, space, community, financing, anthropological, social and cultural aspects all play a role. But also, architects who intend to deal with the design of architecture and

urban or landscape space in contexts characterized by fragilities like loss of services, abandonment, natural risks, depopulation, and demise of identity located, nonetheless, in precious natural and environmental settings. The former can operate through specific training to become the bedrock for these territories' harmonious and sustainable development. At the same time, the latter, with other figures, will undertake projects on different scales, addressing different specialist themes.

2.1 Structure of the Executive Master

It took two years of teamwork by the Director, Professor Emilia Corradi and Deputy Directors, respectively Professor Annunziata Maria Oteri and Professors Paolo Bozzuto, to develop the Executive Master contents. The structure of the Executive Master had to act simultaneously on two mutually integrated aspects, which were then merged into the didactic platform. The first aspect of managing the Master involved administrative procedures and the accreditation process for the recognition of the qualification acquired; the second aspect concerned learning and scientific content. With regard to administrative procedures, the Master had to take into account both the regulations outlined by Italy's Ministry of University and Research, which govern and normalize higher-level training, and the Polytechnic of Milan's indications for the accreditation of Level I and Level II master's degrees. This was a requirement for obtaining legal recognition of the Executive Master, based on compliance with Ministerial Decree 270/2004 conditions, specifying a duration of at least one year for these courses, equal to 60 ECTS, or at least 1,500 student hours [12]. A further administrative aspect to be taken into account was the budget calculation, verifying that it was financially workable to complete the planned activities, with a projection of a hypothetical number of enrollees. It is crucial to decide how many faculty members to involve, based on their skills and qualifications, because it is an aspect that a candidate who intends to enrol in and attend an Executive Master course will consider very carefully. These elements, in turn, made it possible to identify a format for the Mountain-Able Master, contributing to the definition of its didactic and formative contents.

Looking at the didactic and scientific structure, the first step to developing the Master's was to outline the central theme of sustainable development for mountain districts with regard to the research and teaching standards established by Polytechnic of Milan's DASTU and AUIC (School of Urban Architecture and Construction Engineering). This first step was followed by a benchmark analysis of the executive masters on offer in Italian and European architecture schools. The study contributed to estimating the potential of the proposed Mountain-Able Executive Master's didactic and scientific configuration. Results confirmed the need to establish a master's degree that would deliver integrated and multidisciplinary planning for mountain locations with reference to both national and European policies and programming. This process significantly impacted pinpointing the international dimension of themes connected to the potential application for the qualification obtained by students. Subsequent research was conducted to identify the target audience who would be interested in the Executive Master. During this phase, a significant role was played by a series of meetings and interviews undertaken with public offices like the Ministry of Culture or Lombardy regional authority, tasked with mountain district planning and policies, and also with representatives of national, regional, and

local associations or institutions, as well as with businesses and companies operating in mountain districts.

The phase led to setting up the scientific committee and opening the Executive Master to sponsors and partners who support it in various capacities. The final step was to develop the didactic platform, whose primary objective was to provide a training and specialization path that focused at all times on the role of architecture as a process and outcome of the transformation of places as the way to serve residents and the community. The planned didactic contents develop mainly around an operational framework for achieving the general training objectives previously indicated and summarized in the diagram below (Fig. 1).

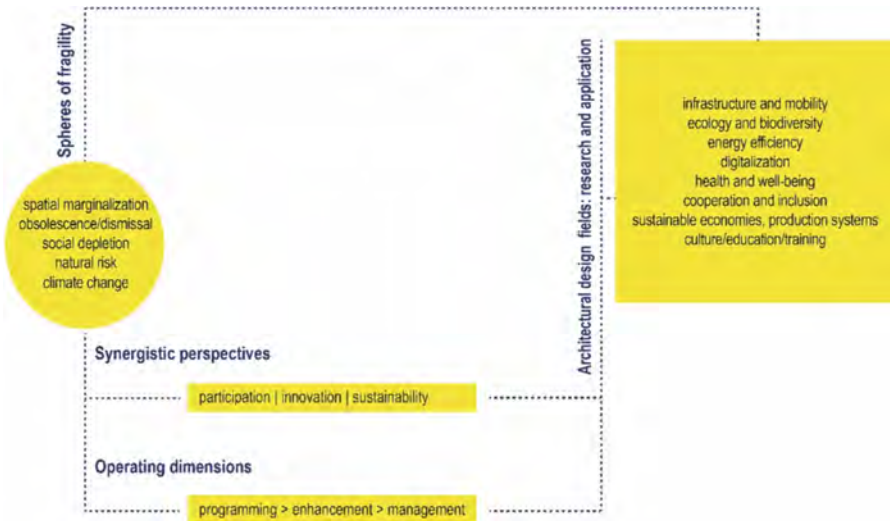


Fig. 1. Executive Master Mountain-Able. Planning and design for sustainable mountain development: topics and objectives, Milan 2023. © Emilia Corradi.

2.2 Didactic Structure and Contents with Respect to Learning Objectives

From a learning perspective, the didactic structure does not intend to train a professional who embodies every single skill. The objective is to train a problem-solving figure to develop a specific awareness of the fact that the creative process is a fundamental part of learning about the themes and problems of mountain districts. The creative process is reinforced by the technical and cultural learning acquired during university studies and stimulated by the Master. From the standpoint of the didactic content of learning objectives, the teaching structure comprises two macro-scales: *projects and policies on the territorial scale* and *projects and policies at the local level*. The former address issues like accessibility, organization of social and health services, as well as concepts inherent to the environmental sustainability of state-of-the-art economic activities and socio-economic interaction and partnerships with metropolitan districts. The latter address

issues, projects and policies at the local level, which can be summed up as strategies for transforming and enhancing communities' physical and cultural heritage through recovery and development actions. This learning structure integrates typical architectural planning disciplines with telemedicine, economics, law, anthropology, geography, and art history to provide adequate tools for contributing to the sustainable transformation of complex mountain districts. The platform considers the project's centrality to be a creative and technical process serving as a pedagogical foundation and fusion of the spatial, landscape, technical, cultural, environmental, economic, legal, and procedural dimensions that affect the development and regeneration of mountain and rural territories and communities.

Through the pedagogical teaching model based on the driven design path, the training approach integrates theory with practice applied to learning by doing. In this respect, the Master opted for a credit structure that supports this didactic approach, dedicating many of the 1,500 student hours of engagement – required by law – to seminar activities, including an international workshop and internships in public administration, agencies, companies, and institutions that are partners in the Master. In a certain sense, this decision influences the didactic and pedagogical structure, especially with regard to the need to integrate theoretical and hands-on training aspects and the understanding of operational procedures.

The Mountain-Able Master is set out as theoretical modules, thematic design laboratories, workshops, seminars, internships, and degree theses. The theoretical modules award 16 ECTS and include a package of 20 modules whose contents address the different themes in a multidisciplinary manner (Fig. 2). Professors provide the theoretical lessons and exercises, but also expert professionals brought on board from the mountain world and public administrations, or companies operating in various capacities in this complex reality. There are economists, experts in co-design and participatory processes, experts in energy communities, territorial planning, jurists, archaeologists, art and architecture historians, experts in climate change, risk, communication, and marketing, and experts in territorial and community policies and management. The theoretical modules help define the field of problems within which the professional must move, both as a designer and as a facilitator.

The three thematic design laboratories provide a total of 15 ECTS. The thematic design laboratories are structured to include experts who illustrate best practices and, with the participants in the Master, identify their methods of application in several areas based on the themes and scales chosen, especially landscape scale, urban scale, and architectural scale. Thematic design laboratories will be able to apply the knowledge acquired in the theoretical modules thanks to an integrated project that considers different scales and spatial, social, participatory, and cultural components, considering extant material and immaterial heritage.

The workshop awards 12 ECTS and is implemented in a mountain area where Master faculty and participants reside for a week. Stakeholders, administrators, experts, and residents are also present, as are international counterparts who can illustrate experiences in similar contexts. The latter aspect is considered extremely important as comparison with other European experiences can be helpful in understanding how to activate partnerships



Fig. 2. Executive Master Mountain-Able. Planning and design for sustainable mountain development: didactic structure, Milan 2023. © Emilia Corradi.

and structure exchange networks in the context of European projects for participation in calls for funding or international cooperation.

The internship awards 12 ECTS and consists of a period of practical experience hosted by institutions, public administrations, or agencies connected to the theme of the Master. It aims to offer an understanding of procedural and operational practices in a workplace setting.

The final thesis for 5 ECTS is when the Master comes together, each student developing their own paper. The thesis involves drafting a critical essay illustrating each

candidate's specific topics of interest, describing a design or procedural path through the knowledge and skills acquired.

3 Conclusion

The path of inductive research developed as the underpinning of the Mountain-Able: Planning and Design for the Sustainable Development of Mountain Executive Master allowed us to spotlight the themes and problems addressed, beginning with a wide range of data. The specific training path suggested for multidisciplinary and multiscale themes inherent to a series of fragilities required the development of a highly specialized learning platform to ensure participants received adequate practical and technical training and were also open to contributions from other disciplines.

The ongoing relationship with stakeholders fully highlighted the possible synergies that can be activated between schools of architecture and players in the territorial transformation process. The result is the chance to implement a dynamic form of training capable of responding to social changes and fully integrating with community policies and strategies. The topic of continuing higher education represents a significant opportunity to improve the educational prospects offered by architecture schools and think about specific shared paths that allow architects to implement a proactive approach appropriate for future challenges. At the same time, continuous learning models must be defined for professional practice also, allowing the figure of the architect to adapt to the changes required by the professional market at increasingly fast speed. Professionalizing Master's degrees can be a positive way of offering extremely effective educational models quickly. These can represent an interesting way to combine education, research, and professional skills, above all because, through a learning-by-doing approach, they can specialize as professionals so they can meet job market demands. At the same time, they also represent a multidisciplinary education model that can overcome sometimes inflexible protocols implemented by state education systems.

The other aspect of executive masters is that they can activate effective synergies not only with the Architects' Council of Europe but also with administrations, companies, and operators in the various sectors, narrowing the gap between academic training, research, and professional practice in the field of architecture [13]. In this respect, it would be appropriate to launch a European-wide survey of executive masters within the EAEE, assessing learning in and updating the architect's professional practice. The survey could facilitate the circulation of models and good practices to be shared in architecture schools and introduce ways to evaluate the effectiveness of a multidisciplinary but also a hybrid path, navigating theory and professional practice and bringing professional *résumés* up to speed.

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The Glass House Revisited

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Abstract. The paper draws upon a pedagogical project that addressed the design of spaces for cohabitation, of new alliances between buildings and the natural environment, in the context of the contemporary city. First, it explores how the fantasy of the large-span, glazed, vegetated environment has shaped visionary projects, marking a shift of attention from the physical to the physiological and from the tangible to the intangible qualities of space which resonates with contemporary concerns on design for sustainability. Following the evolution of the glass house from a place of nature preservation to a vehicle of experimentation into new ways of inhabiting the city, it then examines the contemporary relevance of such a building type and how it has fostered new architectural narratives on the co-existence of people, buildings and plants. Second, the paper presents the methodology practiced in a postgraduate design studio at the AUIC School/Politecnico di Milano which aimed to raise awareness among students about the relational dimension of architecture and the reciprocal exchange between design and research. It discusses how, by revisiting the glass house figure, the studio output set out to generate new conceptual, aesthetic and design definitions of the architecture of the in-between, of spaces of transition between the natural and the manmade, inside and outside.

Keywords: Design Studio · Glasshouse · Collective Housing · Building Envelope · Design Methodology · Cohabitation

1 Genealogy: The Evolving Concept of Human-Nature Cohabitation

The glasshouse model grew pertinent to early twentieth-century experimentations which cast a special attention on the non-physical aspects of space, connected to thermal comfort, hygiene and concepts of health. These experimentations drew upon prior architectural visions that saw the inclusion of greenery in the all-glass structure whose design, construction and maintenance oscillated between horticulture, architecture and engineering, highlighting issues of environmental management [1–3]. The indoor patio or winter garden, which formed an integral part of the modern interior, marked the evolution of the glasshouse from a place of constructing aesthetic experiences to an incubator of novel approaches to the design of the built environment [4].

The phenomenon that saw the hybridization of residential and green spaces continued to manifest itself from the late 1960s onwards, as concerns about the environmental

impact of architecture proliferated. Office, university and commercial buildings, such as Cedric Price's project for a glasshouse in Parc de la Villette in Paris, blended the boundaries between the natural and the manmade (Fig. 1). The latter example incorporated glass-roofed vegetated atria, partly integrated with human activities and equipped with adjustable blinds for indoor heating and ventilation control. The sketch depicts a section of the building permeated by heat, air and energy flows (Fig. 2). It is telling of the then architectural experimentation into new confluences between internal green spaces and program, aspects of air quality and control. Moreover, another stream of experimentation in those days speculated on the definition of 'artificial ecologies', drawing on the glasshouse as the replica of another, ideal and constant climate, in search for a *symbiotic* relationship between human and non-human organisms.

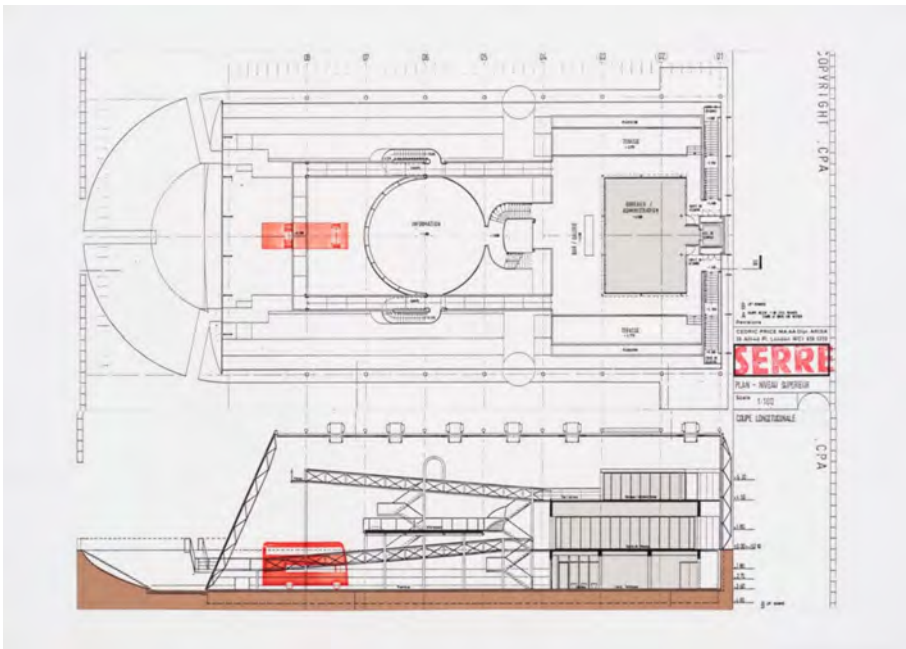


Fig. 1. Cedric Price, Serre (2), upper level plan and longitudinal section, 1988–1990, graphic appliqué film over electrostatic print on paper, mounted on paper with red ink stamp, 29,8 × 42,1 cm. DR2004:0533:004. Canadian Centre for Architecture (drawings © Cedric Price fonds/Canadian Centre for Architecture)

“I thought of referring to communication networks as something fluid, like water streams, to produce an artificial nature rather than architecture,” Toyo Ito described with reference to the design process of the Sendai Médiathèque (1998–2001) [5]. If modernist architecture allowed for an articulated space between building and landscape, today the boundaries between the artificial and natural, the urban and the sylvan, are folding in, influencing the architectural project. Contemporary housing design projects, which range from Lacaton and Vassal’s Exhibition Hall in Paris (2006) to Baukunst

+ Bruther's project for the ZHAW campus in Winterthur (2018) and from Bruther's Super-L – 150 Housing Units in Eysines (2013) to Atelier Kempe Thill's winter garden housing project in Ambers (2015), continue to build upon the glazed structure for the cultivation, preservation and display of tender flowers, plants or biomes. They approach the integration of the building envelope with greenery, in a way that the latter engages with human activity.

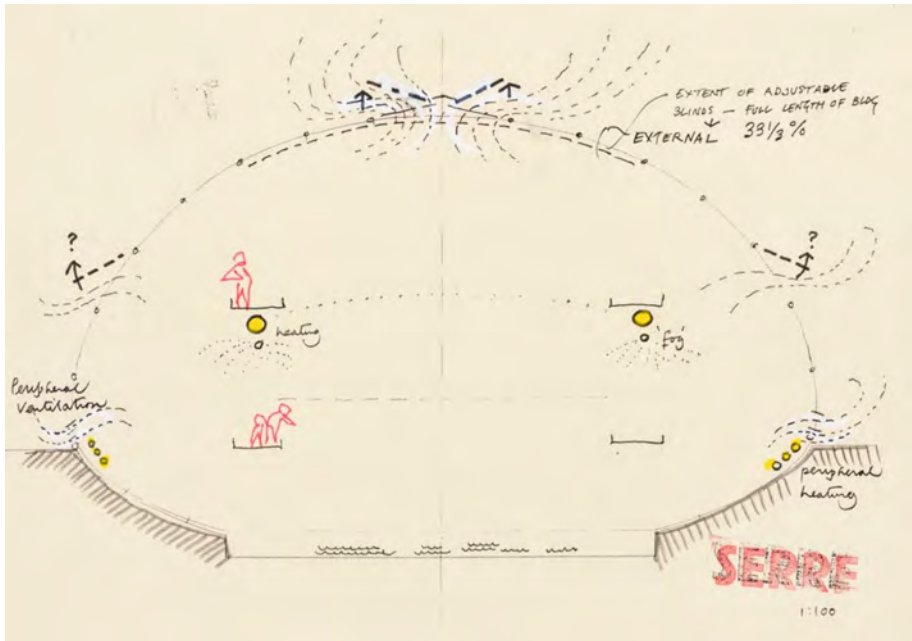


Fig. 2. Cedric Price, Serre (2), sketch showing adjustable blinds, heating and ventilation, 1988–1990, ink, graphite, white paint and coloured pencil over electrostatic print on heavy yellow paper, 21,1 × 29,7 cm. DR2004:0558:003. Canadian Centre for Architecture (diagram © Cedric Price fonds/Canadian Centre for Architecture)

From new construction to transformation projects, and from hybrid-use to urban farming buildings, they point to a phenomenon of *multinaturalisation* of the built environment, in which “green does not stop at a building’s surface: It also penetrates the interior space, to give the impression of living everywhere with nature” [6]. Testifying to the fact that “green additions have taken on various forms that continue to extend perceptions of the term” [7], Penelope Dean makes reference to projects which have set out to bring, through punctual interventions, a positive impact on living space at the scale of the city, such as Atelier Bow-Wow’s Void Metabolism, Emilio Ambasz’s Green Town and Toyo Ito and Associates’ Parque de la Gavia.

In certain cases, as in the work of architects Anne Lacaton and Jean-Philippe Vassal, the glasshouse figure is valued specifically for issues of material efficiency, aspects of comfort and climatic behavior. For the architects, “the potential of technology lies [...] in its ability to be reprogrammed and combined with other things” [8], not on its mere

reappropriation. In this context, the need to revise traditional means of representation and to connect building with processes that are external to it – the movement of its users, the flow of air, the angle of sunlight, energy flows – comes to the fore, reminding us that environmental sustainability is equally a representational and a design issue. The climatic drawings and section diagrams deployed by numerous projects of architects Lacaton and Vassal allude to the increasingly changing definition of the architectural agency which is not limited to physical and material aspects of space alone.

