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# Virtual Museums. Communication and/Is Representation

## *Musei Virtuali. Comunicare e/è rappresentare*

In recent years, museums have undergone profound renovation, extending their functions from conservation to the production and promotion of culture. They no longer serve as 'containers' of works, but as places where knowledge is built, communicated, and shared in a complex system of relationships between subjects (institutions, curators, scholars, the public, visitors, the community, etc.), the heritage (material, immaterial, collections, the territory, the landscape, etc.), and digital technologies (interaction, immersion, virtual reality, augmented reality, performance, etc.). In this context, starting with the assertion that every act to conserve the heritage is naturally an act of communication, the aim is to propose a reflection on what the specific contributions of Representation may be.

*Negli ultimi tempi il Museo si è profondamente rinnovato, estendendo le sue funzioni dalla conservazione alla produzione e promozione della cultura. Non più 'contenitore' di opere, ma luogo dove la conoscenza è costruita, comunicata e condivisa, in un complesso sistema di rapporti tra soggetti (istituzioni, curatori, studiosi, pubblico, visitatori, comunità, ecc.), patrimonio (materiale, immateriale, collezioni, territorio, paesaggio, ecc.) e tecnologie digitali (interazione, immersione, realtà virtuale, realtà aumentata, performance, ecc.). In questo contesto, a partire dall'affermazione per cui ogni atto di conservazione del Patrimonio è per sua natura un atto comunicativo, con la cura di questo numero della rivista l'obiettivo è stato quello di proporre alla discussione una riflessione su quali possano essere gli specifici apporti della Rappresentazione.*

key words: Virtual Museums, Representation, Communication, Digital Technologies

*parole chiave*: Musei Virtuali, Rappresentazione, Comunicazione, Tecnologie digitali

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## 1. THE NEW MISSION OF MUSEUMS. FROM MUSEUMS OF COLLECTIONS TO MUSEUMS OF IDENTITY AND CULTURAL DIVERSITY

Among the different cultural institutions and places, museums, at least in recent decades, have undoubtedly been subject to great transformations and upheavals on different levels, from the content to the container, from conservation to communication, from specialists to the public, from the institution itself to the territory and community of reference.

This change originated in the 1960s, when a change in awareness on behalf of disciplinary experts derived from a new 'inclusive' vision of cultural goods, even in museum specifics: a redesigned role and the subsequent responsibility towards the community. But as an even deeper effect of this change, an increasingly numerous, competent public appeared on the scene with renewed attention for cultural content managed by the cultural heritage. This explains, for example, the success of the editorial 'inventions' that revolutionized publishing in the sector with works designed for maximum circulation characterized by colour pictures, periodicals, and even booklets. The public took a new attitude towards the world of culture with their participation, as evinced by the foundation at that time of numerous free cultural associations, including the so-called 'friends of the museum'[1].

This was a change of view that has since continued incessantly, despite some hiccups. For example, when viewed in hindsight, the models adopted in the 1980s were not so different from the eighteenth-century ideas that were being dismantled. This includes museums/works acting as urban catalysts in renewal policies as if they held miraculous powers; or installations centred more on presentation rather than communication for a public transformed into consumers; or even shows/events where making something a spectacle was necessary for commercialization, etc.
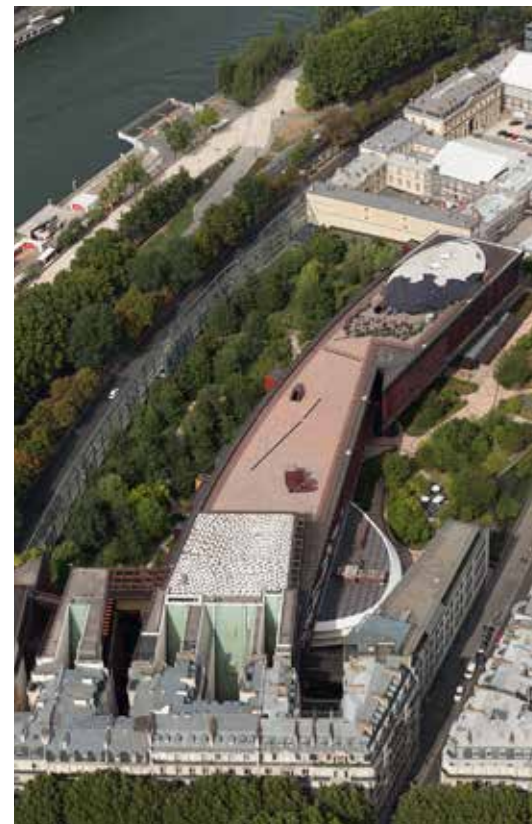
But museums have continued to change, trying to keep up with societal changes, which they have always historically tried to interpret. Thus, today, with the confirmation of cultural and creative sectors as "the spine of a new economy based on knowledge and content" (Sciacchitano, 2015; Symbola, 2015; Symbola, 2016)[2] and in the presence of a new pu-

Figs. 1-4. "Work of art" museums.
Fig. 1. Guggenheim Museum, Bilbao, Frank O. Gehry, 1997 (photo by Michael Reeve, 2005, last accessed 30 December 2016, at https://commons.wikimedia.org/wiki/File:Guggenheim-bilbao-jan05.jpg).
Fig. 2. MAXXI - National Museum of 21st Century Art, Rome, Zaha Hadid, 2010 (photo by Berarnd Touillon, Fondazione MAXXI, 2010, last accessed 30 December 2016, at http://www.fondazionemaxxi.it/progetto-architettonico/).
Figs. 3-4. Quai Branly Museum - Museum of Indigenous Art or Art and Culture of Africa, Asia, Oceania, and the Americas, Paris, Jean Nouvel, 2006 (upper right: photo by William Crochot, 2015, last accessed 30 December 2016, at https://commons.wikimedia.org/wiki/File:Mus%C3%A9e_du_quai_Branly_-_20150801_16h07_(10629).jpg; lower right: last accessed 30 December 2016, at https://it.wikipedia.org/wiki/File:Mus%C3%A8e_du_Quai_Branly.JPG).

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blic that is multiethnic and multicultural, museums are called to reconsider their role in society. If the preeminent task of museums yesterday was to conserve and increase the heritage of the collections, today museums are asked to interpret a process of "democratization" (Garlandini, 2010), not only to promote participation, but also to collaborate in emancipating the public.

Previously, museums were "serialized, reifying, desolating, and desolate space, where juxtaposed objects of art appear in their mere *cumulative* presence" (Landi, 2015, p. 446). They were places to accumulate objects as examples of knowledge but which are mute and incomprehensible to most; places where knowledge was reserved for a chosen public composed of a few specialists. Today, instead, museums are called to play a different role, even playing an active role in economics and cultural policies to promote social cohesion and reinforce the sense of community belonging.

This change of view is also acknowledged in Italian regulations. An initial step in this direction is found in the "Code of Cultural Goods and the Landscape", whose innovation lies in conceiving museums, even if implicitly, as 'goods for use' available to the community[3]. A particular specificity still has not been recognized, however, as they are treated the same as other institutes and cultural places: libraries, archives, archaeological areas and parks, and monu-

Figs. 5-7. Scientific museums.
Fig. 5. Left: Frontispiece of Ferrante Imperato's *Historia Naturale* [Natural History], Naples, 1599, in the Venice edition of 1672, the first known representation of a scientific laboratory (last accessed 30 December 2016, at http://www.ausgepackt.uni-erlangen.de/presse/download/index.shtml).
Fig. 6. Bottom: Galileo Museum (formerly the Institute and Museum of the History of Science) in Florence, radically redesigned in 2010. The museum, which stores and displays collections pertaining to the Institute and Museum of the History of Science, which opened in 1930, represents one of the main international institutions active in scientific preservation, the production of initiatives to spread scientific culture, and documentation and research activities. A visit to the virtual museum allows one to explore more than 1000 objects, including images, animations, films, and detailed sheets. (Last accessed 30 December 2016, at http://catalogo.museogalileo.it/?_ga=1.243654092.8953647 76.1483689071).
Fig. 7. Right: The City of Science and Industry, Paris, specialized in spreading scientific and technical culture. Situated within the Parc de la Villette and based on a design by Bernart Tschumi, the museum was inaugurated in 1991 (last accessed 30 December 2016, at https://99daysinparis.wordpress.com/tag/parc-de-la-villette/).

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ments[4]. This delay leads to a lingering definition of a museum as a "permanent structure that acquires, catalogues, stores, orders, and displays cultural goods for means of education and study"[5]. The definition still does not identify the centre for the new missions it has adopted.

Even more radical is the renewal that began in 2014 to reform the organization of the Ministry of Cultural Goods and Activities and Tourism[6], which instituted the General Museum Manager, whose "responsibility is to direct, coordinate, and circulate guidelines and oversee the correct implementation, development, and realization of the national museum system in order to favour continuous dialogue among the different public and private museums in the territory to give life to an integrated offer for the public"[7]. Initially an office of the Supervisor, museums are therefore assigned complete cultural and managerial autonomy, recognized as "institutes with their own identity, balance, and statutes"[8].

This is a different vision, in which the new mission of the museum is to be an institution "in service of society and its development. It is open to the public and carries out research regarding the material and immaterial records of humanity and its environment. These are acquired, stored, communicated, and displayed for study, education, and pleasure, promoting knowledge for the public and the scientific community"[9].

This renewal is in harmony with what was affirmed internationally with the UNESCO Recommendation from 2015 (UNESCO, 2015)[10], which recognized the contribution of museums to developing "public policies for member states in the field of culture and the contemporary world, notably in heritage preservation, creativity, promotion of cultural and natural diversity, education, scientific progress, and communication". In other words, this is the fundamental role that museums play, by protecting the material and immaterial heritage, in "promoting sustainable development and intercultural dialogue"[11].

This different view is no longer directed within the museum, but outwards: to the public, communities, and the cultural heritage spread throughout the territory. It requires new language and new forms of communication that motivate the reflection proposed by this issue of DISEGNARECON.

## 2. NEW MUSEUM CONFIGURATIONS. FROM THE CONTAINER MUSEUM TO THE DIFFUSE MUSEUM

Since its legal definition fixed in 1967 by the Franceschini Commission (Franceschini, 1967), whose revolutionary cultural importance can still be understood today (Pallottino, 1987, p. 8), the area of interest referred to with the expression *cultural good* is broad, covering every "material artefact with civil value"[12]. The area recently expanded when, in compliance with the UNESCO Convention of 2003, the cultural heritage was combined with the immaterial heritage. According to Italian regulations, this refers to the combination of practices, representations, expressions, knowledge, and skills, as well as tools, artefacts, objects, and the associated cultural spaces that communities, groups, and, in some cases even individuals, recognize as an integral part of their cultural heritage[13]. The immaterial heritage helps to construct a sense of cultural identity and continuity, encouraging respect for cultural diversity among the communities themselves and the subjects involved.

Amplification of the heritage obviously corresponded to an expansion of the museum 'object' of interest[14], above all the immaterial heritage: knowing what to do at rites, ephemeral installations for performances, etc. These objects are no longer characterized exclusively by their material nature; they entail different levels of complexity, including public communication.

This expansion of the 'object' of interest over time



Figs. 8-9. Musée des Confluences, Lyon, Coop Himmelb(l)au, 2014. More than two million finds pertaining to the varied disciplines composing the collections constitute a sort of "room of wonders" (photo by Sergio Pirrone, last accessed 30 December 2016, at http://www.arketipomagazine.it/it/musee-des-confluences-a-lione-coop-himmelblau/ and http://www.frameweb.com/news/visitors-and-prehistoric-creatures-meet-face-to-face-at-a-french-museum-by-coop-himmelb-l-au).

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has also contributed to deconstructing the physical space of museums. New configurations are derived from the closed space—object containers—and are projected towards the open space of the city and the landscape, the territories, and the communities that live there: open museums, diffuse museums[15], eco-museums[16].
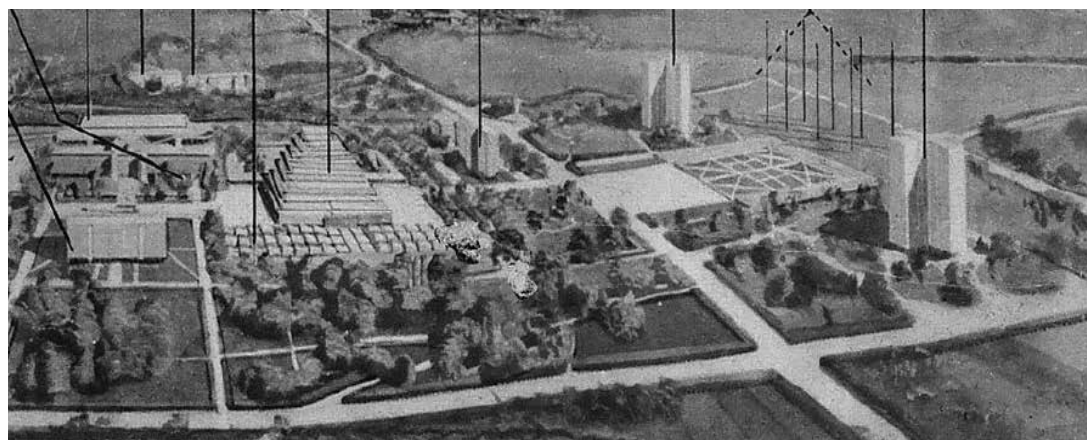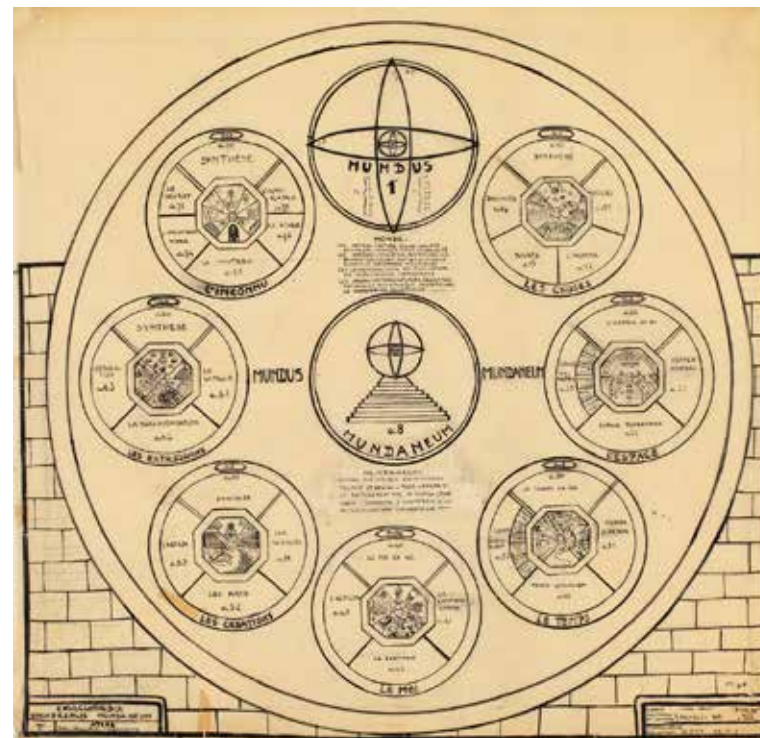
These new spatial configurations are particularly fertile in Italy, starting from the original definition of cultural good, ever oriented at considering the heritage as a systemic good, that is, the expression of both qualitative and quantitative relationships among the individual goods and between these and the context of reference. This is an idea of the systemic heritage that gives rise to "a very careful and sophisticated culture of preservation, which has enhanced both large and small individual monuments as part of a whole situated in the territory, a rich network of identity-creating meanings in which the value of each individual monument or object of art results not from its isolation, but from its insertion in a vital context" (Settis, 2002, p. 15).

