# Exploring Tomás Maldonado

EDITED BY

## Pierfrancesco Califano

Fondazione
Giangiacomo
Feltrinelli

Scenari 45

# Exploring Tomás Maldonado

Edited by
Pierfrancesco Califano

Fondazione
Giangiacomo
Feltrinelli

**Exploring Tomás Maldonado**

**© 2022 Fondazione Giangiacomo Feltrinelli**
Viale Pasubio 5, 20154 Milano (MI)
www.fondazionefeltrinelli.it

ISBN 978-88-6835-458-9

First digital edition June 2022

Direttore: Massimiliano Tarantino
Coordinamento delle attività di ricerca: Francesco Grandi
Coordinamento editoriale: Caterina Croce

Follow our activities:

 facebook.com/fondazionefeltrinelli

 twitter.com/Fondfeltrinelli

 instagram.com/fondazione.feltrinelli

# Summary

# Designing the Experience

## Among the Contemporary Phygital Multiplicity of Bodies and Spaces

*Giovanna Nichilò, Gabriele Pontillo, Beatrice Rossato*

### Introduction

This paper aims to examine the multi-layered nature of space-user interaction, integrated or generated by digital technologies whose experiential dimension is activated by the user through the body as interface. The increasingly pervasive use of new technologies defines a state of seamless interaction between user and inhabited medium, imposing the definition of new scenarios concerning new sensibilities and new proxemics where people, both in the individual and social dimension, are extended physically, mentally and emotionally. Contemporary life is increasingly characterized by dematerialization and digitization of products, processes, and services and, therefore, there is an urgent need for a critical discussion on the experiential value of spaces integrated by digital technologies and the consequent limits and design possibilities that they can offer. The relevant literature – starting from the critical analysis of Maldonado's writings to the considerations of Caronia (1996), Benyon (2014), Morganti, Riva (2006) – focuses on the

importance of designing the experiential dimension of the interaction between body and space.

Based on these observations, the present study contextualizes the subject matter, starting from Tomás Maldonado's critique to more recent interpretations that find continuity or discontinuity with the author's thought. Next, reflections that have emerged around the relevant literature are presented, focusing on current practices that testify to the evolution of the space-body relationship – in the examples, in particular, of the "transparent body" (Maldonado, 1997; Floridi, 2017), the "shared body" (Floridi, 2017), and the "digital self" (Granelli, 2006; Floridi, 2017) – towards an increasing digitization of the body.

The analysis is therefore focused on identifying the multiplicity of bodies and spaces that the co-presence of the physical and virtual dimensions entails, investigating whether and what kind of experience can be designed and whether this can constitute a cognitive enrichment or impoverishment for the user.

## The Inheritance of Tomás Maldonado: Bodies and Spaces in the Real-Virtuality

The need to investigate both on a critical and design level the aspects related to the multiplicity of bodies and spaces and their interactions arises, first of all, from Maldonado's reflection on the meaning of the word virtual and on the relationship between real and virtual space. The author in Reale e virtuale (1992) recalls how human beings have always virtualized concepts, illusorily furnishing the world, so he rejects the definition of virtual only as a technological expression of immersive three-dimensional space. He, instead, searches for the meaning of illusory reality where man produces images that he persuades himself to consider real. A practice that goes back to the ability of primitive man to depict symbolic worlds rather than a novelty triggered by technological progress. In this regard, it becomes interesting to resume the definition of Pierre Lévy that in Il Virtuale notes that the word virtual comes from the Latin virtualis, derived from virtus,

or strength, power. "In scholastic philosophy, virtual is what exists in power and not in act" (Lévy, 1997, p. 10. Translated by the authors) thus not a concept opposed to the real but rather the potential of the real itself, an opportunity for creativity.

The consideration around the definition of virtual becomes necessary to understand how, in this paper, spaces understood as virtual will be considered. They embrace not only the virtual immersive realities that transport the user into an immersive digital three-dimensional world, but attention is paid above all to the middle ground that constitutes a continuity between the real world and the illusory world, of which immersive realities are naturally one part. In this regard, Maldonado offers the cue to reflect on the theme of the plurality and complexity of middle-lands, a condition that arises from the increasing dematerialization that the contemporary context has experienced and is experiencing and about which he speaks critically in Reale e virtuale:

> In this sense, we find it in the scenarios that are envisaged on the role of science and technology in the next century. In such scenarios, it is often argued, the impact of emerging technologies (information technology, telecommunications, bioengineering, robotics, and advanced materials technology) would lead to a progressive thinning of the materiality of the world, to a dematerialization of our reality as a whole. […] a contraction of the universe of material objects, objects that would be replaced by increasingly immaterial processes and services (Maldonado, 1992, p. 10. Translated by the authors).