Under the growing sustainability demands, the union of art and nature in a “continuous sensorium” [9] calls for further theoretical attention. The glasshouse figure intersects with broader discourses on architectural ecologies as “it was the exercise of granting plants hospitality that first created the conditions under which it became possible to formulate a concept of environment” [10]. It resonates with contemporary theories which promote the understanding of the “environment as a shared climate” among humans, plants, and the environment, following German philosopher Peter Sloterdijk. For Sloterdijk, the greenhouse concept has nurtured a representation of nature as “non-external, as a housemate in the republic of beings,” in opposition to the theories that regarded the former “an outside force” [11]. The increasing union of art and nature in the “continuous sensorium” of regulated climates may enable a different understanding of nature in the context of design, one which surpasses the dichotomy between “naturalization” and “symbolization” [12] and points to new relations between human and non-human organisms.

Approaching “environmental design as atmospheric,” Sloterdijk “updates the concept of the environment into that of a *sensorium*, a sphere that is shared” [13], suggesting new forms of *togetherness*. Such a state reveals, in particular, Sloterdijk’s “concern with examples of intimacy and interiority,” varying from “primitive interhuman and interspecies notions of intimacy” such as biophilic connections to “increasingly large-scale and complex modifications of interiority” such as the control of indoor climate [14]. Sloterdijk focuses a critical attention on the “climatization of the inhabited space” which entails “envisaging the anthropogenic climate in all its thematic intrusiveness” following different degrees of environmental appropriation [15] that ring all the more familiar today as contemporary societies are confronted with the fragility of nature.

It renders explicit the quality, design, and agency of air, after the proliferation of “zones of a carefully manipulated climate, flooded with natural sunlight, overgrown with plants, and populated with humans” which, as cultural theorist Eva Horn remarks, “[represent] artificial atmospheres that experiment on the artificiality of nature itself” [16]. As the boundaries between nature and artifice are increasingly folding in, attention shifts away from static forms and solid volumes and is guided towards the design of envelopes, spaces of flows, and atmospheres with the aim to bridge quantitative and qualitative design criteria.

2 Pedagogy: Addressing Collective Housing Design as an Interface Between the Natural and the Manmade

Framed by these premises, the postgraduate design studio titled “The Architecture of the In-Between,” at the School of Architecture, Urban Planning, Construction Engineering (AUIC), Politecnico di Milano, addressed the intermediate space as a new interface

between built and natural environments. The studio placed a particular attention on the integration of architecture with nature – of open green spaces in collective housing design – reflecting on its ability to enhance environmental performance, notions of engagement and care. The studio explored how such integration may nurture new critical narratives and foster a critical reflection on the design of spaces for cohabitation in the contemporary city. It recognized in the figure of the greenhouse an opportunity for design experimentation to address current environmental issues and the shift from the physical to the physiological qualities of space, speculating on its future stance.

The first phase of the studio asked students to undertake a case study analysis concerning projects that have problematized the dichotomy between inside and outside. The notion of inhabiting spheres of different environmental qualities, in a state of co-presence, coevolution, co-breathing between human and non-human organisms, suggests the construction of “an environment of relationality and interrelational movements” [17]. The tracing of a genealogy of collective housing projects which have addressed the open space, landscape and natural environment in an explicit manner, revealed an evolving and multifaceted building typology, while challenging students to contemplate such integration in connection with contemporary social and ecological issues. It drew a novel attention to the character of liminal spaces, such as loggias, terraces, winter gardens, glazed atria and galleries, inherent to modernist and contemporary projects which have

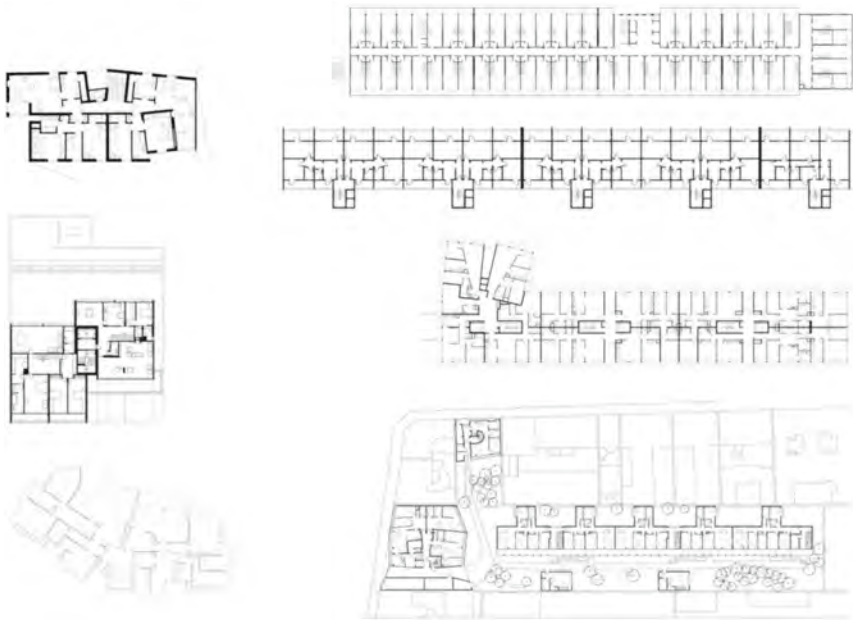


Fig. 3. Case study atlas: floor plan design (selection). “Thresholds. Architecture of the In-Between,” Architectural Design Thematic Module, Architecture of Interiors Design Studio (section B), AUIC School, Politecnico di Milano, a.a. 2022–23.

attempted to define more efficient, sophisticated, non-mechanical means for environmental control. The resulting case study atlas (Fig. 3) underpinned a critical comparative analysis of design precedents, exploring their potential to generate new conceptual definitions of intermediate spaces.

It reflected the studio's engagement with design discourses and practices that have interrogated architectural form *after* performance, coining novel approaches to the relation between aesthetic perception and social concerns. The critical comparative analysis of design precedents led to the tracing of controversial aspects regarding the case studies at stake, embracing the hypothesis that "learning about architecture by mapping controversies can cultivate a specific attention to the performativity of design and can ultimately result in better design" [18].

The impressions from the studied project were then integrated into a conceptual collage-manifesto: one of the adopted analytical tools, alongside processes of redrawing, schematic representation, photographic documentation and writing. The collages highlighted the manifold declinations of spaces of sequence, transition, and continuity between public and private, natural and artificial domains (Figs. 4 and 5). They addressed in-between spaces as zones in their own right, which organize transitions between the respective domains, pointing to the conceptualization of architecture as an articulated system of mediation with open boundaries. Crossing between historical precedents analysis and design speculation, the design studio was practiced in its ability to offer "a productive environment to conduct research, by engaging in wide-ranging networks, adapting seemingly determined technologies, and testing didactic structures and methodological approaches" [19].

The deployed tools included but were not limited to archival research, on-site surveys, observation, graphic representations and concept mapping, conceiving of the studio environment as "a workshop, a platform for debate, a synthesizer of ideas and concepts, as it takes advantage of the expertise of a wide range of individuals and fields of interest" [20]. The design proposals then set out to explore potential future scenarios of high-density dwelling which integrate the exterior open space as an integral part of the

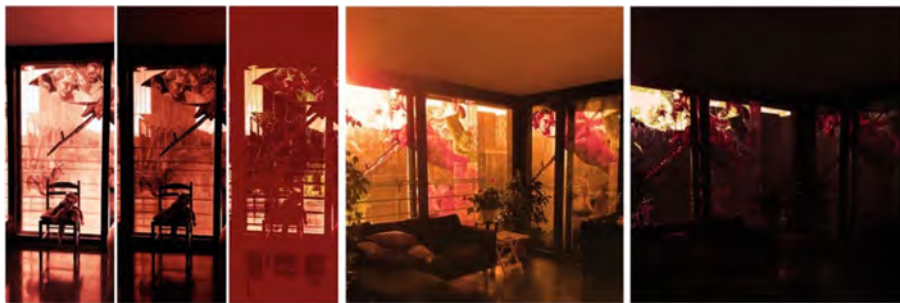


Fig. 4. Efimova A., Mijatov D., Vennitti J.M., Vujinovic K., Case study: manifesto – Francis Soler, 'Suite Sans Fin', rue Durkheim, Paris (1994–97). "Thresholds. Architecture of the In-Between," Architectural Design Thematic Module, Architecture of Interiors Design Studio (section B), AUIC School, Politecnico di Milano, a.a. 2022–23.

domestic environment (Figs. 6 and 7). Focusing on the definition of skins, filters, membranes and surfaces, the adopted studio method raised awareness among students about the relational dimension of architecture and the need to re-think patterns of cohabitation in the contemporary city.

To address the issue of design for sustainability, what emerges as important is our relationship to natural objects rather than their understanding as performative apparatuses in support of our increasingly regulated environments. It involves developing design proposals which do not merely attempt “to mitigate a building’s impact on natural systems, but [which seek], at least rhetorically, to become a part of those systems” [21], suggesting new hybrids between architecture and nature. The studio outcome ultimately set out to explore the implications into form, space and materiality that such notion entails. The various recent intersections between biology and building nurture the belief that “the concepts of nature and architecture are not separable but linked. The binary opposition between the natural and the artificial is increasingly called into question, conceiving of plants, flowers, and biomes as central elements of new design scenarios: “nature is just as designed as design is natural; life is planned in the same way that the plan is something alive” [22]. In such a context, architecture is not solely to be understood as the theory and practice of a singular building or the spatial design of our environment, but extends to encompass design, planning and visualisation of politics, economy, environment, future and human life in general” [23].



Fig. 5. Bayraktar B.N., Garre A.C., Saison L.I., Yesilyurt A.H., Case study: manifesto – Angelo Mangiarotti, ‘La Balossa’, Monza, (1972). “Thresholds. Architecture of the In-Between,” Architectural Design Thematic Module, Architecture of Interiors Design Studio (section B), AUIC School, Politecnico di Milano, a.a. 2022–23.

Seen from this perspective, the figure of the glasshouse underlines the urgency of safeguarding natural organisms and environments, enabling us to reimagine architecture as part and as an expression of nature, as something that emerges from within the latter, instead of opposing it. The condition of *living together* introduces a new understanding of the nature-culture oppositional relationship, fostering novel definitions of form, performance and aesthetic perception. Under the growing sustainability demands, the notion of aesthetics addresses “the relationship between sensory perception (the subjective) and quantifiable measures (the objective), and furthermore, they address the role of architectonics in informing the relationship between the expression of material culture and the environment” [24]: it emerges as “a discipline of reflecting on art as mediation between culture and nature” [25]. Initially a place for contemplation and retreat from the industrialized city, the glasshouse figure emerges today as a multifaceted design notion, as an operative and symbolic subject matter alike. In a context that sees design for sustainability lacking paradigmatic icons, revisiting the glasshouse as a symbol of a new aesthetic perception connected to collective housing may hold the key in establishing new connections between green objects and buildings. It re-affirms the need to define new means of aesthetic expression mediated through the project. It points, on the one hand, to a design stance which associates nature with the animation of culture and its symbols and which addresses, on the other, issues of environmental performance and the fragile ecosystems on which our living spaces depend.

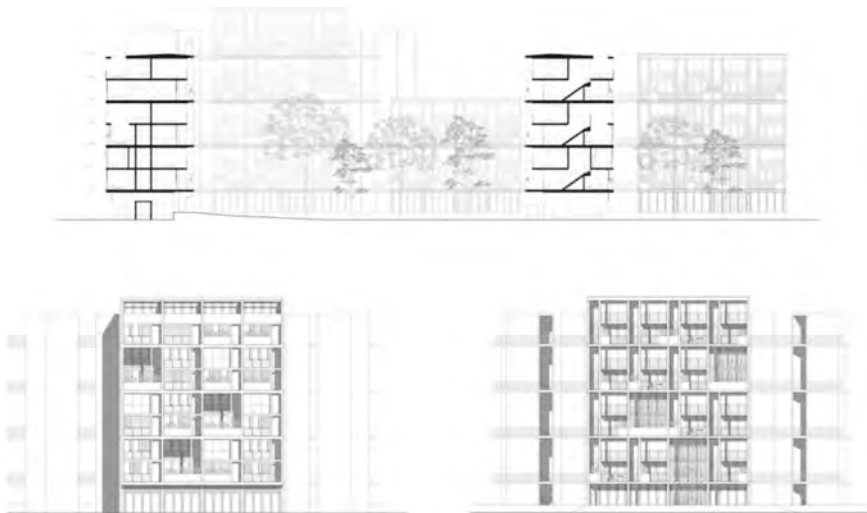


Fig. 6. Anversa A., Köhn M.K., Lo Vecchio J., Vignotti M., Project: section and elevations. “Thresholds. Architecture of the In-Between,” Architectural Design Thematic Module, Architecture of Interiors Design Studio (section B), AUIC School, Politecnico di Milano, a.a. 2022–23.

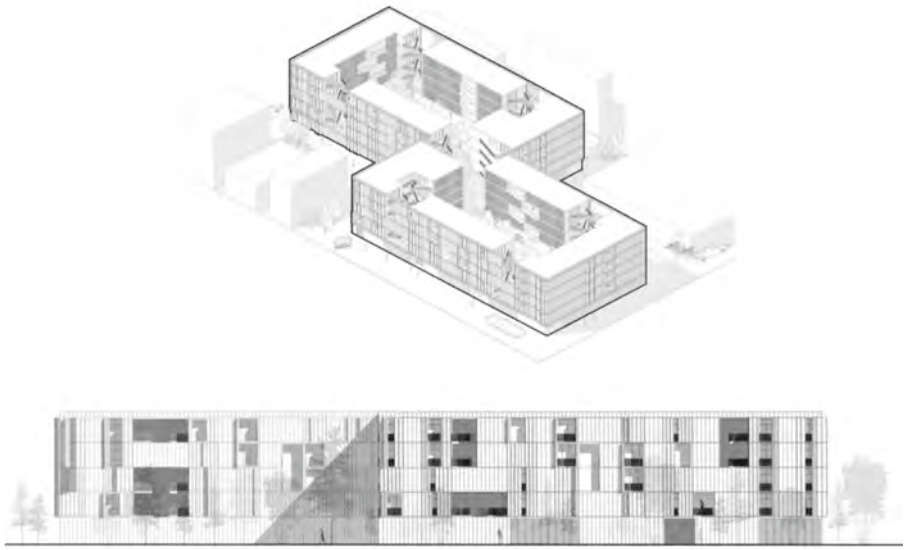


Fig. 7. Albin J., Morozova P., Pernot M.J.E., Rodríguez C.W.L., Veeramuthaiah N., Project: axonometric and elevation. “Thresholds. Architecture of the In-Between,” Architectural Design Thematic Module, Architecture of Interiors Design Studio (section B), AUIC School, Politecnico di Milano, a.a. 2022–23.

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Participation of Stakeholders in Open Architectural and Urban Planning Competitions. Procedure Model and Application in Croatian Context

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Abstract. The participation of society in public spaces issues, though advocated for decades, experiences an increase in recent years. Citizen participation in Croatian spatial planning appears to be mostly declarative and formally takes place in the final stages of planning. On the contrary, the full benefits of integrative planning would be if participation of all sectors (civil, academic, economy and management structures) is continuous, especially important in the initial planning phase - forming the basic intentions.

The selection of the best spatial solution by architectural and urban planning competitions has a long and fruitful tradition in European societies. It represents a good yet hermetic method in searching for the most appropriate, most innovative and overall best solution whose authors remain anonymous till the very end of the selection.

The question is how to combine these two widely accepted and proven procedures into one, to acquire the best creative solution and raise awareness and involvement of the community?

The article will present recent case studies of participation in open competitions in Poland, Germany, Norway, and Croatia. The contribution of this paper is the effort to present systematically the ways of participation and how they are linked to individual groups of stakeholders within the competition procedure. Through the comparative analysis, highlighting benefits and challenges, the combined procedure model is proposed and applied in the Croatian context.

Keywords: Participation · Architectural competition · Urban Planning competition · Quadruple Helix

1 Introduction

The procedure of architectural and urban planning competitions represents a long and fruitful tradition in European societies. The selection of the best spatial solution through these competitions is a good but hermetic method to search for the most suitable, innovative, and overall best solution, whose authors remain anonymous until the very end of the selection.

Regarding community participation in public space issues, it has been advocated for decades and has been experiencing an increase in recent years. Citizen participation in spatial planning seems to be mostly declarative and formally takes place in the final stages of planning. On the contrary, the full benefit of inclusive planning would be given if the participation of all sectors (civil society, academic, business, and administrative structures) is continuous, which is especially important in the initial stages of planning - when the basic intentions are formulated.

As for the mode of participation, we used an adapted version of Arnstein's participatory ladder [1] and considered those in the lower and middle part of the scale. Specifically, they are: informing; survey; interview; interactive discussion; creative discussion; and participation in realisation. As the level of participation increases, so does the involvement of the participants, both in terms of the amount of time that needs to be devoted to work, and in terms of intellectual effort as well as motivation. It is therefore not surprising that the number of participants decreases as the level of participation increases (Fig. 1).



Fig. 1. A scheme of inverse proportionality of the number of participants and their involvement, Zagreb 2023 (Scheme by authors)

Quadruple helix is a widely accepted model for conducting inclusive innovative processes with not only civil society [2]. Using a moderator as a neutral and objective subject, it brings together representatives of four groups: decision makers from management structures, experts on specific issues from the academic community, investors from the business sector, and citizens and associations as direct beneficiaries [3]. Observing the process, such as this research, through the Quad Helix model, can ensure appropriate and continuous involvement of all relevant stakeholders.

The question is how to intertwine the procedure of architectural and urban planning competitions and community participation methods to achieve quality process, without each of them losing its valuable qualities. In particular, the task is to include participation in the tender process without impairing the proven quality of the independent selection of anonymous solution proposals. The benefits we see that could come from this are community involvement that would result in public maturity and participatory data collection. Of course, there are also threats, mainly how to ensure the anonymity of the contestants and maintain professional integrity.

The goal of the research presented in this article is the formation of a procedural model that shows when and in which form it is possible to integrate some of the participatory methods within the architectural and urban planning competition. The method derives

from the analysis and comparison of examples of such practice, considering the positive effects and negative implications.

2 The Examples of Citizens' Participation in Open Architectural and Urban Planning Competitions

Although examples involving community participation in the conduct of architectural and urban planning design competitions are occasional, some research that tackle this topic are available within the European context. Europe shares the same issues related to participation in competitions, as current research shows.

The article by Bern and Røe from Norway [4] points out that, although competitions can arouse significant community interest, the institution of architectural and urban planning competitions cannot easily incorporate participation in its implementation. Through interviews with architects both anonymity and professional integrity issues were raised. The authors argue that the best practice is to involve the interested public as soon as possible, in the preparation of the competition task and in defining the problems and requirements. That is when the opinion of the wider public has an impact on competitors and their solutions without compromising anonymity, which is one of the valuable features of the competition process.

Some of the examples implemented a parallel assignments model, where different programmes were given as a task to different architectural offices that were invited to participate. Although this model can provide interesting insights from proposed solutions and involve participation on the greater level, it is not applicable where public procurement and competition obligations are mandatory. That is why we will not include those examples in further analysis.

Kowalczyk in his article [5] points out that it is impossible to reconcile presenting works to a wider audience before the final decision of the jury and maintaining anonymity. He demonstrates the anonymity issue through several illustrative examples that served as solid case studies for this research. Cases are chosen from some EU countries with diverse attempts to involve participation in different competition stages.