A new view is also orienting processes of enhancement towards what really makes the Italian cultural heritage unique, focusing on its identifying character, i.e., the context, the "continuum between monuments, cities, and citizens" (Settis, 2002, p. 10). According to the interpretation by Salvatore Settis, "our most precious cultural good" (Settis, 2002, p. 10), for which, "what Italy offers is not only the sum of its monuments, museums, and natural beauty, but also and especially their composition in a whole" (Settis, 2002, p. 9), lies in that extraordinary continuum between 'high' works and the connective tissue of cities that house them. Promoting the communication of these types of goods means starting with the enhancement of the connection with the territory, offering both visitors and the resident community to make it an 'experience'. It is a unique, unrepeatable experience provided that it is built designing "tours of meaning that are well-focused in specific territorial areas so that [...] it is not simply a review of a series of works of art or monuments, but is translated into a historically and culturally coherent path, or into many possible parallel paths" (Bray, 2013). These new spatial configurations entail new, complex problems for management, preservation, display, and enhancement. Above all, they entail an expansion of the field of interest that forces museums to turn their

Figs. 10-11. The *Mundaneum*.
Fig. 10. Plate from the *International Encyclopedia of Unified Science*, created as separate plates beginning in 1920, 1936, Paul Marie Ghislain Otlet (1868 – 1944). The visionary ideas for a different organization of knowledge, which make it accessible and useable independent of the place in which it was recorded, were based on a strong thematic structure, an innovative system of classification, and the combined use of technologies then available (last accessed 30 December 2016, at https://commons.wikimedia.org/wiki/File:Atlas_Monde_-_Mundaneum.jpg).
Fig. 11. The project for the World City, Geneva, 1929, Paul Otlet, Le Corbusier with Henri La Fontaine and Pierre Jeanneret (Rayward, 2010, p. 35).

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gaze according to a different perspective: no longer towards the interior, but rather outwards towards the cultural heritage spread throughout the territory and the communities living there. This new view complicates even more the actions to realize the new mission that museums are called to carry out.

## 3. THE CULTURAL EXPERIENCE. ENHANCEMENT AND/IS COMMUNICATION

Enhancement of the cultural heritage does not end En-hancement of the cultural heritage does not end with the preservation of its material aspects, but is realized when it can be enjoyed and used by the community. All the actions aimed at its conservation—from the physical/material condition to in-depth knowledge—acquire sense if finalized in the view of making them available for the community, favouring the transmission of culture, that is, the body of knowledge, skills, and values precisely of a determined society in a given historical moment. Enhancement therefore "implies the willingness to confirm the communicational, symbolic, and social role of the object of enhancement. Enhancement is, therefore, a cultural and communicational action that occurs within a community that is recognized within a system of values" (Salvarani, 2005, p. 103). According to this structure, the cultural heritage can be enhanced only beginning with its 'intentional communication', that is, 'finalized' in a way that, by implementing all the necessary strategies, the good can be understood and made by the target of the communication itself. This communicational model is therefore not limited to the simple transfer of knowledge, but is rather a 'cultural' model of communication where the target of communication participates and is active in constructing meanings (Hooper-Greenhill, 2003).

Firstly, this means identifying the target of the communication—the 'public/visitor'—who is recognized as an individual pertaining to a 'community of interpretation' and as such, entails "expectations, pre-existing knowledge, historical/cultural background, capabilities and styles of learning, and interpretive strategies" (Bodo, 2003, p. XIV).

To bridge the gap between the underlying meanings and what is perceived, 'cultural' communication should therefore act as the interpreter of an action of 'cultural mediation'. Mediation in turn is realized

through a synergic relationship between 'interpretation' and 'presentation' (ICOMOS, 2008). Interpretation is the set of potential activities that aim to increase public awareness and improve understanding of the cultural heritage. Presentation, more specifically, concerns carefully planned communication of the interpretational content, guaranteeing physical access to the cultural heritage site equipped with the appropriate interpretational infrastructure.

This mediation also encourages visitors to share their experiences by sharing the visit itself, thereby becoming "common heritage which unites the members of a community" (Desvallées & Mairesse, 2016, p. 56) and allowing itself to be recognized.

These are even more complex, binding questions for museums in that they can statutorily be considered as a "system of communication, even as a prototype of a communication system" (Lugli, 1993, p. 80) for those specific aspects that differentiate it from other institutes and cultural places. Among these, two aspects can be recognized in particular: the 'sensory display' and 'marginalizing reality' (Desvallées & Mairesse, 2016, pp. 59-60; Marini Clarelli, 2011).

For the first aspect, in fact, the 'objects' displayed in a museum, both material and immaterial, goods and accessories, are primarily 'sensory' objects, i.e., objects



Figs. 12-13. The *Mundaneum*. Fig. 12. *Musée: Galerie centrale et salle latérale de la Section d'Histoire* [Museum: Central hall and side room in the History Section]. Plate from the *International Encyclopedia of Unified Science*, 1920, Paul Otlet (1868 – 1944). The plate shows the innovative museum display organized by theme and with different supporting materials. Fig. 13. Display of teaching material organized by Paul Otlet for the International Expo in Brussels, 29 July 1935. Last accessed 30 December 2016, at https://commons.wikimedia.org/wiki/Category:Mundaneum?uselang=fr.

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that can be interpreted and understood starting from the senses[17], first of all sight (relating often to goods that have a 'shape'), but also hearing, touch, and, even if more rarely, taste and smell. Therefore, in a museum, communication is necessarily different from the text and also from speech; it depends "on the non-verbal language of the objects and observable phenomena. It is primarily a visual language, and at times an aural or tactile language. So intense is its communicative power that ethical responsibility in its use must be a primary concern of the museum worker" (Cameron, 1968, p. 34).

For the second aspect, however, the museum, by its nature, is the "decontextualizer *par excellence* of the works" (Antinucci, 2010, p. 36). Due to its founding statute, the museum operates starting from a process of 'marginalizing reality', where what is displayed is by definition decontextualized from the original conditions that generated it, being transformed thus into a mute, and no longer narrative, object. This is an evident contradiction because in order for a work—a sign object—to perform its communicational function, it is

necessary that "the target of communication have the code that the signs always imply and on which their interpretation necessarily depends" (Antinucci, 2010, p. 29). In addition, for the message to be understandable, it is necessary to have the context assumed by the message. Therefore, without "some communication that does not have contextual assumptions, [the] sharing of these preconceptions is fundamental in understanding the message" (Antinucci, 2010, p. 35). For the work of art specifically, "the role of context is crucial and delicate [because] it acts in a collective and extended communicational situation in which the preconceptions with respect to which the work are created, are carefully studied and determined by the author" (Antinucci, 2010, p. 35).

So that a work—a sign/communicative, sensible, and cultural artefact—can communicate, and so that this communication can be understood by the recipient, it must be presented according to the primary 'intentions' for which it was created, that is, first of all those of the 'authors', including the clients, designers, masters, etc. (Antinucci, 2010). This translates as a need

to reconnect those relationships between the work, the visual codes, and the generating context indispensable for its understanding, defining new languages and new forms of communication.

## 4. THE CULTURAL EXPERIENCE. DIGITAL TECHNOLOGIES AND VISUAL MODELS

Relationships between information and communications technology and the cultural heritage have increasingly affected a wider area, for example, by being applied to and transforming processes, methods, criteria, and tools to acquire cultural data and to process them into information. That is, directed towards the renewal of libraries, archives, and museums, these relationships have extended their functions from exclusive preservation to the production and promotion of culture, etc.

In an initial phase, however, the applications of ICT to the cultural heritage did not produce substantial changes. Rather, they were characterized by their "very high costs and difficulty of effective dissemination as a

Figs. 14-16. The origins of the diffuse museum: travel literature.
Fig. 14. *The Travels of Sir John Mandeville* (mid-fourteenth century), a book of travels that was enormously popular throughout the 1800s. The author, John de Mandeville, an Englishman, probably never moved from his home. A paper manuscript from the library of the Pfäfers Abbey from the second quarter of the fifteenth century contains the German translation of the book by Otto di Diemeringen, distributed widely in the late Middle Ages. Furnished with numerous colour illustrations in pen and ink (last accessed 30 December 2016, at http://www.e-codices. unifr.ch/it/ssg/0016/110r).
Fig. 15. Marco Polo, *Le Livre des merveilles* [*The Book of Marvels*]; Odoric de Pordenone, *Itinerarium de mirabilibus orientalium Tartarorum, traduit en français par Jean le Long*, 1400-1420 French manuscript edition (last accessed 30 December 2016, at http://gallica.bnf.fr/ark:/12148/btv1b52000858n).
Fig. 16. *Passeggiate romane* [*Promenades dans Rome*] by Stendhal (Marie-Henri Beyle, 1783-1842), in the 1956 Italian edition, with a preface by Alberto Moravia and a critical introduction by Glauco Natoli.

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working, communication, and edutainment tool, with paltry efficacy with respect to the theoretical potential" (Gaiani, 2007, p. 17). Regarding museums, the applications mostly echo the real conditions, thereby encountering all the same problems. For more than twenty years beginning in the 1980s, 'virtual museum' experiences were mostly limited to proposing nothing more than a "digital clone of the real museum" (Galluzzi, 2010). The expository method was similar to the traditional method, with the different works still organized into separate microcosms, the paths only within the museum, even when they were virtual, the relationships imprisoned in the restricted area of the genre and the discipline of the work being examined. Often not even the potential of hypertexts and multimedia were fully used. Interaction was rarely available, and the same means of use and exploration mostly reiterated the spaces, forms, and modes of the real world" (Galluzzi, 2010).

Recent reflections have been deeper, certainly favoured by the progressive strengthening of digital technologies, but especially determined by the needs of a 'new' public, which is increasingly a 'digital subject' that requires museums to update their means of communication. The modern public lives in increasing symbiosis with technological devices, where "the medium is less a medium and increasingly a new reality that goes precisely by the name *virtual*, which no longer refers to mediation of a natural reality, but is rather […] a *new* reality" (Grienti, V., 2009, p. 77). The effectiveness of virtual reality thus resides in being a particular type of artificiality. Different from other types, it pretends to be natural, and by virtue of this naturalness, "simultaneously involving all five senses, virtual communication is presented as a development of humanity, not as a form of concession to it" (Ventimiglia, 2001, p. 55).

The combination of computational systems, network connections, and the strength of spatial simulation have therefore generated, and still continue to generate, profound changes in the relationships between subject and environment, with effects both on the way of constructing knowledge and on models of communication and use. From the first multimedia applications, through further progress in the development of technologies to simulate space in particular, experimentation today is aimed at defining participatory and

Figs. 17-18. The diffuse museum: applications for mobile devices.
Fig. 17. *That's contemporary* is an up-to-date online platform about events and contemporary art exhibits in Milan, created by Francesca Baglietto and Giulia Restifo in 2011. *That's App*, a smartphone version developed by Stefano Fattorusso, proposes a selected guide of events, shows, and places providing an exhaustive informational sheet with images, texts, dates, opening times, and contact information.

Fig. 18. *Mirami App* is an application to promote tourism in Milan, designed for EXPO 2015. It uses augmented reality and Open Data from the City of Milan, but is also integrated with Wikipedia and other portals. Pointing the smartphone in an open space, the application highlights points of cultural interest or leisure. Last accessed 30 December 2016, at https://www.thatscontemporary.com/ and http://www.mirami-app.com/#sthash.vyLeJHDD.dpbs.

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immersive forms of communication by crossing techniques and languages according to a new vision of the virtual museum intended as "communicational projection to the whole field of the real museum" (Antinucci, 2007, p. 115). The application of ICT to museums therefore contributes to characterizing museums "no longer as physical places but as a network of services, which begin well before the actual visit and end much later. The visit itself is completely reinvented and modelled through modern means of use, which are dynamic and very involving, such as virtual reality or augmented reality systems and technologies that simulate touch through a system of cameras or laser pointers capable of recognizing objects" (Canina, M., Celino, I., Frumento, E., Pagani, A., & Simeoni, N., 2008, p. 8).

This is a new museum where technological innovation serves as the means and not the end. It is an active, intelligent vehicle for constructing cultural knowledge as well as communicating and spreading it. The new museum therefore more properly interprets the directions—historically fixed and recently expanded—of the cultural heritage and the rights for its effective 'enjoyment' to the whole field.

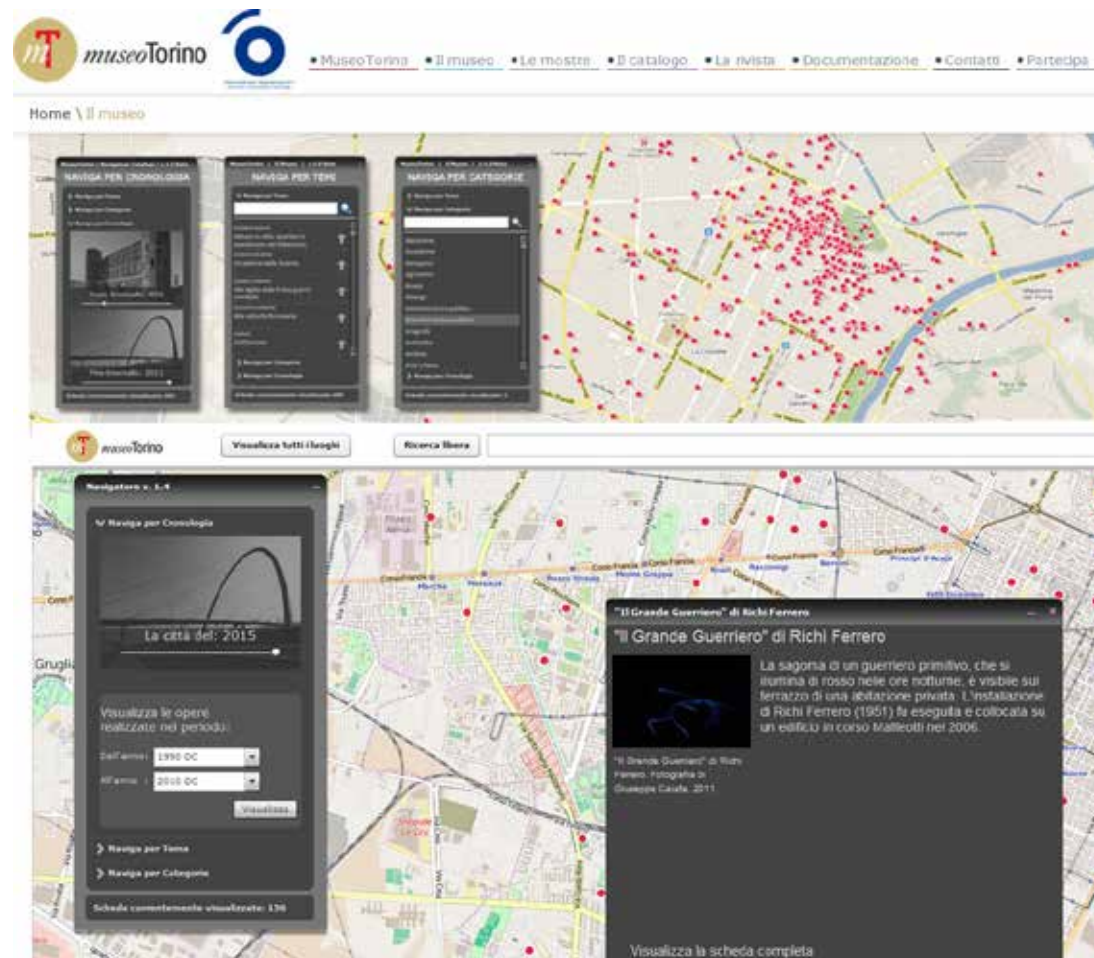## 5. VIRTUAL MUSEUMS. COMMUNICATION AND/IS REPRESENTATION

The reflections made up to now have traced some of the questions connected to the transformation still underway in museums, in the overall system of relationships between subjects (institutions, curators, scholars, the public, visitors, communities, etc.), the heritage (material, immaterial, collections, the territory, the landscape, etc.), and digital technologies (interaction, immersion, virtual reality, augmented reality, performance, etc.).