Maldonado anticipates the contemporary situation in which more and more products, processes and services are being moved away from their physical sphere in favor of a digitally integrated experience. The sudden and strong push to digital transition linked to the epidemiological emergency from Covid-19 actualizes Maldonado's thought and criticism around the topic, highlighting his strong skepticism in considering plausible a complete dematerialization of physical artifacts and, above all, of the body. Antonio Caronia, in his essay Il corpo virtuale,

takes up and emphasizes the critical issues proposed by Maldonado about the dematerialization of reality, in particular emphasizing the criticism of the "increasingly obsessive craving for evanescent worlds" (Maldonado, 1992). In Maldonado's thought, it is in fact unlikely that a total cancellation of corporeality, which is a constitutive element of human experience, will be achieved. In 1997, in Critica alla ragione informatica, Maldonado refers to the body as object of knowledge – for the experience that passes through the senses – and technical subject – as a reference point for technical operativity. In particular, he highlights how the link with the body is almost indispensable: "for me, the body should rather be understood as our inalienable daily reality, as the body experienced every day, and in the first person, by each and every one of us, as the body that is sensoriality, sensuality, and sensitivity, in short, as the body that we are" (Maldonado, 1997, p. 140. Translated by the authors).

Maldonado, in fact, specifically questions the experience of the body in continuity between natural and artificial, real and virtual, where he identifies numerous unknowns: the interaction between the body and the environment and with other body types or the types of new forms of sensoriality, sensuality, and sensitivity that are created, to name a few.

The attachment to the body and its physicality opens interesting considerations around sensoriality in virtual realities and it is worth mentioning in this scenario the ambivalence that Maldonado recognizes in the very nature of virtual realities: on the one hand the discontinuity with the real body, on the other hand, their potential as a tool for rehabilitative medicine, design, industrial robotics. Maldonado's discourse, therefore, emphasizes not only the increasingly contemporary tendency to perceive the world through virtual simulacra of reality but also in their duplicity, as a limit and an opportunity. The limit of the body and the perception of the body within virtual realities becomes central to Maldonado's discourse:

The experience of space, to varying degrees and intensities, involves at least four of our senses: sight, touch, hearing, and smell. It is therefore fair to define space as a perceptual system [...]. Our sensorimotor behavior, whether normal or abnormal, always refers to a perceptual system. When this is lacking, as happens with virtual space, sensorimotor behavior suffers (Maldonado, 1997, p. 162. Translated by the authors).

Caronia also takes up this concept by proposing the definition of unidirectional disseminated body when explaining the characteristics of the experience in the virtual reality of a dislocated body:

We move our limbs, we turn our heads, and this has the same effect as in the real world, but the space of the effects lacks one of the characteristics of the usual everyday space, namely materiality. The possibility therefore of extending one's own body and perceiving the bodies of others albeit distant, but the limitation of not having a perceptual intervention on one's own physical body (Caronia, 1996, pp. 73-74. Translated by the authors).

As cited earlier, the ambivalent nature that Maldonado finds in virtual realities also identifies the areas of application in which they can be successful – depending on the environment. Among these, the case of medical rehabilitation is discussed extensively primarily because it brings attention back to "a question of responsibility that we should not dramatize, but neither should we evade" (Maldonado, 1997, p. 159. Translated by the authors). The intent is to emphasize the importance of the role of perception in rehabilitation practice which, as seen above, Maldonado believes is a complex condition for virtual realities:

It has been said [...] cognitive science, because of the central role it assigns to perception, cannot afford to ignore action. But if this is true, the reverse is no less so. In a cognitivist approach, nothing can be more misleading than to isolate action from perception (Maldonado, 1997, p. 158. Translated by the authors).

Action and perception thus become issues to be analyzed in the design of places of experience, wondering whether the absence of bodily sensory perception can still be considered, as Maldonado states, an intrinsic limitation of virtual realities and whether this consequently constitutes a limitation also in the experience that can be generated between digitally integrated space and the body.