2.1 Design of the Main Square in Koprivnica, Croatia

In the Croatian context, the example of the competition for city square in Koprivnica from 2019 stands out, in which the opinion of the public was analysed and included in the competition program through the project terms of reference and the attached documentation [6]. Citizens' opinion was questioned on three levels: local stakeholder groups, internet questionnaires and field surveys. Such comprehensive involvement in the initial phase is proven to be not only possible but strongly recommended (Fig. 2).

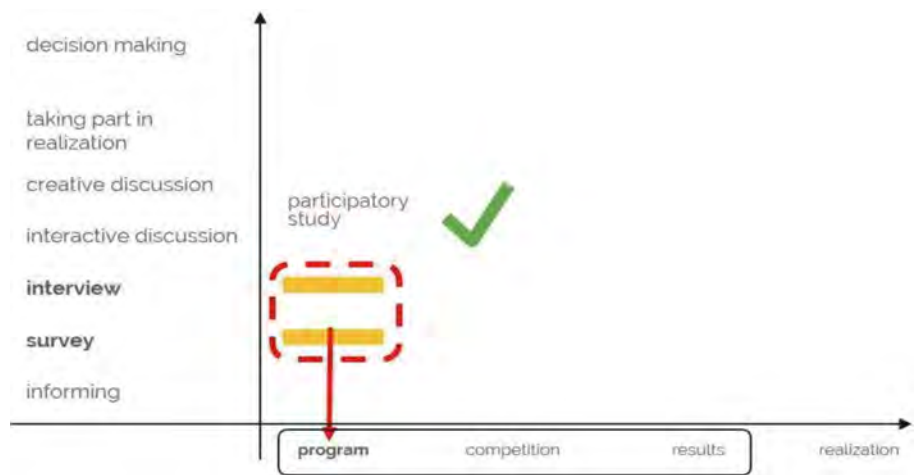


Fig. 2. Applied participation in the competition procedure for the design of the main square in Koprivnica, Croatia, 2023 (Scheme by authors)

2.2 Reconstruction of the Aeja in Komorow, Poland

For the Aleja Marii Dabrowskiej reconstruction in Komorow, Poland, a different formula was adopted. Delegates from interested groups were appointed and involved in the competition process as external experts, whose opinion on the individual works the jury must consider when making its decision. In this case wide participation was not ensured, but anonymity in the judging process was preserved [5] (Fig. 3).

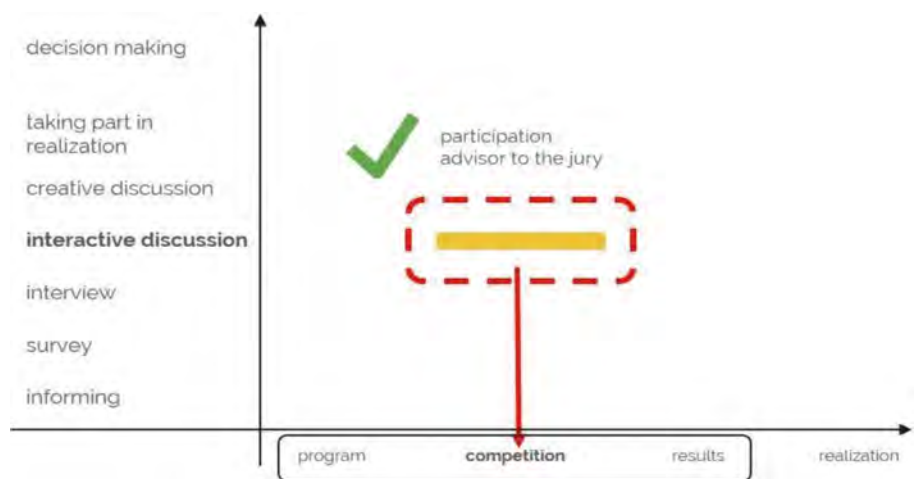


Fig. 3. Applied participation in the competition procedure for the reconstruction of the Aeja in Komorow, Poland, 2023 (Scheme by authors)

2.3 Construction of the Cultural Centre in Wolfsburg, Germany

Competition for the Cultural centre in Wolfsburg, Germany is an interesting example of a two-stage competition with an exhibition of the entries between stages with the introduction of the participation. After the 1st stage an open exhibition was organized in which local residents could participate. Citizens' comments were adopted by the jury and transformed into recommendations for the more detailed 2nd phase of the competition. Keeping anonymity while exhibiting the entries publicly presented significant organizational difficulty and risk. Still, the process was successfully carried out, with wide participation in the middle of the competition process [5] (Fig. 4).

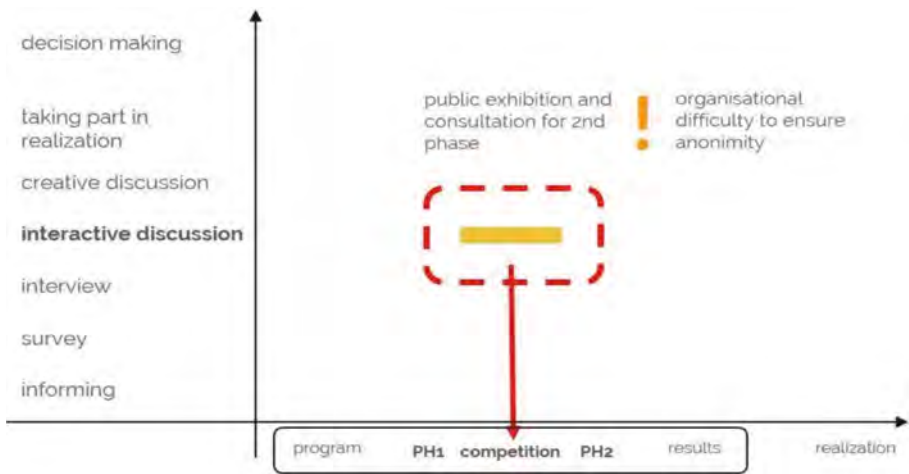


Fig. 4. Applied participation in the competition procedure for the construction of the cultural centre in Wolfsburg, Germany, 2023 (Scheme by authors)

2.4 Spatial Concept of the Central Square in Warsaw, Poland

Another interesting and somehow controversial example is competition for the spatial concept of Warsaw Central Square. Operated on the principle of maintaining anonymity and awarding five equal prizes from which the public was to choose the best solution through open consultation. This solution has been criticized by many architects that actually anonymity was not guaranteed in this way [5] (Fig. 5).

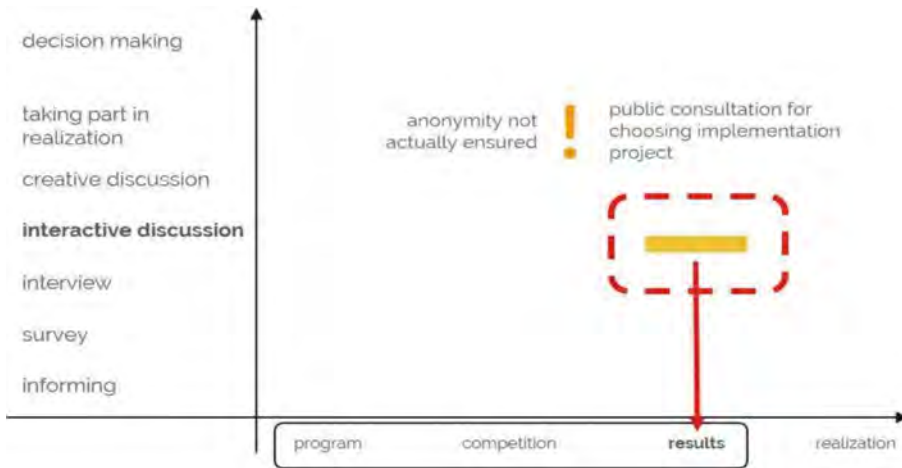


Fig. 5. Applied participation in the competition procedure for the spatial concept of the central square in Warsaw, Poland, 2023 (Scheme by authors)

3 Design of the Main Square in Petrinja, Croatia

Ongoing task, which is a part of this research, is the development of a project program for an architectural and urban planning competition for the project of the main square in the Croatian city of Petrinja. The City suffered significant damage in the earthquakes of 2020, especially the central zone, and establishing a new main square as a hearth of public life in the city was deemed fundamental for restoring faith in the normalization of life in Petrinja. Therefore, participation was an essential element of the process, as well as gaining the best solution through a competition (Fig. 6).

The creation of the competition program was preceded by a participatory study that included: informing the community, citizens' survey, interviewing experts who are familiar with Petrinja and/or the area of the square, and interactive discussions with the city's management structures [7].

Informing the community represents the first rung of the participatory ladder, the beginning of raising awareness of the possibility and need of involving interested citizens in the planning of the built environment. In the case of Petrinja, the public was already very interested in redesigning the main town square through several activities of non-governmental organisations as well as multiple inquiries from citizens to the town administration about the normalization of life in the town after the devastating earthquake.

During the spring of 2022, at the invitation of the City of Petrinja, the team from the Faculty of Architecture, University of Zagreb launched a complete process for programming the redesign of the city's central public space at the location of Croatian Veterans Square in Petrinja. The basis for the creation of a competition program for the Square and its surrounding area is a participatory study that included representatives of three relevant sectors: administrative, civil, and professional; through three rungs of the participatory ladder: survey, interviews, and interactive discussions.

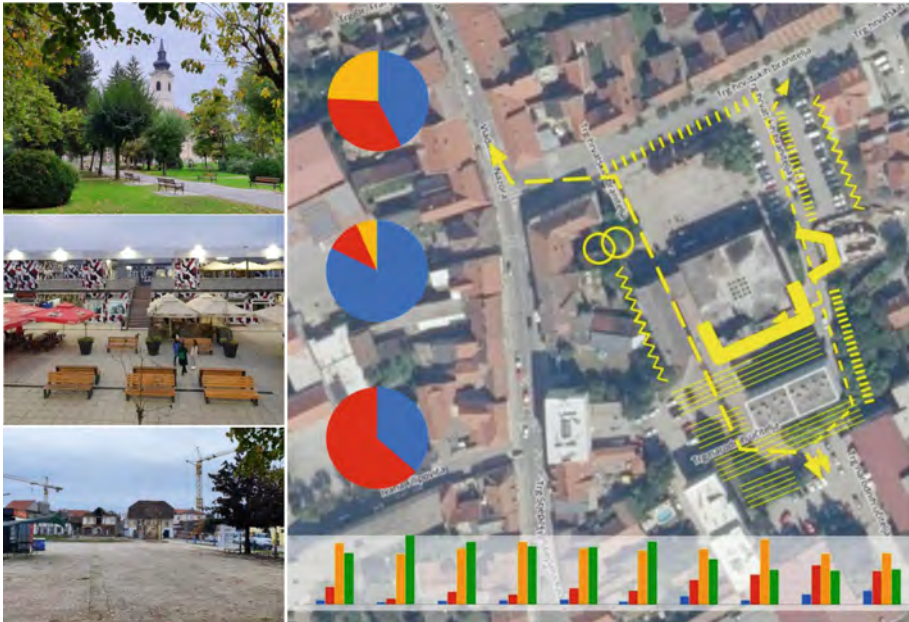


Fig. 6. Public spaces in Petrinja after earthquake and participation study results, 2023 (Scheme by authors, photographs by Gabriel Nikolić, Franka Omazić, Petra Omazić)

An online questionnaire was distributed among the residents of Petrinja, which at the same time informed them about the intention of redesigning the main square and asked important questions for viewing the space from the perspective of citizens. By surveying through a questionnaire, participation moved to the second rung of the participatory ladder. In the period from March 25 to 30, 2022, in just six days, 300 people answered the questionnaire, which represents a significant random sample. The questionnaire collected general information about the respondents, their opinion about life in Petrinja in general, as well as their opinion about the centre of the City of Petrinja and the main town square.

The third rung of the participatory ladder was reached in spring 2023 through interviews with important experts who actively participated or are still involved in planning and designing public urban spaces in the City of Petrinja. The expert insights of urban planners, landscape architects and architects are thus included in the research.

Interactive discussions, as the fourth rung of the participatory ladder, were held with members of the city administration of the City of Petrinja on several occasions in the period from April 2022 to May 2023 in the premises of the Petrinje city administration. Through in-depth discussions, an attempt was made to cover all topics of importance for the area of the main city square.

All data were processed, structured and interpreted in a participatory study that was submitted to the City of Petrinja in May 2023, and in which all significant elements of the intention for the urban development of the square were presented, coordinated with representatives of three relevant sectors.

The essential insights gained from the study are incorporated into the project program and represent a significant level of citizen participation in the creation of the task set before the contestants. Comprehensive participation model will be applied and will include public presentations and discussions both for the programme as well as competition results. Also, a representative for involvement will be included as a member of the jury, to ensure continuous participation as much as possible (Fig. 7).

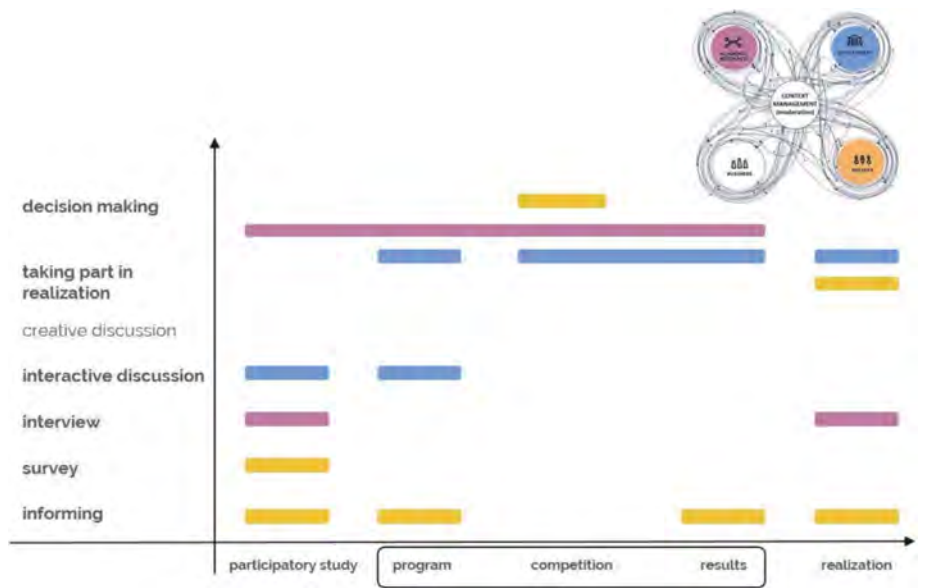


Fig. 7. Expected course of applied participation in the competition procedure for the main square in Petrinja, Croatia, 2023 (Scheme by authors)

4 Conclusion

Introducing comprehensive participation into procedures of architectural and urban planning competitions is not a straightforward process. As seen from the examples, conflicts in terms of continuously involving citizens and at the same time keeping anonymity emerge in the central phases of the competition, until the jury reaches its decision and announces results. Also, in the part when architects design their projects, keeping integrity of the profession (allowing architects to do their work) was advocated. The goal of this research was to find all possibilities of participation, without compromising anonymity and professional integrity mentioned above, considering that participation has several options and levels on the participatory ladder and bearing in mind that different design tasks have different needs for participation.

Roughly, we can indicate three types of participation within the procedure of architectural and urban planning competitions: before (in the preparation of the competition

program); centrally positioned (in making decisions on the ranking of the submitted works); and after (in communicating the decision).

Involving by all methods in the first phases before articulating an architectural program is not only possible but strongly recommended. Input from these participatory studies becomes the backbone of the competition brief / programme, and ensures that strong involvement from the very beginning is achieved.

In the central phase of the competition, while judging entries, wide participation compromises anonymity, but introducing a valid public representative as a member of jury or advisor to the jury, remains a reasonable option. Still, examples show that wide participation for certain cases in this phase can be practiced and successful, but with great care for the process and critical anonymity issue.

After the results are announced, public presentations or exhibitions are necessary to communicate the winning solution and bring it closer to the interested and previously involved stakeholders.

In some planning cases where architectural and urban planning competition and anonymity are not mandatory, stronger involvement in the direction of co-creating can be implemented. Models like parallel assignments given to different teams, co-creative workshops and similar are available, still this is not in the framework of this article, and these alternative models present potential for future research.

In conclusion, every design task and competition is different and requires its individual participation approach. This depends on several factors, for example how interested the stakeholders are or how high is their capacity for involvement. In terms of different tasks, some are easy to be involved in since they are familiar to the wider public, some are maybe too complex and are better to be solved in professional discourse. Sometimes, participation is requested to strengthen the community, improve relations between stakeholders or increase social cohesion.

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Architectural practice in the Digital Age: Balancing Adoption and Adaptation

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Abstract. The digital age presents both challenges and opportunities for the architectural profession. Architects must navigate the integration of new technologies, such as artificial intelligence and digital design tools while adapting to the evolving scope of their practice. This paper investigates the balance between adoption and adaptation in architectural practice, exploring strategies for architects to effectively engage with the digital landscape while maintaining the integrity of their profession. The outcomes of fully embracing new technologies and methodologies are contrasted with the approach of modifying existing practices to accommodate digital advancements, considering the implications for the architectural profession.

In addressing these issues, architectural education and research play crucial roles in preparing architects for the digital age by examining the relationship between design-based research, academic inquiry, and professional practice. This study investigates the advantages and challenges of digital technologies integration in design, decision-making, and resource allocation, as well as its influence on traditional professional boundaries and skillsets.

Drawing from an analysis of the current scope of architectural services, this study aims to provide architects (practicing and teaching) with a comprehensive understanding of the opportunities and challenges that the digital age presents, enabling them to make well-informed decisions about the future of their practice.

Keywords: Digital Technology · Architectural Education · Architecture · Adoption · Adaptation · Digital Transformation

1 Introduction

1.1 Digital World of Architecture

Architectural practice is undergoing a digital transformation, a transition that has been met with significant resistance as professionals grapple with integrating new technologies into established workflows. It appears that we are still in the early stages of implementation despite the impact of digital technologies on the nature of professional services. Insights from the Architects' Council of Europe (ACE) Sector Studies conducted between 2018 and 2022 indicate increased use of Building Information Modeling (BIM) between 2018 and 2020; however, its usage seems to have decreased since. We can identify the highest adoption rates in 3D modeling and rendering tools, hovering around

50%, and BIM at approximately 25%. Other tools, such as common-data environments, augmented reality (AR), virtual reality (VR), and 3D printing, are significantly trailing, with adoption rates of 15% or less [1].

The scenario in architectural education appears even more critical. The introduction of digital planning methods in architecture courses seems to be in its infancy. There is an urgent call to articulate expectations and strategize the integration of digital planning into architecture curricula [2]. That necessitates a profession-wide effort to define the minimum level of digital literacy students should learn through courses and studios at educational institutions.

The “Digital Planning in University Education” guide by the Federal Chamber of Architects in Germany (BAK) raises several relevant questions on what digital knowledge, skills, and competencies are essential for architects entering the third millennium, why, and how to integrate digital methods into the design process. [2] At the same time, digital methods integration requires the teachers to identify what advantages digital technologies offer compared to traditional methods, balancing the risk that faculty courses and studios could transform into software training sessions. That transformation could be incongruent with the principles of the Bologna system, which emphasizes the importance of experimental and innovative teaching content.

