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HANDLING TRADITION FOR A SYSTEMIC INNOVATION

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Abstract. There is always something from the past embedded in the new, establishing a synergetic and sympathetic relationship which gives meaning and value to this new creation. Innovation is about creating new values. Contemporary trends in architectural contemplation and creation are looking into a redefinition of innovation as an inventive systemic synergy of multiple parameters, the dynamic modeling of which, with the aid of new digital technologies, can suggest the appropriate form and materiality of architectural design. Sympathy and synergy are not mere situations, but primarily values that nurture architectural design and open up new challenges for architectural education.

Materialised architecture is the expression of worldviews and values. Its form and materiality constitute the meaningful platform on which the relationship between tradition and innovation are represented. Tradition and innovation have always been in a binary opposition. Through the act of creation, invention, innovation, change and transformation are introduced. However, there has always been something in the new that comes from the existent. This condition can become the foundation for a new conception of innovation to emerge, a systemic innovation in which tradition is reflected upon and exploited as a constraint that will leverage and foster it.

Keywords: architectural education, innovation, tradition, history, sympathy, systemic, new technologies, associative thinking.

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Introduction

The role of tradition in defining the innovative

Even though tradition, as a notion, has no rigorous conceptual structure, it has a rather precise role in the construction of knowledge. While examining the Archaeology of Knowledge, Foucault (1969) explains that, by giving to an ensemble of successive and identical -or at least similar- phenomena a special temporal status, tradition enables us to rethink the dispersion of history under the logic of the same. This way, tradition constitutes a convergent background of stability and permanence from which the innovative can be detached and isolated. Tradition becomes the reference point from which the new defines its proper values.

By assuming that the role of tradition is to enable us to define the values of the new, we are confronted with a paradox: The normal intellectual development of culture is a highly convergent activity based upon a

settled consensus. However, the ultimate effect of this tradition-bound work has invariably been to change tradition. There is a kind of tension between tradition and innovation which constitutes a key mechanism in the development of the intellectual environment of cultural production in a certain period of time; not only as a descriptive account of how this environment developed through history but also as a way of carrying normative implications for any cultural practice shaping the future. This detected tension became the premise on which Thomas Kuhn (1962) constructed his epistemological positions on scientific revolutions and paradigms. This is still detectable in contemporary writings like those by Maurice Blanchot (1993) who, by arguing about epochal changes, he speaks about the ‘discrete forces of the turning point’ in which new

developed knowledge challenges the established values between certainties, structuring tradition, and uncertainties, forming innovation.

As tradition has no rigorous conceptual structure, in each period of history, its conceptualisation is reflected in the values controlling the tension between tradition and innovation. We could argue that there is always a traditional view of the tradition, which is always threatened by an innovative one, which wishes to be established as traditional. The history of civilisation is, at the end of the day, the history of the aforementioned dynamics between tradition and innovation. It is the history of the role of tradition in the definition of the innovative. In the 20th century, the main characteristic of this dynamics was, the dialectic conception of the relationship tradition-innovation: we would either have to look forward neglecting the past and considering tradition as an obstacle to the innovative change (modernism), or we would have to go ahead and move forward, while always looking back to be inspired by tradition (post modernism).

In the last ten years, a considerable change can be observed on the understanding of the role of tradition in the formation of the innovative. This transformation can be perceived as a shift from an either-or logic to a both-and one. At present, as we will see below, we are experiencing a reconciliation of these two polarised logics. Both tradition and innovation, as structural components of our thinking and creating processes, no longer appear as opposites, glorifying accordingly the gravity of the current quest for stability or for transformability, solidity or liquidity. On the contrary, they can be both occasionally prioritized depending upon the overall dynamics emerging from the broader complex and unstable conditions in which the overall systemic context exists. According to our contemporary worldview, we increasingly understand that there has always been something from the past embedded in the new, establishing a synergetic and sympathetic relationship which gives meaning, that is to say value, to this new creation. Aristotle could never be more contemporary, when he argued that in everything new there is always something stable and unchangeable, which however becomes different after changes occur.