The limits and fears for virtual realities and digitally integrated spaces become clear when the author introduces the theme of desocialization linked to the dematerialization of the real. From considering domotics as the cause of a "housing coma" (Paul Virilio in Maldonado, 1992, p. 53) to the use of telework, once again Maldonado seems to anticipate the current scenario in which we are forced by necessity to consider digitally mediated forms of social interaction, while not excluding the primary importance of the physical interaction that they contain. Therefore, there is no doubt that Maldonado's thought still offers critical considerations on the relationship between real space, virtual space, body, and interaction.

## Contemporary Considerations: Bodies of Multiplicity Inhabit Spaces of Complexity

Talking about digital transition, body and space, the maldonadian thought about the concept of transparency of the body is still relevant: digital technologies allow at the clinical level to enter the physical body and explore as well as modify its structures and functions, without it being configured as a black box; one can observe in vitro and at the same time intervene in vivo (Maldonado, 1997, p. 148. Translated by the authors). Floridi (2017) takes up Maldonado's words to mark the shift from black boxes to transparent boxes, crediting ICTs with being able to measure, model, simulate, monitor, and manage the body with extreme accuracy and without this process being invasive to the body itself. A process, remembers Floridi, that is not limited to diseases but to wellbeing in general where the awareness of one's own body

is increased and improved. In contemporary times, the use of technologies in the investigation, communication, representation, fruition of the body, and its design, configures a hybrid scenario in which body and technologies are in a continuum of close correlation, they influence each other and interact.

> The body can no longer do without technology to empower itself, communicate and self-represent since the awareness of its physicality has expanded following the double track of the immateriality of the media and the materiality of its imprint: it is a body that modifies itself because it wants to achieve the image it has always dreamed of itself (Ciammaichella, 2015. Translated by the authors).

Today, having arrived "from the opacity to the transparency of the body" (Maldonado, 1997), techniques and processes of medical imaging, nanotechnology, biosensors, and communication technologies allow us to detect, communicate and interact with bodies in a multidisciplinary dimension in which fall not only diagnostics, therapy, surgery but also decision-making models, disclosure extending to the conception of spaces and artifacts, both physical and virtual, at various scales of design.

An example in the rehabilitation field is the D-Wall project by Tecnobody (Figure 1), a medical device that works with virtual and augmented reality that looks like a digital mirror able to monitor and visualize the movements of the patient (body recognition) thanks to a frontal 3D camera and the floor equipped with sensors that allow to reconstruct up to 16 joints of the body. The real-time detection returns through digital avatar the movement that is being made, then analyzes it and produces informative data becoming a system of continuous learning. In this example, the automatic movement of the body, made transparent, is virtualized by informing the user about the actions performed. Participation in the rehabilitation process is enhanced, thanks to the playful component included in the device, with immersive environments that help to focus on the goal to be achieved. The interac-

tion, mediated by the screen, involves the physical body of the patient and its virtual transparent double with favorable consequences on the physical body in terms of rehabilitation.



Figure 1. D-Wall, Tecnobody, 2020. Virtual and augmented reality medical device for rehabilitation.

The ability to collect, store, and analyze individuals' physiological, behavioral, and geolocated data has come to influence a wide range of domains of daily life, from marketing to epidemiology. The body increasingly becomes a "shared body" (Floridi, 2017) and, therefore, it is human beings themselves who are owners and sources of information, as well as channels that transfer it. The "datafication of health" (Ruckenstein, Schüll, 2017) is encompassed by different domains – by scales and registries – that have never been sharply distinguished: data-driven medical research and public health infrastructure, of which biobanks are an example; clinical health care, including eHealth practices such as continuous patient monitoring, implantable biosensors, and personalized medicine; and self-care practices, such as wearable fitness and health devices and smartphone apps. Problematizing the value of data in today's society, Ruckenstein and Schüll call on scholars to pay more attention to the phenomenon of health datafication and, in particular, to probe and experiment with new relationships

with areas not only directly related to medicine. For example, recalling the work on health care by Oriana Persico and Salvatore Iaconesi,[1] the authors talk about data activism exploring how data technology can be exploited to promote social justice, equality, political participation, and collective action. In this regard, they write:

> Individual self-tracking data, for instance, can have social and political potential when it is pooled to identify health inequalities, collective environmental exposure, or disparities in quality of life [...]. Such data might demonstrate that physiological stress is tied to everyday rhythms defined by societal norms and pressures rather than by individual predilections [...], or they might highlight the physiological and emotional costs of particular work schedules for caregivers [...] (Ruckenstein, Schüll, 2017, p. 280).