Our sector is notably atomized [3]. This fragmentation presents a challenge in adopting new digital technologies, and small and medium-sized enterprises (SMEs), which dominate our field, are at risk of being left behind. The American Institute of Architects Firm Survey Report highlights that 75.2% of architectural firms are considered small companies (1–9 employees) and account for only 18% of the total staff and 12.8% of billings in 2019. [4]. The situation in the European market is even more alarming, with the ACE reporting that 96.1% of firms are small-sized (1–10 employees), including a staggering 62.2% solo practices, 16.2% two-person offices, and 13.7% with 3–5 employees [5]. Digital solutions, often designed with larger enterprises in mind, are challenging to scale down to SMEs due to cost, lack of human resources, or a lack of digital competency necessary for adoption.

Aside from these challenges, the digital world is evolving at an unprecedented pace, with a 100-million-fold increase in computing power across various AI systems domains over the past decade [6]. Digital tools, particularly those integrated into the Building Information Modeling (BIM) process and the emerging suite of AI-enabled tools, could significantly enhance architectural processes and the overall quality of architecture. The AEC AI Hub [7], initiated by Stjepan Mikulić, sheds light on these tools in the architecture, engineering, and construction (AEC) industry, presenting both their potential and limitations. As we enter a new phase of the digital revolution marked by the Internet of Things, deep learning, and artificial intelligence, it is vital to recognize this as a continuation of the technological evolution in architecture, not a disruption. These advancements, especially AI text transformers and AI image generators, are reshaping the design processes, offering innovative approaches and efficient design exploration. While both bring the risk of generating mediocre content, they also provide opportunities for high-quality, innovative work, making it essential for architects to stay informed and proficient with these tools. The digital transformation in the building industry, exemplified by BIM, underscores the need for architectural services and education systems to

adapt more effectively to these technological advancements. Benefits of BIM, such as advanced project data management and cost control, highlight the importance of data structure and management skills not emphasized in standard architectural education.

This rapid development widens the gap between small and large companies, potentially intensifying the SMEs' challenges. Even in large firms, issues such as data inconsistency across projects persist, a point highlighted by Martha Tsigkari and Sherif Tarabishi of Foster + Partners [8]. Paradoxically, this inconsistency could be providing a lifeline for smaller firms. However, this paper posits that now is the crucial time for the architectural community to engage proactively, offering insights and strategies to navigate this digital landscape.

1.2 Balancing Adoption and Adaptation

This research explores how the distinctions between adoption and adaptation can significantly influence outcomes and implications within the architectural profession. This inquiry is especially pertinent in environments dominated by SMEs. In the context of this paper, I will define **adoption** as selecting, implementing, and embracing new digital technologies, tools, and methodologies within architectural practice. Conversely, **adaptation** refers to adjusting existing practices, tools, and methods to accommodate the shifts brought about by the digital era. While we cannot guarantee adaptation only by adopting new technologies, it is often a crucial step in the broader change process.

But what influences these choices, and how are they manifested within the architectural practices? Moving beyond the classic adopter categorization curve based on innovativeness as outlined by Everett M. Rogers, Moore introduces a nuanced perspective, identifying psychological gaps between different adopter groups. The Chasm, as he terms it, is highlighted as a critical gap in this context. To the left of the Chasm, we find Innovators and Early Adopters - individuals motivated by the prospect of revolutionary change, architects typically characterized as risk-takers, prioritizing long-term impact over immediate practicality. On the opposite side of the Chasm are the Early Majority and Late Majority adopter groups [9].

Our focus, particularly for broader adoption, is on the Early Majority group. These architects are open to new technology, simultaneously seeking incremental improvements of existing practices, tools, and methods. They could play a pivotal role in guiding the architectural community through the digital transition, striking a balance between embracing innovation and preserving professional integrity. The challenge, and at the same time the goal, is to make the digital transformation accessible and advantageous for the majority.

1.3 Hypothesis

Within the architectural profession and education, there is a visible tension between the slow-paced evolution of systems and practices and the rapid progress characterizing the contemporary digital era. This dichotomy is particularly pronounced due to the atomized nature of the market, leaving architects in an uncertain position regarding the sustainable future of the profession. The building industry sector, by contrast, seems to be outpacing architects, intensifying the pressure on the profession.

Notably, resistance to change is a persistent issue rooted in a complex web of psychological factors, including fear, emotional responses, and individual biases. This research posits that these psychological elements play a critical role in shaping decision-making processes for architects and their ability to adapt to change. The study maps these psychological factors against the industry-specific challenges that are most influential in the decision-making processes of architects.

Multi-criteria analysis is conducted based on the data collected from three surveys to understand these complex challenges, providing architects and educators with insights that could help navigate these uncertain times and contribute to a more flexible and resilient profession.

2 Challenges of Digital Transformation

Resistance to change among people appears to originate from various factors, which we could categorize into two main groups: individual and situational factors [10], where individual factors represent the behavior caused by personal features, and situational factors represent behaviors caused by the environment. While these factors in the research by Darmawan and Azizah initially describe employee resistance within an organization, they can also apply to a market characterized by its atomized nature, where employers often double as employees. Several factors from each group significantly affect adoption in our environment and are relevant to this paper.

We can identify six main **individual** factors: lack of confidence due to insufficient training and resources, fear of failure, increased stress, feelings of uncertainty, low motivation, and poor self-efficacy. Out of **situational** factors, we can identify high ambiguity and inadequate information, inadequate communication and organizational silence, lack of participation in change processes, insufficient work integrity, an ever-increasing sense of job insecurity, and a weak organizational culture with professional associations and universities failing to be transparent leaders.

Additionally, often unrealistic timelines for adoption and existing organizational culture and norms play a crucial role at the organizational resistance level.

Finally, the endowment effect, a well-documented cognitive bias, plays a crucial role, revealing itself as a significant resistance factor. Experts, architects in our case, tend to overvalue their established knowledge and show reluctance toward adopting new methodologies. This reluctance becomes particularly pronounced in situations that demand significant technological advancements and a transformation in organizational standards, all necessitated by digitalization.

Within the specific context of our field, I have identified five main areas of industry-specific challenges.

Market Dynamics: Issues of productivity and market fragmentation strain the architectural profession. Efforts are continuously underway to deregulate the profession at a European level, as highlighted in the ACE The Economic Benefits of Regulation in Architectural Services report [3].

Historical Processes: The long-standing traditions influence the architectural profession, which has ingrained the way of doing business. Altering these established methods carries associated costs, contributing to resistance against change.

Collaboration: The atomized nature of organizational structures in the architectural field hinders effective teamwork. A notable issue is the *collaboration paradox*, which refers to the inability to achieve real-time collaboration in such a fragmented market, amplified by limited human resources. Here, we can also observe the form of the *productivity paradox* (also the *Solow paradox*) in a situation where IT collaborative tools designed to enhance efficiency consume more time than they save if they are not utilized adequately or are misused.

Education and Research: There is a noticeable delay in adopting new technologies within educational institutions and research bodies [2]. Moreover, there is inadequate dissemination of knowledge in schools, universities, and through continuing professional development programs within professional associations, which is especially accented on an interdisciplinary level [11].

Complexity and Variability: A diverse array of stakeholders and constantly changing regulations characterize the architectural field, which leads to high levels of volatility, uncertainty, complexity, and ambiguity (VUCA) [12].

Each of these areas has unique issues, ranging from market volatility to the challenges of real-time collaboration, all of which contribute to the overall resistance to change in the industry.

3 Survey

To validate my initial hypothesis, I conducted a survey targeting architects in Croatia to gain insight into the adoption of technology within our profession, customized for three distinct groups: practicing licensed architects, architecture students, and architecture faculty members, with minor adjustments in questions to suit specifics of each group. The distribution of the survey was as follows:

Practicing Licensed Architects: Disseminated through the Croatian Chamber of Architects, the survey saw participation from 120 out of 2,834 active members. Among the respondents, 84 categorized themselves as employers.

Architecture Students: Conducted at the University of Zagreb, Faculty of Architecture, where undergraduate and graduate programs participated, with 130 out of 862 students responding. That included 43 Master's students and 87 Bachelor's students.

Architecture Faculty Members: At the same University, 32 out of 106 teachers participated.

The survey aims to analyze the current level of integration of new technologies among practicing architects, students, and educators. Apart from general demographic data, a self-assessment of respondents' knowledge of computers, data protection, and cloud storage is collected. These questions, deemed irrelevant to this analysis, will form the basis for broader research in the future.

The questions relevant to this paper delve into three topics: **integration, education, and frequency of use** of different digital technologies in the work environment. The survey covers the most frequently used digital tools, categorized into eight major software groups. In the following diagrams, the alpha-numeric symbol within specific groups represents the software tool, as is presented in Table 1. Additionally, two hardware categories, Virtual/Augmented reality (VR/AR) and 3D printing, are assessed.

Table 1. List of software tools

Tool group	Software tools					
BIM	a1 Autodesk Construction Cloud	a4 Archicad				
	a2 Graphisoft BIMcloud SaaS	a5 Revit				
	a3 Allplan					
CAD	b1 AutoCAD					
	b2 Rhinoceros					
	b3 SketchUp					
Office	c1 Google Docs	c4 Microsoft Word				
	c2 Google Sheets					
	c3 Microsoft Excel					
Photo Editing and Graphic Design	d1 Adobe Acrobat Professional	d4 AdobeInDesign				
	d2 Adobe Acrobat	d5 Adobe Photoshop				
	d3 Adobe Illustrator	d6 CorelDRAW				

Tool group	Software tools			
Visualizations	e1 3DS Max	e4 Lumion		
	e2 Blender	e5 Twinmotion		
	e3 Enscape			
Programming	f1 Dynamo	f4 Other programming tools		
	f2 Grasshopper	f5 Python		
	f3 Basic/Visual Basic			
AI and Data analysis	g1 Microsoft PowerBI	g4 OpenAI - DALL-E		
	g2 Midjourney	g5 Stable Diffusion		
	g3 OpenAI-Chat GPT			
Urban Planning	h1 Autodesk Forma	h4 Map 3D		
	h2 ESRI ArcGIS	h5 QGIS		
	h3 ISPU			

3.1 Integration

Participants responded to five questions in this category.

In **Question 1**, participants self-assessed the digital tools integration, regarding their familiarity and usage of various software tools in their work through the 7-level scale: ? = never heard of; 0 = did not use; 1 = installed and opened; 2 = introduced to interface and tried elementary functions; 3 = used elementary functions in work; 4 = used advanced functions in work; 5 = expert with certificate (Fig. 1).

In multiple-choice **Question 2**, participants indicated why they had not integrated specific software tool groups into their work through multiple-choice answers, such as I use the tools intensively, I do not use/need these tools, lack of support, lack of time for learning new tools, I feel that technology limits my creativity, fear of negative impact on my obligations, high price.

In **Question 3**, participants indicated the integration of virtual/augmented reality technologies, and in **Question 4**, if they had incorporated 3D printing into their work, teaching, or studio assignments.

In **Question 5**, only practicing architects were asked if they had developed a digital transformation strategy for their company, and those participants who responded positively selected the activities planned by this strategy in multiple-choice **Question 6**. The participants chose from various digital transformation activities: implementation of BIM, website creation, social networks management, development of proprietary add-ons in the field of BIM, improvement of cybernetic security, integration of VR/AR technologies, development of applications for E-commerce, development of proprietary software/tools in the field of artificial intelligence, and integration of 3D printing technologies.



Fig. 1. Question 1 – self assessment of the digital tools integration (survey data diagrams), 2023, (by Damir Mance, previously unpublished)

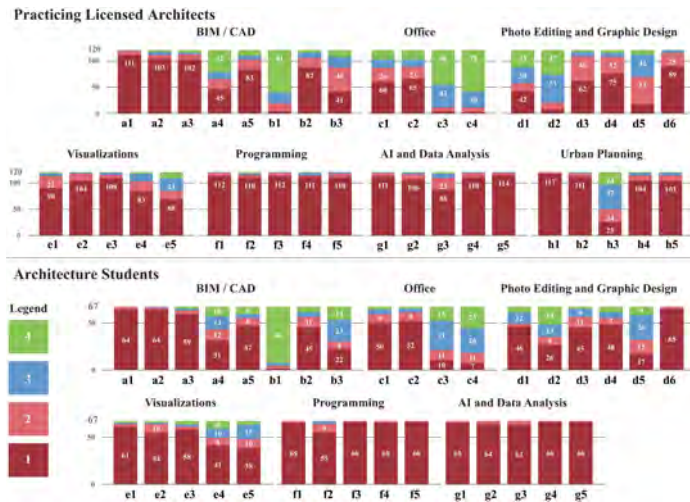


Fig. 2. Question 9 – Usage frequency of software tools (survey data diagrams), 2023, (by Damir Mance, previously unpublished)

3.2 Education

In this category, all participants evaluated their level of agreement with the statement regarding the necessity of providing students with additional education on digital tools and technologies in **Question 7**, rated on a scale from 1-Disagree Completely to 5-Agree Completely. Only practicing architects evaluated the digital literacy of students and interns within the work environment in **Question 8**, also rated on a 5-point scale.

3.3 Frequency of Use

Through **Question 9** participants evaluated how frequently they use specific software tools in design assignments within the office setting. Only practicing architects were included in this part of the survey, with students who had participated in internship programs (totaling 67 students).

Figure (Fig. 2) displays the usage patterns of various software tools, where participants rated their frequency of use on a scale from 1-Never to 4-Daily.

4 Analysis

I used the Microsoft Power BI engine to analyze and visualize the data collected from the surveys, allowing for specific options and filters tailored to each respondent group. This chapter provides insights based on the key findings from the eight major digital tool categories: BIM, CAD, Office, Programming, Visualizations, Photo and Graphic Design, AI and Data Analysis, and Urban Planning.

4.1 Integration

The visual data from Fig. 1 highlights a predominant unfamiliarity with many tools among the respondents, marked by the red bars indicating a lack of tool use in the work environment. Despite this, essential tools like CAD, Office, and Adobe Suite maintain their status as industry standards, with the growing use of Archicad indicating a slow but positive shift toward BIM. Students showed similar trends, favoring Rhinoceros and Sketchup, albeit at beginner levels, which also reflected in the skills of teachers.

The usage of BIM tools has slightly improved compared to past studies, but it is still not at the desired level within architectural offices and education. We could attribute the lack of certifications among respondents to factors such as employer indifference, cost, time commitment, low perceived value, and overconfidence in personal skills.

A surprising 40–60% of practicing architects cited lack of time for learning as the main reason for not using certain tool groups, a sentiment echoed by 30–75% of students, especially when it comes to more complex tools like BIM, programming, and AI. Teachers shared similar concerns, with the added fear of courses transforming into software training sessions.

VR/AR and 3D printing usage remains below 15%, except for students engaging with these technologies in their free time, at 24.6% and 36.2%, respectively. Respondents mostly use these tools for design presentations to clients.

Regarding digital transformation strategies, only 13.1% of participants confirmed their development, predominantly at early stages and revolving around BIM implementation, website creation, and social network management.

4.2 Education

Over 71% of all participants firmly believe that students should receive additional education on digital tools and technologies. Practicing architects rated students' digital literacy at an average level, suggesting that professional practices are more advanced in applying certain digital technologies than current academic curriculums.

Additionally, participants responded to specific questions related to learning material sources and the potential benefits of digital tools in architectural practice. The majority acknowledged the significant advantages digital transformation could bring to the field.

4.3 Frequency of Use

Data on tool usage frequency reaffirmed the dependence on CAD, Office tools, and the Adobe suite, with limited utilization of other technologies. Predominantly selected were Never and Rarely categories, indicating a substantial untapped potential in various digital tools. Students' responses mostly mirrored those of practicing architects, with notable differences in the less frequent use of Office tools and Adobe Acrobat and more frequent use of SketchUp and Photoshop, likely due to their educational and studio work contexts (Fig. 2).

5 Conclusion

Survey data highlights significant skill gaps, particularly in emerging technologies like BIM, AI, and data analysis, underscoring the need for focused training and education. Traditional tools such as CAD, Office applications, and the Adobe Suite continue to be the mainstay of architectural practice, signifying resistance to change while providing a foundational basis for integrating new technologies. The findings from the survey bring us to a pivotal question: What role can educators play in addressing the evident skill gaps in digital literacy within the architectural profession?

Today, only a small percentage of SMEs have embraced advanced technologies or developed a digital transformation strategy, representing a niche of industry innovators poised to lead the change. Being architects, adapting to these changes is crucial to remain relevant and competitive. In a market characterized by a predominance of micro-sized architectural offices, the sustainability of the architectural profession is at stake. Large architectural companies typically employ 2–4% of digitally advanced staff, focusing on tech implementation and research. That is not a feasible model for smaller firms, where dedicating architects solely to tech subjects is considered a waste of resources. While outsourcing is an option, it often results in time delays and losses in an increasingly productive environment. Due to the inherent limitations of SMEs, they cannot carry the responsibility for digital transformation. Therefore, it is imperative to promptly adjust architectural school curricula to meet the growing demand for digitally literate architects.

While the lack of education in schools and faculties is a significant issue, there is no need to educate all users to an expert level. Larger offices typically reserve advanced and expert tool use for a small percentage of their staff, indicating a possible pathway for educational institutions. Implementing minimum standards for various digital tools and technologies in the curriculum is crucial, with advanced and expert levels reserved for enthusiasts through elective courses and higher education.

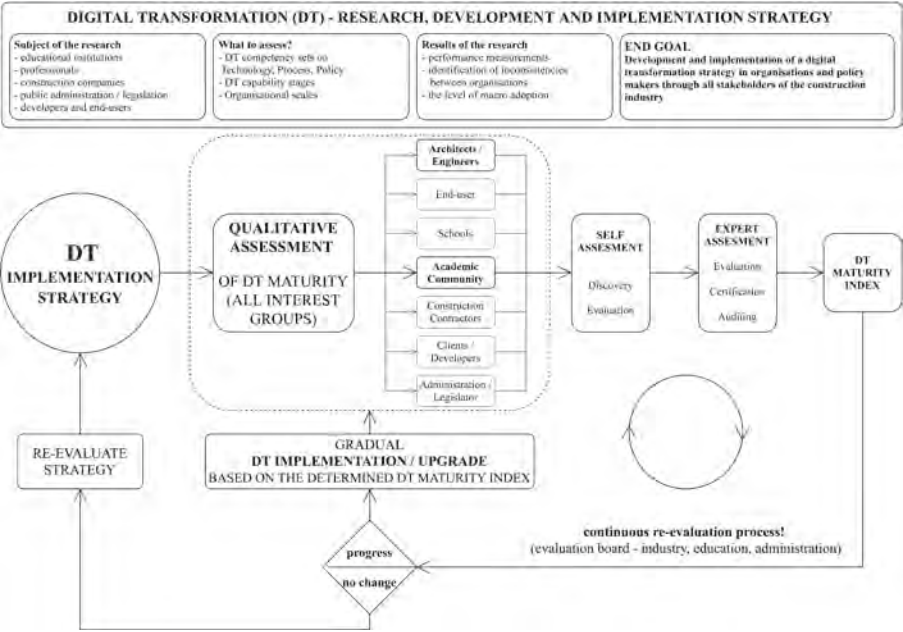


Fig. 3. Digital Transformation – Research, Development and Implementation Strategy, 2023, (by Damir Mance, previously unpublished). The diagram is based on BIM – Research, Development and Implementation strategy [11] and Building Information Modelling maturity matrix [13] and adapted for digital transformation of construction industry in general.

