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ARCHITECTURAL KNOWLEDGE:

Transformations, transpositions and variations

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Introduction

The challenge of architecture is to focus on architecture itself — drawings, models, architectural texts and buildings — as its *locus* of knowledge and, specifically, on how that knowledge can become a tool of the design process. Drawings, models and architectural texts support buildings conception and, inversely, buildings are capital to continuously reformulate those.

One of the earliest attempts embody this thesis can be read in the two academic manuals, *Précis* and *Recueil*, elaborated by Durand in the early 19th century. If *Recueil* represented the search for an epistemological validation of a field previously anchored in the domain of metaphysics, *Précis* defined the hinge for a design methodology taking further the Vitruvian axiom *architectura est scientia*, and answering Enlightenment's anxiety for demonstration and systematization of knowledge. Durand sought to clarify the fundamentals of architectural praxis and the genealogies of what it produces by taking history as its material and, through techniques of decomposing and recomposing, established the principles that guided the teaching of architecture until the 20th century, when their deterioration, oversimplification and direct implementation — partially because of their normative and hermetic character — became a target of criticisms. Nevertheless, the legacy of Durand's effort to re-centre the discipline in its inaugural act opened the way for Peter Eisenman, almost two centuries later, to shift the focus of architectural discourse from its object to its process. As the underlying statement of his 11 houses reveal, he sought not so much how to draw a house, but rather how to draw the process of designing a house, being his diagrams more expressive of a set of intentions than the houses themselves. Over more than thirty years Eisenman's ideas exerted an ascendancy over several generations, although interpreted in a variety of ways, with profound consequences both in practice and education, resulting, as Peter Cook realized, "in a civilization that is obsessed by the process".

Architectural representation and self-legitimation

This paradigm transformation undertake a (re)promotion of the conceptual tools both as expression and clarification of mental concepts, as happened long before, in the *Cinquecento*, with the elevation of drawing to the category of liberal art, particularly due to Francesco Dori who related *disegno* with divine speculation, describing its first act as that of God creating the universe; to Brunelleschi whose alternative approach to linear perspective defined a gradual and complex transition from a theory of vision to a mathematical and geometrical rationalization of image; and to Giorgio Vasari's *Accademia del Disegno* in Florence, that promoted the modernization of arts over medieval traditions, and the drawing as transcendental of its purely instrumental or documentary role. Thus, *disegno* identified as visual knowledge could be recognized as a complete consequence of liberal arts.

Yet, drawings and models gradually acquired the status of objective instruments of representation, first with the impulse of Alberti's claim for the urge of accuracy, and definitely with the codification of descriptive geometry and orthogonal projections by Gaspar Monge in the 18th century. Despite Alberti's, and later on Philibert Delorme's, efforts to define architecture as an intellectual activity, drawings and models have since, more often than not, been used in the Greek sense of *techne*, reaching its peak with recent hyper-realistic simulations based on rigorous mathematical and scientific procedures. Adriaan Snodgrass provides a very elucidative definition of it:

The word [practice] comes from the Greek praxis, but for the Greeks this term did not refer to what we now call 'practice', that is, the application in action of rules and principles provided by theory. This latter meaning of the word corresponds to what the Greeks termed techne, which is the making of something in accordance with episteme, 'knowledge', and more specifically knowledge that is consciously known, and can be directly communicated to others.¹