Similarly, the installation Protoni e Dati, which sits between science, technology and art, converts medical data from proton therapy into 3D sounds so that the patient can perceive the area in which the proton radiation is acting. This allows greater awareness of the treatment process on one's own body, implementing the intimate and relational sphere with the treatment itself. Such a system transforms the therapy into a cultural artifact, sounds that become pieces of music and can be shared with relatives and friends, triggering a dialogue and an empathic relationship that promotes the well-being of the patient.

Still, about the quantity and potential of human body data and its sharing, it is relevant to report the case of the Human BioMolecular Atlas (HuBMAP) project, a program funded by the National Institutes of Health, whose goal is to develop a human biomolecular atlas conformed as a global open data platform that maps healthy cells in the human body.

---

1    Salvatore Iaconesi, by online sharing information about his brain cancer and requesting crowd-sourced answers to his condition, has successfully created a public space where, by experiencing his own disease and recovery, he can not be reduced to a "category", that of cancer patient consisting of a set of medical data.

HuBMAP researchers are studying the connections that cells – 37 trillion in an adult human body – have with each other throughout the body to determine how those relationships might affect an individual's health. The open-access platform enables the development of new approaches for integrating, visualizing, and modeling imaging data for reuse by the global scientific community in areas such as computational research, biology, teaching and education, and project disciplines.

Interacting with all aspects of daily living, the intervention of ICTs in collecting, analyzing, and measuring data about the human body creates a community dimension in which this is shared; technologies consequently become tools for the constitution of personal identity, "powerful technologies of the self" (Floridi, 2017) that mediate and construct a "digital self" (Granelli, 2006). According to Granelli, the birth of the digital self can be attributed to three different digital phenomena: peer-to-peer digital information exchange, blogging, and the spread of digital identifiers such as personal emails, avatars, or digital aliases. The sharing of information online constituted and enabled by the content that humans themselves communicate through social networks, instant messaging, or through digital avatars, all become micro narratives of their own identity that modify the social relationships established between individuals.

It is increasingly natural then, as Floridi reminds us, to consider the body as a source of shareable information. Moving in the context of the network, the intersections of multiple data sources and therefore the connections between people and bodies, influence the environment in which we live, in its different notions of material or immaterial state. From metaverse to home automation, to responsive environments, the flow of data, processed with different purposes, offers new forms of sensory, motor, and spatial interaction. Bidirectional communication is established between the sensed bodies and the space in which it is translated.

From this point of view, it is interesting to observe the first installations of the Pulse series, the work of the artist Rafael Lozano-Hem-

mer. He tries to overturn the use of biometrics from mere control to a continuous representation of a community. The installations, in fact, are conceived in the wake of the debate on the use of absolute identification by businesses and the state, as acquisitions of biometric data translated into sequences of flashing lights, soundscapes, animated fingerprints, waves of water moving through space. Such an approach allows us to look at ICT beyond the network or our own home environment, and projects towards a new way of experiencing social space that becomes both a physical and digital experience. In the last decade, in fact, technologies such as IoT have become affordable to be integrated and connected to spatial design to contribute to the creation of hybrid and connected environments that include spaces, structures, objects, and people equipped with sensors and actuators, and to acquire messages, data and information from as many environments to transfer them over the network to further spaces, structures, objects and people outlining a complex relational infrastructure full of potential for everyday life.

The potential of such an approach has been further highlighted by the recent period of isolation due to the Covid-19 epidemiological emergency. Since March 2020, human activities have shifted from taking place in common physical spaces to the network: educational activities, medical visits, work shifts, and cultural experiences have been transformed respectively into distance learning, telemedicine, smart working, virtual museums, and streaming services. Nonetheless, a real rethinking of social spaces is lacking, which certainly cannot be reduced to sharing platforms and social networks. Today we can see the psychological damage due to the restrictions imposed during the pandemic in which people were not ready to a sudden reduction of communication to the digital form only.