With the digital standards in the architectural sector being relatively low and lack of time frequently mentioned as a significant barrier to adopting new tools, identifying and addressing areas for improvement is essential. Key areas to focus on include:

Active Engagement with Technological Advancements: Tailoring the adoption of new technologies to match the current maturity level of users is crucial [13], which is especially important in integrating new digital technologies such as BIM or AI into the design studio at architectural schools [11]. That ensures a gradual and sustainable transition, enabling users to implement new tools into their workflows effectively (Fig. 3).

Use Case Analysis: It is vital to evaluate the suitability of each tool for specific business objectives, assessing how well a technology addresses the needs of a particular use case. This process not only aids in selecting the right tools but also provides guides on how they contribute to achieving the set objectives (illustrated in Fig. 4).

Enhanced Communication Strategies: Developing platforms dedicated to e-learning and the experiences exchange can foster a collaborative learning environment, ensuring that knowledge is shared efficiently across the board.

Integration of Advanced Project Management Techniques: Planning for the integration of digital technologies in both educational and professional settings requires advanced project management strategies. Emphasis should be placed on effective time management to ensure a smooth transition.

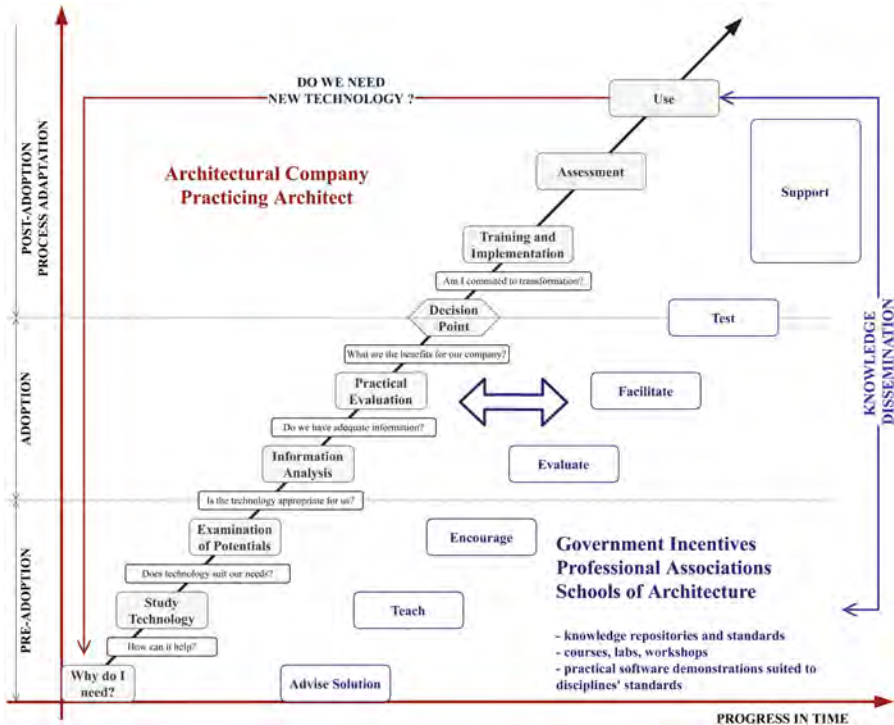


Fig. 4. Adoption of Digital Technologies decision-making process diagram, 2023, (by Damir Mance, previously unpublished). The diagram is based on Construction Technology Adoption Framework (CTAP) [14] and adapted for the architecture sector. The CTAP is a framework that delineates the phases of the process that customer organizations use when deciding to adopt a new digital technology as well as the parallel vendor activities [15]. In this adaptation, instead of vendors, government incentives, along with professional associations and schools of architecture, are positioned as facilitators in the transformation.

Extracurricular and Summer Learning Opportunities: Introducing students to new tools and digital processes early in their undergraduate studies is essential. By doing so, we can prevent studio sessions from becoming mere software training classes, ensuring a holistic educational experience in compliance with the Bologna process.

Leveraging Government Incentives: Proactively working towards digital technology adoption is critical, and government incentives can play a crucial role in facilitating this transformation. Encouraging policies and funding opportunities can provide the necessary support for educational institutions and small architectural practices.

In future research, I intend to refine the survey to engage more respondents and critically examine digital transformation, including AI. While the limited sample size of the survey necessitates caution in interpreting the results, the implications are significant if non-participation reflects a disinterest in digital change.

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Aligning the Pedagogy of Postgraduate Professional Practice Courses to Develop the Meta-competencies Required of Architects Today

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Abstract. The architectural profession can be seen as a developing and multi-disciplinary career, which has evolved from the Vitruvian sole master to the need for specialisation and collaboration in multidisciplinary teams. As a regulated profession, postgraduate professional practice courses in Ireland and the United Kingdom (UK) play a critical role in the registration process for Architects. However, there is little research published on the pedagogy of these courses nor their suitability to the evolving demands on the multifaceted role required of Architects today. As a result, there is a need to reassess professional practice courses considering the competencies required in Architect's diverse ways of practice. Over the past two decades, the number of Irish institutions offering Bachelor and Master of Architecture courses has increased significantly. Therefore, the demand for developing a new postgraduate course to meet the increased number of graduates is acknowledged. This presents an opportunity to address the research gap identified and to explore innovative approaches to curriculum design, delivery and assessment that can enhance learning while adapting to the changing societal, environmental, technological and professional challenges of architectural practice. In a desktop study, courses in Ireland and the UK were systematically examined to reveal fundamental similarities, with some significant variances. The study highlights the importance of reflective practice and multidisciplinary learning in preparation for the global challenges of the built environment. The complex nature of the architecture profession requires a diverse range of skill sets, knowledge and competencies as well as meta-competencies.

Keywords: Professional Practice · Postgraduate · Architecture · Education · Meta-competencies · Multidisciplinary

1 Introduction

Successful completion of postgraduate professional practice courses is a component of the common pathway for the registration of the title of Architect in Ireland and the United Kingdom (UK). The popularity of the architecture profession is increasing with

the number of Architects in Europe rising to 100,000, and Ireland's number of registered Architects rising by 25% in the last ten years to 3300 [1]. Despite this, "professional practice" is an under-researched area, within the context of architectural education [2]. In the past, Master Builders such as Michelangelo and Vitruvius had extensive knowledge of all aspects of the design and construction of buildings and worked independently to a high level of expertise and mastery. With significant societal, scientific and technological developments, the building process gradually became more complex and resulted in the requirements of specialised fields and expertise. As Rifaat [3] points out, it became unattainable for Architects to "effectively emulate the performance of the old masters." Today there is a requirement for Architects to oversee the process and to act as coordinators [4] and mediators [5] between different professionals. A considerable amount of literature has argued that the ability to collaborate across and communicate with professionals and workers from different disciplines is indispensable for the role of an Architect today [2, 5, 6]. The 21st-century Architect is understood to lead less and facilitate more and they are vitally important as part of a collaborative team [7].

2 Challenges of Professional Practice

In the pursuit of effective pedagogical approaches for architectural education, Borucka and Macikowski [4] assert that it is imperative to, first, understand the contemporary role that the Architect holds today. Similarly, Legény et al. [8] remind us of the evolving role of the Architect and argues that educational institutions need to react to the constant change in the architectural profession. Architects have to respond to an increasing level of complexity in the design and construction process. There is consensus in the literature that Architects have to navigate uncertain and changing situations that lead to diverse and evolving demands [9]. In particular, there is greater pressure on the role due to societal challenges, such as the recent pandemic and future inevitable forces that are unknown [7]. There are other challenges in the form of volatile economic forces [10], increased regulatory requirements [11], technological advances, including the evolution of digital tools, artificial intelligence and immersive technologies [12, 13]. However, one of the most pressing issues is the requirement to respond to climate change [14], and meet the requirements for climate neutrality by 2050 [15]. In addition, there is more emphasis placed on the social responsibility to design inclusive, sustainable spaces that are responsive to the needs of the community [16]. The perceived definition of 'ethics' within the architectural profession has expanded to create the requirement to design and build for the benefit of the public good and not just the good of the client [6]. Furthermore, it is acknowledged that the vast number of different specialists and stakeholders involved in the design and construction process today adds to the perplexity of the process. Bourka and Macikowski [4] point out, that the complexity is also concerned with the communications among different participants and the diverse fields of knowledge required as a result. Yet it is noted that unwillingness towards engagement with other construction professionals is a weakness in the profession [17].

These challenges will require changes in the working environment and in the professional landscape [7]; moreover, interdisciplinary cooperation and teamwork are proposed as key to dealing with these problems [18, 19]. Architects are required to possess

proficiency in implementing theoretical knowledge to complex situations and a holistic knowledge of their own profession. However, MacLaren & Thompson [6] point out that they also need to possess an understanding of their own role in relation to the broader team, be able to communicate with these stakeholders and have an implicit understanding of the other roles within the team. While the importance of ‘collaboration’ within the construction industry has been extensively highlighted, criticism of the “singular discipline mentality” that exists within the industry has been recognised [20]. It has been argued that the need for effective collaboration in all areas of work will assume greater significance and be essential in order to meet the requirement to achieve Net Zero Carbon by 2050 [21]. It is argued that these challenges require more flexible and adaptable ways of practice [9, 18] and a positive attitude towards engagement for successful sustainable interdisciplinary collaboration [22]. Furthermore, Samuel [10] proposes reforms in architectural education to enable more socially aware professionals. Similarly, Scott [24] highlights the need for emerging ways of practice to be more effectively addressed in education and argues that there are shifts required in learning paradigms to tackle the complex global challenges [25]. Analogously, the Education Policies and Standards produced by the Royal Institute of Architects of Ireland (RIAI) [23] propose that to address the ever-expanding scope and complexity of the Architect’s role, more effective collaboration within the profession and with allied professions is required. Consequently, the priority placed on collaboration by the RIAI is further evident in the theme and title of the RIAI Annual Conference 2023 entitled ‘Collaboration’.

3 Education of the Profession

Traditional teaching approaches in architectural and engineering courses are primarily founded on passive learning and as such have received a significant amount of criticism. Stump et al. [26] argue that these traditional methods are unsuccessful in preparing students for professional practices. Oliveira et al. [27] suggest that the siloed discipline-based structure of architecture and engineering courses is the reason for failure to meet the current or future needs of the industry [27]. Furthermore, it is argued that the tendency within architectural education to give priority to traditional design knowledge rather than collaborative and critical learning is unfavourable and leads to disconnected experiences [27]. Notwithstanding this criticism, there are some notable examples of interdisciplinary learning present in the history of architectural education, specifically the London County Council (LCC) School of Building in Brixton (1904–1970s) and the Bauhaus Art School Dessau (1925–1932). In the LCC School of Building in Brixton, the emphasis was placed on instructional setting and Building Trades and Architects were taught under the same roof [28] (Fig. 1a and b).



Fig. 1. a and b. School of Building: Carpentry and School of Building: Stone Masonry Class by unknown, photograph © London Metropolitan Archives (City of London).

While at the Bauhaus, Walter Gropius' aimed to create a comprehensive artwork that would eventually bring all the arts together. The Bauhaus curriculum included elementary form and basic studies of materials taught over the first three years (See Fig. 2 and 3). Only after completing the fundamental courses were the best students allowed to progress to the core architecture course.



Fig. 2. Gropius, Walter, (1883–1969). (1925–1926, Image: 05/15/2003). Bauhaus, exterior, workshop wing, view from south. [Art schools]. Retrieved from <https://library.artstor.org>

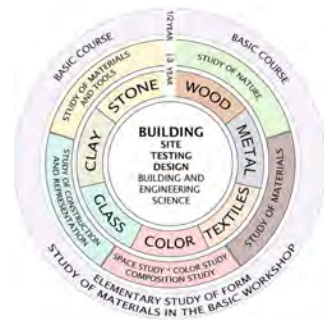


Fig. 3. Diagram of the Bauhaus Curriculum, CC BY-SA3.0, <https://creativecommons.org/licenses/by-sa/3.0/>, via Wikimedia Commons

Although it is acknowledged that courses such as the Bauhaus and LCC School of Building had a historical influence on architectural education, there were few other examples of multidisciplinary or interdisciplinary learning in architectural education prior to 2000 [29]. The education sector has been much slower than industry to focus on integrating multidisciplinary collaboration and teamwork. There is a relatively small body of literature concerned with collaboration between design and construction disciplines within an educational context [30]. The majority of these studies have been qualitative and have focused on interdisciplinary design collaboration and teamwork using digital modalities [31]. A frequently observed theme in recent studies published on interdisciplinary learning within architecture courses is the presence of an overarching aim of sustainable building practices [30, 32, 33]. However, it should be noted

that the preponderance of recent studies pertains to experiences and projects that are relatively short (commonly only lasting between four days and five weeks) [34].

There is consensus that the vast majority of architecture students' time is spent working alone with limited opportunities to collaborate with students from other disciplines. As a consequence, it is argued that architecture students lack the ability to effectively communicate and collaborate [5]. In this respect, the Architects' Council of Europe advise that teamwork and collective intelligence should be prioritised over the rigid categorisation of disciplines in a new systemic condition of teaching [15]. In addition, they advise developing relevant skills to support research in practice [35].

4 Pedagogy

The principal approach of architectural teaching focuses on the Design Studio. This learning paradigm supports integrative learning to lead to creative exploration and critical discourse. The Design Studio was proposed by Schön [36] as an exemplar for other professional courses. Paradoxically, other architecture modules (including professional practice) are generally taught in a more didactic, disintegrative way [37].

The scholarship of teaching and learning provides empirical support for the efficacy of peer learning in architectural education. The conversation theory framework offers a way to explain how interactions lead to knowing [38]. As well as bolstering students' confidence and competence, peer learning is also credited with alleviating students' anxiety [39]. Furthermore, in drawing from fields such as situated learning, interdisciplinary learning is recognised as emphasising the collaborative construction of knowledge in specific contexts and its benefits are not contested. Moreover, social anthropology aligns with this concept of learning as a social process in which knowledge is co-constructed and is situated in a specific social and physical environment [40]. In addition to Bigg's [41] outcome-based theory of constructive alignment, pedagogical approaches such as problem-based and participatory learning are more effective in bridging the gap between education and practice than the universal approach of imparting facts [9, 42, 43], challenge-based (team) learning [44] and the reflective process of assessing potential solutions [36] have been espoused as important for architecture students.

By establishing pedagogical approaches that promote and utilise the combined skills of Architects and Engineers, mutual respect and understanding of their own and the other disciplines will be possible [7]. Architects often do not apprehend and defend their unique skill sets, which are predominantly idea or solution-orientated. To enable their viable skill sets to adapt and respond to challenges and have new ideas for the future realised and acknowledged, reflective practice is important [25]. Reflective practice enables the ability to recognise one's limitations and ensure subsequent life-long learning. Facilitating this, for instance, by referencing frameworks such as the conscious competence model as a way of studying experiential learning, is beneficial for professional practice [45]. In addition, an interdisciplinary learning approach aligns with the evolving landscape of architectural ways of practice. This recognises the need for meta-competencies that facilitate the development of collaboration and communication in a

multi-disciplinary environment. By aligning curriculum with real-world ways of practice, students are enabled to develop the necessary meta-competencies that underscore competency development, to operate effectively in complex and uncertain environments.

5 Professional Practice Courses

Demonstration of professional knowledge, skills and competencies are required for eligibility for Architectural Registration. These requirements are based on the elements listed under Article 46 of the EU Qualifications Directive (2005/36/EC). In the UK, registration for Architects is through the Architects Registration Board (ARB) whereas in Ireland, the RIAI [46] are the registration body and competent authority. Their Standard of Knowledge, Skill and Competence for Practice as an Architect, at a professional level, is currently under review and the revision awaits publication. The current eligibility requirements include knowledge of regulation, context, professionalism, management, technology and procurement and ability in design and communication. In Ireland and the UK, a candidate for registration usually completes the professional practice lecture course and examinations prior to registration. In Ireland the courses are set against the EU Directive 2005 36 - Article 46 [47] At present, the RIAI route 'C' sets the criteria for courses until the publication of a new competency framework.

The UK Courses are delivered and assessed in accordance with requirements of the Royal Institute of British Architects (RIBA)/Architects Registration Board (ARB) shared Professional Criteria for Part 3 [48]. These criteria include Professionalism (PC1), client users and delivery of services (PC2), legal framework and processes (PC3), Practice and management (PC4), and building procurement (PC5). In the UK the review of Architects Competencies Report [54] stated findings relating to the increasing importance of the Architects' roles regarding climate change/sustainability and management of health and safety. This aligns with the RIBAs' three specific mandatory competencies for attaining and maintaining chartered status; health and life safety, climate literacy, and ethical practice, with a possibility of research literacy being added [49]. This refinement of competencies is clear and direct and demonstrates a move away from a focus on cognitive and design skills to practical and interpersonal competencies required for professional practice.

6 Comparison of Irish and UK Professional Practice Courses

Ireland and UK postgraduate professional practice courses prepare architectural graduates for registered status as an Architect, knowledge and ability against a set of key criteria. In order to sit the examinations, a minimum of 24 months of relevant practical experience is required. As a result, candidates generally undertake their professional practice course part-time while working full-time in practice. Consequently, it can be an onerous undertaking for the candidate and the practice in which they are working.

The comparison of 20 Irish and UK Professional Practice courses revealed differences in European Credit Transfer and Accumulation System (ECTs) awarded. Ireland's courses award 30 ECTs and the UK courses most commonly award 60 ECTs for very similar curricula and assessments. The typical course duration is predominantly one year (part-time) however pathways do range from six months (London Metropolitan University) to 5 years flexible study option (University of Greenwich; Technological University Dublin). The majority of courses are delivered in person with exceptions including predominantly online, (University College London) and fully online courses (University of Bath). While in Ireland, University College Dublin (UCD) offers a choice of online and in-person modes. Although a small number of institutions simultaneously offer their professional practice modules to professionals in the built environment who may register for individual modules as part of their continuous professional development (CPD), there is a lack of institutions specifying or highlighting that their course is multidisciplinary. Despite the call for interdisciplinary learning within the architectural industry and in education, this does not seem to be provided for within the current course offerings.

In both Ireland and the UK, assessment components generally include documentary submissions relating to practical experience, as well as procedural, legal, professional and managerial themes. The practical experience submissions generally take the form of a Career Appraisal Report that focuses on professional practice as well as a case study with an average requirement of 8000 words. The word count of the case study ranges from 5000 (Architectural Association School) to 10,000–12000 (UCD). The other topics are generally assessed via essays and written examinations as well as a final interview. However, personal reflection on practice and learning is promoted as coursework by a few institutions including London Metropolitan University, London South Bank University, Newcastle University, and the University of Greenwich.

In the UK, The Architects Registration Board, report the need for modernisation to the structure of parts 1, 2 and 3 education of Architects [62]. A rethinking of course content and structure to include formative reflective practice and meta-competency development could be more conducive to lifelong learning and the development of reflective and critical practitioners.

7 Demand for Postgraduate Professional Practice Courses

There are currently five qualifications in architecture that are legally recognised for access to the Register of Architects in the Republic of Ireland. Table 1 lists the Higher Education institutes (HEI) delivering those courses along with the number of graduates on each, for

four consecutive academic years. In addition to these courses, Atlantic Technological University Sligo has also been awarded provisional approval as a prescribed course. With 55 new entrants in the 2022–2023 academic year, it is expected that this will add significantly to the total number of graduates in the country. In addition to the pressure that this will put on the demand for postgraduate professional practice examination courses, there is further pressure from graduates coming from abroad and requiring registration in Ireland. As a result, the RIAI has stated that the provision of 140–150 places on professional practice examination courses may not meet the demand [50].

