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*La simulation expérientielle en architecture et dans l'espace urbain -*

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- 1 Beyond the design of the physical space, designers have to deal with the intangible outcomes of projects, which include allowance for the future experience of people in time and space. The purpose of design is to project<sup>1</sup> the future conditions of the built environment on which we intervene. Hence, designers are required to express their sensitivity thanks to the ability to imagine and depict non-existent environments such as future conditions originating in their minds, as well as lost environments from the past. Imagining and representing non-existent environments refers to both the material features of places and intangible values; the latter aspects are difficult to grasp, but have always been a priority for designers. The main merit of architecture and urban design is to achieve a strong sense of place and a particular atmosphere. Even if it is consciously addressed by the designer, the anticipation of the ambiance of places is difficult to communicate and test. Intangible values are expressed and revealed in very different ways by designers during conceptual design. In any case it is very hard to assess how designers control the future ambiance in a scientific and sharable way.
- 2 Hence, if the construction of the ambiance of places is the result of the sensitivity of the designer, we must question if this is his/her responsibility alone or how much other features – even unexpected ones – contribute to the emergence of the resulting ambiance; in addition, we have to investigate how much the designer can truly control and share the expected outcomes of design. In other words, we argue that in practice the validation of design outcomes in relation to physical aspects (mainly geometry and materials) is easy to manage. The real challenge of anticipating the ambiance depends a

great deal on the ability of the designer to grasp and depict the future ambiance and the sense of place, mostly defined by intangible features. We consequently query and investigate how mature awareness and control over design outcomes can be achieved using traditional and innovative tools for representing and simulating architecture and urban design in practice, in research and education applications.

- 3 Simulating non-existent environments is not a novelty at all. Already in the past, the task of representing the future of spaces was a way to test design outcomes and communicate with clients in an effective way. For instance, Brunelleschi (Firenze, 1377 - Firenze, 1446) invented a brilliant and clever technique to visually simulate the Baptistery of Florence<sup>2</sup>. He produced a realistic painting of the baptistery, then cut a hole in its centre and placed a mirror in front of it. He put the painting in the corresponding point of view of the real setting, and then asked people to look through the hole from behind the painting: they could see the reflected image of the painted baptistery with accurate realistic dimensions; moreover, using burnished silver for the sky, Brunelleschi was able to reflect the real sky and the moving clouds into the painting, probably generating an amazing experience for that time. That episode counts as one of the first applications in history of dynamic experiential simulation based on controlled scientific principles. Another effective example is Canaletto (Venice, 1697 - Venice, 1768) with his *Capricci*, i.e. photo-realistic paintings that represent imaginary conditions of transformation in Venice. When he represented the construction of a Palladian bridge over the Grand Canal, Canaletto restored the sense of place and the atmosphere that the transformation would generate in the environment: people and boats animate the town with flows and bring a dynamic feeling and vibrancy about the expected urban life depicted by the painting. Another type of simulation was explored by Luca Beltrami (Milano, 1854 - Roma, 1933) at the end of the 19th century. He provided the most effective way for simulating the future conditions of places, reproducing the reconstruction of the Filarete Tower of Sforza Castle in Milan at the scale of one-to-one on site, a rare example of a real-scale physical prototyping in architecture<sup>3</sup>.
- 4 These few examples demonstrate that already in the past we owned the tools to tackle simulation in an effective and satisfying way. Today, the spectrum of simulation tools has dramatically increased and, most importantly, tools are becoming more and more user-friendly and widely applied. In fact, digital representation tools are easily accessible in everyday design practice. In the last three decades, the rapid evolution of CAD and ICT (especially computer power) has enabled the complexification of design by providing greater control over the outcomes. More recently, in addition to more and more photorealistic representations, dynamic and interactive simulations are now manageable by the youngest generation of designers.
- 5 We question whether these forms of digital photorealistic simulations are really effective in order to return the sense of place and the ambiance of non-existent environments. If our goal is to depict the future in order to support (people-centred) design thinking and validate design solutions, then the representation of geometry and materials alone is not sufficient. We want to investigate whether novel tools are capable of depicting the intangible and experiential values of places. In general, the validation of simulation in terms of accuracy and reliability remains an open question, deeply investigated by numerous scholars, and this debate will continue and evolve together with the evolution of the tools. For instance, let's think about transferring to

architectural and urban simulation emerging technologies like Augmented Reality. The possibility of offering in-place simulation (this perfectly recalls Brunelleschi's idea of simulation) opens up new questions and challenges for designers.