This, then, is the framework of this issue of DISEGNARECON. Affirming that each act to conserve the heritage is by its nature a communicational act (ICOMOS, 2008), this issue investigates what the specific contributions of representation may be and how they can contribute so that the public can play an integral role in the knowledge and communication process[18]. According to which forms and meanings can representation to enhance the multiple and identifying complexities organize the heritage of the country? What are the particularities of the communicational

Fig. 19. The diffuse museum: *MuseoTorino*. Opened on occasion of the 150th anniversary of the Unity of Italy, this is a diffuse museum about the city of Turin composed of the collection of goods, places, buildings, spaces, sites, and natural or manmade landscape elements that constitute the city, interpreted and communicated as a single system through a set of tools—interpretation centres, websites, printed materials, tours, maps, signs, etc.—capable of ensuring identification, accessibility, and intelligibility.

*MuseoTorino* is a museum website (designed and structured like a museum), a participatory museum (a project of the city that grew in a participatory way), a museum for all (city residents, visitors, enthusiasts, and curious people who want to travel through the space of the present city while recognizing the signs of the past), and a process museum (like the city, it grows and evolves with change).

The visit can be made in two ways; travelling through the city (maps and indications about the places that refer to pages in the catalogue) by following one of the thematic tours and accessing the information in the museum catalogue with free, themed research (places, events, themes, subjects, images, itineraries, objects, texts), or visiting the permanent historical museum *Torino: storia di una città* [*Turin: History of a city*]. Last accessed 30 December 2016, at http://www.museotorino.it/.

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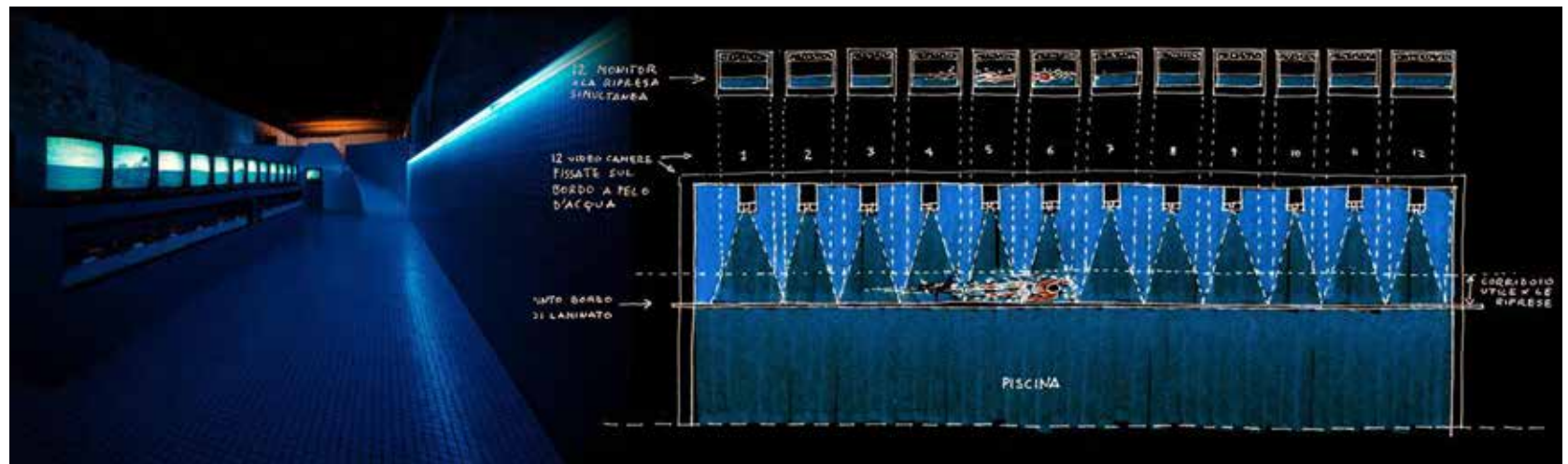
models that, by making technological innovations their own, representation proposes? What is the range of correlations identified by representation in references between museum interior and exterior, between collections and city, buildings, products, places, stories, interpretations, etc.?

The theme thus posed therefore oriented the selection of suggested proposals, so that they might be useful to a reflection on the relationship between representation/technological innovation/communication. Each contribution refers to a particular type of good, i.e., the wide range of objects that fall under an extended definition of 'architecture', from daily items to works of art, from archaeology to the landscape, from the product to the city. Goods that have a 'shape' are recognized as 'artefacts with civil value', starting from their spatial and visual characteristics, from which follows the need that they be used coherently with their specific signs through forms and contexts pertinent to communication. The language adopted can only be visual and representation is called to deepen its practices to experiment with a language capable of encouraging means of exploration based on perceptual criteria and facilitate observations starting from the user's interaction with the [three-dimensional] space of the cultural good.

In this scope, the contributions selected propose a

Figs. 20-22. From sensory environments to the sensory museum: Studio Azzurro. *Il nuotatore (va troppo spesso ad Heidelberg)* [*The Swimmer (goes to Heidelberg too often)*], Videoambiente, Venice, Palazzo Fortuny, 1984. The installation, created with twelve cameras affixed to the edge of a pool at water level, shows a swimmer who, with repeated, weary movements, "crosses" the individual screens close up, while a hundred "microevents" (a falling ball, a sinking anchor, etc.) are inserted within the primary scene and remain relegated to the individual screens. Spectators are called not only to witness a narration; they become participants in the event occurring at that instant and which will never again be the same. Last accessed 30 December 2016, at http://www.studioazzurro. com/index.php?option=com_ works&view=detail&work_ id=15&Itemid=22&lang=en.

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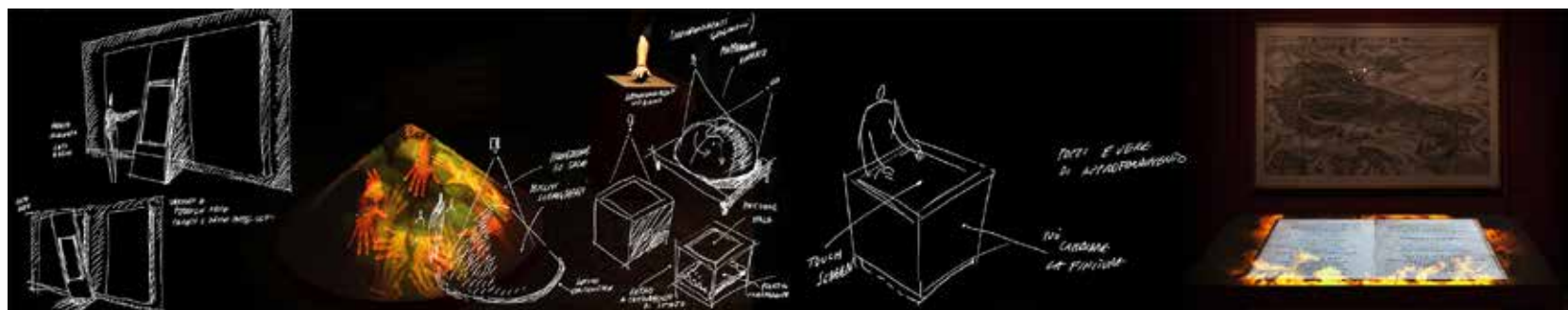
wide range of case studies, differentiated above all by type (city, historical centre, urban space, archaeological park, architectural complex, fortification, church, tower, chapel, monumental organ, collection of pottery, a series of paintings, a set of sceneries with an urban/architectural theme, but also the digital space of databases and virtual parametric space), but also by their state of preservation, conditions of accessibility, etc., and finally, by proposals for enhancement, characterized differently according to degree of use and interaction, communicational means, and device/interface.

In this wide array of case studies, the contributions are similar in their layout and general goals. An initial unifying characteristic is that they are based on reference to scientifically proven methods and procedures in a disciplinary and multidisciplinary context, by acquisition, development, and historical/critical interpre-

tation of the data and information. A second common element lies in the 'contextualization of information' derived from the same notion of cultural good based on the relationship between object and context: communication is therefore anchored in the physical and linguistic context where the cultural good originated; it is from this context that explorations are proposed for knowledge of the 'artefacts with civil value'. A third characteristic uniting the contributions is the presentation of experimentation with representation to communicate and use the cultural heritage either already realized or proposed to the public or in the prototyping phase. But above all, the different contributions have a general goal in common: the different experiences proposed are all viewed in the light of identifying communicational models for the knowledge and use of cultural goods, expanding the representative acceptance of the different technologies used from time to time.

A reflection is made on the relationships between digital technologies to simulate space and participatory and immersive communicational forms for cultural goods that the contributions address, each of which proposes particular visits, that is, different types of 'virtual museums'. As in the case of the contributions by Alessandra Meschini, Daniele Rossi, and Ramona Feriozzi and by Francesco Bergamo, Alessio Bortot, Cristian Boscaro, Giuseppe D'Acunto, and Andrea Gion, while with different characteristics, the solutions adopted to approach the understanding of complex 'objects' are similar. Digital technologies and devices with physical supports are integrated with creative intelligence, identifying particular solutions for the 'sensory' individual and the collective use of cultural content in a closed space. In this view, a 'table of wonders', a multimedia *wunderkammer*, is proposed, where the material model of the Basilica of Loreto is represented with a 3D,

Figs. 23-24. From sensory environments to the sensory museum: Studio Azzurro. *Gli Ebrei, Venezia, L'Europa 1516-2016. Muri invalicabili e immagini flessibili* [*The Jews, Venice, Europe, 1516–2016. Insurmountable Walls and Flexible Images*]. Expository itinerary, Venice, Palazzo Ducale, 2016, www.veniceghetto500.org. The visit, created in collaboration with the cartographic laboratory and GIS from the IUAV University of Venice and the ICEA Department of the University of Padua, displays a rich, organized series of texts, paintings, documents, and images through a multimedia tour in which two perceptual levels coexist: an emotional narrative level and one that is more didactic and educational. The exhibit opens and closes symmetrically with two similar installations that refer to the collection of material. Between these two extremes, electronic images help to tell the social, political, and above all urban and architectural history of the Venetian Ghetto. The video screens thereby become windows, gaps, and passages to observe the developments of the stories, to pass through and especially take deep looks among and within the walls of the buildings in the Ghetto. Last accessed 30 December 2016, at http://www.studioazzurro.com/index.php?option=com_works&view=detail&work_id=143&Itemid=22&lang=en.

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scaled printout and where reality, augmented virtuality, and interactive media combine to offer an 'active' informational/communicational experience. The case of the church of Santissima Trinità dei Monti in Rome lies in a similar vein, where, to enhance the hypotheses of the projective geometry of the seventeenth-century paintings in anamorphosis, the communicational strategies adopted relate two narrative means: the informational and point-like nature of a smartphone app and a scenery of a 3D mapping performance. It is also 'exportable', where a micromap is associated with a physical scale model also obtained with a 3D printout.

An integrated set of technologies and devices, as well as multidisciplinary skills, is likewise used to understand and communicate a complex history: five hundred years of urban transformations of the Venitian Ghetto. In this scope, the contributions by Isabella Friso, Cosimo Monteleone, and Federico Panarotto and by Paolo Borin propose an organized system of applications to be experienced in different spaces at different times. One experience is shared in a specific space and time interval—the show at Palazzo Ducale—and one can be used individually and is designed to accompany the visitor along routes in the actual city, precisely in the living body of the transformations that have occurred.

An analogous focus can be seen in the contribution by Francesca Fatta, Manuela Bassetta, and Andrea Manti, who present a project to enhance the culture of memory for Reggio Calabria, allowing visitors to discover the city through a selection of hybrid urban itineraries among digital totems and interactive models. It is a travelling experience that unfolds in the physical space of the real city to favour the reconstruction of the identity of places, anchoring the fragments of the historical memory of Reggio Calabria before the earthquake of 1908 in the physical traces still visible today.

Memory interrupted violently by an earthquake likewise motivates the experience proposed in the contribution by Caterina Palestini and Alessandro Basso. Here, digital technologies and representation unite in service of a community by enhancing the material culture in which its identity is recognized, proposing the use, interrupted following the earthquake that hit Abruzzo in 2009, of the ancient ceramics in Castelli, a small town in Abruzzo at the foot of Gran Sasso.

There is yet another earthquake motivating the reflection proposed in the contribution by Michele Cal-

vano and Francesca Guadagnoli. A few months after the earthquake on 24 August 2016, they describe an experience whose main objective is to represent the presence of institutions and a wide, diversified community in order to help mend the violent emotional and material break experienced by the community. The citizens of Amatrice, who were deprived of a physical place for their collective identity, are offered an initial 'reconstruction' of the city and the territory: a 'copy' of reality in a three-dimensional digital model and its 3D printout. Developing a careful, specific procedure ascribable to Heritage Building Information Modeling, the 'copy' of reality is offered as a place for participation, sharable on the Internet as an accumulation of information and stories to enhance the culture of the memory.