Materialised architecture is the expression of worldviews and values. Its form and materiality constitute the meaningful platform on which the relationship between tradition and innovation are represented, registered and expressed. At times, architecture and architectural education have been inclined towards the past, neglecting and overlooking novelty while at other times have valued the new, ignoring or underestimating in it, the role of the past. Tradition and innovation

have always been in a binary opposition. However, we never design from scratch, as Bruno Latour (2009) reminds us. There has always been something that pre-existed, known, used, experienced and tested. Something solid used as a context of constraints, to safely build on. But in the same time, through the act of creation, we introduce invention, innovation, change, transformation, the alteration which is the fluid, the unknown, the risky, the 'intentionally uncontrolled', as Jean Nouvel states (Baudrillard, Nouvel 2000). After that, a new building is never entirely new, as it is part or should be a sympathetic part of what already exists in its conceptual and physical context (Spuybroek 2011). It has to be in a sympathetic relationship, for it to be amalgamated with it, to blend into it. This context will allow for a new conception of innovation to emerge, what we could define as systemic innovation, according to which tradition is reflected upon and exploited as a constraint that will leverage and foster it.

Architecture between tradition and innovation

In architecture the dynamics of the relation between the established and the new is a fundamental reference for architectural creation. Architecture is founded upon a system of established values, principally related to the conception of the human being as individual or as a social entity, to which architecture is addressed, and to the worldview according to which architecture is produced. Architecture has an auto-referential character as all architectural evolution in time is based upon the critical questioning of some aspects of the pre-existent and established formal expressions and of their underlying values and principles. This critical questioning of the established is the power of architectural creation, the energy of the act of design, the driving force of architects' formal decisions. Innovation is the intrinsic characteristic of architectural creation. There can be no architectural creation without overcoming and challenging the existent, without remodeling, reorganizing or reconstructing, to a certain extent, the established; in other words, there is no architecture without innovation. However, this quest for innovation is always tailored to and valorised on the basis of a certain conception of tradition.

For Modernism tradition was something to be neglected, ignored and abandoned. The project of Modernism was to create a world of stabilized factors defined on the basis of rationality and scientific knowledge. All its cultural and technological production was based upon predefined norms, axioms, standards, models, rules, benchmarks, patterns, measures or exemplars. Modernism exhausted its energy and resources in order to define and institutionalize constants

on all levels of everyday life, with the conviction that this would provide human beings with a better and a safer, predictable life. Tradition and innovation were in a constant binary opposition. The role of tradition was in this case to mark the negative reference point, which would define the forms and values of the new and innovative.

This opposition to the tradition was also expressed not only through the form of the building but also through its materiality. From Gottfried Semper¹ and Viollet-le-Duc² to Walter Gropius³, Louis Kahn, Le Corbusier and Jørn Utzon, Modernism introduced progressively and against the existing tradition a new role of materiality in architectural design. Modernist architecture and the modern movement associated functionality with form deterministic pursuits. However, in order to express the values of rationality, functionality and clarity it distinguished form and its materiality by distinguishing form and structure, the load-bearing and the non-load-bearing. Notions such as the skeleton, the frame and brickwork constituted a particular, and far from tradition, way of understanding building materiality which led construction towards those materials that could, through their properties, better respond to the expressive demands of the concept.

Post Modernism introduced an entirely different view of tradition. The past was established as the main inspiration reference point for architectural creations, defining the innovative as a critical and solid re-interpretation of the formal and material aspects of architectural creations of the past. In this context, the emergence of meaning as a focal point of architecture attributed to materials a new and enhanced role in the design process, that of the agent of a meaningful articulation between tradition and innovation. Materiality becomes one of the possible signifiers with which the architect 'syntaxes' the cultural meaning of a building as connotation of continuity, stability, resistance to the contemporaneity of interpretation. Form and materiality are now both designed to contribute to the expressivity of architectural creation.

The inclination to history, identity and cultural meaning initiates a new relationship between form and its materiality. Building materials are now conceived

as an expressive aspect of form, and their selection as a creative challenge for the designer. This perspective opens up the production of building materials to a new spectrum of choices and possibilities that will broaden the expressive vocabulary of architects contributing to the generation of increasingly genuine architectural forms. Building materiality appears to be involved in the design process as an agent of meaning of architectural creation.

