

The Body in Digital Space

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The aim of this paper is to investigate the perception of space in the context of digital architecture: if architectural and urban structures are designed for the experience of the body's motor faculties, does digital design, by modifying space-time categories of the lived-body and brain's treatment of spatial perceptions, open new paths of experience?

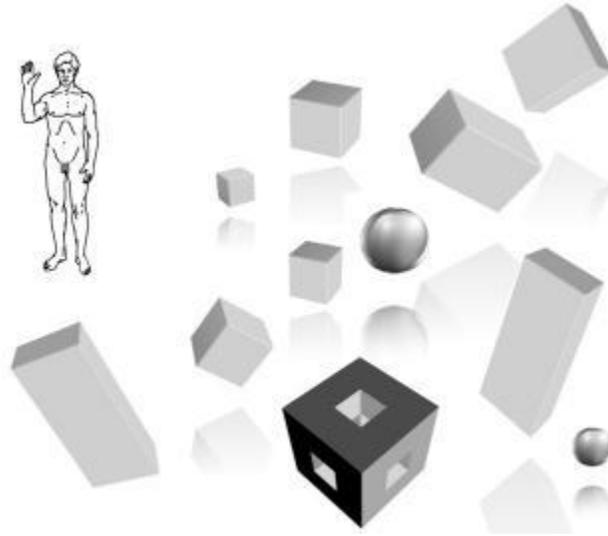


Fig 1. The Body in Digital Space © Marco Cesario

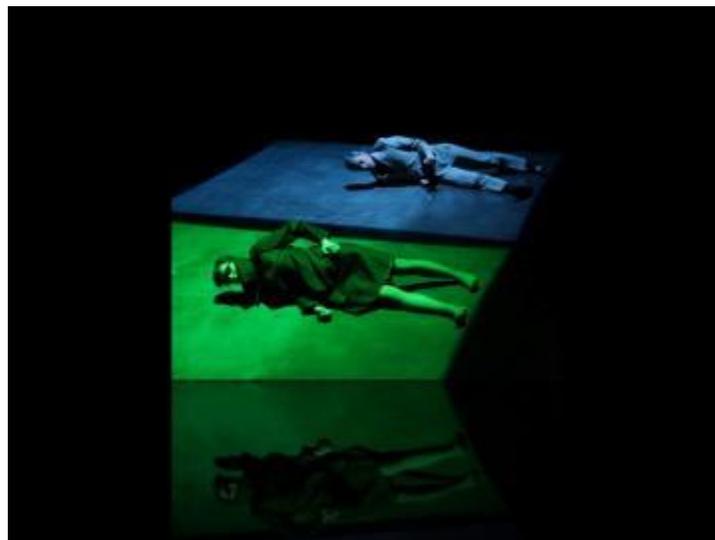


Fig 2. C'est bien d'être ailleurs aussi © Valeria Giuga

Flesh and Reversibility

In Merleau-Ponty's view the 'flesh' represents the continuity between a perceiving body and the perceived world. The flesh is the common element, the concrete emblem of a general manner of being including the subject and its environment; its meaningful expression is the 'chiasm' – the so-called reversibility - which is an immanent coincidence between the seeing and the visible, the touching and touched, the self and other selves. The body can touch and being touched, it can at the same time be the subject and the object of perception. Let us explore the idea of flesh further. The flesh represents the flesh of the world but also the flesh of the body which is self-sensing. The consciousness of our being-in-the-world take roots in this very original sort of primordial sensitivity for which we are included in a general self-sensing matter of the world. From this point of view there's an inner harmony between the external and the internal world and there's no categorical division between object and subject. When my right hand touches my left hand says Merleau-Ponty: "the 'touching subject passes over to the rank of the touched, descends into the things". The reversibility is a reciprocal relation not limited to the senses - to touching or seeing- but also to perception in general.

The Body in Space and Motility

In *The Phenomenology of Perception*, Merleau-Ponty, unveiling the primordial spatiality of the lived body and its original intentionality, disclose the fundamental relations between the body and space. At a first sight, the body's spatiality is external and the body is seen as an external object. In this perspective the spatiality of the body is a 'spatiality of position', related to an external, objective or intelligible space. The body is a mere object topographically located in a determinate position, occupying a portion of the objective space. In 1933 the Swiss psychiatrist Ludwig Binswanger, in his article *The Space Problem in Psychopathology*, explained the role of identification and orientation of the body in space through the study of mental illness. The spaces of our natural world are subdivided into the oriented human space and the homogeneous space of science, the tuned space. The subjective experience of an 'attuned' space contrasts the scientist's oriented space characterized by the vertical and horizontal axis influenced by gravity. According to Binswanger space and time are constantly and subjectively assumed by the body. Space resides inside the subject and the consciousness is itself spatial. There's not one space and time but as many spaces and times as there are subjects. Instead of a 'spatiality of position', the perceptual experience of our lived body discloses a 'spatiality of situation', the situation of the body in face of its daily exploring tasks. Bodily space and external space form a system, the first being the background against which the objects as 'goals' of our actions 'come to light' and disclose themselves. Thanks to action and movement our body "is brought into being". When we analyze the body in movement we can fully understand how it inhabits the space because movement is not strictly submitted to space and time, it assumes them constantly through a here-and-now synthesis.