A participatory experience that aims to favour the production of the 'culture from below' is also seen in the contribution by Paolo Di Pietro Martinelli, Lorenzo Martelli, and Manfredi Scanagatta. The heritage proposed for enhancement is the system of fortifications created in Rome at the end of the nineteenth century in the shape of a ring located about 5 km from the Aurelian Walls. This heritage meaningfully characterizes the history of the territory with its massive, systemic presence, but, while still in existence, is also in this case 'detached' from the community because it has been decommissioned and is no longer usable. The project therefore has the virtue of highlighting problems related to accessibility, physics, content, and the heritage, and which is characterized by participation, as well as adopting low-cost procedures and tools.

In-depth studies of the relationships between technologies and representations made to favour access to the cultural content also include experimentation aimed at appreciating profoundly reworked places, as in the reflection presented by Andrea Maiocchi, Carlo Mambriani, Riccardo Roncella, and Andrea Zerbi. Falling under so-called 'virtual restoration', this case proposes the reconstruction of three-dimensional space, even if illusory, to allow visitors to enjoy, through an immersive experience, the architectural building and the paintings in their original forms, i.e., in the context for which they were created. These are illusory spaces in which virtuality is used to propose cultural content through its 'sensory presentation', corresponding to the idea of extended museum in which the 'objects',





Figs. 25-27. From sensory environments to the sensory museum: *Connected Worlds* is an installation designed and developed in 2015 by Design I/O for the New York Hall of Science with the support of the JPB Foundation, the National Science Foundation, Nasdaq Educational Inc., and Google Inc. It is organized into six interactive "ecosystems" created on the walls and connected together with an interactive floor. The aim is to sensitize children to systematic thought about sustainability. Last accessed 30 December 2016, at http://www.design-io.com/projects/.

both material and immaterial, are primarily 'sensory', that is, they can be interpreted and understood starting from the senses.

This same intention can also be traced in the contributions by Giulia Pettoello and Donato Maniello, where a sensory experience activated by sight is amplified through the use of other senses. A multi-sensory tour is proposed in the experience for the Vulci Archaeological Park, in reference to sensations between the landscape and the cultural good, where the visitor is gradually guided in building knowledge through a set of installations. A proposal is also tested to enhance the monumental König organ in Stevenskerk in Nijmegen, a symbol of the city and the city's identity. Here, the development of a multidisciplinary and collaborative procedure allows sound and lights, musical and visual content, to interact to direct a multimedia performance posed at the most general goal of getting the youngest public to approach classical organ music.

A reflection is also made on the relationships between digital technologies and representation to explore further, deeper connections between real and virtual spaces. This is the theme of the contribution by Andrea Giordano and Leopoldo Repola, where digital representation is experimented with both as a place to communicate the enhancement project and as a place in which the project itself is made. The choice is therefore to identify in an emblematic 'object' for architectural design—a sequence—the central place of narration in a continuous reference between physical reality and cultural memory in the visit to the Torre Maggiore in Villa Rufolo in Ravello.

A similar reflection, but according to the opposing view, is offered by the contribution by Ramona Feriozzi and Graziano Mario Valenti, where the possibilities for a truly virtual space free of the limits of material physicality and the confines imposed by the metaphorical reproduction of the usual explorations of the real space are explored. Along these lines, digital technologies are used to define parametric procedures to create a continuously changing virtual three-dimensional space. Representation is offered as a device to communicate structured virtual information that, displayed in relation to the visitor's experience/request, occasionally redefines the configuration of the multi-dimensional virtual museum.

Finally, the last two contributions further explore the relationships between digital technologies and representation, investigating their most informative acceptance. In the contribution by Aldo R. D. Accardi, Stefano Chiarenza, Rosalinda Inglisa, and Noemi Scarpato, the development of museum tours to use the urban and architectural representations produced in the eighteenth century for the world of scenery illusion by the Bibiena family of architects and scenographers motivates a reflection on managing complex, diverse information. The approach proposed is to adopt a specific ontological model in which multidisciplinary research is situated to make content and methods interact, even with the participation a number of researchers pertaining to different fields. A reflection on the management and use of databases is also developed in the contribution by Sandro Parrinello, Francesca Picchio, and Monica Bercigli. Here, the research experiences proposed reason about the possibility of making 'reality migrate to the virtual environment'. In other words, it reflects on the relationships between structuring the data and designing the 'interfaces' starting by reproducing the relationships of the real space to more effectively use the information.

In the specific type of goods examined—particular sign/communicational artefacts—the contributions proposed therefore demonstrate how the application of digital technologies in the field of representation can help re-establish those relationships. These are indispensable for understanding, among visual codes and the generating context, because, first of all, "visual is explained with the visual" (Antinucci 1997).

In the experiences shown—experiments in representation—visual technologies oriented at simulating space were interpreted as active devices to construct accessible, participatory, and involving communication regarding the heritage. These are spatial and visual communicational models that focus not only on specialists in the sector, but also the 'non expert' public because they work starting from the emotional emphasis connected to vision, which favours emotional involvement and participation, that is, experience of the cultural good.

These experiences demonstrate how technologies to simulate space, with the related integrations and superposition between real and virtual space, have broadened the horizons of representation, transforming the '3D model', which is still a representation, into a



Figs. 28-30. From sensory environments to the sensory museum: *Infinity Room* designed and created in 2014 by Universal Everything in San Francisco for Microsoft Inc. A room full of mirrors and LED animations offers a sensory experience to understand the world of information and the power of big data by interactive visualizations that tell the history of the world following a simple quarter dollar. Last accessed 30 December 2016, at http://universaleverything.com/projects/microsoft/.

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'3D digital scene', a new space in which one moves and with which one interacts according to an approach that is not mediated, but rather is direct and intuitive (Ippoliti & Meschini, 2010). This informative integrated model is proposed for 'participation' and from which, precisely by virtue of this prerogative, derives both the construction of information and access to the cultural content.

To communicate the array of cultural heritage, specific visuals should be identified from time to time along with narrative strategies coherent with the different visual media, both traditional and innovative, developing prototypes of representation/communication and testing an integrated system of products to accompany visitors/travellers in their exploration.

Based on this interpretation, technology is not an end of itself or a precursor to the latest novelty or wonder. Technologically innovative and integrated in a multidisciplinary way, representation can serve as an active vehicle to popularize the heritage and as an opportunity for cultural investigation. It can act as a lever for the social and economic development of territories, an opportunity for social cohesion, and the reinforcement of the sense of belonging to the community (Bray, 2013), that is, the set of possibilities through which the social function of the cultural good is made concrete.

**NOTES**

[1] Regarding this argument, see Faletti & Bertacchini, 2014.

[2] Different socio-economic analyses highlight how 'culture' has recently characterized an increasing segment of the Italian production system. The sector has overcome these years of economic crisis by mixing beauty, innovation, creativity, and sustainability and at the same time investing in advanced technologies, the Internet, and the sharing economy. The production segment of creative cultural industries and culture in general that Censis [Italian Centre for Studies of Social Investment], contrasting the "*zero virgola*" Italy [economic growth less than 1%], classifies in the "geography of winners", has known how to point at the driver of hybridization of sectors and traditional skills and represents the new 'Italian style' (CENSIS, 2015, pp. 20–23). The richness produced by the whole chain of culture is in fact estimated to be about 17% of the national economy, considering that for each euro produced by culture, the rest of the economy, tourism in particular, grows by €1.8. For further information, consult the publications by Symbola, the Fondazione per le Qualità Italiane [Foundation for Italian Quality] (available in Italian on the foundation's website under the section Documenti/Pubblicazioni), among which in particular are the annual reports *Io sono Cultura: I''Italia della qualità e della bellezza sfida la crisi*, available at <http://www.symbola.net/html/article/summary/pubblications>.

[3] Museums are in fact addressed in the Code of Cultural Goods and the Landscape, adopted with D. L. no. 42 of 22 January 2004, in Capo I of Titolo II entitled "Fruizione dei beni culturali".

[4] D. L. 42/2004, art. 101, comma 1 - Titolo II. Fruizione e valorizzazione - Capo I. Fruizione dei beni cul-

turali - Sezione I. Principi generali.

[5] D. L. 42/2004, art. 101, comma 2 - Titolo II. Fruizione e valorizzazione - Capo I. Fruizione dei beni culturali - Sezione I. Principi generali.

[6] The reform was initiated in August 2014 with Presidential Decree no. 171, 29 August 2014 "Regolamento di organizzazione del Ministero dei beni e delle attività culturali e del turismo […]" [Regulation for Organization of the Ministry of Cultural Goods and Activities and Tourism]. It was then enacted with the Decree by the Ministry of Cultural Goods and Activities and Tourism on 23 December 2014 "Organizzazione e funzionamento dei musei statali" [Organization and functioning of National Museums], commonly known as the "Museum Decree".

[7] MiBACT – General Museum Direction. Last accessed 30 December 2016. At <http://www.beniculturali.it/mibac/export/MiBAC/sito-MiBAC/Luogo/Uffici/Struttura-organizzativa/visualizza_asset.html_523365089.html>

[8] MiBACT – General Museum Direction. Last accessed 30 December 2016. At < http://www.beniculturali.it/mibac/export/MiBAC/sito-MiBAC/Luogo/Uffici/Struttura-organizzativa/visualizza_asset.html_523365089.html>

[9] Art. 1 of Decree 23 December 2014, known as the Museum Decree.

[10] The preparatory documents in the *Recommendation concerning the Protection and Promotion of Museums and Collections, their Diversity and their Role in Society*, approved unanimously by the 38th General Conference of UNESCO on 17 November 2015, served as the source to analyze the principles that inspired the reform of the national museum system as specified in the MiBACT Circular referred to

in the following note.

[11] Ministry of Cultural Goods and Activities and Tourism – Circular 37/2015 of 2 December 2015 from general director Ugo Soragni to circulate UNESCO's 2015 Recommendation. Last accessed 30 December 2016 at <http://www.flpbac.it/public/var/910ad6114e01d41ff7e14fcecirc.pdf>.

[12] Declaration I in Acts of the Franceschini Commission, available at http://dl.icar.beniculturali.it/biblio/pdf/Studi/franceschini.pdf, last accessed 30 December 2016.

[13] According to this definition, the immaterial cultural heritage is therefore not a single phenomenon in itself, a single cultural manifestation, but rather know-how and knowledge that are transmitted from generation to generation and recreated by communities and groups in response to their environment, their interaction with nature, and their history. It is precisely the immaterial heritage that guarantees a sense of identity and continuity and encourages respect for cultural diversity, human creativity, and sustainable development, in addition to reciprocal respect between the communities and the subjects involved. In Italy, the Convention, approved unanimously in the 32nd session of the General UNESCO Conference in Paris on 17 October 2003, was ratified on 27 September 2007. Cf. UNESCO, 2003.

[14] In the case of these objects as well, reference is made to a 'collection', meaning "a gathering of objects, each preserving its individuality, and assembled intentionally according to a specific logic" (Desvallées & Mairesse, 2016, p. 36).

[15] The diffuse museum encompasses various ideas of museum utopias: from the idea of an Italy as 'a museum open to the sky' to

a 'diffuse museum' as large as the entire national territory, creating in the territory "the dream to recompose the knowledge—historical, artistic, architectural, scientific, material—and emphasize the importance of diversity and cultural specificity, as if to question whether one could not later construct a model of development for the museum form on an international level" (Mottola Molfino, 2007). As a rule, a diffuse museum is a thematic museum that proposes itineraries that organize points of interest.

[16] "A museum that overcomes the logic of mere preservation of the stored good to promote a new idea of cultural good as fruit of the territory and therefore distinguished by the signs of human activity. The objective is to enhance the natural, historical, and cultural resources of a determined territory, which is also achieved thanks to the active involvement of the community living there" (Ecomuseo, Voce, 2012). "The ecomuseum is a participatory practice to enhance the material and immaterial cultural heritage, developed and strengthened by an organized subject, the expression of a local community in the perspective of sustainable development" (Carta degli Ecomusei, 2007).

[17] In fact, "this means that an illiterate person or even a young child can always gain something from a museum visit, whereas they would be incapable of using the resources of a library. […] A painting or a sculpture is made to be seen first of all, and reference to a text (or reading a placard if there is one) only comes afterwards and is not absolutely essential" (Desvallées & Mairesse, 2016, p. 60).

[18] DISEGNARECON has addressed this theme many times, but in particular with the issue *Tecnologie per la comunicazione del patrimonio culturale* from 2011, edited by Elena Ippoliti and Alessandra Meschini.

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# Virtual Museums. Communication and/Is Representation

## *Musei Virtuali. Comunicare e/è rappresentare*

In recent years, museums have undergone profound renovation, extending their functions from conservation to the production and promotion of culture. They no longer serve as 'containers' of works, but as places where knowledge is built, communicated, and shared in a complex system of relationships between subjects (institutions, curators, scholars, the public, visitors, the community, etc.), the heritage (material, immaterial, collections, the territory, the landscape, etc.), and digital technologies (interaction, immersion, virtual reality, augmented reality, performance, etc.). In this context, starting with the assertion that every act to conserve the heritage is naturally an act of communication, the aim is to propose a reflection on what the specific contributions of Representation may be.

*Negli ultimi tempi il Museo si è profondamente rinnovato, estendendo le sue funzioni dalla conservazione alla produzione e promozione della cultura. Non più 'contenitore' di opere, ma luogo dove la conoscenza è costruita, comunicata e condivisa, in un complesso sistema di rapporti tra soggetti (istituzioni, curatori, studiosi, pubblico, visitatori, comunità, ecc.), patrimonio (materiale, immateriale, collezioni, territorio, paesaggio, ecc.) e tecnologie digitali (interazione, immersione, realtà virtuale, realtà aumentata, performance, ecc.). In questo contesto, a partire dall'affermazione per cui ogni atto di conservazione del Patrimonio è per sua natura un atto comunicativo, con la cura di questo numero della rivista l'obiettivo è stato quello di proporre alla discussione una riflessione su quali possano essere gli specifici apporti della Rappresentazione.*

**key words**: Virtual Museums, Representation, Communication, Digital Technologies

***parole chiave***: *Musei Virtuali, Rappresentazione, Comunicazione, Tecnologie digitali*

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## 1. THE NEW MISSION OF MUSEUMS. FROM MUSEUMS OF COLLECTIONS TO MUSEUMS OF IDENTITY AND CULTURAL DIVERSITY

Among the different cultural institutions and places, museums, at least in recent decades, have undoubtedly been subject to great transformations and upheavals on different levels, from the content to the container, from conservation to communication, from specialists to the public, from the institution itself to the territory and community of reference.

This change originated in the 1960s, when a change in awareness on behalf of disciplinary experts derived from a new 'inclusive' vision of cultural goods, even in museum specifics: a redesigned role and the subsequent responsibility towards the community. But as an even deeper effect of this change, an increasingly numerous, competent public appeared on the scene with renewed attention for cultural content managed by the cultural heritage. This explains, for example, the success of the editorial 'inventions' that revolutionized publishing in the sector with works designed for maximum circulation characterized by colour pictures, periodicals, and even booklets. The public took a new attitude towards the world of culture with their participation, as evinced by the foundation at that time of numerous free cultural associations, including the so-called 'friends of the museum'[1].