In the last decades, given the absence of absolute reference systems and the negation of a universally valid method underlying architecture, students have been required to render a narrative that correlates reasoning and investigation behind the idea — or sequence of ideas — that conducted it as a way of self-legitimation, which had an enormous impact in architectural expression and representation, but not in the process of investigation itself. Furthermore, it configured an over simplistic understanding of the design process as an end in itself, inducing the idea that as long as it does not look arbitrary and that students know how to present it as a logical evolution and in a “seductive” way, that is enough. Indeed, since studio-based design became the mainstream teaching scheme in most western countries, and with the growing interest of a wider audience in the architect’s process, the training in architecture might be inculcating an ideological pattern-based education in the wake of its professional and academic idols and their design process. The paraphernalia of images broadcast in professional magazines, and the exhibition of artefacts that traditionally were not revealed in the circuit of museums and galleries, formerly devoted exclusively to painters and sculptors, have been establishing an emancipated and autonomous codified corpus, with its proper rules and aesthetics, which became embedded in our own culture. They are visible in certain kinds of sequencing models or drawings, lying somewhere between Serlio’s and Palladio’s variations and Durand’s typologies; in the materials used; in the minimalist vs. the expressionist representation (that is the Suisse/Japanese vs. the Dutch pattern). Therefore, although the training in architecture tends to withdraw gradually from the teaching system that was established primarily from the 18th century onwards — fully consistent with a view of a perfect and commensurable relationship between theory and practice — the potential development of a true praxis is still latent, and we might be witnessing a new proposition in the academic universe: one that does not lie in the process of architecture, but in the **architecture of the process**. Regardless of the generative capacity of models and drawings to become tools to reason visually about architecture, curricula continue to include it as a sort of techno-rationalist way of representation, both of the student’s process and its result, misjudging its power in training and education.

Knowledge (re)representation

On the one hand, the general expectation that students have from an architectural school is to be taught how to design a house, a church, an office building... On the other hand, the professional view is that the teacher “is not someone who asks questions whose answers he already knows” and that “practicing architecture is asking oneself questions”². Paradoxically, the particular type of approach to design studios — to work upon a programme client alike, testing different typologies (in the functional definition of the term and not that of Quatremère) under a monitor’s guidance — demands conclusive answers to support their evaluation. Ultimately, these points out their redundancy, which add little value to previous academic systems, where students would attend scientific and technological courses related with architecture, and then learn their praxis under a tutor patronage. This would provide a great argument for those responsible for the major Bologna’s teaching reform in Europe to fulfil their aims of reducing the expenses of courses such as ours.

According to Robin Evans, the disadvantage of architects in relation to other artists, including painters and sculptors, is that they only work with the means of architectural production, primarily drawing, which is consistent with Walter Benjamin’s definition of architecture as a “marginal case”³ in relation to other arts given the lack of contact, in terms of production, with the artwork itself — the built work — since, until the 21st century, they produced drawings, models and texts, and never their buildings. This is, for Anthony Vidler, a “paradoxical separation between the artist and the work”⁴, which becomes especially evident in the academic milieu.

Taking into account that studios are not replicas of design offices, where drawings and models are a fiction that represents and anticipates reality, whereas buildings constitute the reality itself, and that, generally, students work with a fictional design project, drawings and models, once the fictions of a reality to come, became themselves the reality of a subjective fiction. Their ability to suggest, more than reveal, something that may one day exist makes the school the privileged place of imagination and research whose memories construct their own knowledge, mapping a sort of Aby Warburg’s *Atlas Mnemosyne*.

Kant questioned knowledge as it exists, considering that it does not serve to depict reality but, on the contrary, to dictate the empirical world as it should be built. Following this argument we can say that real knowledge in architecture is its representation, primarily graphic and written — the means by which one’s prefigure space — and ultimately translates into a physical form, which may be considered a knowledge (re)representation. As Marco Frascari put it: “our conceptual system is generated by the architecture around us; we make buildings and they make us. Architecture is framed by embodied experience and embodied experience is framed by architecture and this mirroring action is also embodied in the drawing”⁵. As previously outlined, the understanding of representation should be expanded and separated from its purely communicative role, entailing a reconfiguration of artistic representation that replaces the methods preceding the reality of vision to the reality of knowledge, i.e. to a reality that does not exist as it is perceived but as it is conceived, assuming a more critical role.

Taking further Walter Benjamin’s proposition that drawings do not re-produce architecture but produce it in the first place⁶, and inverting cause and effect, if drawings, models, and all other kind of graphic tools are not intended to describe something that “will be”, that “will be” remarkably becomes a possible representation of the graphic material produced. This dramatically challenges our “scalar imagination”⁷, to use Paul Emmons’ expression, once the unclear relationship between body and drawings/models allow us to project ourselves into those in multiple and ambiguous

ways.

