

D.I.G.I.T.A.L. Defining Internal Goals In The Architectural Landscape

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Abstract

The digital factor is a challenge to regain the meaning of Design on Architecture, in addition to evaluating its possible extension and transformations. Digital could be an answer for the actual needs of architectural design: Architecture should be digital because digital is profit. Digital could help to understand architectural design as "verified conception" through the concept of computational modelling: Architecture should be digital because digital goes in line and not against design tradition. Digital could enhance the didactic dimension, really important for students: Architecture should be digital because is actual. Digital offers cognitive and ontological value for the design and new skills for the designer: Architecture should be digital because digital is a catalyst of new and creativity. Digital reshapes constructed architecture introducing new aesthetic paradigms: Architecture should be digital because digital is the mental landscape as reference point for the actual theoretical phase of Architecture ...

There are several answers to the question: "Why Architecture should be digital?", but without rigor and critical dimension cannot be any digital benefit in architectural landscape, and the main risk could be that the "representation" prevails over "the fact".

1. Introduction

The digital factor is a challenge to regain the meaning of Design on architecture, in addition to evaluating its possible extension and transformations. To sum up, we could say that the value of the Digital for Designing is relevant to the procedural iter (methodological aspect), to the dynamic of knowledge (cognitive aspect) and to the concept (ontological aspect). Some pre-concepts block the education to this value in architecture.

1) considering Digital just a "tool" (therefore exclude it from direct relevance, prevent it to having real effects in architectural theory and practice). This misunderstanding probably comes from the early approaches to computer technology, as an assistive technology that would enhance the architecture designers. The scope of the early engagements was captured in the unhappy phrase: "computer - aided architectural design". Today, i.e., the concept of "totally computer-mediated architectural design", has a totally different significance, implications and potentialities. (Mahalingam G. 2003).

2) making the contribution of Digital to coincide with only the esthetic component of a specific type of building (these shapes are currently undergoing a lot of criticism).

Critical training starting with didactic sphere, therefore of vital importance. From always the digital "resources" for design have always affected our ways of thinking and designers studying design techniques, have also disclosed a unique view of reality and at the same time a "way of being" towards the meaning of design itself (Heinsen G.L. 1995).

From many years by now, the computational models evolves: from being simple tools for the implementation of working methods to affecting the genesis of a potential transformation of the designing conception and practice. Critics often highlight that today we are witnessing the birth of a new International Style, (typical of a so-called "digital" – or "transgenic", "blobby", "liquid" architecture) a limit of which is especially the cultural position with respect to: the specific features of a place the permanence of shapes, the search for tradition and memory, the value of history (the ancient "*Genius Loci*"); the theoretical and practical approach to the "*Triade Vitruviana: Firmitas, Utilitas, Venustas*", base of the meaning of the architectural typologies.

2. Methodological value

At the glance, it could be possible to assert that Architecture should be digital because everything is already (and even more will be) digital... It is a problem of "citizenship": belongings, language and communication. Digital for Architecture as and after Digital for the World. (Or, from a different point of view: "no-digital Architecture" could survive in a digital world?). But this would be, obviously, an "external" reason. Really there are several "internal" reasons. In our times, architectural design has become so complex that traditional ways of managing the process design are no longer sufficient. Design should be not merely a process, but a co-evolution of efforts and events in various places and times, both synchronous and asynchronous (Anders P., Jabl W. 2003), but we know, instead, as the process design is – the facto - fragmentary owing to the numerous "actors", phases, environmental contexts and cultural backgrounds (Wix J. 1997; Eastman C., Siabiris 1995; Jacobsen, oth. 1997). This leads to considering the Design as a set of isolated and sequential compartment. All this introduces an inefficiency of costs and/or timing, or leads to buildings that do not attain the required performances, and, locally, produces buildings that after some time are unliveable (Carrara G., Kalay Y. 1994, Carrara G., Fioravanti A. 2002). Digital could be an answer for the actual needs of architectural design: we could say that Architecture should be digital because is profit. The Digital allows on the one hand, to open up new fields of investigation, and on the other hand, if well considered, to take back the meaning of designing to its original value. This value goes in line and not against tradition.