Table 2 lists the only two professional practice examination courses that are accredited by the RIAI and specified under the Building Control Act 2007 for access to the register of Architects in the Republic of Ireland. Although the RIAI have noted that each can enrol 70–75 students, the number of graduates shown in Table 2 reveals a significant disparity between enrolment and graduate numbers on both courses. Owing to attempts to help students complete the course and delays during the COVID-19 pandemic, UCD did not accept any new entrants in the 2023–2024 academic year. Despite being listed as part-time one-year courses, on both prospectuses, it is thought that the disparity between enrollment and graduate figures is because it is not uncommon for students to take two, three or more years to successfully complete the course. This limits the ability of these courses to meet the need and infers a demand for a new course.

Table 1. Graduates by HEI, course name, academic year (Higher Education Authority Statistics Unit. (2024). Personal communication)

Higher Education Institution	Course Name	2019–2020	2020–2021	2021–2022	2022–2023
Munster Technological University	Master of Architecture	10	10	15	20
South East Technological University	Bachelor of Architecture	15	15	20	15
Technological University Dublin	Master of Architecture	45	30	50	35
University College Dublin	Master of Architecture	45	30	50	35
University of Limerick	Bachelor of Architecture	20	20	20	35
Total		135	105	155	140

Table 2. Professional Practice Graduates by HEI, course name, academic year (Higher Education Authority Statistics Unit. (2024). Personal communication)

Higher Education Institution	Course Name	2019–2020	2020–2021	2021–2022	2022–2023
Technological University Dublin	Professional Diploma in Architectural Practice	15	15	20	15
University College Dublin	Professional Diploma in Architecture	40	35	30	30
University College Dublin	Professional Diploma in Architecture (online)	25	20	10	15
Total		80	70	60	60

8 Meta-competencies

Professional Practice is “the embodiment, indeed the expression, of the practitioner’s everyday knowledge” [51]. The recruitment process in architectural practices has shifted focus from cognitive to soft/professional skills to include teamwork, leadership, negotiation and critical thinking [52]. In addition, interpersonal, communication, responsibility, and a positive attitude are also becoming integral to meeting the demands of the profession [53]. Meta-competencies and soft/professional skills are inextricably linked and interdependent with a range of skills that are often included with the term 21st-century skills [52]. Meta-competencies have appeared in professional competency models that incorporate reflection [36, 55, 56], yet are not included in most educational and professional frameworks. Meta-competencies enable people to become flexible and should be fostered in higher education to allow future adaptation in the workforce [12]. In addition, they can increase students’ entrepreneurial mindset and readiness for innovation by enabling complex thinking and reflection [26]. The literature is varied as to its categorisations and definitions of the terms; competencies, competences and meta-competencies [25]. The term competence is understood as a combination of an Architect’s knowledge, skills and experience [5]. Meta-competencies are higher-order abilities, which facilitate skillful, meaningful learning, thinking and adapting in diverse contexts, required for the activation of all other skills and competencies that help prepare people for future change [18, 25, 55, 57, 58].

Cheetham and Chivers [55] proposed a holistic model of professional competency by combining Schons’ reflective practitioner [36] approach with meta-competencies, explained as the ability to cope with uncertainty, as well as with learning and reflection. Le Deist and Winterton explain cognitive competence (knowledge), functional competence (skills) and social competence (attributes) are required in order to be effective at work. They prioritise meta-competencies relating to learning to learn and align them with individual effectiveness, and that of social competence [25]. Meta-competencies such as volition, self-regulation and action competence can control the development of professional skills [59]. In addition, Bates et al. [60] prioritised meta-competencies of inter-relation, intrapersonal (self-management and self-reflection), domain-specific and normative (moral and ethical judgement) competence. Inter-relation skills enable the crossing of disciplinary and cultural boundaries, which harnesses empathy, communication and collaboration, to connect with other people. This was revealed as unique to

address complex real-world problems aligned with the United Nations (UN) Sustainable Development Goals (SDGs) they focused upon. Furthermore, system and temporal thinking, interpersonal and ethical literacy, as well as creativity are five meta-competencies proposed for addressing the UN SDGs. This infers educational approaches to include case studies, guided inquiry with peer-to-peer learning, reflection essays along with self-assessment exercises and instruments [61].

Meta-competencies such as an open and creative mind, leadership, ability to prioritise, self-awareness, self-directed growth and self-reflection are also highlighted as important in the architecture profession [18]. While it has long since been acknowledged that these skills are required by Architects, the prevailing view in the literature is that meta-competencies are needed by graduates for future adaptation, employability, and success in the workplace [18, 60].

9 Conclusion

The role of Architects within the construction industry is demanding and evolving due to increased challenges and complexities. The recruitment process of Architects has shifted towards emphasising soft and professional skills rather than cognitive abilities, underlining the significance of teamwork, leadership, negotiation, and critical thinking. Skills such as interpersonal communication, accountability, and a positive attitude are also considered crucial for professional effectiveness. Despite this, professional criteria for Architects' registration typically relate to professional, procedural, legal, and managerial competencies. A comparison of Irish and UK postgraduate professional practice courses for Architects revealed similarities in duration, curriculum and assessment, yet significant variances exist concerning awarded credits in the qualifications. In considering how professional practice courses respond or adapt to complex global challenges and opportunities present today and in the future, interdisciplinary collaboration and meta-competency development are regarded as fundamental. In addition, fostering reflective practice as a learning outcome-based approach is considered beneficial for Architects as they journey through lifelong learning and navigate the diverse ways of practice.

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Design Institutes and Design Studios

Cases of Permeability Between Teaching and Practice (Including Research)

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Abstract. The contribution describes an urban design teaching activity developed in the last eight years (2016–2023) at the top School of Architecture in China. Several Design Studios “Urban morphology, architectural typology, contemporary settlement patterns” has been held at the School of Architecture, in Southeast University Nanjing, China.

One of the main features of the teaching activity has been the strong connection with the practice activities developed within the Design Institute of the same University, such as the Urban Architectural Lab, founded in 2006 as part of the historic Architects & Engineers Co. Ltd. of the same university.

The role of the Design Institutes is specific of the Chinese context, where those public structures are the legacy of the process of collectivization of the professions promoted during the Fifties. The strategic role of the Design Institutes located in the universities allows nowadays not only high quality in design productions, but also the opportunity for students to face real topics of great complexity and to improve their competencies: in design as well as in socio-economic management.

The aim of the contribution is also quoting some urban regeneration projects developed in Nanjing historical urban tissues where the connection between Design Institute and Design Studios was fruitful and strong, from the choice of the topic and the surveys to the exams involving stakeholders within the final jury.

Keywords: Design Studios · Design Institutes · China · Urban regeneration · Urban morphology

1 The Role Played by Design Studios in Chinese Urban and Architectural Design Education

Architectural education in China dates back to a specific date, 1927. In that year, in the Capital city of Nanjing, the first university course aimed at teaching the practice of architectural design was activated.

The institution that takes charge of this initiative was the National Central University (later Nanjing Institute of Technology), divided from 1952 in two different main

high education institutes: the “generalist” Nanjing University (NJU) and the “technical” Southeast University (SEU). This last one, with its School of Architecture SEU-Arch, is considered as the heir of that tradition of the first School of Architecture based in 1927 within the National Central University.

Four are considered the founding fathers of modern Chinese architecture: Liang Sicheng, Liu Dunzhen, Yang Tingbao and Tong Jun. If Liang Sicheng (1901–1972) was the “inventor” (overall operative in Beijing) of historical Chinese architecture as field of knowledge, Liu Dunzhen (1897–1968) founded, as Japanese trained scholar founding the earliest architectural departments in China in 1920s at Suzhou Technical School, Tong Jun (1900–1982) became the leading expert on Chinese garden art, Yang Tingbao (1901–1982) was probably the greatest architect of all of them, crossing the twentieth century with a precise attention to the relationship between tradition and innovation. The last three are directly involved in the establishment of the Nanjing school, while the first one, Liang Sicheng, had a decisive role in the foundation of the Beijing School (at the Tsinghua University), as well as representing an intellectual figure who more than others had the merit, starting from the 1920s, of revealing to the world the existence of a historical Chinese architectural culture of a level and importance equal to the Western classical one.

The Chinese pedagogical model in architecture is imported, in a sort of global circle of references [1]. Many of the Chinese architects who trained in the first half of the 1920s did their studies either in Japan or in the United States. There, in particular, in Philadelphia, at Pennsylvania University, a French architect and professor, Paul Philippe Cret (1876–1945), trained at the Ecole des Beaux Arts in Lyon, was active. Most of the younger professor of late 1920s studied at “Penn”, where that French Master had brought the Fine Arts way to teach design. Thus, the Western method of teaching architectural design in Design Studios arrived in China from the US, at the foundation of the Chinese Schools of Architecture in late Twenties on the basis of a European eclectic model [2].

For all these reasons, the pedagogical system on which the Chinese architecture school is built is precisely the “beaux arts” one: an atelier in which a few students (a dozen at most) refer by imitation to a Master who guides them in dealing with precise and given design themes, strong in conspicuous collections of repertoires and catalogs from which to draw (“copying”, so exercising the main action of nineteenth-century art, or in the most extraordinary cases reinterpreting, through minimal scraps of minimal emancipation gain from a given model).

Nowadays, Design Studios still exist. In the work of students, the imitation of the Master’s design work in Fine Arts ateliers has been replaced by forms of discussion with teachers upon design works and the attempt of investigating more and more design questions (for example the urban contexts) by collecting data is one of the main phases of the work. The design process is defined as an incremental step-based process, which involves different stages: diagnosis of the context, envisioning exercise and development of a number of design options, selection of a design alternative and implementation.

2 The Role Played by Design Institutes in Chinese Professional Practice Ecosystem in Urban and Architectural Design

The Design Institutes are Chinese bodies governed by public law, responsible for the design of works, neighborhoods and urban settlements. After 1949, with the establishment of the People's Republic of China, collectivism radically transformed the work system, no longer oriented towards the market and capitalist profit, but towards effectiveness and efficiency, with respect to the functions to be performed. The old liberal professions are obviously overwhelmed by this revolution. The two main professions (those to which the European Union still today recognizes a special status today due to their necessity for people's lives), those linked to the practice of medicine and architecture, are interpreted in the pivotal role of public utility and therefore it is decided that they be carried out within specific structures. In this sense it can be said that, at least initially, the design institutes (first located within local, municipal or provincial government structures, then also within public universities) are for architects, engineers and planners, at least in their conception and in their functioning, what the hospitals or clinics are for doctors and surgeons [3].

Following the first Five Years Plan (towards a collectivistic transformation of China), in 1952 the East China Industry Bureau Architectural Design Company, as the first Shanghai's state-owned Design Institute, was established. From that moment, the Design Institutes will become the main actors of the architectural and urban transformation until nowadays in China Mainland.

Nowadays, even after the Chinese economic and commercial reforms of the 1990s, design institutes continue to occupy a predominant role in the panorama of Chinese professional practice. There are, as in the whole world, large and powerful private design companies, some of which are multinational in nature, and there are also small studios that offer a sort of brand of their products (with a large circle of real architects/artists with personalities relevant, often at the level of the great international star-architects), but the power of the public design institutes remains unshakeable: they are reliable, have important tools, human resources and skills, a great ability to deal with the public sector of which they are part, often (from within the universities where they are located) have the opportunity to experiment [4].

In China, Design Institutes (within universities or within municipalities) are the dominant subject in the professional environment, where they are the key between local government and developers (as, for example, in the key area of Yuzui CBD of Hexi New City with the interplay among urban infrastructures, ecological resources and high-rises in vertical dimension) [5].

The general framework described here should also be considered as a possible operational horizon to which a Chinese architecture student today aspires: the average student expects to work in a large company (design and development companies carry out frequent enrollment sessions within schools, directed at final year bachelor students), while he/she dreams of doing an apprenticeship that will one day allow him/her to open a business (his own or in a small group) as an independent designer. However, also considering the great difficulties of the Chinese national exam for the qualification to practice the profession which very few are destined to pass and which confers an almost purely notarial seal in the project validation/approval process, the best, most prepared

and most disciplined students are immediately involved in the design institutes and saw operational careers of some interest opening up.

3 “Urban Morphology, Architectural Typology, Contemporary Settlement Patterns” (SEU Nanjing, from 2015)

The Design Studios “Urban morphology, architectural typology, contemporary settlement patterns” held at the School of Architecture in Southeast University (Nanjing, China) are working, since almost a decade (2015–2024), in strong connection with the Design Institute of the same University «Urban Architectural Lab» founded in 2006 as a part of the historic Architects & Engineers Co. Ltd. of the same university.

Design studios have not changed much in the century that has now passed since the founding of the architecture school in China, at least in a high-ranking public university like Southeast University and many others. Above all, the pedagogical structure has remained unchanged. There is always a very small number of students (from 6 to 12) who present themselves as a team. The teacher prefers to exercise his authority with a guiding role (through his projects and/or through its methodological approach), rather than becoming a trainer of students in a series/sequence of practices that can be used in a professional context. The type of project training is still firmly anchored to the evaluation of the formal, constructive and functional outcome of the project action, rather than to the enhancement of the student’s educational path read in the form of a design process (Fig. 1).

However, the themes are very current and similar to a lot of architecture schools around the world: the use of innovative technologies and construction systems, the dialogue with traditional forms and techniques also in terms of sustainability, the use of performance satisfaction metrics, the comparison with an elderly and weak society, the search for design solutions capable of developing the opportunities offered by digital devices, the question of heritage as element able to switch on fruitful connections between tourism and marketing.

The themes of urban regeneration have had a certain importance, especially in the last ten years. The innovative design studio named “Urban morphology, architectural typology, contemporary settlement patterns” was experimented in Nanjing from 2015. There, a favorable connection between the Chinese Southeast University and the Italian Politecnico di Torino created the conditions for joint teaching actions, based on a simple mission: using the standard morphological-based method that was characteristic of the Italian school of urban analysis and urban design to teach students how to read the settlement forms, the spaces and the urban objects of the Chinese city (including urban fabrics) and also to design accordingly [6].

This has allowed the conceptual tool represented by the Italian typo-morphological tradition to update itself by dealing with a new theme such as that of the Asian city, and the question of the urban regeneration of the Chinese city to find new possible approaches, not necessarily based on new urbanism practices. or of pushed gentrification, but ultimately oriented (as we will see) on protocols of innovative participatory forms directly played on aspects of urban form.

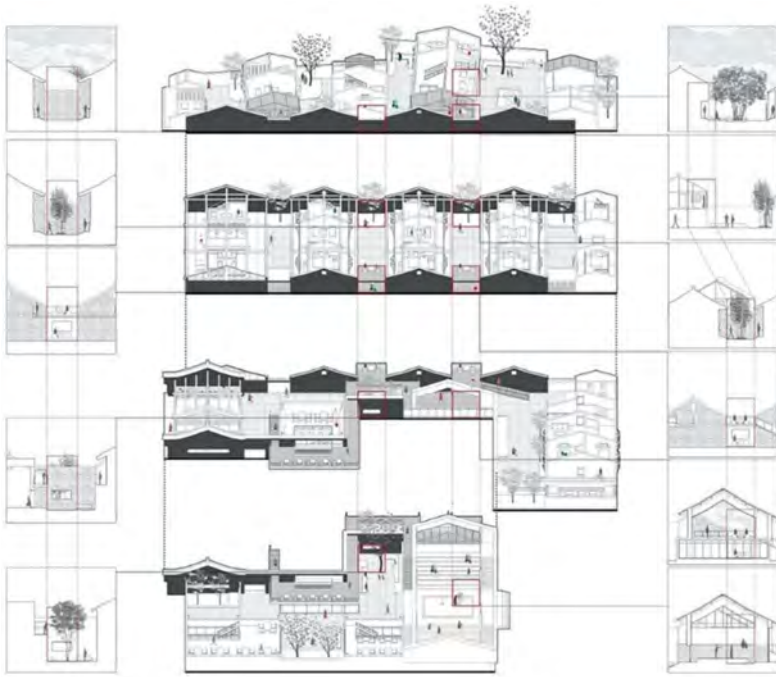


Fig. 1. Studies on the transitional morphologies of the XiaoXiHu block in Nanjing (Qinhuai District), from the Design Studio “Urban morphology, architectural typology, contemporary settlement patterns” at SEUArch 2018 (Professors Bao Li and Marco Trisciuglio), traditional typologies and their renovation (from Archive “Transitional Morphologies” Joint Research Unit)

Thus, the first aim of the Design Studios is practicing fundamentals of urban morphology and buildings typology in order to read the urban spaces and artefacts. The second aim of the Design Studios is using that reading activity in order to look for innovative design solutions for the contemporary city. The teaching activity is based on the reading of the Chinese city of nowadays and the work in the Design Studios is organized by weekly collective discussions about design development.

A series of more or less extensive areas (in any case at the scale of the urban project, between 1:200 and 1:1000, with in-depth analyzes at 1:100 scale), located in Nanjing or in other Chinese areas, have been the subject of the attention of teachers and students.

Without necessarily distorting the traditional pedagogical structure of the Design Studio, this experiment makes use of at least two important innovations. The first innovation consists in addressing real and not hypothetical issues, having them suggested directly by the Design Institute of the same university (therefore with the involvement of stakeholders both at the level of developers and at the level of politicians and managers directly operational on urban regeneration practices). The second innovation consists in hiring, alongside the usual dozen undergraduate students, about half of master students with the organization of three-person working groups, made up of two undergraduates and one master students, where mentoring by the older students becomes fundamental.

Based on the concepts of TECTONICS, TYPOLOGY and TOPOGRAPHY, the Design Studio lets bachelor and master students together investigate on the interplay between tradition and modernity (through design activities as surveys, sketches, models, diagram) [7] (Fig. 2).



Fig. 2. Studies on the transitional morphologies of the XiaoXiHu block in Nanjing (Qinhua District), from the Design Studio “Urban morphology, architectural typology, contemporary settlement patterns” at SEUArch 2018 (Professors Bao Li and Marco Trisciuglio), detail of the entrance (from Archive “Transitional Morphologies” Joint Research Unit)

The master students are not only more adults. It in a pedagogical system like the Chinese one (which is American-style 1+4+2, i.e. one preparatory year, four undergraduate years and two optional master’s years), they are often the ones already involved in work as an internship within the school and departments, able to develop, with the relevant professors, projects in preliminary stages intended for the design institutes, when not directly projects already being developed within the design institutes.

4 The «Architectural Lab» Within the Context of the Historical Architects & Engineers Co. Ltd (SEU Nanjing, from 2006)

It should not be thought at all that design institutes are anonymous professional bodies, capable of providing a low-quality service that is in no way comparable to that provided by large design companies or celebrated star architects. In the Chinese system, the reciprocal roles of architecture schools, renowned designer architects, the world of communication that revolves around design, public developers and local governments are very different from those in Europe (and, above all, the university has a pre-eminence of position which is still relevant today).

In this context, it is not uncommon for important practitioners, who are also professors, to set up their own professional studio within the same design institute. One of the most interesting realities on the Chinese professional scene in recent years has been the Urban Architectural Lab of the Southeast University of Nanjing.

The Urban Architectural Lab (UAL), founded in 2006, is based at and part of the Architects & Engineers Co. Ltd., the Design Institute of Southeast University (around 580 employees versus the 800 at the Design Institute at Tsinghua University).