This was a change of view that has since continued incessantly, despite some hiccups. For example, when viewed in hindsight, the models adopted in the 1980s were not so different from the eighteenth-century ideas that were being dismantled. This includes museums/works acting as urban catalysts in renewal policies as if they held miraculous powers; or installations centred more on presentation rather than communication for a public transformed into consumers; or even shows/events where making something a spectacle was necessary for commercialization, etc.
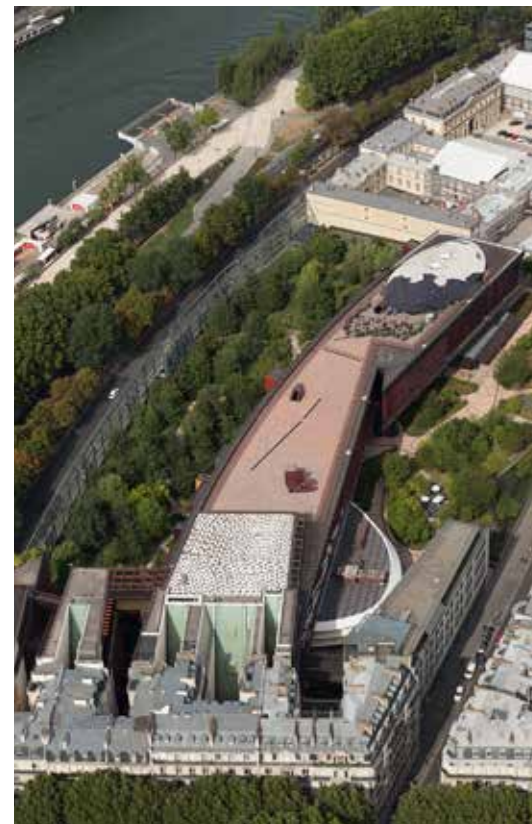
But museums have continued to change, trying to keep up with societal changes, which they have always historically tried to interpret. Thus, today, with the confirmation of cultural and creative sectors as "the spine of a new economy based on knowledge and content" (Sciacchitano, 2015; Symbola, 2015; Symbola, 2016)[2] and in the presence of a new pu-

Figs. 1-4. "Work of art" museums.
Fig. 1. Guggenheim Museum, Bilbao, Frank O. Gehry, 1997 (photo by Michael Reeve, 2005, last accessed 30 December 2016, at https://commons.wikimedia.org/wiki/File:Guggenheim-bilbao-jan05.jpg).
Fig. 2. MAXXI - National Museum of 21st Century Art, Rome, Zaha Hadid, 2010 (photo by Berarnd Touillon, Fondazione MAXXI, 2010, last accessed 30 December 2016, at http://www.fondazionemaxxi.it/progetto-architettonico/).
Figs. 3-4. Quai Branly Museum - Museum of Indigenous Art or Art and Culture of Africa, Asia, Oceania, and the Americas, Paris, Jean Nouvel, 2006 (upper right: photo by William Crochot, 2015, last accessed 30 December 2016, at https://commons.wikimedia.org/wiki/File:Mus%C3%A9e_du_quai_Branly_-_20150801_16h07_(10629).jpg; lower right: last accessed 30 December 2016, at https://it.wikipedia.org/wiki/File:Mus%C3%A8e_du_Quai_Branly.JPG).

blic that is multiethnic and multicultural, museums are called to reconsider their role in society. If the preeminent task of museums yesterday was to conserve and increase the heritage of the collections, today museums are asked to interpret a process of "democratization" (Garlandini, 2010), not only to promote participation, but also to collaborate in emancipating the public.

Previously, museums were "serialized, reifying, desolating, and desolate space, where juxtaposed objects of art appear in their mere *cumulative* presence" (Landi, 2015, p. 446). They were places to accumulate objects as examples of knowledge but which are mute and incomprehensible to most; places where knowledge was reserved for a chosen public composed of a few specialists. Today, instead, museums are called to play a different role, even playing an active role in economics and cultural policies to promote social cohesion and reinforce the sense of community belonging.

This change of view is also acknowledged in Italian regulations. An initial step in this direction is found in the "Code of Cultural Goods and the Landscape", whose innovation lies in conceiving museums, even if implicitly, as 'goods for use' available to the community[3]. A particular specificity still has not been recognized, however, as they are treated the same as other institutes and cultural places: libraries, archives, archaeological areas and parks, and monu-

Figs. 5-7. Scientific museums.
Fig. 5. Left: Frontispiece of Ferrante Imperato's *Historia Naturale* [Natural History], Naples, 1599, in the Venice edition of 1672, the first known representation of a scientific laboratory (last accessed 30 December 2016, at http://www.ausgepackt.uni-erlangen.de/presse/download/index.shtml).
Fig. 6. Bottom: Galileo Museum (formerly the Institute and Museum of the History of Science) in Florence, radically redesigned in 2010. The museum, which stores and displays collections pertaining to the Institute and Museum of the History of Science, which opened in 1930, represents one of the main international institutions active in scientific preservation, the production of initiatives to spread scientific culture, and documentation and research activities. A visit to the virtual museum allows one to explore more than 1000 objects, including images, animations, films, and detailed sheets. (Last accessed 30 December 2016, at http://catalogo.museogalileo.it/?_ga=1.243654092.8953647 76.1483689071).
Fig. 7. Right: The City of Science and Industry, Paris, specialized in spreading scientific and technical culture. Situated within the Parc de la Villette and based on a design by Bernart Tschumi, the museum was inaugurated in 1991 (last accessed 30 December 2016, at https://99daysinparis.wordpress.com/tag/parc-de-la-villette/).

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ments[4]. This delay leads to a lingering definition of a museum as a "permanent structure that acquires, catalogues, stores, orders, and displays cultural goods for means of education and study"[5]. The definition still does not identify the centre for the new missions it has adopted.

Even more radical is the renewal that began in 2014 to reform the organization of the Ministry of Cultural Goods and Activities and Tourism[6], which instituted the General Museum Manager, whose "responsibility is to direct, coordinate, and circulate guidelines and oversee the correct implementation, development, and realization of the national museum system in order to favour continuous dialogue among the different public and private museums in the territory to give life to an integrated offer for the public"[7]. Initially an office of the Supervisor, museums are therefore assigned complete cultural and managerial autonomy, recognized as "institutes with their own identity, balance, and statutes"[8].

This is a different vision, in which the new mission of the museum is to be an institution "in service of society and its development. It is open to the public and carries out research regarding the material and immaterial records of humanity and its environment. These are acquired, stored, communicated, and displayed for study, education, and pleasure, promoting knowledge for the public and the scientific community"[9].

This renewal is in harmony with what was affirmed internationally with the UNESCO Recommendation from 2015 (UNESCO, 2015)[10], which recognized the contribution of museums to developing "public policies for member states in the field of culture and the contemporary world, notably in heritage preservation, creativity, promotion of cultural and natural diversity, education, scientific progress, and communication". In other words, this is the fundamental role that museums play, by protecting the material and immaterial heritage, in "promoting sustainable development and intercultural dialogue"[11].

This different view is no longer directed within the museum, but outwards: to the public, communities, and the cultural heritage spread throughout the territory. It requires new language and new forms of communication that motivate the reflection proposed by this issue of DISEGNARECON.

## 2. NEW MUSEUM CONFIGURATIONS. FROM THE CONTAINER MUSEUM TO THE DIFFUSE MUSEUM

Since its legal definition fixed in 1967 by the Franceschini Commission (Franceschini, 1967), whose revolutionary cultural importance can still be understood today (Pallottino, 1987, p. 8), the area of interest referred to with the expression *cultural good* is broad, covering every "material artefact with civil value"[12]. The area recently expanded when, in compliance with the UNESCO Convention of 2003, the cultural heritage was combined with the immaterial heritage. According to Italian regulations, this refers to the combination of practices, representations, expressions, knowledge, and skills, as well as tools, artefacts, objects, and the associated cultural spaces that communities, groups, and, in some cases even individuals, recognize as an integral part of their cultural heritage[13]. The immaterial heritage helps to construct a sense of cultural identity and continuity, encouraging respect for cultural diversity among the communities themselves and the subjects involved.

Amplification of the heritage obviously corresponded to an expansion of the museum 'object' of interest[14], above all the immaterial heritage: knowing what to do at rites, ephemeral installations for performances, etc. These objects are no longer characterized exclusively by their material nature; they entail different levels of complexity, including public communication.

This expansion of the 'object' of interest over time



Figs. 8-9. Musée des Confluences, Lyon, Coop Himmelb(l)au, 2014. More than two million finds pertaining to the varied disciplines composing the collections constitute a sort of "room of wonders" (photo by Sergio Pirrone, last accessed 30 December 2016, at http://www.arketipomagazine.it/it/musee-des-confluences-a-lione-coop-himmelblau/ and http://www.frameweb.com/news/visitors-and-prehistoric-creatures-meet-face-to-face-at-a-french-museum-by-coop-himmelb-l-au).

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has also contributed to deconstructing the physical space of museums. New configurations are derived from the closed space—object containers—and are projected towards the open space of the city and the landscape, the territories, and the communities that live there: open museums, diffuse museums[15], eco-museums[16].
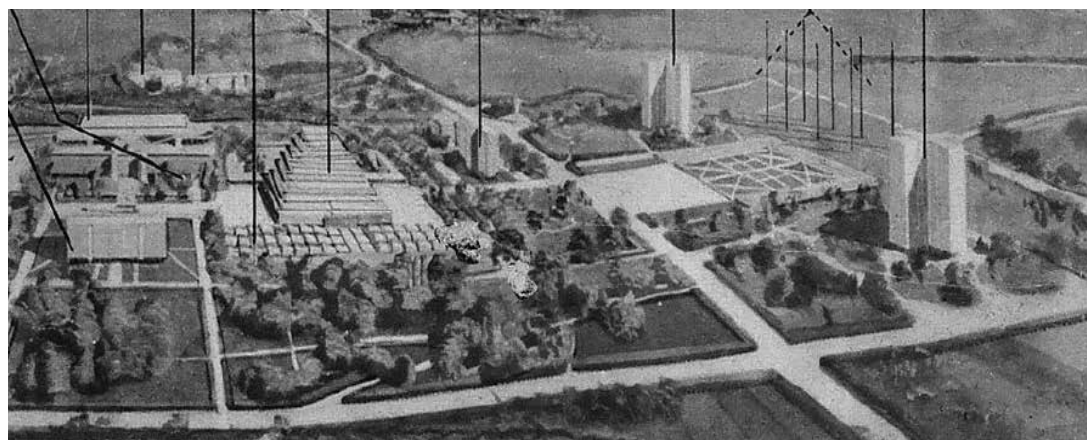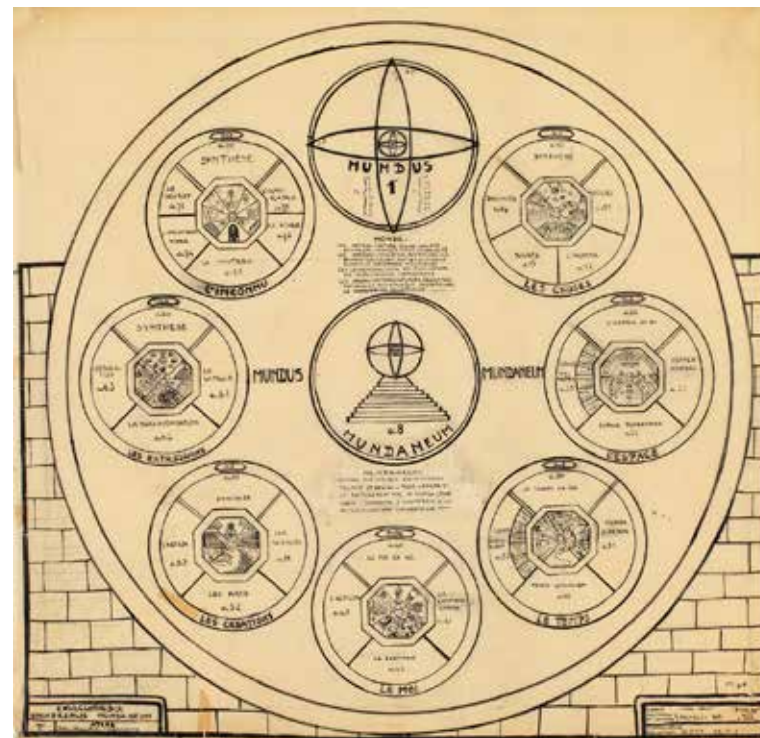
These new spatial configurations are particularly fertile in Italy, starting from the original definition of cultural good, ever oriented at considering the heritage as a systemic good, that is, the expression of both qualitative and quantitative relationships among the individual goods and between these and the context of reference. This is an idea of the systemic heritage that gives rise to "a very careful and sophisticated culture of preservation, which has enhanced both large and small individual monuments as part of a whole situated in the territory, a rich network of identity-creating meanings in which the value of each individual monument or object of art results not from its isolation, but from its insertion in a vital context" (Settis, 2002, p. 15).

A new view is also orienting processes of enhancement towards what really makes the Italian cultural heritage unique, focusing on its identifying character, i.e., the context, the "continuum between monuments, cities, and citizens" (Settis, 2002, p. 10). According to the interpretation by Salvatore Settis, "our most precious cultural good" (Settis, 2002, p. 10), for which, "what Italy offers is not only the sum of its monuments, museums, and natural beauty, but also and especially their composition in a whole" (Settis, 2002, p. 9), lies in that extraordinary continuum between 'high' works and the connective tissue of cities that house them. Promoting the communication of these types of goods means starting with the enhancement of the connection with the territory, offering both visitors and the resident community to make it an 'experience'. It is a unique, unrepeatable experience provided that it is built designing "tours of meaning that are well-focused in specific territorial areas so that [...] it is not simply a review of a series of works of art or monuments, but is translated into a historically and culturally coherent path, or into many possible parallel paths" (Bray, 2013). These new spatial configurations entail new, complex problems for management, preservation, display, and enhancement. Above all, they entail an expansion of the field of interest that forces museums to turn their

Figs. 10-11. The *Mundaneum*.
Fig. 10. Plate from the *International Encyclopedia of Unified Science*, created as separate plates beginning in 1920, 1936, Paul Marie Ghislain Otlet (1868 – 1944). The visionary ideas for a different organization of knowledge, which make it accessible and useable independent of the place in which it was recorded, were based on a strong thematic structure, an innovative system of classification, and the combined use of technologies then available (last accessed 30 December 2016, at https://commons.wikimedia.org/wiki/File:Atlas_Monde_-_Mundaneum.jpg).
Fig. 11. The project for the World City, Geneva, 1929, Paul Otlet, Le Corbusier with Henri La Fontaine and Pierre Jeanneret (Rayward, 2010, p. 35).

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gaze according to a different perspective: no longer towards the interior, but rather outwards towards the cultural heritage spread throughout the territory and the communities living there. This new view complicates even more the actions to realize the new mission that museums are called to carry out.