- 6 We argue that today increasing interest in simulation, by society and the profession, is evident. Maybe, we are witnessing the dawn of a new era of design after postmodernism, post-postmodernism and the archi-stars season. Society largely recognizes how spatial design affects human well-being and health; this generates a serious return to people-centred design and, consequently, increased interest in transparency and participation in the process of decision making about urban spaces. An answer to transparency can be given by professionals by anticipating the environmental and energy performance of new spaces and, not least, the multisensory experience of places. In short, simulation has now a recognized social and environmental mission as never before.
- 7 Exploring the research on architectural representation and simulation of the ambiance of places requires us to enlarge the domains of knowledge beyond the horizon of the design discipline. Hence, we have to invade other fields of research, like the environmental studies, in order to explore the mechanisms of human interaction with the environment.
- 8 In particular, this special issue investigates the relevance of experiential and sensory aspects in architectural and urban design and how these manifest themselves in current practice, research and education. **Barbara E. A. Piga** and **Eugenio Morello** seek to provide a comprehensive framework for introducing experiential simulation into urban design, approaching the topic from an ecological point of view, which means comparing the relationship and dynamic interaction occurring between man/environment and man/simulation. This framework allows us to categorize different types of devices, techniques and applications of simulations in order to orient the designer in the selection of the appropriate tools to use depending on her/his objective and resources.
- 9 Studying the mechanisms of perception, action and emotion from the neuroscience perspective is crucial to overcoming the purely intuitive awareness that architects have of these mechanisms. **Andrea Jelić** argues that human experience acts as a pre-reflective process between the person and the environment, i.e. a kind of precognitive communication. Hence, architecture should take into account the neurophenomenological approach, in order to generate a positive loop between architectural design and people experience.
- 10 The theory of architecture is full of references to multi-sensory studies and the conceptualization of ambiance in practice. **Carolina Coelho** presents this topic analysing the concept of the multi-sensory living experience as a design content. Referring to relevant references of design projects and well-known authors, the research gives a picture of the different outcomes in practice, with a specific case study on a contemporary school.
- 11 The concept of ambiance is also related to the intangible aspects related to the use of spaces. Even if promoting places for social encounter is the main aim of urban design, this aspect has rarely been translated into visuals and mapping methods as argued by **Deirdre Greaney** in her contribution. For instance, methods to predict the future conditions of usage of the public space are mostly expressed as text-based theoretical contributions, whereas representations of predicted social uses are not simulated at all

by designers. In order to bridge the gap between theory and practice, between guidelines and simulation of design outcomes, eidetic mapping is a possible answer to help designers to validate the invisible conditions of usage of future public spaces.

- 12 In addition to the sensitivity of designers to acknowledging and addressing the topic of ambiance in practice, simulation can represent an effective way to validate and communicate the sense of place. **Anetta Kepczynska Walczak** and **Bartosz Marek Walczak** explore the efficacy of digital simulation tools to depict the aura of places. Representation tools have to be adapted in order to give back the intangible values of places. In fact, most of the time, these tend to exclude the atmospheric characteristics of the environment and even more the unexpected, irregular or defective features that define the uniqueness of place.
- 13 The simulation of the atmosphere goes far beyond the visual world alone. **Valerio Signorelli** explores the role of sound as a key for increasing the dynamic experience of places. Enriching the visual dimension with sound is now possible with several digital tools, especially with game-engine technologies. The topic of soundscapes opens up new questions, not only about the role of sound in defining the ambiance of places, but also about the attention and control that designers pose to the sound environment.
- 14 Finally, we are only at the beginning of exploring the power of novel immersive tools applied to research and teaching in architectural and urban design. **Antonietta Angulo** presents a recent case-study application of a teaching experience with students, whereby the use of novel immersive technologies for testing design outcomes was offered to students. How these tools will affect the way the designers of the future conceive architecture, and how simulation technologies will enable us to pay more attention to the intangible values of the ambiance of spaces, is still an open question.

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## NOTES

1. The term project derives from the Latin verb *prōjiciō*, which combines the terms ‘*pro*’ (from, in the place of, for) and ‘*iaciō*’ (throw, hurl): the etymology of project reminds us the strong link of the act of designing (doing a project) and the concept of envisioning and simulation.
2. Cf. Bosselmann Peter. 1998. *Representation of Places*, The MIT Press. Cambridge MA.
3. Madini, Pietro. 1934. *Luca Beltrami nell’aneddoto e altri appunti storici e folcloristici*. Milano: Famiglia Meneghina Editrice. 269 p.

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