Nowadays, the appreciation of unstable parameters affecting our reality and, consequently architectural creations, as part of it, are increasingly legitimised. According to this worldview, innovation emerges from a dynamic and open set of parameters associated creatively among them in order to be expressed directly to forms and materialities with the use of advanced information technologies. In this synergetic assemblage of facts, considerations, data, hypotheses, aspirations and views expressed as parametric constraints for the creation of artifacts aspects of tradition could eventually be contemplated. Tradition can be just an agent of innovation, involved in the dynamics of complexity to be treated as it is, neither reduced through abstraction, nor simplified by implementing hierarchies of prioritized factors driving design decisions. According to this approach the traditional standard is conceived as just a version of the non-standard parametric, opening up, this way the path towards innovative formal experimentations.

In the unconventional and fluid environment of globalised economy and information society, architecture, as a cultural statement and manifestation of our life in space, seeks to further develop the above considerations. The project of architecture is now to administer and manage complex systemic associations of parameters. Information technology and scripting are invited to accommodate such complex management in which the unconventional and the fluid as characteristics of our reality obtain the status of a value.

New terms, notions and concepts are constantly appearing in the architectural vocabulary. Liquid, fluid, hybrid, virtual, trans, emergent, animated, seamless, interactive, parametric, machinic, self-organising, are all new terms initiating a new culture where change is replacing stability and solidity, and complexity are replacing simplicity and clarity – terms and values that have nourished architecture for centuries. All these belong to a new framework of values and principles, knowledge, skills and competences, tools and means, as well as priorities and preferences, which constitute a new paradigm of thinking and creating architecture, with a strong impact on Architectural education.

¹ Goetfried Semper 19th C advanced a theory of style that derived objective principles from systems, structures or manufacturing techniques, which could be used to determine the external appearance of objects and relate them to their context.

² Viollet-le-Duc advanced his theory of structural rationalism, which concerned itself with functional efficiency and the honest expression of structures and materials as the basis for the external appearance of forms.

³ Walter Gropius drew parallels between structures and the machine aesthetic as well as the techniques of mass production

Architectural education: traditions and innovations

The way we teach architecture depends upon the way we contemplate and practise architecture. Changes in perceptions of architecture occurring in its history are naturally accompanied by changes in the way architecture is taught. The process of creating architecture and architectural education are fundamentally expressions, representations or manifestations of the same set of values prevailing in a certain period of time. Thus, the development and transformation of values in time are accompanied not only by transformations in architecture itself, but consequently, by transformations in the way architecture is taught. However, architectural education structures appear very inflexible and resistant to follow the changes occurring in architectural contemplation and practice. Tradition in architectural education appears resistant to innovation in its contents and pedagogy.

In the recent history of education, we can easily observe that there are significant changes in the fundamental objectives-values of architectural education. As the ultimate educational objective of architectural education is to assure a valuable way of thinking to its graduates, we can observe that the content of this objective is not the same in the last decades. In the fifties and sixties, the main aim of architectural education was to assure rational thinking, as rationality was conceived as the safe ground to create the future, neglecting the charged, with sentimental and cultural meanings and values, past. The teaching of sciences played a significant role in the structure of school curricula directly linked with the fact that the majority of schools of architecture belonged to Technical Universities and Polytechnics. History of Architecture was considered as a general knowledge and has a marginal implication on the technicalities of architectural design. Architectural curricula were structured by a number of fragments dealing with specific parts of architectural design knowledge (usually called Chairs or departments) and representing different aspects of architectural creation like scale, form, building typology, construction etc. Each one of these units had its own architectural design class, known as 'laboratory'. Form and materiality were taught in different educational environments.