## 3. THE CULTURAL EXPERIENCE. ENHANCEMENT AND/IS COMMUNICATION

Enhancement of the cultural heritage does not end Enhancement of the cultural heritage does not end with the preservation of its material aspects, but is realized when it can be enjoyed and used by the community. All the actions aimed at its conservation—from the physical/material condition to in-depth knowledge—acquire sense if finalized in the view of making them available for the community, favouring the transmission of culture, that is, the body of knowledge, skills, and values precisely of a determined society in a given historical moment. Enhancement therefore "implies the willingness to confirm the communicational, symbolic, and social role of the object of enhancement. Enhancement is, therefore, a cultural and communicational action that occurs within a community that is recognized within a system of values" (Salvarani, 2005, p. 103). According to this structure, the cultural heritage can be enhanced only beginning with its 'intentional communication', that is, 'finalized' in a way that, by implementing all the necessary strategies, the good can be understood and made by the target of the communication itself. This communicational model is therefore not limited to the simple transfer of knowledge, but is rather a 'cultural' model of communication where the target of communication participates and is active in constructing meanings (Hooper-Greenhill, 2003).

Firstly, this means identifying the target of the communication—the 'public/visitor'—who is recognized as an individual pertaining to a 'community of interpretation' and as such, entails "expectations, pre-existing knowledge, historical/cultural background, capabilities and styles of learning, and interpretive strategies" (Bodo, 2003, p. XIV).
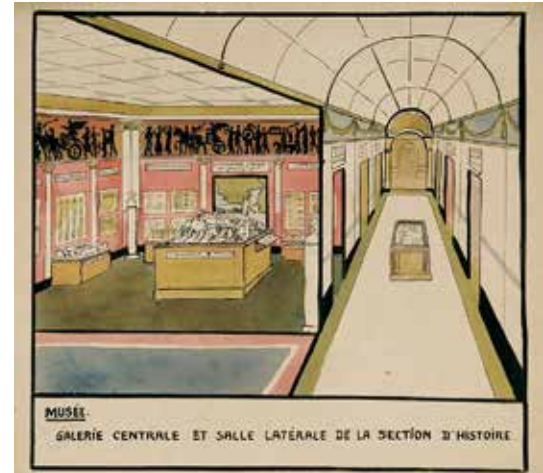
To bridge the gap between the underlying meanings and what is perceived, 'cultural' communication should therefore act as the interpreter of an action of 'cultural mediation'. Mediation in turn is realized through a synergic relationship between 'interpretation' and 'presentation' (ICOMOS, 2008). Interpretation is the set of potential activities that aim to increase public awareness and improve understanding of the cultural heritage. Presentation, more specifically, concerns carefully planned communication of the interpretational content, guaranteeing physical access to the cultural heritage site equipped with the appropriate interpretational infrastructure.

This mediation also encourages visitors to share their experiences by sharing the visit itself, thereby becoming "common heritage which unites the members of a community" (Desvallées & Mairesse, 2016, p. 56) and allowing itself to be recognized.

These are even more complex, binding questions for museums in that they can statutorily be considered as a "system of communication, even as a prototype of a communication system" (Lugli, 1993, p. 80) for those specific aspects that differentiate it from other institutes and cultural places. Among these, two aspects can be recognized in particular: the 'sensory display' and 'marginalizing reality' (Desvallées & Mairesse, 2016, pp. 59-60; Marini Clarelli, 2011).

For the first aspect, in fact, the 'objects' displayed in a museum, both material and immaterial, goods and accessories, are primarily 'sensory' objects, i.e., objects



MUSÉE.
GALERIE CENTRALE ET SALLE LATÉRALE DE LA SECTION D'HISTOIRE

Figs. 12-13. The *Mundaneum*. Fig. 12. *Musée: Galerie centrale et salle latérale de la Section d'Histoire* [Museum: Central hall and side room in the History Section]. Plate from the *International Encyclopedia of Unified Science*, 1920, Paul Otlet (1868 – 1944). The plate shows the innovative museum display organized by theme and with different supporting materials. Fig. 13. Display of teaching material organized by Paul Otlet for the International Expo in Brussels, 29 July 1935. Last accessed 30 December 2016, at https://commons.wikimedia.org/wiki/Category:Mundaneum?uselang=fr.

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that can be interpreted and understood starting from the senses[17], first of all sight (relating often to goods that have a 'shape'), but also hearing, touch, and, even if more rarely, taste and smell. Therefore, in a museum, communication is necessarily different from the text and also from speech; it depends "on the non-verbal language of the objects and observable phenomena. It is primarily a visual language, and at times an aural or tactile language. So intense is its communicative power that ethical responsibility in its use must be a primary concern of the museum worker" (Cameron, 1968, p. 34).

For the second aspect, however, the museum, by its nature, is the "decontextualizer *par excellence* of the works" (Antinucci, 2010, p. 36). Due to its founding statute, the museum operates starting from a process of 'marginalizing reality', where what is displayed is by definition decontextualized from the original conditions that generated it, being transformed thus into a mute, and no longer narrative, object. This is an evident contradiction because in order for a work—a sign object—to perform its communicational function, it is

necessary that "the target of communication have the code that the signs always imply and on which their interpretation necessarily depends" (Antinucci, 2010, p. 29). In addition, for the message to be understandable, it is necessary to have the context assumed by the message. Therefore, without "some communication that does not have contextual assumptions, [the] sharing of these preconceptions is fundamental in understanding the message" (Antinucci, 2010, p. 35). For the work of art specifically, "the role of context is crucial and delicate [because] it acts in a collective and extended communicational situation in which the preconceptions with respect to which the work are created, are carefully studied and determined by the author" (Antinucci, 2010, p. 35).

So that a work—a sign/communicative, sensible, and cultural artefact—can communicate, and so that this communication can be understood by the recipient, it must be presented according to the primary 'intentions' for which it was created, that is, first of all those of the 'authors', including the clients, designers, masters, etc. (Antinucci, 2010). This translates as a need

to reconnect those relationships between the work, the visual codes, and the generating context indispensable for its understanding, defining new languages and new forms of communication.

## 4. THE CULTURAL EXPERIENCE. DIGITAL TECHNOLOGIES AND VISUAL MODELS

Relationships between information and communications technology and the cultural heritage have increasingly affected a wider area, for example, by being applied to and transforming processes, methods, criteria, and tools to acquire cultural data and to process them into information. That is, directed towards the renewal of libraries, archives, and museums, these relationships have extended their functions from exclusive preservation to the production and promotion of culture, etc.

In an initial phase, however, the applications of ICT to the cultural heritage did not produce substantial changes. Rather, they were characterized by their "very high costs and difficulty of effective dissemination as a

Figs. 14-16. The origins of the diffuse museum: travel literature.

Fig. 14. *The Travels of Sir John Mandeville* (mid-fourteenth century), a book of travels that was enormously popular throughout the 1800s. The author, John de Mandeville, an Englishman, probably never moved from his home. A paper manuscript from the library of the Pfäfers Abbey from the second quarter of the fifteenth century contains the German translation of the book by Otto di Diemeringen, distributed widely in the late Middle Ages. Furnished with numerous colour illustrations in pen and ink (last accessed 30 December 2016, at http://www.e-codices. unifr.ch/it/ssg/0016/110r).

Fig. 15. Marco Polo, *Le Livre des merveilles* [*The Book of Marvels*]; Odoric de Pordenone, *Itinerarium de mirabilibus orientalium Tartarorum, traduit en français par Jean le Long*, 1400-1420 French manuscript edition (last accessed 30 December 2016, at http://gallica.bnf.fr/ark:/12148/btv1b52000858n).

Fig. 16. *Passeggiate romane* [*Promenades dans Rome*] by Stendhal (Marie-Henri Beyle, 1783-1842), in the 1956 Italian edition, with a preface by Alberto Moravia and a critical introduction by Glauco Natoli.

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working, communication, and edutainment tool, with paltry efficacy with respect to the theoretical potential" (Gaiani, 2007, p. 17). Regarding museums, the applications mostly echo the real conditions, thereby encountering all the same problems. For more than twenty years beginning in the 1980s, 'virtual museum' experiences were mostly limited to proposing nothing more than a "digital clone of the real museum" (Galluzzi, 2010). The expository method was similar to the traditional method, with the different works still organized into separate microcosms, the paths only within the museum, even when they were virtual, the relationships imprisoned in the restricted area of the genre and the discipline of the work being examined. Often not even the potential of hypertexts and multimedia were fully used. Interaction was rarely available, and the same means of use and exploration mostly reiterated the spaces, forms, and modes of the real world" (Galluzzi, 2010).

Recent reflections have been deeper, certainly favoured by the progressive strengthening of digital technologies, but especially determined by the needs of a 'new' public, which is increasingly a 'digital subject' that requires museums to update their means of communication. The modern public lives in increasing symbiosis with technological devices, where "the medium is less a medium and increasingly a new reality that goes precisely by the name *virtual*, which no longer refers to mediation of a natural reality, but is rather [...] a *new* reality" (Grienti, V., 2009, p. 77). The effectiveness of virtual reality thus resides in being a particular type of artificiality. Different from other types, it pretends to be natural, and by virtue of this naturalness, "simultaneously involving all five senses, virtual communication is presented as a development of humanity, not as a form of concession to it" (Ventimiglia, 2001, p. 55).

The combination of computational systems, network connections, and the strength of spatial simulation have therefore generated, and still continue to generate, profound changes in the relationships between subject and environment, with effects both on the way of constructing knowledge and on models of communication and use. From the first multimedia applications, through further progress in the development of technologies to simulate space in particular, experimentation today is aimed at defining participatory and

Figs. 17-18. The diffuse museum: applications for mobile devices.
Fig. 17. *That's contemporary* is an up-to-date online platform about events and contemporary art exhibits in Milan, created by Francesca Baglietto and Giulia Restifo in 2011. *That's App*, a smartphone version developed by Stefano Fattorusso, proposes a selected guide of events, shows, and places providing an exhaustive informational sheet with images, texts, dates, opening times, and contact information.
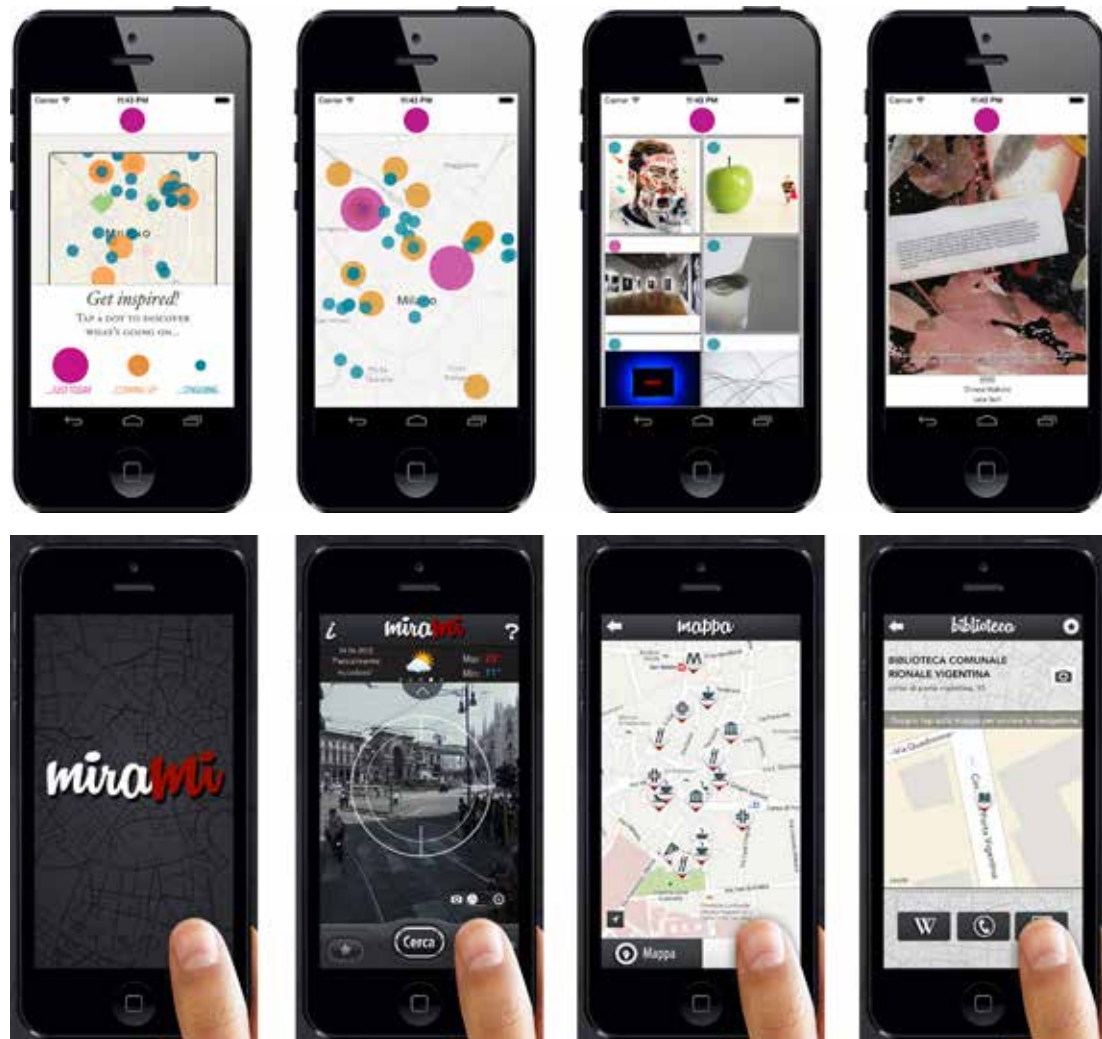
Fig. 18. *Mirami App* is an application to promote tourism in Milan, designed for EXPO 2015. It uses augmented reality and Open Data from the City of Milan, but is also integrated with Wikipedia and other portals. Pointing the smartphone in an open space, the application highlights points of cultural interest or leisure. Last accessed 30 December 2016, at https://www.thatscontemporary.com/ and http://www.mirami-app.com/#sthash.vyLeJHDD.dpbs.

immersive forms of communication by crossing techniques and languages according to a new vision of the virtual museum intended as "communicational projection to the whole field of the real museum" (Antinucci, 2007, p. 115). The application of ICT to museums therefore contributes to characterizing museums "no longer as physical places but as a network of services, which begin well before the actual visit and end much later. The visit itself is completely reinvented and modelled through modern means of use, which are dynamic and very involving, such as virtual reality or augmented reality systems and technologies that simulate touch through a system of cameras or laser pointers capable of recognizing objects" (Canina, M., Celino, I., Frumento, E., Pagani, A., & Simeoni, N., 2008, p. 8).

This is a new museum where technological innovation serves as the means and not the end. It is an active, intelligent vehicle for constructing cultural knowledge as well as communicating and spreading it. The new museum therefore more properly interprets the directions—historically fixed and recently expanded—of the cultural heritage and the rights for its effective 'enjoyment' to the whole field.