Representation as the locus of knowledge production

As a way of addressing this possibility as the *modus operandi* within the design studio (with our first year students), we have adopted rules of representation to go beyond representation, considering, as Pierre Francastel states, that the artist invents while designing and the particular technique that he uses imposes, always, a certain discriminatory order.⁸ Reinterpreting Robin Evans essay *Translations from drawing to building*, we attempted to translate existing representations (texts, drawings, paintings and music) to build up a reality by rescuing representation methods as a way of exploring its potentials both as techniques and background material.

The first research dates back to 2007, taking Italo Calvino's book, *Le città invisibili*, as the subject of investigation. Each student had to choose one of the cities described by Marco Polo to Kublai Kan, interpret, synthesize and spatially translate it into an object (not a model, the scale should be 1/1) not bigger than (a random) one cubic metre. Students were encouraged to experiment a range of materials, textures, colours, transparencies and opacities, different from those traditionally used in models, as a way of mediating the tension between reality and representation from the reading and, at the same time, to look for ways to relate constructive and constitutive logics.

The choice of a literary source as a basic material relied upon the recognition of an opportunity to work with what was already a representation as an operative support of intervention. The fact that the representation of literary fiction (the text) does not stand to represent something that is real, but, on the contrary, creates a fictional reality that is open to multiple interpretations — becomes evident, for instance, in cinema adaptations. The selection of Marco Polo and Kublai Kahn's dialogue is twofold. First, because it was primarily a description of space. Secondly, my personal speculation that Marco Polo could be describing his home town, Venetia, as a kind of multilayering deconstruction and reconstruction of fragments that prompted 55 disparate and autonomous narratives of the same reality stand for a kind of promise behind our own predictions.

Reality, representation and imagination

One of the first problems we had to face was that, understandably, undergraduate students tend to describe the real as equivalent to the real (tangible) world, and therefore the knowledge representation in architecture relies in the built reality. Consequently, everything else was to be representations of that reality but never the reality itself. For that reason, in the first working days, a fair amount of studio discussions were attempts to avoid straightforward approaches that could have misled to miniaturized versions, or three-dimensional illustrations of the cities described. And so, even before the final results, it appeared that what in the first instance seemed to be a good choice (a book specifically describing spatial atmospheres) became a sort of pitfall.

After overcoming those contingencies, the results were, in general, quite surprising (*Fig. 1-3*). Students managed to move away from the idea of model, both in terms of content, form and materials. Exhibited in the school's gallery, as we moved through from one object to the other, we could really have an imaginary and personal experience of architectural space according to the range of different states — between Lilliputians and Gullivers — that each of us assumed for themselves. In that sense, representation could be understood as the space for the construction of ideas, a provisional condition for a series of possible transformations.

Representation' systems as support of critical processes

In subsequent years, we attempted to push forward the re-appropriation of representation systems for purposes other than those for which they are usually intended, looking for the possible outcomes of their hybridization or inversion (such as reading plans or elevations as perspectives and invert the process, etc.), and the reinterpretation and variation of representations and/or existing realities as support of critical processes of transformation. If the purpose of translating a text into an object was to explore mental concepts of space, the interpretation of El Lissitzky's painting, *Prουν*, searched for spatial depth expressed in the relationship between figure/ground, the constructive materiality and thickness perceived by the quality of the trace, the scale and proportion between parts and the whole, the contrasts of light and shadow that define a space, the surface quality (*Fig. 4*). With Rodrigo Leão's music we intended to pose questions of structure, order, rhythmic sequences and arrhythmic threads, repetition, hierarchy, pause and tension (*Fig. 5*). Lewis Carroll's *Alice's Adventures in Wonderland* and *Alice Through the Looking Glass* provided the ground for exploring spatial sequences, frontiers, and motion perspective (*Fig. 6, Fig. 7*). On another occasion, after having discussed Le Corbusier's *Cabanon*, students were asked to build up their own *cabanon* within a defined perimeter in the school, aiming at projecting one's body into the space in question exploring through dimensioning and tectonics, issues of perception (*Fig. 8*).

In all of them the power of the univocal and ambiguous character of drawings and models became evident, as

opposed to objective (re)presentations, to go far beyond a specific exercise, as their abstract nature provokes unforeseen possibilities, renders the unimagined visible, providing room for the unexpected and enabling visually thinking spatial relations and relational spaces rather than a defined object of investigation.