In the seventies and eighties, architectural education pursued the redefinition of its main aim to focus on the development of critical thinking. Reality was no longer conceived as constructed under one, and unique truth, but on the conviction that there are more than one socially and culturally defined truths dominating the conception of reality, rendering the development

of critical thinking necessary to lead innovation. In school curricula, human sciences played a crucial role and the new schools of architecture belonged to Universities or Academies of Fine Arts. The curricula structures became more fragmented by implementing the modular system. Architectural design was now isolated in its own classroom known as 'studio' and remained separated from the other modules such as construction, theory or history. The former administrative structure of Chairs became less coherent and reinforced fragmentation as now architectural design formed a separate unit not related with the others usually named as theory and history, construction, urban design etc.

In the nineties and in the first decade of the 21st century a new shift was observed in architectural education from critical thinking into creative thinking. The request for the development of creative thinking in architectural education was based upon a new worldview according to which the truth of reality existed only in the mind of the individual. Reality was permanently constructed and reconstructed according to the parameters influencing it and structuring its complexity. Creative thinking was the most appropriate competence of the architect as it could enhance his/her capacity to adapt, to be flexible, to be open, to think innovatively in an unpredictable, fast changing, agile and uncertain world and profession. This attitude went hand-in-hand with the enhancement of the role of creative disciplines in architectural curricula and the dominance of a more experimental approach to architectural design, being considered as an investigation practice of its time. The fragmentation of curricula was still active, but the architectural design studio, known as 'design lab', opened its parametric thinking on aspects of architecture able to be expressed in algorithmic terms able to be encompassed to existing software developed for other purposes and areas of the creative realm. In this case, tradition was completely out of context and innovation in architectural design experimentations became an end in itself expressed under the term 'presentism' (Picon 2013).

Nowadays, we can sense a new shift of design thinking and educating which aspires to associative thinking. According to this approach, reality is constructed temporarily and permanently through associations of different agents that form it, creating a kind of ecosystem in which a systemic logic defines temporary hierarchies and dominations. In this reality, there are no exclusions by default. There is a togetherness, which appears to be the fundamental aspect of this systemic thinking. Rationality, critical thinking and creativity are invited to cooperate. This inclusive logic raises new

questions regarding architectural education. What must be the form and the staffing of the studio in order to assure the trans and cross-disciplinary nature of contemporary architectural creations? How can other disciplines and views become active agents enhancing architectural creativity? How will the materiality of architectural creations become a decisive and accelerating agent of architectural innovation? How can digital technologies be better exploited to support associative architectural thinking? How can this associative thinking prevail over the imposition of the software logic? How can past and tradition find a new role in this new logic, becoming another inspiration agent to enhance creativity? How have we to teach history in a helpful to our students to avoid being captives of their own time, as Cloes Caldenby suggests (Brunnstrom 2012). How can we ‘develop a reflexive stance to history and tradition’ in order to avoid ‘presentism’, a contemporary formalistic and superficial perception of innovation, as Antoine Picon urges us (2013)? We will try to trace some of the above-mentioned issues in the following sections of this essay.

Reviewing form and materiality education

The relationship of tradition and innovation is an intrinsic part of architectural thinking. The design of every single building is based upon the rejection of something already existent, and the expectation of something exceptional that never existed before. The author, as coordinator of the European Network of Construction Teachers in Schools of Architecture, in the broader context of an EU funded Thematic Network established in 2002 (www.enhsa.net), organised and participated in a series of debates having as focal point the relationship between tradition and innovation in architectural design and construction education (Voyatzaki 2002, 2003, 2004, 2005a). Beyond defining the content and teaching method as well as the profile of the contemporary construction teacher and the timing in which materiality of architecture has to become an issue of design education the debate primarily focused on the distinction between teaching tradition and teaching innovation. We can distinguish two extremities in this debate. The one valorising the teaching of fundamentals as essential contribution of construction teaching to architectural design, and the other focusing on experimentations on building materials from which new design ideas could emerge.

The basics or fundamentals were distinguished as the tradition of construction, the established knowledge on the properties, characteristics and specific use of construction materials and components and

the established methods of construction and assembly. This knowledge would be transmitted in theoretical courses and assessed through exams. In most cases of this approach, students were asked to use this knowledge adequately and effectively in the design studio by resolving the detailing of a design project. There was a conception of the priority of formal elaboration, which would be later on materialized.