3. The architectural design as "verified conception"

Design has always played a key role: that of being a "verified conception". In the past, a conception was implicitly verified as one designed and built to the professional standards that had been developed by tradition over the centuries (Gucci N. 1998). Nowadays, the designing conception is verified (in "a priori" manner), before the building is erected through the modelling of its structural features, through an interactive process running across different disciplines and iterative between the time of the ideational expression and the time of its verification, based on a wide-ranging concept of digital modelling, (not just as pure geometrical modelling). How Digital could assert and promote this way? A sample. We know that the BIM methodology allows to create a virtual model using object oriented elements of construction (pillars, beams, bricks, fixtures...). The value of digital BIM, is to be a logical-functional model of the future construction, that permits to obtain in an "*unicum*", not only the possibility to study the different phases of construction, to simulate the thermo-physical properties, the cost, etc... but allows to generate everything in a combined manner. It is not just a procedural method change (to build directly a constructive object-oriented model from which documents: views, sections... are derived afterwards instead of the opposite), but a cognitive change: the design concept needs to be integrated since an early stage.

4. A didactic experience

In my Course ("Technical Architecture II" in Civil Engineering Degree), the significance of this designing method has been explored. The students have been invited to design a single family villa. Contrary to what they were used to do, beginning with the design of a map, prospects, and sections, they were asked to use a 3D object oriented approach, using constructive elements, and trying - in addition - to translate in construction of a digital model, the operational mode that would have characterized the construction of a building.

In the final written report, the students always report a radical challenge of their designing practice, with respect to the "normal" design procedures within a generic C.A.D. software. Basically students writing:

- "*To have a different way of reasoning*": the fact of being invited to conceptualizing the project from a constructive system an subsystem perspective in the student's minds and then as a virtual model, had a direct effect in terms of understanding "the building object", like they had never experimented before.

- "*To understand all in clear and total way*": they experimented how this procedure had the benefit of leading them to think how to immediately solve the relationship between constructive elements to avoid leaving unsolved/incomplete many aspects of the building.

Please note, that students were familiar the topic of the design of a building of this type: (they were already attending others courses). However, they have indicated a rediscovery of the practice not only at a project level but also constructive of the future building.

5. The digital: cognitive and ontological value for the design

5.1 A concept of space

The digital dimension generates new cognitive spaces for the designer and "in" the designer and for the designing concept (Saggio A. 2005; Novak K. 1999; Mitchell W. 1999). The new technology is dramatically changing our approach to design. This change involves as much our conceptual and designing potentials as their implementation. The digital dimension affects the way designers works through the generation of new mode to perceiving conceiving and imagining space and to relating to it - and "in it" - in a new way (Pea R.D. 1994; Winograd T. 1995;). The digital dimension allows for and boosts the growth of a new dynamic "environment", half natural and half artificial, in which the design concept comes to life and form and matter can even be replaced by digital information, by virtual entity, by augmented object. (Thinking i.e. at the Collaborative Environment Rich Virtualized)

5.2 New meanings of interactivity

The digital dimension turns a new "environment" (Johnson A. 2001; Maher M. L., P. Frost 2003; Brown M. 1999) where it is born and grows a new concept of an unusual form of interaction between the designers (subject) and the design (object). A sample. Immersive and augmented are new working spaces for designers: one can see that this increases, improves the process of knowledge (know ability and creativity, and therefore also design) to such extent as to allow the cognitive processes themselves to move from a symbolic-reconstructive value to a perceptive-motor value, which is the inborn cognitive method of the human organism (Forte F. 1997). To sum up, we are moving beyond vision to "experience" the design before it is built. This interaction was always believed in the arts and design history. The main aspect was to overcome the concept of Renaissance Window, towards a dynamic relationship between subject who observe and object that is observed: (i.e., the design vision of F. Brunelleschi, L.B. Alberti, D. Velázquez, R. Magritte, P. Picasso).

5.3 New skills for the designer?

We could say that digital also increases our designing abstraction skills. Two main aspects:

- From the theoretical side, about the possibility of discovering a kind of visualization of our mental space. - From the technical side, about the possibility of renders some portions of space visible that would otherwise usually lie beyond our perception (Eloueni A. 2001).

The conquest of a new cognitive space leads to the conception of a new architectural space. In architecture, changing the environment where design takes place involves a dramatic change in the way the architectural space is conceived of and designed.