In this regard, the design experiments of the Interactive Architecture Lab of the Bartlett School of Architecture in London, which has always been engaged in design and research on the behavior and interaction of things, environments, and their inhabitants, are interesting. One example is Dysphasia, an interactive telepresence project that,

in response to the need for distancing and subsequent digitization imposed by the pandemic, encourages reinventing social interaction (Figure 2, 3)."It builds bridges between digital and physical space connecting users to places and people geographically distributed around the world" (Deng, You, 2021). In addition to an exponential increase in the use of chat and social networks to compensate for the lack of relationships, Dysphasia authors Doris Deng and Bojia You observed an increase in the use of live streaming of public space during the period of isolation to satisfy the lack of familiar, everyday experiences. Based on these observations, the project connects a web app and an associated physical installation via a feedback loop. Users, in fact, access the website from private rooms around the world and interact in real-time with the public space by remotely and simultaneously viewing and controlling the light installations. Theirs are not only virtual visits to the social space to which access is forbidden, but they are involved in a non-communicative remote dialogue that affects feelings and sense of presence.
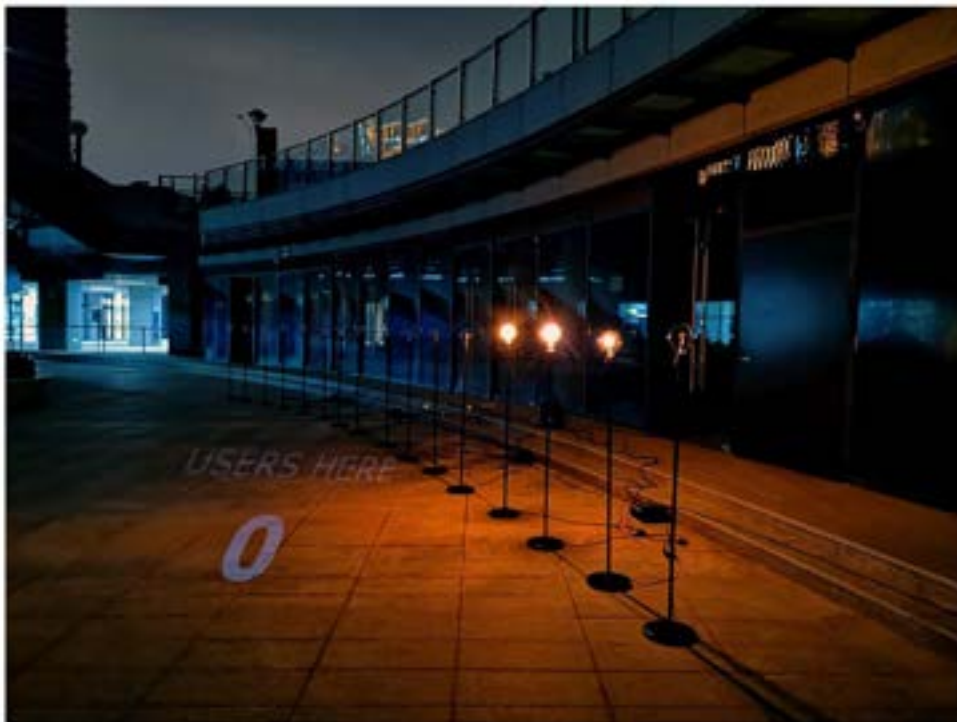


Figure 2. Dysphasia, Doris Deng and Bojia You, 2021. The ground projection shows the real-time number of virtual visitors and helps engage people in interaction.

Figure 3. Dysphasia, Doris Deng and Bojia You, 2021. Access portal.

In this sense, the sharp distinction between presence and location of the self is hybridized, to digitally re-appropriate sociality in physical space.

A different approach, but triggered by the same design urgency, is the one adopted by Mahalia Henry-Richards and Stephen Henderson for the design of The Playground, a system of sociality in a digital dimension that involves digital bodies and is mixed with the physical body that is involved (Figure 4, 5). Also created during the pandemic in collaboration with the Interactive Architecture Lab, The Playground is based on unconventional collective interactions that take place on the physical and digital plane. It is configured as a hybrid world that integrates physical and digital spaces and proposes a social interaction based on gameplay determining changes based on the position one holds in the virtual space. The narrative of the digital experience is focused on understanding what interaction is possible when physical presence is lost, with creative means of visualizing and sharing information.

Figure 4. The Playground, Mahalia Henry-Richards and Stephen Henderson, 2021. "The chatbox changes behavior based on location in the virtual space, encouraging different types of engagement and interaction" (Henry-Richards and Henderson, 2021).