By innovative construction teaching the teachers meant the teaching of construction through experimenting with building materials before preempting students about their properties, capacities and limitations and in the design process. In this case form and materiality are explored together. The experimentation, especially in the lower year of a syllabus, would use every day objects as vehicles (a hat, a chair, etc.). Familiarity with building materials would be possible through direct contact with building industry companies. Teachers were of the conviction that standards and given properties of materials can be easily accessible through contemporary digital platforms. Hands-on experience and transcendence from the expected and unpredictable that formal education can offer is invaluable.

The conclusions drawn from these annual European workshops (conferences) that ran for five years, could be summed up as follows:

- Despite the importance of basic theoretical courses and irrespective of the approach, construction teaching should be primarily taking place in the design studio.
- Teaching construction should be taken as yet another source of creativity and not as a technical constraint and limitation.
- A transdisciplinary design team not only simulates real life scenarios, but it also enhances the unpredictability and emergence of new ideas as each expertise has something different to offer.
- A syllabus can take no adamant position for or against either tradition or innovation, as they are both important to future architects.
- Teaching of construction is the teaching of values and an expression of a worldview, in the same manner that architecture as a whole is.

Despite their potential operational value, these two last reconciling conclusions were not discussed to a greater extent. However, issues of integration, associations among expertise, the virtue of emergence and unpredictability, and the transcendence of norms and standards were definitely aired. It was interesting, however, to note that once the network reached the above conclusion in the first five years of its life-

time (2002–2006) it became ‘self-destructed’. All seven international conferences that have taken place since (2006–2012) have been focusing on the articulation of design and technology including not only building technology but also information technology. The reason for this is that it appeared that the ideological context that can best nourish virtues such as emergence, unpredictability, systemic thinking among the parameters that influence design decision is that of computational architecture and construction is yet another parameter; a discussion that will be further developed later in this essay.

Along the same lines, a relatively recent inquiry (Voyatzaki 2005b) could constitute useful feedback for our current discussion. Construction History is by default associated with tradition in construction. The inquiry presented, asked the participants of the survey questions on the position of Construction History in contemporary architectural education. More specifically this main question was accompanied by questions such as: How much teaching time is allocated to the teaching of Construction History in schools of architecture? Is the teaching of Construction History associated with design teaching? What other subject areas is Construction History teaching associated with, in a school curriculum?

The inquiry regarded the content of construction teaching in European schools of architecture, part of which is the history of construction. The aforementioned European Thematic Network of Construction Teachers (ETNCT) carried out the inquiry.

According to the respondents, the necessity of Construction History as a course in a school curriculum was strongly supported. However, the time allocated to this particular subject was extremely limited making evident that Construction history is not yet consolidated in schools of architecture. It was even more interesting to realize that construction history was perceived as a way to better appreciate the relationship between materials and structures, form and materials, techniques and precedents. This last pairing is quite an intriguing issue especially in the design studio and for studio teaching. The term ‘precedent’ appeared quite a number of times and it was strongly believed that with the study of history of construction innovation could break through. It was strongly argued that only by having studied the tradition, students could strike innovation in architectural ideas and their materiality.

A strong tendency appeared and underlined the socio-cultural and philosophical aspect of architecture: it was claimed that by understanding Construction History one can better appreciate culture as well as

current trends, in other words the state of the art in the architectural realm. This seems to be the most interesting point made for the necessity of Construction History; to be a catalyst for the better understanding of architecture as a whole.

Furthermore, Construction History is associated with the social and geographical context that gave rise to certain achievements, which in turn relate to the history of the profession, and accentuate the ‘heroic’ dimension of building innovators that thought differently in order to materialize the impossible, the novel. Participants specifically stated that Construction History is part of the history of cultures and knowledge, embedded with social and economical organizations; an essential pole in the dialectic between idea and matter. Construction History can help us appreciate where, why and how new demands, theories, ideas, materials, and construction methods changed in different societies, climates and cultures. Construction History is the history of changes in the area of materials and technological solutions, which answer to changeable needs and actual technical possibilities. It is part of the continually evolving tectonic culture and is dynamically associated with present, past and future. By studying the tradition, inventiveness and innovation in design and construction are put in context and teach contemporary designers to follow the traces of the avant-garde of each period in history characterised in their days as innovation but currently as traditions”.