The Body's Posture and *Praktognosia*

Our primary link to the world takes root in space through an embodied consciousness which is motile/spatial. While moving in space, the body is able to incorporate direct spatial relations and make a dynamic and constantly-in-motion synthesis. According to the German psychiatrist and phenomenologist Erwin Straus, the human posture is a primary source of sensory awareness. Man's upright position

has an inner time consciousness of the world and the geometrical structure of reality becomes secondary to one's sense of time as duration in the world. Models of posture are consequentially projected onto changing spatial situations by the human body, whose position in space is constantly updated in order to interact with the environment. The communication between the body and the world takes place through a *praktognosia*, a practical and direct knowledge of the world. The body's posture is predictive because it assumes multiple or possible tasks and acts in an oriented-space connected with a historical time.

The intention of the body creates a space-time structure of here-and-now. The multiplicity of point of 'heres' constituted by the movement can be considered as a 'chain' of experiences in which each situation and perspective one and no more of them is presented in an objective way. Mathematically the movement - decomposed *ad libitum* - would open a *plethora* of spatial situations. The first access to the world is made through the movement of the body in space. This is the reason why we should consider the body's *praktognosia* not as a particular case of knowledge but as the original access to the world and the objects themselves.

***Kinesthesia*, the Sixth Sense**

According to the French neurologist and phenomenologist Alain Berthoz beyond the five traditional senses – touch, sight, hearing, taste, and smell – we should consider the sense of movement – *kinesthesia* - a 'sixth sense'. The body has a double immediate perception while moving: self-orientation (the perception of where we are located in a determined space with respect to certain landmarks in the environment) and object-orientation (the perception where specific objects are located with respect to each other). The body's ability to interact with the environment depends on the interaction between the two. From the external world we receive inputs recorded by our external sensory organs (exteroceptors): eyes, nose, ears. At the same time we receive inputs from the internal sensory systems (interoceptors). A particular internal sensory system is proprioception, which is composed of receptors and nerves in our bodies monitoring constantly the positions of our muscles and joints. It is a complex system allowing the body to keep its own balance and prepare fluid and coordinate movements such as in dance performances. The ordinary space relations are suspended because new forms of spatiality are cut out through the body's movement. The dancer, for instance, can experience an enlarged time because his internal-time consciousness is modified by the 'arc' of the body's movement. Sensory receptors contribute to the sense of movement. We can definitely argue that the body has a kinesthetic consciousness of the world because the origins of human knowledge reside in the body's movement and action.

The Body and Architecture

We are surrounded by architecture and constantly included in an architectural context. The architectural environment opens determined spatial experiences and enlarges consciousness by exploiting the multiple possibilities of the body's kinesthesia. The architectural context seems to show a 'motile essence' in which the user is immediately absorbed. The 'sense' of architecture is to open a whole perceptive experience to the body's kinesthesia. The hall of a building, its stairs seem to be conceived to experience the body's motor faculties. Not only distance, length and depth is experienced by the body but also a 'general sense' of movement arising from the whole building. If we have a look at some contemporary buildings it seems that there's a slow, hidden and general movement of the whole structure and that all the elements of the building create a sense of direction, of a moving structure.

In a complex building my body becomes part of a wider interconnecting system involving me and the architectural elements composing the structure. That's because in architectural design the building is

conceived as from a mental representation of the body in space, as from the exploring sense of awareness. While drawing, mind reproduces in scale the kinesthetic properties of a body moving in space. Mental reasoning about spatial environments is strictly linked with spatio-analogical representation criteria. In the architects drawing process his, mind tends to create and explore task-sensitive representations to achieve specified spatial situations for the human body.

The idea of space in architecture should be connected with the idea of a 'practiced space', in the sense of how this space is experienced beyond the geometric perspective including other sensorial experiences. The experience of a railway station by night for example: the wheels of an incoming train, far voices from few passengers moving towards the exit, the low, orange light of night lampposts. Or the experience of a park at dawn: birds, the faint, cold light settling on the buildings and the sound of the wind in the trees. Those visible and audio traces can alter the experience of lived spaces. The experience of space to be fully understood by the body should be total and include all the aspects of the senses. Changing the relationships in a sequence of rooms, for example, produces important transformations of the properties of space and in general has an impact on how intelligible people perceive them. There's a strict relationship between the geometrical properties of space and how we tend to recognize it.