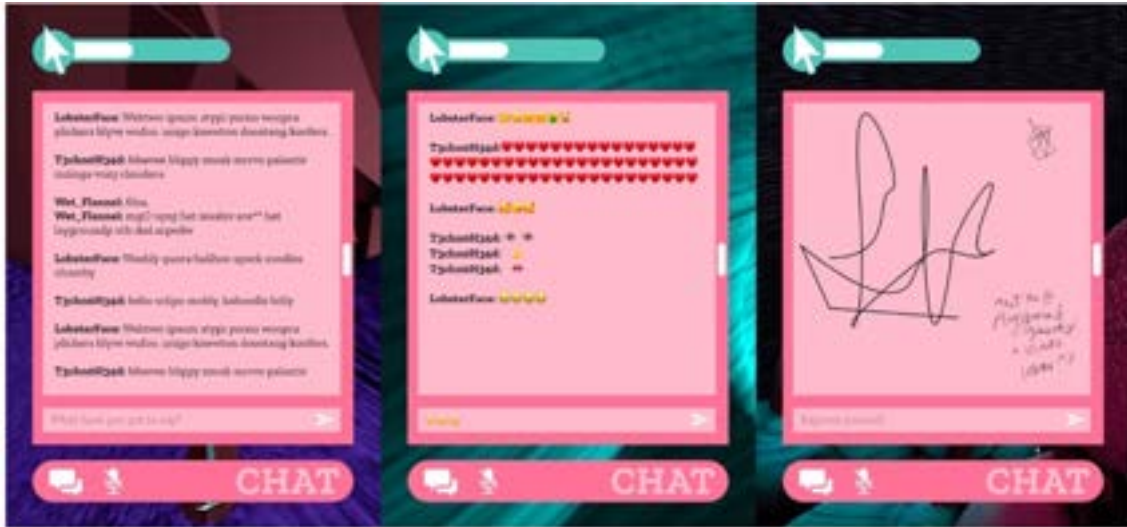Figure 5. The Playground, Mahalia Henry-Richards and Stephen Henderson, 2021. Landscape Interactions.

The examples of the Pulse series, Dysphasia and The Playground demonstrate how the concept of space becomes central to shaping the user experience and underscore the need to design, in complementary ways, both space and experience. As David Benyon (2014) reminds us, interaction can be conceptualized as the relationship between four elements that make up PACT: people, activities, contexts and technologies. In any form of interaction, you have people immersed in an environment, physical or digital, performing an action. The environment

itself is described by the context and the technologies that comprise it, and the interactions that are created in this system can be multiple and simultaneous. Benyon also recalls: "There is an essential physicality to these media that derives from the fact that humans are embodied. The concepts that we develop, how we classify things and how we approach interaction derive from the embodied and embedded notion of interaction" (Benyon, 2014, p. 27). A thought close to the strict relationship that Maldonado emphasizes between the user's body and the perceived experience. Considering Benyon's assertions, it can be said that there is a close relationship between the user's body and space, terms that in the formation of experience influence each other. Mallgrave states: "We are organisms-within-environments that continually evolve and self-organize, and it is this dynamic field of relationships between mind, body, and matter that configures our pre-cognitive and cognitive understanding of the world, rather than some static extraction of our presumed human nature" (Mallgrave, 2015, p. 13. Translated by the authors).

The authors and the examples put the attention to the importance of experience design and the interaction between the body and space, whether digital bodies, transparent bodies, physical spaces or virtual spaces. Around this concept, Morganti and Riva's (2006) study of spatial presence in virtual realities is interesting. If for Maldonado perception and bodily physicality constitute an indispensable element for the formation of experience, the authors emphasize how being in a place can be fostered by the nature of the action being performed.

> We can assume that the sensory perceptual depletion resulting from the simulated world can assume a minimally interfering role in the acquisition of knowledge. We can further understand how, if the actions allowed will be sufficiently fluid and consistent with those possible in the non-simulated world, VR will not constitute a higher level of complexity in information processing such as to necessitate cognitive overload. It will therefore become important to design virtual environments not only technologically

advanced and able to improve the correspondence between VR simulation and external reality, but also a functional design able to allow a large degree of action in the same spaces (Morganti, Riva, 2006, pp. 99-100. Translated by the authors).

In actions, therefore, the authors recognize the key point for learning and experiential growth of the individual, no longer considering the perceptual limit as an interference of the learning process. Moreover, as Melacca and Invitto (2019) remind us, the actions performed in the simulated environment take place within a framework of meanings proper to the user's culture, that is, they respond to the human tendency to explain situations never experienced before through additional information coming from their cultural experience. This leads to consider the simulated realities themselves as constitutive of original experiences and reworked by the user and not as separate and arid moments.