However, these exercises still remain as isolated experiments, in a latent expectation for a broader systematization of their goals, directly relating the development of design skills with the research of specific spatial issues, and for an adapted model for growing complexities in subsequent years.

The role of knowledge representation in knowledge production

The recognition of the important role of knowledge representation in knowledge production as a new approach to design, not the architecture of the object as in the beaux-arts' tradition, nor the process of architecture in its various nuances that occurred between the theories of Durand and Eisenman — the former imposing specific methodologies, the latter at the risk of students represent a process that may never have existed, paradoxically transforming itself and again, in (regressive) object representations —, could suggest the fragmentation and isolation of the multiple spatial issues that stand as an integral part of a design project, turning each in the main goal of investigation. That would include a variety of problems such as mass/void, light/shadow, color/texture, proportion/scale, etc., that deprived from its circumstantial aspects could bring about new possibilities, but also more tangible and specific ones such as site and programme. The (re)reading of both not as an hypothetic object but as an end in itself, by exploring the limits of its representation and different from the sort of mapping and "organigramming" that most of the students usually fall into, highlighting qualities, tensions and fractures, with no reference to codified forms of architecture, might allow a deeper understanding of its importance in the unfold of original proposals.

The gradual reassemble of what has been previously broken up does not rely in the conviction of a successful step-by-step learning programme, but rather in the possibilities that might arise by starting to correlate them through the instrumentalization of representation techniques, and its potential to improve students capabilities to do in a more conscientious and critical manner, what architects have always done — re-elaborating and working upon others' work as a simulacrum for analogies through transformations, transpositions and variations, conferring new meanings to what is already known. That is to say, using architectural knowledge by making specific choices on existing material according to the problem identified — since in the meantime students are supposed to have acquired that ability from subjects, such as history and theory of architecture, but also by their own perceptual experience — reasoning about past and contemporary architecture. And therefore contribute to the continuous construction of critical arguments in the process of conception through the very act of designing, integrating aspects of theory and practice.

Fig.1 ISCTE/IUL, 2007.

Fig. 2 ISCTE/IUL, 2007.

Fig. 3 ISCTE/IUL, 2007.

Fig. 4 ISCTE/IUL, 2009.

Fig. 5 ISCTE/IUL, 2009.

Fig. 6 ISCTE/IUL, 2008.

Fig. 7 ISCTE/IUL, 2008.

Fig. 8 ISCTE/IUL, 2009.

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¹ SNODGRASS, Adrian. 2000. "On 'Theorizing Architectural Education'." *Architectural Theory Review* 5(2):89-93, p.89.

² ZUMTHOR, Peter. 2005. *Pensar a Arquitectura*. Barcelona: Gustavo Gili, p.53.

³ BENJAMIN, Walter. Winter 1988. "Rigorous Study of Art: On the First Volume of the Kunstwissen-Schaftliche Forschungen." *October* 47:84-90, p.89.

⁴ VIDLER, Anthony. 2011. "Diagrams of Diagrams: Architectural Abstraction and Modern Representation." Pp. 54-63 in *The Diagrams of Architecture*, edited by Mark (ed.) GARCIA. Chichester: John Wiley & Sons, p.56.

⁵ FRASCARI, Marco. 2011. *Eleven exercises in the art of architectural drawing. Slow food for the architect's imagination*. London/New York: Routledge, p.6.

⁶ BENJAMIN, Walter. Winter 1988. "Rigorous Study of Art: On the First Volume of the Kunstwissen-Schaftliche Forschungen." *October* 47:84-90, p.89.

⁷ EMMONS, Paul. 2007. "Drawn to scale: the imaginative inhabitation of architectural drawings." Pp. 64-78 in *From Models to Drawings*, edited by Marco; HALE FRASCARI, Jonathan; STARKEY, Bradley. London/New York: Routledge, p.71.

⁸ FRANCASTEL, Pierre. 1963. *Arte e técnica nos séculos XIX e XX*. Lisboa: Livros do Brasil, p.316.