The core members of UAL began the team's professional activities in 2000 and after around 20 years of development, the team has now more than 50 members: 5 architects and faculty, 15 full-time architects, 30 among PhD students and master students.

It is a separate structure, more streamlined than the great Design Institute, and directed today by Han Dongqing, former Dean of the School of Architecture, well known Master of urban and architectural design [8].

The Design Institutes signed at 2020 around 70 projects (mostly in Nanjing), some of them are very important works, published on international journals as demonstrative. One interesting case for the SEU Design Institute UAL is the reconstruction in Nanjing, with a great symbolic intention, of the Jinling Da Bao En Temple (financed in 2015 by the investor Wang Jianlin of Dalia Wanda Group), the former Porcelain Tower, described in 17th century as one of the Seven Wonders in the World [9].

Being part of an academic environment (or the bridge between the academic world and the practice world), the activity of the Design Institute is often not only focused on design, but also on methodological investigations. In the last three years, for example, UAL made great efforts in linking ownership's data with typo-morphological map in order to improve innovative participatory models, for the for the implementation of large and innovative urban regeneration projects.

5 The Southern Part of the Walled Center of Nanjing Between Real Estate and Urban Regeneration

Nanjing today still retains much of its Ming-era city wall (when it was Capital City of Chinese Empire). The southern part of the city in particular, called Qinhuai District and crossed from west to east by a navigable canal, still shows large parts of the ancient city, with its urban fabric made up of courtyard houses. Of course, much of the extension of this sector (which still constitutes a fifth of the surface area of historic Nanjing enclosed by the walls) is also irremediably compromised by the presence of functionalist building types built between the 1960s and the 1980s, by the presence of a series of road infrastructures that do not respect historical routes, by the looming heavy gentrification, especially of a commercial nature, which has significantly altered the urban spaces of the traditional city [10, 11].

For a first-level Chinese city, capital of the province of Jiangsu, the most technologically advanced of all the provinces of the People's Republic, therefore with prospects of a lively city of the future, the theme of urban regeneration is urgent. Furthermore, the general conditions of the historical spaces and buildings aren't at a level so sufficient to let inhabitants live in a safe and healthy way. However, the sense of community is very strong: every house, every small courtyard, every person tells stories about the places and the vivid daily life into them [12].

Over the last twenty years the local government has sequentially experimented with three different regeneration methods. A first phase, with an exquisitely commercial imprint, has reconstructed the urban fabric around the Confucius Temple (Fuzimiao) through an operation dictated by a pop culture of tourism and tradition. A second phase, suggested by unbridled real estate practices, razed part of the historical fabric to the ground (in Laomendong), moving the resident population to much more functional

suburbs and creating very expensive and refined urban villas in the choice of materials, all immediately sold but all left irremediably uninhabited. A third phase, based on the direct involvement of citizens, has in fact invented almost from scratch a participation system which has borne excellent and clearly extraordinary results (for example in the case of the Xiaoxihu block) (Fig. 3).



Fig. 3. View of the regeneration project at Xiaoxihu, Nanjing 2023 (photo by Author).

The stubbornly sought connection between the activities of the Design Institute and the activities of the Design Studio contributed significantly to the development of this third phase, after the local government asked SEU a help to find different design processes after the experiences of Fuzimiao and Laomendong.

In fact, for the first time, starting around six/seven years ago, the involvement of stakeholders, developers and local decision makers has intensified in the discussion of the outcomes (even partial) of the training activity conducted by the Design Studios. At the same time, the Design Institute entrusted entire sections of blocks to be redeveloped to some of the teachers directly operating in the same project areas [13].

In this way, on the one hand the approach of the Design Studio took strictly into consideration professional opportunities gradually proposed to the Design Institute, on the other hand the work carried out with the students immediately found a testing ground in entire passages of the real city. In short, an incredible virtuous circularity has been created between operators and students, under the guidance of designers/professors capable of keeping the world of study and that of the profession closely together.

6 The Regeneration of the Block XiaoXiHu as a Living Lab for Students' Design Investigation. Coincidences

Within the context of a series of Design Studios, students analysed the pilot block of Xiaoxihu (very close either to Laomendong or to Fuzimiao) in order to demonstrate a more careful approach to what still exists (and what was existed) of the old town.

The design activity within the Design Studios (attended by mixed groups of Bachelor and Master Students) gave some first important guidelines and suggestions for the future uses of buildings and spaces and for the image of Xiaoxihu.

The final results of Design Studios were an important pre-figuration of the possible processes to reactivate ways of living in the block, with its internal spaces and its paths, so as to recreate the typical porosity of traditional fabric and daily life.

The system of images produced within the Design Studios and the results of the physical and social surveys became shared element of critical discussion in the context of the Design Institute, in a harmonious relationship of reciprocity where the two institutions, the didactic one and the professional one, have worked “shoulder to shoulder” (Fig. 4).



Fig. 4. View of the regeneration project at Xiaoxihu, Nanjing 2023 (photo by Author).

A first result was a real urban regeneration project nowadays almost completed, which won the 2022 UNESCO Asia Pacific Award for Cultural Heritage Conservation.

A second result was the improvement of the competences of students, thanks to the opportunity to work on real project in the connection Design Studio + Design Institute.

The more important result was the regeneration and the improvement of the urban social daily life of the Xiaoxihu block, through a mix of technical skills and investigation for innovation (Design Institute) and braveness, imagination and attention in design (Design Studios).

Xiaoxihu is today an important demonstration project in China.

The shared activities between Design Studios and the Design Institute helped a lot the scientific research: papers, books, seminars, international conferences, PhD dissertations were and are promoted, also deeply supporting the activities of the “Transitional Morphologies” Joint Research Unit (established in 2018 between Southeast University and Politecnico di Torino) [14].

Generally speaking, in China, the permeability between Design Studios and Design Institutes was until now not only advantageous from the point of view of both project training and the choice of specific design solutions to the detriment of others. Actually, it has allowed us to identify and develop important lines of research. One of these concerned, for example in Nanjing, the possibility of creating “augmented” urban typological maps with property and land value data deduced from the intersection of old land registers with a current survey of building structures and also of housing conditions. Another line of research prefigured, tested and then verified an innovative participation system based in Nanjing on the so called “diagram of the five actors” (local government, developers, designers, insiders and outsiders) and on the possibility of alienating part of the families’ assets in favor of activities of microeconomics to be achieved in the most complete respect of building types and settlement morphologies. The most recent line of research concerns, always in Nanjing, the monetary valorization of urban spaces and objects involved in participatory negotiation, imagining connections between urban morphology and urban economics.

All three of these shortly described three lines of research used, as a case study, the Xiaoxihu block, located in the Qinhuai District, characterized by the presence of some structures from the historical era and also by a very high number of modern compromises. For some years now, the block has been the subject of redevelopment actions which aim not only at the mere protection of the buildings placed under protection, but also and above all at identifying new, “transitional” roads to prefigure the urban settlement of the future.

As mentioned above, Xiaoxihu’s project won the 2022 UNESCO Asia Pacific Award for Cultural Heritage Conservation. At the same time, the same block became the subject of some Design Studios also held in Italy, at the Politecnico di Torino. One of the purposes of the connections established between the Politecnico di Torino and Southeast University is in fact to mutually exchange experiences and solutions, again in pedagogy, research, urban design practice.

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Ways of Architecture(s)



A New Form of Practice: *La Rivoluzione delle Seppie*

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Abstract. The paper describes the work of *La Rivoluzione delle Seppie* in Belmonte Calabro, where they have regenerated places and promoted new forms of community and social cohesion. The tested and implemented strategies aim to make these so-called marginal areas competitive and attractive within local and territorial systems and globally. The experimental nature of this practice is characterized by a methodology for designing and constructing placed-based interventions tailored to the territories and carried out through the involvement and protagonism of academics, students, institutions and local communities. A methodology that enhances the local skills implemented by knowledge of global stakeholders and it uses critical issues as opportunities to generate elements of innovation necessary to qualify the relaunch and the development of the area concerned. The action of *La Rivoluzione delle Seppie* started in Belmonte Calabro. The group acted as an agent of change and, above all, as a facilitator between the old and the new inhabitants. Not only Belmonte, but also *BelMondo*!

Keywords: marginal area · conviviality · learning by doing · agent of change · selfconstruction · commons · The *BelMondo* case study in Belmonte Calabro

1 The *BelMondo* Case Study in Belmonte Calabro

(See Fig. 1).

The development that characterized industrial growth and intense urban aggregation processes in Italy during the last century generated contradictions and imbalances at a territorial and social level. In the last decades, faced with large public debt, the margins of policies aimed at great investments or welfare-type interventions have been increasingly shrinking. However, the criticality marked by the abandonment and depopulation today for these territories can be seized as an opportunity. It is not a question of soliciting new oppositions concerning those that have marked the historical events of the last century, nor of cultivating anti-urban imagery or fueling settlement dispersion, but, on the contrary, of shifting attention to the territorial organization as a whole. There is a need to imagine a territory that, thanks to the rich articulation of its settlement models, continues to hold together weak and robust areas with a dense network of increasingly intangible flows; a territory that in its entirety knows specific processes of ecological transition and redevelopment of fixed capital and the relationships of proximity. In this



Fig. 1. *Questa non è Campagna*, workshop in collaboration with Cheap, Crossings 2022, Belmonte, Photo by Nicola Barbuto, July 2022.

framework, the question arises of a new social pact that can guarantee new levels of integration and social inclusion. For this to happen, a more innovative function of public infrastructure is needed, but also a greater protagonism of the agents that on the territory can be facilitators of the processes of satisfaction of new needs and social interests (Fig. 2).



Fig. 2. Happy Lab, Ceramic Workshop with refugee children, *Casa di BelMondo*, Belmonte Calabro, Photo by Giulia Rosco, October 2023.

The *La Rivoluzione delle Seppie*'s practice conceived and tested intentions to go in this direction, fuelled by a strong focus on planning and implementing the imagined design. The intention is not to photograph local systems as they are now but to stimulate and prefigure a decisive transformation based on global and collective influences.

It may be helpful to point out three traits that characterize its work and to help grasp its meaning and specificity. The first is related to combining a specific radical vision and an effort of concreteness in action. This radical vision seeks to make room for itself with proposals that outline measured, tactically and concretely actionable efforts. A second important aspect is that the actions carried out decline a form of multifunctional planning, which aims with the same investment to obtain multiple benefits.

The objective is not only related to the traditional renovation of a building or a space but also to develop civic research for each step, making proposals in a collective form, combining visions of the future and concreteness of action on different levels. A third aspect is that this set of actions, developed by many hands, not only by professionals but also by scholars, students, locals and migrants from different locations, proposes to focus on a precise way of understanding a diverse approach to academic research and architectural practice (Fig. 3).



Fig. 3. Collaboration Rooms, Design by Orizzontale, Crossings 2019, Belmonte Calabro, Photo by Antonio D'Agostino, July 2019.

The main question on which *La Rivoluzione delle Seppie*'s work is: "How can we build our communities around places?"

By strengthening the connection between people and places, *Le Seppie*'s work is based on a collaborative process through which the public sphere can be shaped to maximize shared value. With community-based participation, both local and temporary, an effective place-making process that capitalizes on the resources, inspiration, and

potential of the above-mentioned heterogeneous group results in the development of the *BelMondo* process.

This process has generated a series of actions since 2016 that contribute to both cultural welfare development and the people's well-being. The action started in Belmonte Calabro, South of Italy, and has progressively taken shape through the annual editions of *Crossings*, a series of residencies, symposia and workshops: an inter-weaving of activities that have generated a network of collaborators and constant moments of exchange between different actors for a common goal: the construction of *BelMondo*.

The physical place, the *Casa di BelMondo*, is the space where manual and artistic activities take shape, the non-physical place, *BelMondo Atlas*, is the virtual space where collective sessions at a distance take shape, where debates, seminars, and confrontations alternate with radio projects, experiential atlases, and communication projects. In this context, La Rivoluzione delle Seppie aims to redefine the village as a living architecture, a set of places and non-places that can accommodate new living forms and offer collectively usable hybrid spaces. This allows communities to appropriate them according to collective and social needs based on the current cultural and resource-sharing approach. A solution is not proposed but a dynamic process.



Fig. 4. Baywatch movable structure part of the Market Temporary Square in Belmonte Marina, Design by Orizzontale, Crossing 2022, Belmonte Calabro, Photo by Giulia Rosco, July 2022.

The objectives are twofold: the first is the elaboration of a diverse model of living and working collectively, as opposed to competitive living and hyper-specialized work culture; the second is the exchange of knowledge to inhabit a place temporarily but constantly so that experimental, conceptual but not ideological forms can be manifested, with a different conception of a participatory approach to public living. To achieve these objectives, *Glocal Tools* have been developed and deciphered: eight tools that

characterize the operational approach of *La Rivoluzione delle Seppie*, derived precisely from the know-how accumulated so far, which defines shared values that can be adapted according to the opportunities and skills in a given socio-cultural and territorial context (Fig. 4).

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Everyone Belongs to Everyone Else

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Abstract. The scarcity of resources in a context of permanent crisis is not only an opportunity but also the only direction in which it makes sense to practice. In our view, there is a generation that has already accepted the challenge and is trying every day to develop antibodies to disillusionment. The Italian Pavilion at the 18th International Architecture Exhibition – La Biennale di Venezia invited these practitioners to recognize themselves as a “movement.” Titled *Spaziale*, it referred to an expanded notion of the discipline where the built artifact was not seen as an ultimate goal but as one of the possible tools for intervening in the fabric of relationships between people and places. Nine practices were invited to collaborate with nine advisors – from other fields of creativity – in nine Italian territories representative of conditions of fragility or transformation, with the support of as many local interlocutors. Each intervention represented a chapter in an incomplete agenda of urgent research themes for the national context and for architecture: open questions, traceable to the scenario of transition – not only ecological – that we are facing in these years.

Keywords: La Biennale di Venezia · Italian Pavilion · permacrisis · critical spatial practices

We represent a generation that grew up in a state of permacrisis. The neologism, elected Word of the Year in 2022 by Collins Dictionary, expresses a recurring dimension of catastrophic occurrences that perfectly describes the unfolding of events of the last twenty years. After the near miss of the Y2K bug, the century began with the 9/11 attack on the Twin Towers: the crisis of the West being screened on live television. We enrolled at university during the 2007–2008 financial crisis and, once we graduated, we started to look for work in the smoking ruins of the market. Today an energy and geopolitical crisis, tomorrow the environmental crisis; and this is only a partial representation of reality.

The global consequences have produced obvious repercussions on our profession and, while the age of architectural exuberance came to an end with the 2008 crisis, the pandemic has broadened that widespread awareness of the total depletion of resources [1]. As Rory Hyde suggests: “All crises have spatial consequences that architects are well prepared to deal with, yet instead of diving into them, we seem to be experiencing our own crisis: one of relevance” [2]. The clear risk is that the umpteenth internal discourse within the discipline makes us lose sight of how architecture, rather than providing solutions,

is often part of the problem: on the one hand, the construction sector is one of the main causes of the environmental crisis; on the other hand (especially in Italy), the increase in land consumption does not correspond to the involvement of architects in transformation, neither their involvement in such process. An inversely proportional relationship between growth and development that lays the foundations for an unprecedented alliance between



Fig. 1. Italian Pavilion, La Biennale di Venezia, 2023. Photo © Delfino Sisto Legnani.

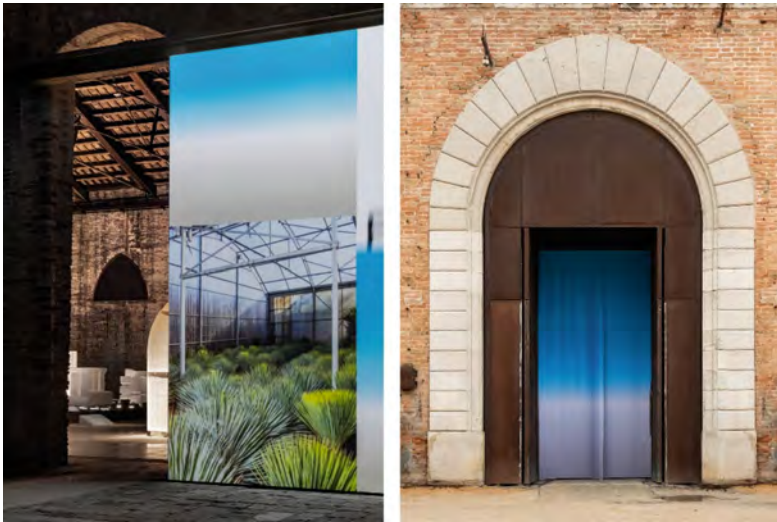


Fig. 2. Italian Pavilion, La Biennale di Venezia, 2023. Photo © Delfino Sisto Legnani.

the environment and professionals in the sector. An opportunity for architecture to evolve, albeit only opportunistically, in order to survive (Figs. 1, 2, 3 and 4).



Fig. 3. *Siren Land*. Authors: BB (Fabrizio Ballabio + Alessandro Bava) + Terraforma. Location: Baia di Ieranto (Napoli), Campania. Photo © Piercarlo Quecchia/DSL Studio.

There is a generation of sustainable natives who, in our view, have already accepted the challenge and seek to develop antibodies to disillusionment in their daily practice. In our opinion these critical spatial practices, term coined by Jane Randell in 2003 to indicate those practices “working across public and private, art and architecture” [3], are those who use the codified tools of design to question the social conditions of the places where they intervene. Accustomed by training to operating within a regime of scarcity, these practices foster transdisciplinarity as a means of pushing back the limits of architecture to hitherto little-explored fields.

We have intended our appointment as curators of the Italian Pavilion at the La Biennale 2023, titled ‘Spaziale. Everyone Belongs to Everyone Else’, as an unprecedented occasion to present to a broader public a series of Italian critical spatial practices and an invite to probe their diverse attitude confronting them with real design occasions, using curatorial practice as a powerful tool to shift from archiving to action. Necessarily recognising an ethical dimension to this role, we decided to use the Italian Pavilion as



Fig. 4. *Uccellaccio*. Authors: HPO + Claudia Durastanti. Location: Ripa Teatina, Abruzzo. Photo © HPO.

a pretext to activate pioneering projects, concrete actions that go beyond the six-month duration of the Biennale. Moreover, ethics also lies at the heart of the discourse when questioning the meaning and impact of temporary events of this scale: be they exhibitions, fashion shows, concerts, sporting events or fairs, they are all extractive processes that dissipate a great deal of energy and resources. In order to continue to celebrate moments of confrontation and contamination in a sustainable manner, it is now urgent to drastically rethink formats, flows and temporalities. To convert consumption into investment and the end into a beginning, Spaziale employed a substantial part of the public funds earmarked by the Italian Ministry of Culture to initiate and realize those pioneering projects in the months prior to the inauguration of the Venice Biennale 2023.

Each project tackled an agenda of urgent research topics for the national context and for the discipline as a whole: open questions that may be traced back to the transition scenario – and not only the ecological one – that we have been dealing with over recent years. An incomplete list of ‘impossible’ challenges that have been up for debate for decades, yet which – on the scale of the micro-histories of local contexts – are capable of producing tangible results. The definition of the themes guided the selection of designers under forty, who in their daily practice develop independent research in line with our curatorial proposals. Identified on the basis of the approach with which they operate, the territories in which they intervene, the means they use, the questions they raise and the answers they put forward, they were called upon to develop site-specific actions for the Italian Pavilion. Each practice was associated with an Advisor: nine professionals supporting the designers, from various fields across the creative industry, capable of informing and enhancing the ongoing projects, making them an undoubtedly transdisciplinary product. The installations were implemented in sites representative

of conditions of fragility or transformation of our country: nine Stations narrating an unprecedented Italian landscape, a series of symbolic destinations on a renewed Italian Journey. Each collaboration was supported by one or more local interlocutors: public or private institutions which, as Incubators, helped to root the projects in the selected Stations.