In conclusion, it is possible to report this Maldonado's last statement, considered particularly relevant to the concepts outlined so far: "Are virtual realities experiences? I would not hesitate to answer affirmatively" (Maldonado, 1992, p. 42. Translated by the authors).

## Conclusions: Design for Places of Experiences

If Maldonado proves to be, implicitly or explicitly, critical of digital technologies and their relationship with the body, it is important to contextualize not only the reading of his thought in time but above all to place doubts or certainties in the design sphere.

From the Canon of Polykleitos to Leonardo's Vitruvian Man, from Vitruvius' De Architectura to the Modulor (Le Corbusier, 1948), from the body techniques to the body-object (Foucault, 1975), from the prosthetic body (Maldonado, 1997) to the augmented body (Arduini, 2020), from the virtual body (Caronia, 1996) to the digital self (Granelli, 2006), from the transparent body (Maldonado, 1997; Floridi, 2017) to the shared body (Floridi, 2017), the concepts of body and corpo-

reality have always been, and particularly during the last decades, a place of exchange between different scientific knowledge and design disciplines. As Riccini (2015) reminds us, while reflecting on the relationship between body and space has always emerged in architectural thought, starting from the symbolic link to the synaesthetic body/building relationship, the link between body and design has only recently emerged – brought to light by Norman's (1990) critique – despite the fact that it is precisely design products that interact with the body directly, actively and reciprocally. The author continues:

> As we have seen, the culture of the body in design is grafted onto some pre-existing traditions, such as architecture, fashion, avant-garde arts, including dance and theater, and the organization of work (factory and domestic). From these, design borrows a series of specific tools for the analysis of the body, through an elaboration that becomes more autonomous, since the design is constituted not only as a profession but as a discipline, with its own theories and design methodologies. Although this has always been true, only recently has the link between body and design finally emerged as essential, autonomous and qualifying through the idea of interaction between artifact and user (Riccini, 2015, p. 21. Translated by the authors).

Interaction design, one of the main expressions of contemporary design, exponentially expands the relationship between artifact and user, coming to involve different disciplines on the one hand because of the need, during the design process, to place side by side its own methods and knowledge with those of neuroscience, sociology, anthropology, cognitive and behavioral psychology, form psychology, marketing, and engineering, on the other hand, because it now invests different design scales.

In this sense, with this contribution, recognizing the multitude of possible bodies and usable spaces – physical, digital, conceptual, information, mixed – we look at spaces not as an architectural phenomenon but as environments, social and technological, of relationships

between people, between people and objects, between objects and the environment, between the environment and people. Space is not a conceptual abstraction but an embodied practice that is primarily constituted through emotional and multisensory experience. Mallgrave argues:

> From this perspective, the organism and the environment are complementary and reciprocal in their relationship and perception is an active extraction of invariants or configurations that always involves the perception of the self. It is thus psychology of embodied realism in which the cultural environment cannot be separated from the natural environment, as if there were a world of mental products distinct from the world of material products (Mallgrave, 2015, p. 12. Translated by the authors).

Therefore, we align ourselves to a spatial vision of interaction design so of user experience. In this sense, as Benyon says: "Thinking spatially makes us think about layout, topology, density, direction, and distance. The idea is not to use space as a metaphor for what goes on in HCI, ID, and UX; it is to bring concepts of spatiality and of people being in spaces to understand the design of user experience from a different perspective" (Benyon, 2014, p. 27).

With this in mind, Benyon, while considering and acknowledging the importance of micro-interaction design, emphasizes the importance of a broader aspect to consider: the user experience. Extending the concept of UX from the digital to the diffuse dimension of the environments that humans inhabit through devices, in time and in physical spaces, allows us to see beyond interaction as a cognitive activity and achievement of tasks but to focus on how people are connected with the world, create meanings and feel feelings. It puts the focus of interaction design on users' encounters with technologies in their environment to make places of experience whereby: "it will make no sense to talk about emotions, or the sense of presence as something separate from our embodied experience of being in the world" (Benyon, 2014, p. 98).