6. Constructed (digital) architecture

In the last two decades a common conceptual base of Architectural vanguard experiences, was the concept of architectural form: digital information (as a set of ever-moving, ever-changing data) becomes shape and vice-versa (thinking, i.e., about to the architecture "of immaterial"). After centuries, the shapes and the buildings "move". Digital reshapes constructed architecture, overcoming the assumption that Architecture was always compared to the study of the inert, of everything "static".

In addition, the Digital constructed architecture is often the architecture "of relation": it does not keep its distance from the onlooker, it asks the onlooker to enter the building.

This architecture is no longer defined by the space it offers but also by the number and features of the services it supplies, its ability to change as quickly as possible, to be open to anything without contradictions. The building becomes, in itself, a service whose value is related to its ability to fulfil a given number of requirements.

7. Conclusion

Today, the debate on the relationship between Digital and Architecture is really actual and totally open and will be ever more necessary, important and unavoidable, because the digital "resources" increase day by day and not just because they involve several potential architectural aspects (Digital thinking, pedagogy, projects, practices, representation, design, visualization, fabrication, tools..), but because, these aspects, all together, are generating – de facto - a only Digital Dimension for Architecture. Probably, some contrary positions hide a "fear": could "the digital" be absorbed by the discipline (the Architecture) or vice - versa? This question looks like the core of the majority of local cultural (and "strategic") positions, but, often, could reveal a weak cultural position on the architecture landscape: a problem of "identity". In order to avoid fading away of the discipline (Architecture), the problem is not the situation the discipline faces, but what the discipline actually is: its identity (the identity of cultural positions inside it). A cultural position with strong identity is almost always open to new situations, looks for a comparison and is able, after a critical recognition, to include the positive factors of the new situations and to exclude the negative once.

We know that Architecture is the genetic "expression" of human understanding of reality: Architecture interprets, includes and stimulates the cognition models within human live reality. The change of the cognition models is strongly related to the change of the paradigms of the Architecture and vice-versa. It is knowledge itself that is "represented" in the architectural object. These happenings are more evident during specific times that we could name "phases of revolution". Today we are living a phase of digital revolution and we know that new technology has always been a catalyst for new ideas in architecture. After some decades it is possible assert that Digital enhances design creativity in Architecture, rather than just work production (thinking i.e. to the digital animation, we could understand "the movement" as dynamic force, a creativity resource, not just as pictures sequence).

From an aesthetic point of view probably the contemporary architecture cannot "not be digital". Architecture should be digital, because digital is the actual theoretical phase of the Architecture. Renaissance Architecture (influenced by the "new science" of Perspective) has

been transformed to be "*perspectivable*" itself (object/subject of perspective). The Architecture of "Funzionalismo" (Modern Movement), has been transformed to be "*industriable*" (o/s of industry): objective, separated, mechanical, not just standard-built (the assonometric representation was its announcement). Today (part of) Architecture would change to be "*digitable*" (o/s of digital): to include the dynamic, the connection, the interactivity of the digital paradigm (hyper-surfaces, algorithms, splines ... as new language). We could say that Digital is the mental landscape as reference point for the actual phase of Architecture.

From a theoretical point of view, the digital factor for architectural design evolves between two opposite risks:

- The digital as an obstacle to reality. The power of modeling as resource of the evaluation, could suffocate the concept itself, preventing the creativity...
- The Digital as Land of Utopia, idealizing creativity: on one hand because digital is become a link, between what can be conceived and what can be built through "file-to-factory" processes, on the other hand, because the projects could remain only exercises in software). The risk could be a fashion leaning towards aestheticism, that makes the representation ("marketability") prevail over "the fact" - over the "substance" - it refers to (the correctness and operation of the architectural design). The shape of the building stands out, prevails over its function, on the consistency of the constructive decisions. Thus, the Digital in architecture can risk reducing its message to pure form (thinking about the possibility to obtain physical form from digital entity using a 3D printer).

For the future, it is hoped, that the discussion about the digital for design in Architecture shouldn't be about its orthodoxies, what matters instead is its effectiveness. The challenge for the designed Architecture is to try to take hold of the new digital paradigm, but without taking them, tout court, as "objective" parameter in order to assess the achievement of a new quality of built Architecture.

8. References

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