The Body in Digital Space

The perception of architectural spaces is nowadays connected with the rise of technology and virtual reality produced by digital design. In the case of computer-aided architectural design - in which the architect can manipulate visual representations - architectural spaces gain a new reality by supporting the creation of new architectural objects. In this process, the constituting elements of a building become technical networks of communicating nodes. Digital design becomes not only a way to create new objects but also a support for communicative and intersubjective platforms which could be considered means of mediation between people. Every part of the model is individually defined and can be created without referring to other parts of the model. In a computer model in which the architect presents a building, we can easily use a specific coordinate of the building, a determined point, a node or an architectural object, to develop news plans or physical models and create a whole building from it. During the design process every aspect of the model can be modified. This is the reason why we often have the perception that the whole structure is constantly in movement.

By the development of computer technologies such as computer aided design (CAD), virtual environments (VE) and virtual reality (VR), architects have an endless number of possibilities of representation. Designing in a digital environment allows the architect to shape and re-shape the design continuously with less effort. But, as pointed out by Alicia Imperiale, the interest of architects is shifting from 'Derridean deconstruction' to 'Deleuzian focus on smooth space, serial and dynamic process'. By the use of different mathematical calculations the architect strives towards a surprising, innovative element in the design process.

Imperial points out that nowadays in contemporary architecture, the interest is no longer focused on designing spaces but entirely on the surface. In the new digital architecture the space as a proper object of architecture is mainly neglected. Often, the interior of a building is simply the concave part of the convex exterior surface, its internal opposite. Space becomes the residual part of the 'skin' or the 'mass' of the objects. Space is not 'designed' specifically and doesn't seem to have properties or a specific architectural nature but it becomes a derivative space, 'what remains' between different masses of the architectural objects juxtaposed. If computer programs can aid and even contribute to the design of an object what about the design of space and what impact on the body in digitally designed spaces?

In the virtual context of digital architecture the body oriented space is modified and the original movement is replaced by an exploring virtual body projected by the mind inside a non-Euclidean and non-or-

thogonal context. The most perceivable information is mainly visual rather than auditory or tactile. Virtual environments surely provide benefits on all phases of architectural design process and digital 3D models – being similar to physical models but without its tactile qualities - improve the perception of designs and the whole spatial perception of a building. However those technologies provide feedback for only three of the five senses. If the visual, auditory or tactile senses are concerned, smell or tactility is not included in virtual environments. Above all, kinesthesia – the sixth sense that we discussed above – is totally cut out since digitally produced models often lack a sense of scale.

A space which is not assumed and experienced by the body and its movement remains an artificial space created ad hoc to be close-like to the body's reality and doesn't represent the whole multi-sensorial human experience. We are still in the homogenous space of the science; digital space has mathematical and geometrical properties but is yet not conceived to be experienced by the body's kinesthesia and could therefore be misleading. The objects created can be wonderfully realized and can constitute an original experience for humans but they are conceived as detached, opaque objects in which lived space is derivative and the body's movement is approximate, compelled secondary.

Conclusion

The sense of movement, as we demonstrated above, is crucial to provide access to the world. In conceptualizing space the cognitive theorists Lakoff & Johnson points to how: "The body is not merely somehow involved in conceptualization but is shaping its very nature". The decisive role of the sensory-motor system for human understanding and perception of space is crucial. How we perceive spatiality and interpret space is the common denominator for both the cognitive and phenomenological perspective.

While drawing the architect "thinks in drawing", his hand reproduces on the paper a symbolic world following an 'inner vision' - the mental representation of an achieved building. In a virtual environment the process of creating through 3D software creates an alternative reality in which the Demiurge-Architect has endless possibilities to create and manipulate objects and in which aestheticism becomes the priority rather than the laws of gravity. An 'inner vision' is replaced by software defying the laws of physics.

The body is no longer the centre of the architectural project. While drawing, the mind creates spaces according to a bodily consciousness – the experiences of the body in physical space. Mental representations of those experiences can support the creation of new artificial spaces.

However, in a virtual environment, the space is not conceived to be experienced by the human body and the attention is no longer focused on the impact of the achieved building on the environment or on human lives. From this point of view digital architecture – whose main purpose seems to be the design in itself and not the concrete architecture - appears 'detached' from human life and devoid of any link to the concrete existence. Bodily space should be the core of the process of architectural design because any structure will be experienced, lived daily by humans. From this point of view, architecture shouldn't simply manipulate or juxtapose architectural objects without any link to the physical existence. The structure of buildings should reflect our being-in-the-world. Putting the human body and its sense of movement in the centre of digital architecture would be a new frontier for exploring the multiple nature of human perception. A 'spatiality of situation' should guide the work of the architect rather than a 'spatiality of position'. Therefore we need to consider the context of the 'flesh' – the intertwining between the body and perceived world – the fundamental ground in order to grasp the intimate nature of space.

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