Inhabited spaces are now more or less mixed and vary in correspondences between the physical and the digital. To date, although the points of contact between physical and digital are largely visible, the design actions, that lead to their definition, are not yet outlined with a specific methodology, which can lead to the creation of a hybrid context where the distinction between the two becomes less and less clear. The tendency is to move towards a configuration of mixed spaces where the physical and the digital are configured as a continuum in which the environment becomes an interface. In this sense, interaction design welcomes another design field that deals with users' experiences in movement between different environments and, therefore, with multimodal interactions between shared bodies and physical spaces, real bodies and digital spaces, transparent bodies and mixed spaces, and so on. The designer now becomes essential to translate the multiplicity and multidisciplinary nature of this design field, where the project itself becomes the opportunity to shape the subsequent enrichment or impoverishment of the user experience.

## Bibliography

Arduini, Giovanni, *Il corpo e il testo: il corpo nella realtà aumentata*, in "Giornale Italiano di Educazione alla Salute, Sport e Didattica Inclusiva", 1, 2020.

Benyon, David, *Spaces of Interaction, Places for Experience. Synthesis Lectures on Human-Centered Information*, John M. Carroll, Penn State University 2014.

Caronia, Antonio, *Il corpo virtuale*, Franco Muzzio Editore, Padova 1996.

Ciammaichella, Massimiliano, *Il corpo umano sulla scena del design*, Il poligrafo, Padova 2015.

Corbusier, Le, *The Modulor and Modulor 2*, Springer Science & Business Media, Berlin, 2004.

Deng, Doris, You, Bojia, *Dysphasia*, in "Interactive Architecture Lab, Projects", February 17, 2021. http://www.interactivearchitecture. org/lab-projects/dysphasia (Last consultation February 21, 2022).

Floridi, Luciano, *La quarta rivoluzione: come l'infosfera sta trasformando il mondo*, Raffaello Cortina Editore, Milano 2017.

Foucault, Michel, *Sorvegliare e punire: nascita della prigione*, trad. it. Alcesti Tarchetti, Einaudi, Torino, 1975.

Granelli, Andrea, *Il sé digitale: identità, memoria, relazioni nell'era della rete*, Guerini e Associati, Milano 2006.

Henry-Richards, Mahalia, Henderson, Stephen, *The Playground*, in "Interactive Architecture Lab, Projects", February 19, 2021. http:// www.interactivearchitecture.org/lab-projects/the-playground (Last consultation February 21, 2022).

HuBMAP, https://hubmapconsortium.org/ (Last consultation February 21, 2022).

Lévy, Pierre, *Il virtuale*, trad. it. Maria Colò and Maddalena Di Sopra, Raffaello Cortina, Milano 1997.

Maldonado, Tomás, *Reale e virtuale*, Feltrinelli, Milano 1992.

Maldonado, Tomás, *Critica della ragione informatica*, Feltrinelli, Milano 1997.

Mallgrave, Harry F., *L'empatia degli spazi. Architettura e neuroscienze*, Raffaello Cortina Editore, Milano 2015.

Mellacca, Giuseppe, Invitto, Sara, *La realtà virtuale. Strumento per elicitare processi neurocognitivi per il trattamento in ambito riabilitativo*, in "Psychofenia: ricerca ed analisi psicologica", 33, 2016.

Morganti, Francesca, Riva, Giuseppe, *Conoscenza comunicazione e tecnologia. Aspetti cognitivi della realtà virtuale*, LED Edizioni Universitarie, Milano 2006.

Norman, Donald, *La caffettiera del masochista*, Giunti, Firenze 1990.

Persico, Oriana, Iaconesi, Salvatore, La cura, https://la-cura.it/ (Last consultation February 21, 2022).

Persico, Oriana, *Di protoni e dati.* https://www.he-r.it/project/di-protoni-e-dati/ (Last consultation February 21, 2022).

Lozano-Hemmer, Rafael, *Individual Project*. https://www.lozano-hemmer.com/projects.php (Last consultation February 21, 2022).

Riccini, Raimonda, *Artificio e trasparenza*, in Massimiliano Ciammaichella, "Il corpo umano sulla scena del design", Il poligrafo, Padova 2015.

Ruckenstein, Minna, Dow Schüll, Natasha, *The Datafication of Health*, in "Annual Review of Anthropology", 46, 2017.

Tecnobody, D-WALL H Sport, https://www.tecnobody.com/it/prodotti/dettaglio/d-wall-h-sport (Last consultation February 21, 2022).

TecnoBody, *Tra gamification, realtà virtuale e aumentata: la riabilitazione digitale e immersiva*, October 20, 2020. http://blog.tecnobody.com/2020/10/06/tra-gamification-realta-virtuale-e-aumentata-la-riabilitazione-digitale-e-immersiva/ (Last consultation February 21, 2022).