What was shown in the Italian Pavilion has not to be intended as an exhibition but rather as a visual and formal synthesis of the multiple design processes and approaches embodied by the participants. The ultimate objective of the exhibition being the manifestation of a new disciplinary attitude that sees architectural interventions not as a goal, but rather as an one of the possible instruments to act in the space, or a network of relationships between communities and places; the basis of any architectural project.



Fig. 5. *Concrete Jungle*. Authors: Parasite 2.0 + Elia Fornari (Brain Dead). Location: Marghera, Veneto. Photo © Melania Dalle Grave/DSL Studio



Fig. 6. *La Casa Tappeto*. Authors: Studio Ossidiana + Adelita Husni Bey. Location: Librino (Catania), Sicily. Photo © Piercarlo Quecchia/DSL Studio.

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Assemblage and Rituals

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Abstract. False Mirror Office analyses its own architectural practice, exposing the connections between some of its recent projects, research activities and publications. The following text is based on the presentation led by Giovanni Glorialanza and Filippo Fanciotti (False Mirror Office).

Keywords: Collage · Assemblage · Rituals · Domestic Environment · UFO

False Mirror Office's (FMO) work, being as multidisciplinary as somewhat devious, involves refining techniques for combining heterogeneous elements into assemblages in architecture, using pop-art's method of transfiguration of form and meaning. FMO's members conduct a rigorous initial phase of individual research before each design opportunity, uncovering any underlying themes that such project could imply in order to further explore them way after the assignment is completed. The exploration spectrum of those researches often extends beyond the disciplinary field of architecture, landing into cross-cutting issues; this is why in its research journals the complex representations of James R. Thompson Center's, designed by the architect Helmut Jahn, Chicago 1980, easily appear next to Frances Glessner Lee's dollhouses or the voyeuristic scenes in Hitchcock's *Rear Window* (1954). By juxtaposing and combining diverse elements, the natural mutability of the ever-changing referent in Architecture is further amplified: whereas the Doric capital caricatured at the Allen Memorial Art Museum, by Venturi and Scott-Brown (Ohio, 1977), still refer to elements disciplinarily belonging to architecture, it was precisely the encroachment of everyday-objects that demonstrated that 'Alles Ist Architektur' [1]. This oscillation between highbrow and inevitably lowbrow references makes the outcome of these assemblages distinctly autobiographical.

A first example of the application of these techniques can be observed in the project for a villa in the Roman countryside: a purely speculative exercise consisted of a three-part development. The first act consisted in grafting the floor plans of Roman villas with those typical of modern construction in the Roman countryside of today (Fig. 1), followed by a collage of places and characters associated with everyday-life in the Roman countryside; the third document presents a model of the villa, revealing the original forms of both architectures and some prominent representatives of the referential park from the collage, presented in a literal primordial broth, displayed in an elegant tureen.

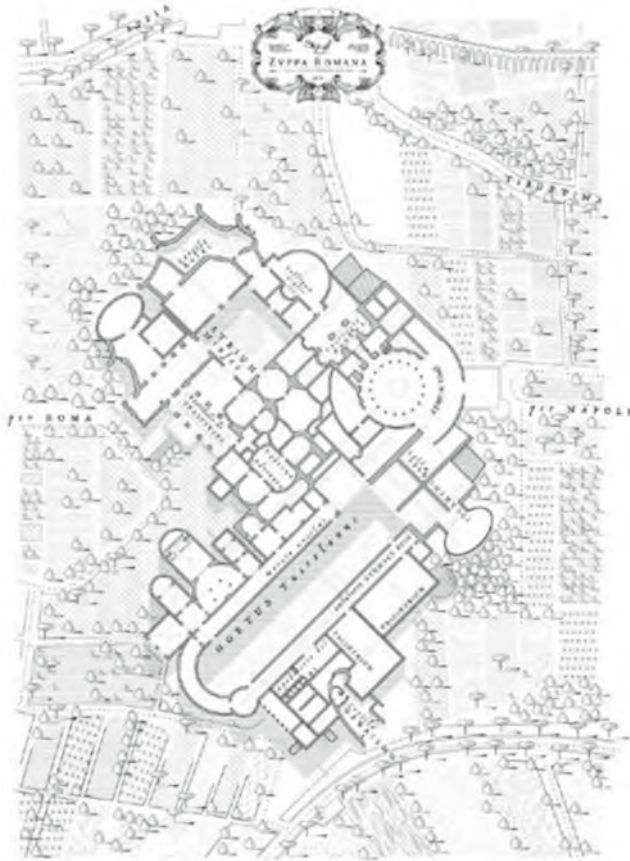


Fig. 1. *Zuppa Romana* (grafting), False Mirror Office, [2017].

A second attempt in architectural assemblages happened throughout the project to transform a neglected warehouse in the port of Trondheim into a public food-hall; the new exterior facade of the building was purely designed as a scenic backdrop, featuring the tail of a whale, a small boat, a mysterious chimney, and the profile of a riverfront *bryggen*. The proposal for a decommissioned building in Cuneo included irreverently positioned elements such as the golden palms from the *Austrian Travel Agency*, designed by Hans Hollein in Vienna (1978), and colossal versions of *LEGO pine trees*. Additionally, a grand-scale theft from the *National Collegiate Football Hall of Fame*, by Venturi and Scott Brown, in New Brunswick (1967) was incorporated, reduced to a mere form, ready for new functions (Fig. 2).

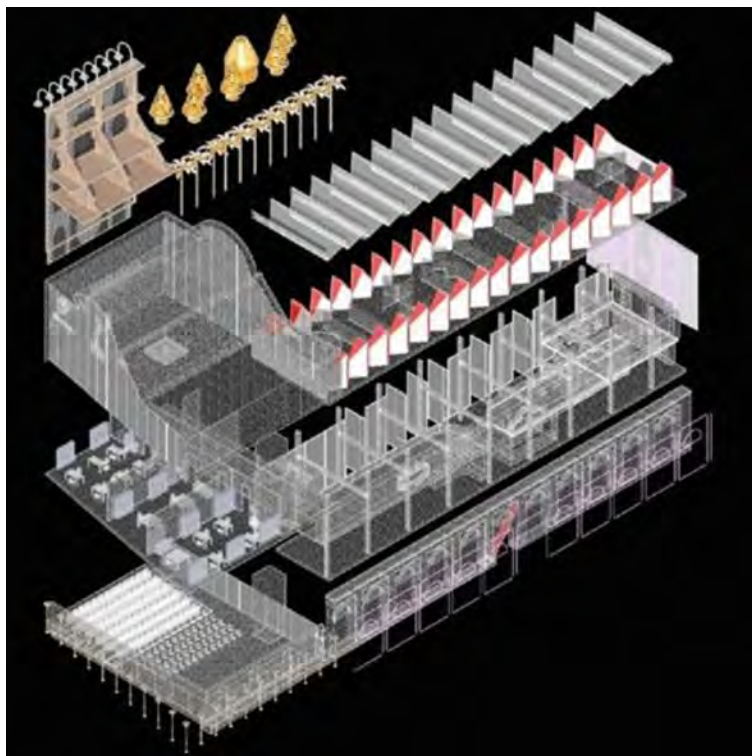


Fig. 2. *Frigo, False Mirror Office, [2020].*

Studying those cases in which the technique of *assemblage* has been applied in architecture, it is impossible do overlook the handful of projects realized by the radical group *UFO* (Lapo Binazzi, Riccardo Foresi, Titti Maschietto, Carlo Bachi, Patrizia Cammeo), active in Florence between '68 and '78. FMO's interest in the UFO's work, born out of genuine curiosity, first took shape in the publication *L'assemblaggio come testo figurativo per l'architettura* [2] and was then further explored in the monograph *UNIDENTIFIED FLYING OBJECT for contemporary architecture*, published by ACTAR and financed by the Italian Art Council of 2021.

While UFO performances aimed to subvert interactions between people and public space, at the domestic scale such rituals only intensify, further defining rigid rules in the division of spaces associated with living; the increasingly common practice of smart working ultimately introduces rituals related to *negotium* into the domestic space. These assumption inspired the project for a *New post-pandemic habitat* [3]; designed to accommodate multiple inhabitants, the habitat features semi-public devices provided for shared activities between small groups of inhabitants, while individual living units are designed to keep fundamental activities separate into *poche* obtained digging the perimetrical wall (Fig. 3).

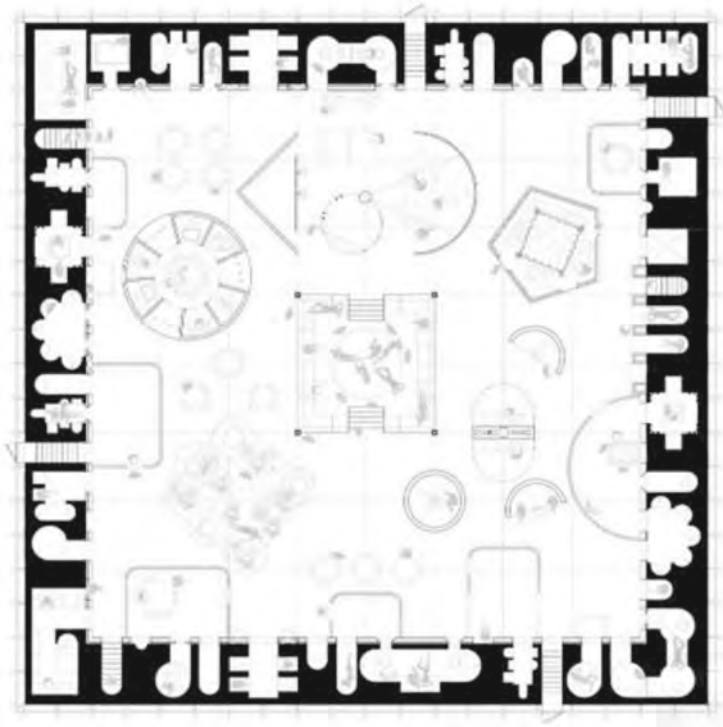


Fig. 3. *Nuovo habitat post-pandemico*, False Mirror Office, [2020].

Starting from these assumptions takes form also a device for the cult of *otium* within the domestic space, exposed first for the exhibition *Italy: The New Domestic Landscape. New York 1972 / Venice 2020*, held in Venice (2020) and then in Milan (*Otiarum*, Superattico, 2022) together with five additional votive temples, each dedicated to a distinct aspect of idleness in the domestic space.

The same shrine-like form finally became the object of production of a workshop called *Station to Station* (Monesiglio, 2021); in that occasion participants selected stories from the small village in Alta Langa, artfully misrepresented them, and elevated them to the status of myth by representing them within a diorama. At the climax of the workshop, the participants staged a procession through the streets of Monesiglio; by stopping at various significant spots in the village to display their dioramas, they intentionally enacted a profoundly lay version of the stations of the Cross (Fig. 4).



Fig. 4. *Station to station*, Monesiglio, False Mirror Office, [2021].

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New Territorial Narratives

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Abstract. Spatial and territorial complexity require new and multiple forms of representation. Photography becomes the privileged tool to reflect on contemporary shifting landscapes adopting a critical look at our society. *Paesaggisensibili* is an independent observatory on contemporary landscape, a space for research and experimentation for the elaboration of territorial narratives based on interdisciplinary and multi-actor engagement.

Keywords: landscape photography · cultural landscape · narrative · community engagement · transdisciplinary approach

1 Introduction

Alessandro Guida and Viviana Rubbo graduated at the Polytechnic of Turin, Italy, and, from there, their paths have been very different for quite a long time. Alessandro worked as an architect, 3D visual designer and photographer. Viviana worked for several years in social planning and community-based development projects until when she found herself dealing with urban and territorial dynamics in Europe and around the world. Those two paths began to intertwine along the years because of a common interest in the observation of the territorial shifting and its spatial and societal implications. In 2016 they embarked on a new common adventure with the creation, together with other photographers, of the collective *Urban Reports* which has led –few years later– to the duo format of *Paesaggisensibili*. This practice was born to develop new forms of territorial narrative through the use of different languages (mainly photography, video and texts) as a method of engagement of a large spectrum of disciplines and knowledge sectors aimed at the involvement of a wider public in the discussion around landscape's transformations.

2 Photography as a Cultural Tool to Delve into the Landscapes (the Act of Looking as an Instrument for a Critical Observation of Our Society)

In a moment when we are confronted with an unprecedented complexity of territorial systems, an increasing acceleration of the processes of transformation and global phenomena (climate crisis, massive migration flows and pandemic events to name a few),

the landscapes, and our perception of them, are subject to change, questioning the systems of values that, as individuals and as a society, we assign to them. These changes are happening faster than before and society doesn't have the time to assimilate them.

Already thirty years ago geographer Eugenio Turri proposed the metaphor of 'the landscape as a theatre' to express the urge to reflect on the way we transform our spaces of life; "man's relationship with the territory does not only concern his accomplishment as a doer, who operates and transforms nature, but also, if not above all, his being an observer [...] who understands the measure of his footprint: that is, the reflection on himself, the awareness of his own action" [1]. In this sense, landscapes are not just a mere spatial concept, but a cultural construction, made up of images that we inherit from the past, and which is enriched, day by day, by observing them.

Landscapes are like a text made of stories, memories and signs and, as such, they must be deciphered, read and interpreted.

Photography is a medium that can well respond to this challenge. In fact, it expands the possibilities of critical analysis of the space because it requires the immersion in the territory, the physical and mental experience of the places, introducing the subjective dimension in the interpretation of the landscape. At the same time it is also a powerful means of communication, because of its empathy and subjectivity, capable of dealing with the existing imagination, updating or replacing it, and thus giving life to territorial narratives capable of reaching out a large variety of actors, such as technicians, specialists and policy-makers, but also the general public with the aim to encourage more inclusive decision-making processes. This is why the privileged target of *Pesaggisensibili* are landscapes in transition, places in abeyance or going through a process of change. The goal is to draw attention to hurdles and issues, as well as hidden potentials and values to be rediscovered, and meanings to be reassigned. The sense of a place shouldn't be lost as Juan Noguè, the Catalan geographer recalls, "when the landscape loses its imagination and one is unable to replace it, in that very moment, the landscape dies" [2].

For this paper, three projects were selected to display a number of possibilities offered by this tool.

In the first one, the perceptive dimension of the space was introduced to nourish a research-led design process. The occasion was the project called *Arcipelago*, proposed by Mario Cucinella, the curator of the Italian Pavilion at the XVI International Architecture Biennale in Venice in 2018. The goal was to experiment new paradigms based on interdisciplinary and multi-actor working methods stimulating the role of architecture as change-maker in the reactivation of the inland areas of the country.

In this context photography:

1. Proved to be a concrete knowledge tool supporting the design process, providing a new layer of understanding of the areas of interest (the photographic research was not limited to the single intervention site but had explored a wider region);
2. Offered insights and unexpected connections between the sites when seen all together (territorial analysis and observation). Seeking to provide a larger vision of the sites, each photographer has adopted his/her own point of view, capturing the diversity and the richness of each area;

3. Gave an organic vision, a new representation of these areas (from recomposing the photographers' individual investigation into a collective narrative), showing the photographers' view on the reality explored.

The photographic campaign saw the photographers travel along the Apennine ridge and develop a vision of the places that was intended to encourage the dialogue with the architects, being able to broaden their cognitive horizons, "an interpretative space that (has been) a resource and inspiration, to grasp the invisible reality, the silent words of the landscape" [3]. The areas of investigation chosen by the curator were: the Casentinesi Forests in the Emilia-Romagna region, the town of Camerino in the Marche region, the Basento Valley in Basilicata, Gibellina in Sicily and Ottana in the heart of Barbagia, in Sardinia. This work has produced a new level of interpretation for each area and therefore, as a whole, a visual synthesis of the identity of these territories.

The second project shows the use of the photographic narrative as a research instrument for territorial analysis and a method for communities engagement to raise awareness around the topic of the Ecosystem Services (ESs).

L.U.I.G.I stands for *Linking Urban and Inner Alpine Green Infrastructures* and was the title of a European project funded by the Alpine Space Program aimed at recognize, analyze, map and enhance ESs. The Habitats Directive (Council Directive 92/43/EEC) was adopted in 1992. It requires all EU Member States to establish a strict protection regime for species endangered with the aim of halting and reversing the loss of biodiversity and ecosystem services.

The study case chosen by the Turin Metropolitan City was the five lakes area of Ivrea, characterized by the presence of a majestic geological structure of glacial origins: the Morainic Amphitheater of Ivrea (AMI). The area is today a site of community importance and a *Special Conservation Zone* under the European Union Habitat Directive embracing six municipalities. Through a series of individual interviews, small group meetings (with the representatives of the productive and economic sectors, and with the administrators) and public gatherings, the process of listening has made possible to renew, and in some cases, to establish new connections between the territory and the representatives of the Metropolitan City and, at the inter-municipal level, between the public administrations, the associative world and the productive sectors which operate locally. The outcomes included a visual representation of this particular *milieu* which was brought at the citizens' attention during a series of exhibitions in the public realm. In addition, an open-call was organized inviting the population to bring their own point of view with respect to the elements of the landscape that today require more care and attention.

Photography was therefore used, on the one hand, as a 'cultural tool' for the technical and sector-specific discussion between the Metropolitan City, the local administrators and the experts responsible for the identification and mapping of the ESs; on the other hand, as a 'narrative language' to address the theme of the ESs in dialogue with the territory with the aim to start a process of recognition of the naturalistic and environmental values of the site.

Finally, a project where photography has become the means for a group of inhabitants to explore and rediscover their own territory, assigning new, unexpected and, perhaps, forgotten meanings.

Découvrir pour promouvoir Saint-Vincent was a pilot project developed by the *Associazione Poetica del Territorio* together with *Paesaggisensibili* in collaboration with the Municipality of Saint-Vincent in the Italian Alps. The programme was funded by the European Union Interreg Alcotra Program. The Alpine town has been for more than two-thousand years at a crossroad of international influences, playing a strategic role in the socio-economic, cultural and urban development of the region.

Today the town is represented by a binary narrative: its casino and the thermal baths. The goal of the two year plan of activities was to steer a process of engagement of the local community in the recognition and re-appropriation of the cultural heritage and values of the municipal territory. A first step included the identification of a wide spectrum of disciplines to develop the contents necessary to deepen the knowledge of the site from a geological, archeological, artistic, historical and anthropological perspective. The outcomes were presented to the community during two public events. A second step centered on a workshop activity where participants were asked to elaborate their own vision of the local material and immaterial values supported by site visits and based on the awareness given by the direct experience of the place. The individual works were discussed collectively leading to a new multi-voice representation which seemed much more realistic and close to the complexity of the present reality. The results became a public show where an actress in duet with a musician interpreted and gave voice and atmosphere to the visual narrative with the aim to share the emerged vision with the larger community.

We are facing times which require to address an extraordinary number of territorial challenges starting from retrieving our ability to observe and interpret the space that surrounds us, what French geographer Jean-Marc Besse defines ‘la nécessité du paysage’ [4], possibly allowing different forms of representations to express such dense territorial conditions.

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