The pedagogic aspect of this is the associations of these lessons of the past to young people and the possibility they are given to connect past, present and future in order to integrate technique and architecture, tradition and innovation, by appreciating the thinking behind technological advances in building.

The fact that a great number of architecture educators perceive the traditions of construction as a fertile field for understanding architecture is an important finding. This thesis seems to be well founded in the milieu of people who teach construction nowadays, as the history of construction is not only important for the value of the knowledge of tradition it offers as background and reference point (in a positive or negative way) of contemporary architectural praxis. It is primarily important for better comprehension of the deepest structures of the architectural thinking and praxis. This way it allows us to better comprehend the strong relationship between culture and construction, that is the way that ideas and values of a certain period in history are ‘translated’ into architectural form with the constructive intervention of construction methods and techniques. It also allows us to realise the intimate relationship between form and the construction process as

a creative context, which breeds an architectural idea and drives the design of an architectural proposition. Moreover, it allows us to comprehend the importance of construction innovation in the expression/shaping of new architectural ideas but also of new attestations and views on architecture, the human being and its social and cultural context. Finally, it allows us to comprehend the materiality of architecture as the ‘material’ for the ‘construction’ of an architectural idea, of a concept.

Systemic architectural education: from fragmented time to real time

Time is the ultimate common denominator of tradition and innovation. All paradigms of architectural practice and architectural educational, presented above represent the way that time becomes part of architectural contemplation. What is interesting to note through this trajectory is that time has always been conceived as fragmented and associated with either the past or the future. History of architecture is the development of the different periods of the dominance of fragments of time. The past was loved either for its aesthetic values (Renaissance), for its political integrity (18th Century), or for its cultural continuity (post modernism). Aspirations for the future were loved as vehicles to escape from the past and created a new reality experimenting on dreams and future possibilities. In all these cases we have a rather static conception of time, which is used as a reference point but the final conception of the artifact is timeless. It is designed and constructed in order to be omnipresent, unchangeable, and everlasting. A completed artifact dedicated to glorify, to please, to function, to mean, to provoke, to impress.

We are governed by a new conception of time in architecture and architectural design. Time is now conceived as ‘real time’. Real time is past, present and future at the same time. This conception of time affects, or at least is compatible with the way that the architectural outcome is conceived: as something adaptable, responsive, alive, dynamic, transformative, on time. Affected by its social and natural environment, open to affordance, emergence, temporality, interaction, mutation.

In this new conception of time in architectural creations, materiality is no longer an afterthought that follows the final definition of form, or something to be retrieved intact from the past to create form. Materiality must allow the dynamic and systemic nature of form, to accommodate time, and as such to become the real medium of time, the agent to accommodate temporality, the ‘organ’ to keep the building ‘alive’. According

to Manuel Delanda (2009) a material is conceived as yet another complex, dynamic system that actively organises itself into new structures and forms. Material performativity comes from the complex dynamic behaviour of the components of a material that attribute to it emergent properties. This way in the design process matter is not conceived constitutive of the materiality of the form but as a decisive morphogenetic agent.

All the above changes certainly influence architectural education practices. There is, indeed, a long way to go towards redefining all the features of the educational system, the contents and pedagogy. However, what seems to be already present is the progressive emergence of associative thinking, which affects our conception of tradition and innovation, the conception of time. In this new concept, tradition cannot be excluded from the future. Both future and past can be creatively amalgamated with present in the unstable and unpredictable dynamics of reality. Past, present and future are always associated.

According to Greek Mythology, Moirai (Μοῖραι) were three white dressed women incarnating the destiny of humans. The one was weaving the thread of life, the other delivered the goods and the evils and the third controlled memories. In other words, one was dealing with the present, the other with the future and the third with the past. They were always together and could not exist separately. That was a particular conception of time, which is increasingly coming back and has to inevitably dwell in and govern contemporary human conscience, architectural practice and architectural education towards systemic innovation accelerated and leveraged by the agent tradition.

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