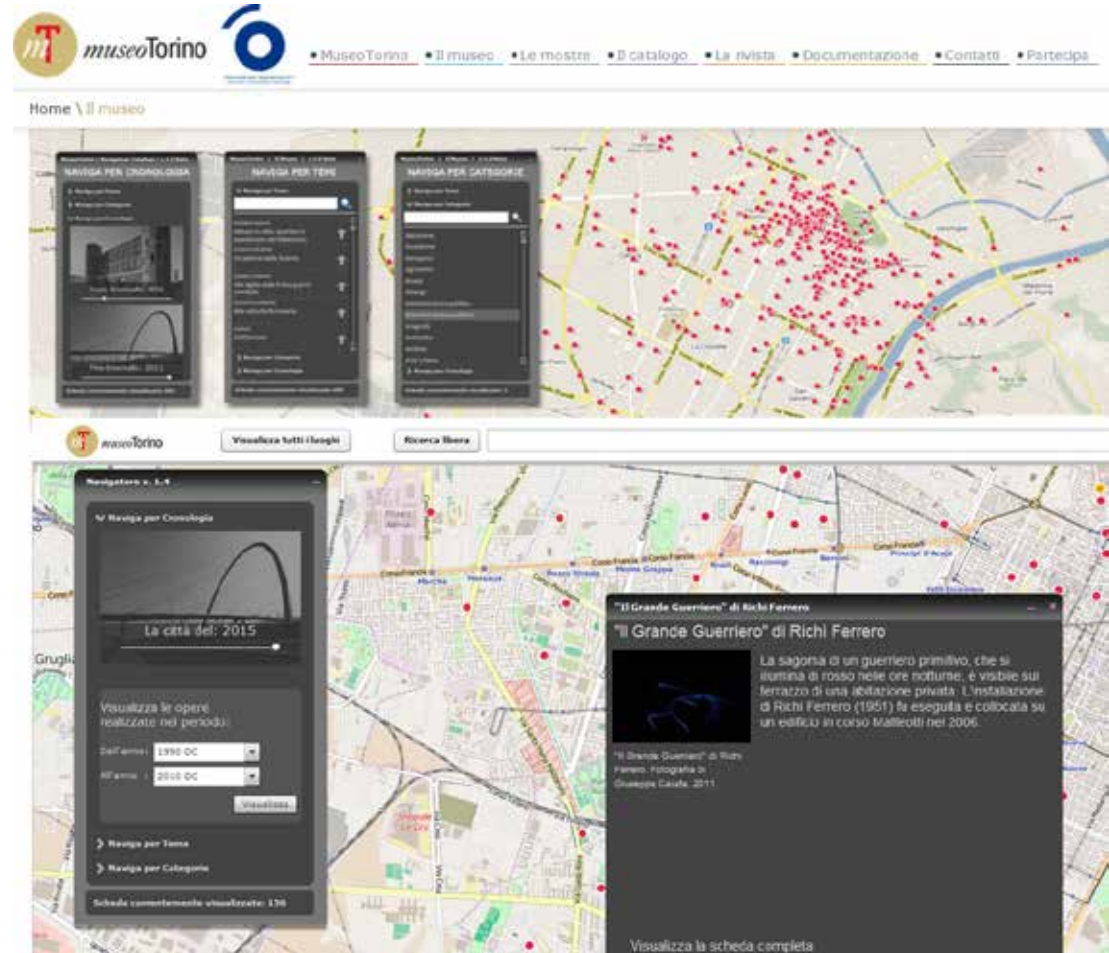## 5. VIRTUAL MUSEUMS. COMMUNICATION AND/IS REPRESENTATION

The reflections made up to now have traced some of the questions connected to the transformation still underway in museums, in the overall system of relationships between subjects (institutions, curators, scholars, the public, visitors, communities, etc.), the heritage (material, immaterial, collections, the territory, the landscape, etc.), and digital technologies (interaction, immersion, virtual reality, augmented reality, performance, etc.).

This, then, is the framework of this issue of DISEGNARECON. Affirming that each act to conserve the heritage is by its nature a communicational act (ICOMOS, 2008), this issue investigates what the specific contributions of representation may be and how they can contribute so that the public can play an integral role in the knowledge and communication process[18]. According to which forms and meanings can representation to enhance the multiple and identifying complexities organize the heritage of the country? What are the particularities of the communicational

Fig. 19. The diffuse museum: *MuseoTorino*. Opened on occasion of the 150th anniversary of the Unity of Italy, this is a diffuse museum about the city of Turin composed of the collection of goods, places, buildings, spaces, sites, and natural or manmade landscape elements that constitute the city, interpreted and communicated as a single system through a set of tools—interpretation centres, websites, printed materials, tours, maps, signs, etc.—capable of ensuring identification, accessibility, and intelligibility.

*MuseoTorino* is a museum website (designed and structured like a museum), a participatory museum (a project of the city that grew in a participatory way), a museum for all (city residents, visitors, enthu-

siasts, and curious people who want to travel through the space of the present city while recognizing the signs of the past), and a process museum (like the city, it grows and evolves with change).

The visit can be made in two ways; travelling through the city (maps and indications about the places that refer to pages in the catalogue) by following one of the thematic tours and accessing the information in the museum catalogue with free, themed research (places, events, themes, subjects, images, itineraries, objects, texts), or visiting the permanent historical museum *Torino: storia di una città* [*Turin: History of a city*]. Last accessed 30 December 2016, at http://www.museotorino.it/.

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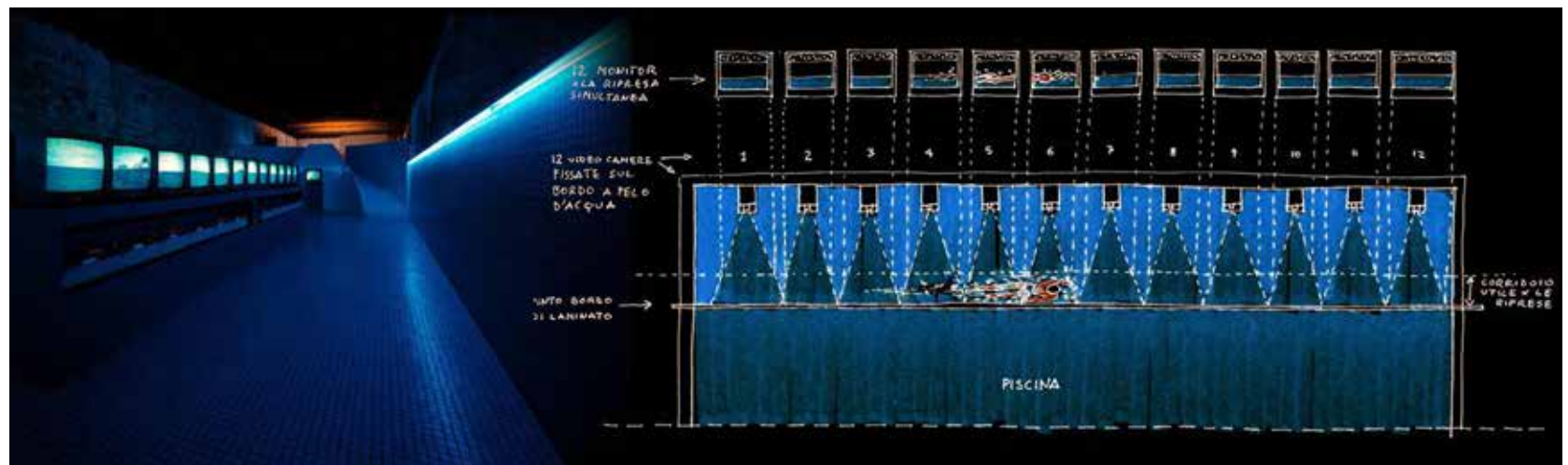ISSN 1828-5961                                Virtual Museums. Communication and/is Representation

models that, by making technological innovations their own, representation proposes? What is the range of correlations identified by representation in references between museum interior and exterior, between collections and city, buildings, products, places, stories, interpretations, etc.?

The theme thus posed therefore oriented the selection of suggested proposals, so that they might be useful to a reflection on the relationship between representation/technological innovation/communication. Each contribution refers to a particular type of good, i.e., the wide range of objects that fall under an extended definition of 'architecture', from daily items to works of art, from archaeology to the landscape, from the product to the city. Goods that have a 'shape' are recognized as 'artefacts with civil value', starting from their spatial and visual characteristics, from which follows the need that they be used coherently with their specific signs through forms and contexts pertinent to communication. The language adopted can only be visual and representation is called to deepen its practices to experiment with a language capable of encouraging means of exploration based on perceptual criteria and facilitate observations starting from the user's interaction with the [three-dimensional] space of the cultural good.

In this scope, the contributions selected propose a

Figs. 20-22. From sensory environments to the sensory museum: Studio Azzurro. *Il nuotatore (va troppo spesso ad Heidelberg)* [*The Swimmer (goes to Heidelberg too often)*], Videoambiente, Venice, Palazzo Fortuny, 1984. The installation, created with twelve cameras affixed to the edge of a pool at water level, shows a swimmer who, with repeated, weary movements, "crosses" the individual screens close up, while a hundred "microevents" (a falling ball, a sinking anchor, etc.) are inserted within the primary scene and remain relegated to the individual screens. Spectators are called not only to witness a narration; they become participants in the event occurring at that instant and which will never again be the same. Last accessed 30 December 2016, at http://www.studioazzurro.com/index.php?option=com_works&view=detail&work_id=15&Itemid=22&lang=en.

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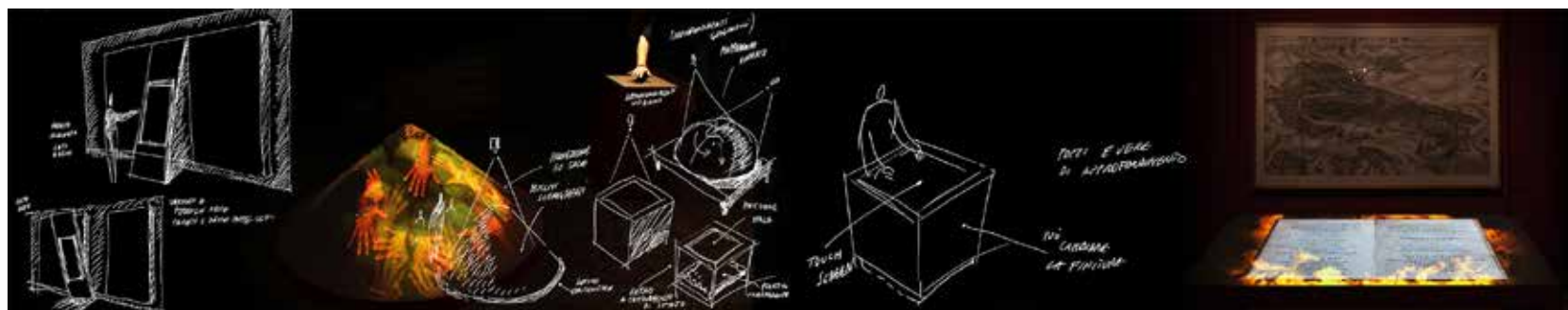ISSN 1828-5961                            Virtual Museums. Communication and/is Representation

wide range of case studies, differentiated above all by type (city, historical centre, urban space, archaeological park, architectural complex, fortification, church, tower, chapel, monumental organ, collection of pottery, a series of paintings, a set of sceneries with an urban/architectural theme, but also the digital space of databases and virtual parametric space), but also by their state of preservation, conditions of accessibility, etc., and finally, by proposals for enhancement, characterized differently according to degree of use and interaction, communicational means, and device/interface.

In this wide array of case studies, the contributions are similar in their layout and general goals. An initial unifying characteristic is that they are based on reference to scientifically proven methods and procedures in a disciplinary and multidisciplinary context, by acquisition, development, and historical/critical interpre-

tation of the data and information. A second common element lies in the 'contextualization of information' derived from the same notion of cultural good based on the relationship between object and context: communication is therefore anchored in the physical and linguistic context where the cultural good originated; it is from this context that explorations are proposed for knowledge of the 'artefacts with civil value'. A third characteristic uniting the contributions is the presentation of experimentation with representation to communicate and use the cultural heritage either already realized or proposed to the public or in the prototyping phase. But above all, the different contributions have a general goal in common: the different experiences proposed are all viewed in the light of identifying communicational models for the knowledge and use of cultural goods, expanding the representative acceptance of the different technologies used from time to time.

A reflection is made on the relationships between digital technologies to simulate space and participatory and immersive communicational forms for cultural goods that the contributions address, each of which proposes particular visits, that is, different types of 'virtual museums'. As in the case of the contributions by Alessandra Meschini, Daniele Rossi, and Ramona Feriozzi and by Francesco Bergamo, Alessio Bortot, Cristian Boscaro, Giuseppe D'Acunto, and Andrea Gion, while with different characteristics, the solutions adopted to approach the understanding of complex 'objects' are similar. Digital technologies and devices with physical supports are integrated with creative intelligence, identifying particular solutions for the 'sensory' individual and the collective use of cultural content in a closed space. In this view, a 'table of wonders', a multimedia *wunderkammer*, is proposed, where the material model of the Basilica of Loreto is represented with a 3D,

Figs. 23-24. From sensory environments to the sensory museum: Studio Azzurro. *Gli Ebrei, Venezia, L'Europa 1516-2016. Muri invalicabili e immagini flessibili* [*The Jews, Venice, Europe, 1516–2016. Insurmountable Walls and Flexible Images*]. Expository itinerary, Venice, Palazzo Ducale, 2016, www.veniceghetto500.org. The visit, created in collaboration with the cartographic laboratory and GIS from the IUAV University of Venice and the ICEA Department of the University of Padua, displays a rich, organized series of texts, paintings, documents, and images through a multimedia tour in which two perceptual levels coexist: an emotional narrative level and one that is more didactic and educational. The exhibit opens and closes symmetrically with two similar installations that refer to the collection of material. Between these two extremes, electronic images help to tell the social, political, and above all urban and architectural history of the Venetian Ghetto. The video screens thereby become windows, gaps, and passages to observe the developments of the stories, to pass through and especially take deep looks among and within the walls of the buildings in the Ghetto. Last accessed 30 December 2016, at http://www.studioazzurro.com/index.php?option=com_works&view=detail&work_id=143&Itemid=22&lang=en.

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scaled printout and where reality, augmented virtuality, and interactive media combine to offer an 'active' informational/communicational experience. The case of the church of Santissima Trinità dei Monti in Rome lies in a similar vein, where, to enhance the hypotheses of the projective geometry of the seventeenth-century paintings in anamorphosis, the communicational strategies adopted relate two narrative means: the informational and point-like nature of a smartphone app and a scenery of a 3D mapping performance. It is also 'exportable', where a micromap is associated with a physical scale model also obtained with a 3D printout.

An integrated set of technologies and devices, as well as multidisciplinary skills, is likewise used to understand and communicate a complex history: five hundred years of urban transformations of the Venitian Ghetto. In this scope, the contributions by Isabella Friso, Cosimo Monteleone, and Federico Panarotto and by Paolo Borin propose an organized system of applications to be experienced in different spaces at different times. One experience is shared in a specific space and time interval—the show at Palazzo Ducale—and one can be used individually and is designed to accompany the visitor along routes in the actual city, precisely in the living body of the transformations that have occurred.

An analogous focus can be seen in the contribution by Francesca Fatta, Manuela Bassetta, and Andrea Manti, who present a project to enhance the culture of memory for Reggio Calabria, allowing visitors to discover the city through a selection of hybrid urban itineraries among digital totems and interactive models. It is a travelling experience that unfolds in the physical space of the real city to favour the reconstruction of the identity of places, anchoring the fragments of the historical memory of Reggio Calabria before the earthquake of 1908 in the physical traces still visible today.

Memory interrupted violently by an earthquake likewise motivates the experience proposed in the contribution by Caterina Palestini and Alessandro Basso. Here, digital technologies and representation unite in service of a community by enhancing the material culture in which its identity is recognized, proposing the use, interrupted following the earthquake that hit Abruzzo in 2009, of the ancient ceramics in Castelli, a small town in Abruzzo at the foot of Gran Sasso.

There is yet another earthquake motivating the reflection proposed in the contribution by Michele Cal-

vano and Francesca Guadagnoli. A few months after the earthquake on 24 August 2016, they describe an experience whose main objective is to represent the presence of institutions and a wide, diversified community in order to help mend the violent emotional and material break experienced by the community. The citizens of Amatrice, who were deprived of a physical place for their collective identity, are offered an initial 'reconstruction' of the city and the territory: a 'copy' of reality in a three-dimensional digital model and its 3D printout. Developing a careful, specific procedure ascribable to Heritage Building Information Modeling, the 'copy' of reality is offered as a place for participation, sharable on the Internet as an accumulation of information and stories to enhance the culture of the memory.

A participatory experience that aims to favour the production of the 'culture from below' is also seen in the contribution by Paolo Di Pietro Martinelli, Lorenzo Martelli, and Manfredi Scanagatta. The heritage proposed for enhancement is the system of fortifications created in Rome at the end of the nineteenth century in the shape of a ring located about 5 km from the Aurelian Walls. This heritage meaningfully characterizes the history of the territory with its massive, systemic presence, but, while still in existence, is also in this case 'detached' from the community because it has been decommissioned and is no longer usable. The project therefore has the virtue of highlighting problems related to accessibility, physics, content, and the heritage, and which is characterized by participation, as well as adopting low-cost procedures and tools.

In-depth studies of the relationships between technologies and representations made to favour access to the cultural content also include experimentation aimed at appreciating profoundly reworked places, as in the reflection presented by Andrea Maiocchi, Carlo Mambriani, Riccardo Roncella, and Andrea Zerbi. Falling under so-called 'virtual restoration', this case proposes the reconstruction of three-dimensional space, even if illusory, to allow visitors to enjoy, through an immersive experience, the architectural building and the paintings in their original forms, i.e., in the context for which they were created. These are illusory spaces in which virtuality is used to propose cultural content through its 'sensory presentation', corresponding to the idea of extended museum in which the 'objects',





Figs. 25-27. From sensory environments to the sensory museum: *Connected Worlds* is an installation designed and developed in 2015 by Design I/O for the New York Hall of Science with the support of the JPB Foundation, the National Science Foundation, Nasdaq Educational Inc., and Google Inc. It is organized into six interactive "ecosystems" created on the walls and connected together with an interactive floor. The aim is to sensitize children to systematic thought about sustainability. Last accessed 30 December 2016, at http://www.design-io.com/projects/.

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both material and immaterial, are primarily 'sensory', that is, they can be interpreted and understood starting from the senses.

This same intention can also be traced in the contributions by Giulia Pettoello and Donato Maniello, where a sensory experience activated by sight is amplified through the use of other senses. A multi-sensory tour is proposed in the experience for the Vulci Archaeological Park, in reference to sensations between the landscape and the cultural good, where the visitor is gradually guided in building knowledge through a set of installations. A proposal is also tested to enhance the monumental König organ in Stevenskerk in Nijmegen, a symbol of the city and the city's identity. Here, the development of a multidisciplinary and collaborative procedure allows sound and lights, musical and visual content, to interact to direct a multimedia performance posed at the most general goal of getting the youngest public to approach classical organ music.

A reflection is also made on the relationships between digital technologies and representation to explore further, deeper connections between real and virtual spaces. This is the theme of the contribution by Andrea Giordano and Leopoldo Repola, where digital representation is experimented with both as a place to communicate the enhancement project and as a place in which the project itself is made. The choice is therefore to identify in an emblematic 'object' for architectural design—a sequence—the central place of narration in a continuous reference between physical reality and cultural memory in the visit to the Torre Maggiore in Villa Rufolo in Ravello.

A similar reflection, but according to the opposing view, is offered by the contribution by Ramona Feriozzi and Graziano Mario Valenti, where the possibilities for a truly virtual space free of the limits of material physicality and the confines imposed by the metaphorical reproduction of the usual explorations of the real space are explored. Along these lines, digital technologies are used to define parametric procedures to create a continuously changing virtual three-dimensional space. Representation is offered as a device to communicate structured virtual information that, displayed in relation to the visitor's experience/request, occasionally redefines the configuration of the multi-dimensional virtual museum.

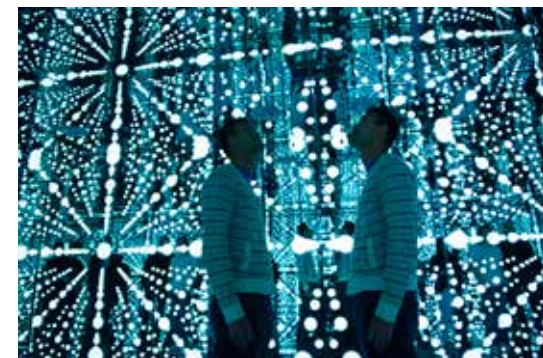Finally, the last two contributions further explore the

relationships between digital technologies and representation, investigating their most informative acceptance. In the contribution by Aldo R. D. Accardi, Stefano Chiarenza, Rosalinda Inglisa, and Noemi Scarpato, the development of museum tours to use the urban and architectural representations produced in the eighteenth century for the world of scenery illusion by the Bibiena family of architects and scenographers motivates a reflection on managing complex, diverse information. The approach proposed is to adopt a specific ontological model in which multidisciplinary research is situated to make content and methods interact, even with the participation a number of researchers pertaining to different fields. A reflection on the management and use of databases is also developed in the contribution by Sandro Parrinello, Francesca Picchio, and Monica Bercigli. Here, the research experiences proposed reason about the possibility of making 'reality migrate to the virtual environment'. In other words, it reflects on the relationships between structuring the data and designing the 'interfaces' starting by reproducing the relationships of the real space to more effectively use the information.

In the specific type of goods examined—particular sign/communicational artefacts—the contributions proposed therefore demonstrate how the application of digital technologies in the field of representation can help re-establish those relationships. These are indispensable for understanding, among visual codes and the generating context, because, first of all, "visual is explained with the visual" (Antinucci 1997).

In the experiences shown—experiments in representation—visual technologies oriented at simulating space were interpreted as active devices to construct accessible, participatory, and involving communication regarding the heritage. These are spatial and visual communicational models that focus not only on specialists in the sector, but also the 'non expert' public because they work starting from the emotional emphasis connected to vision, which favours emotional involvement and participation, that is, experience of the cultural good.

These experiences demonstrate how technologies to simulate space, with the related integrations and superposition between real and virtual space, have broadened the horizons of representation, transforming the '3D model', which is still a representation, into a



Figs. 28-30. From sensory environments to the sensory museum: *Infinity Room* designed and created in 2014 by Universal Everything in San Francisco for Microsoft Inc. A room full of mirrors and LED animations offers a sensory experience to understand the world of information and the power of big data by interactive visualizations that tell the history of the world following a simple quarter dollar. Last accessed 30 December 2016, at http://universaleverything.com/projects/microsoft/.

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'3D digital scene', a new space in which one moves and with which one interacts according to an approach that is not mediated, but rather is direct and intuitive (Ippoliti & Meschini, 2010). This informative integrated model is proposed for 'participation' and from which, precisely by virtue of this prerogative, derives both the construction of information and access to the cultural content.

To communicate the array of cultural heritage, specific visuals should be identified from time to time along with narrative strategies coherent with the different visual media, both traditional and innovative, developing prototypes of representation/communication and testing an integrated system of products to accompany visitors/travellers in their exploration.

Based on this interpretation, technology is not an end of itself or a precursor to the latest novelty or wonder. Technologically innovative and integrated in a multidisciplinary way, representation can serve as an active vehicle to popularize the heritage and as an opportunity for cultural investigation. It can act as a lever for the social and economic development of territories, an opportunity for social cohesion, and the reinforcement of the sense of belonging to the community (Bray, 2013), that is, the set of possibilities through which the social function of the cultural good is made concrete.

**NOTES**

[1] Regarding this argument, see Faletti & Bertacchini, 2014.

[2] Different socio-economic analyses highlight how 'culture' has recently characterized an increasing segment of the Italian production system. The sector has overcome these years of economic crisis by mixing beauty, innovation, creativity, and sustainability and at the same time investing in advanced technologies, the Internet, and the sharing economy. The production segment of creative cultural industries and culture in general that Censis [Italian Centre for Studies of Social Investment], contrasting the "*zero virgola*" Italy [economic growth less than 1%], classifies in the "geography of winners", has known how to point at the driver of hybridization of sectors and traditional skills and represents the new 'Italian style' (CENSIS, 2015, pp. 20–23). The richness produced by the whole chain of culture is in fact estimated to be about 17% of the national economy, considering that for each euro produced by culture, the rest of the economy, tourism in particular, grows by €1.8. For further information, consult the publications by Symbola, the Fondazione per le Qualità Italiane [Foundation for Italian Quality] (available in Italian on the foundation's website under the section Documenti/Pubblicazioni), among which in particular are the annual reports *Io sono Cultura: I''Italia della qualità e della bellezza sfida la crisi*, available at <http://www.symbola.net/html/article/summary/pubblications>.

[3] Museums are in fact addressed in the Code of Cultural Goods and the Landscape, adopted with D. L. no. 42 of 22 January 2004, in Capo I of Titolo II entitled "Fruizione dei beni culturali".

[4] D. L. 42/2004, art. 101, comma 1 - Titolo II. Fruizione e valorizzazione - Capo I. Fruizione dei beni culturali - Sezione I. Principi generali.

[5] D. L. 42/2004, art. 101, comma 2 - Titolo II. Fruizione e valorizzazione - Capo I. Fruizione dei beni culturali - Sezione I. Principi generali.

[6] The reform was initiated in August 2014 with Presidential Decree no. 171, 29 August 2014 "Regolamento di organizzazione del Ministero dei beni e delle attività culturali e del turismo […]" [Regulation for Organization of the Ministry of Cultural Goods and Activities and Tourism]. It was then enacted with the Decree by the Ministry of Cultural Goods and Activities and Tourism on 23 December 2014 "Organizzazione e funzionamento dei musei statali" [Organization and functioning of National Museums], commonly known as the "Museum Decree".

[7] MiBACT – General Museum Direction. Last accessed 30 December 2016. At <http://www.beniculturali.it/mibac/export/MiBAC/sito-MiBAC/Luogo/Uffici/Struttura-organizzativa/visualizza_asset.html_523365089.html>

[8] MiBACT – General Museum Direction. Last accessed 30 December 2016. At < http://www.beniculturali.it/mibac/export/MiBAC/sito-MiBAC/Luogo/Uffici/Struttura-organizzativa/visualizza_asset.html_523365089.html>

[9] Art. 1 of Decree 23 December 2014, known as the Museum Decree.

[10] The preparatory documents in the *Recommendation concerning the Protection and Promotion of Museums and Collections, their Diversity and their Role in Society*, approved unanimously by the 38th General Conference of UNESCO on 17 November 2015, served as the source to analyze the principles that inspired the reform of the national museum system as specified in the MiBACT Circular referred to in the following note.

[11] Ministry of Cultural Goods and Activities and Tourism – Circular 37/2015 of 2 December 2015 from general director Ugo Soragni to circulate UNESCO's 2015 Recommendation. Last accessed 30 December 2016 at <http://www.flpbac.it/public/var/910ad6114e01d41ff7e14fcecirc.pdf>.

[12] Declaration I in Acts of the Franceschini Commission, available at http://dl.icar.beniculturali.it/biblio/pdf/Studi/franceschini.pdf, last accessed 30 December 2016.

[13] According to this definition, the immaterial cultural heritage is therefore not a single phenomenon in itself, a single cultural manifestation, but rather know-how and knowledge that are transmitted from generation to generation and recreated by communities and groups in response to their environment, their interaction with nature, and their history. It is precisely the immaterial heritage that guarantees a sense of identity and continuity and encourages respect for cultural diversity, human creativity, and sustainable development, in addition to reciprocal respect between the communities and the subjects involved. In Italy, the Convention, approved unanimously in the 32nd session of the General UNESCO Conference in Paris on 17 October 2003, was ratified on 27 September 2007. Cf. UNESCO, 2003.

[14] In the case of these objects as well, reference is made to a 'collection', meaning "a gathering of objects, each preserving its individuality, and assembled intentionally according to a specific logic" (Desvallées & Mairesse, 2016, p. 36).

[15] The diffuse museum encompasses various ideas of museum utopias: from the idea of an Italy as 'a museum open to the sky' to a 'diffuse museum' as large as the entire national territory, creating in the territory "the dream to recompose the knowledge—historical, artistic, architectural, scientific, material—and emphasize the importance of diversity and cultural specificity, as if to question whether one could not later construct a model of development for the museum form on an international level" (Mottola Molfino, 2007). As a rule, a diffuse museum is a thematic museum that proposes itineraries that organize points of interest.

[16] "A museum that overcomes the logic of mere preservation of the stored good to promote a new idea of cultural good as fruit of the territory and therefore distinguished by the signs of human activity. The objective is to enhance the natural, historical, and cultural resources of a determined territory, which is also achieved thanks to the active involvement of the community living there" (Ecomuseo, Voce, 2012). "The ecomuseum is a participatory practice to enhance the material and immaterial cultural heritage, developed and strengthened by an organized subject, the expression of a local community in the perspective of sustainable development" (Carta degli Ecomusei, 2007).

[17] In fact, "this means that an illiterate person or even a young child can always gain something from a museum visit, whereas they would be incapable of using the resources of a library. […] A painting or a sculpture is made to be seen first of all, and reference to a text (or reading a placard if there is one) only comes afterwards and is not absolutely essential" (Desvallées & Mairesse, 2016, p. 60).

[18] DISEGNARECON has addressed this theme many times, but in particular with the issue *Tecnologie per la comunicazione del patrimonio culturale* from 2011, edited by Elena Ippoliti and Alessandra Meschini.

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