ABSTRACT

This article intends to study the role of immaterial architecture in virtual museums, which are defining a new relationship with their public by increasingly fixing its activities in the virtual realm. It is intended that this reflection considers the historical framework of the virtual museum and unveils the hypothesis of a virtual architecture focused on the combination of utopian projects and digital technology. It is believed that this is a highly relevant theme for its topicality and for the unexploited opportunities that are considered to exist in the domain of immaterial architecture, museums and the digital space – having the last become a meeting place, more than just a simple means for communications.

Key-words: virtual architecture; digital art; virtual museums and exhibitions; unplace project.
Despite the Internet also being considered as major importance for this growth, museums used the hypertext model for making their virtual versions in the nineties, long before using the Internet to communicate with their publics. These cybernetic versions came across as CD-ROM’s with virtual rooms, collections’ highlights and main information about the museum. The revolutionary element that made hypertext a ground-breaking tool was the fact that it allowed the content to be perceived in a non-linear way, creating a dynamic path and eventually a spatial perception of the information. On the other hand, this spatial perception leads us to another key point in the virtual museum realm, which is cyberspace. William Gibson firstly defined cyberspace in his novel Neuromancer (1984) as “a graphic representation of data” and “the non-space of the mind”, determining a connection between the human mind and this technology-generated domain. Furthermore, Michael Benedikt corroborates this correlation by recalling that the human race, as an intellectual collective, is well acquainted with the virtual dimension and the acknowledgement of a non-physical realm is not a consequence of the technological Era. To illustrate this, the author recalls humanity’s universal concepts such as mathematics, collective memories, mythology, symbols and universal truths, which are established on a non-physical context but still existent. Besides this, cyberspace is something architects have increasingly been thinking about, whether it is because of the virtual nature of an architecture project, whether it concerns the architect’s interaction with digital technology. Undoubtedly and according to Antoine Picon “an architecture project is indeed a virtual object”. In addition is the fact that a growing number of authors considers the digital space as the new public space and architects, as space-thinkers, might need to have a bigger role in the process of making cyberspace and the virtual museum an improved reality.

The virtual dimension in architecture

Drawing from Antoine Picon’s previous notion of a project being a virtual object, the utopic and visionary architecture projects are, in fact, what bring us closer to an eventual virtual dimension of architecture. Despite the theories about cyberspace and the repercussion of digital technology on architecture date back from the end of the 20th century, the virtual condition of architecture is, as stated, something inherent to its nature of forecasting a reality. Therefore, the visionary architects constitute the essence of this dimension, for their capacity to go beyond the established and define new paths even though they rarely built based on these ideas. For example, Leon Battista Alberti’s (1404-72) designs for the renascence ideal cities were clearly utopic for their time, but are still considered as important architecture proposals even if they never existed physically. Throughout History we see a large number of similar approaches to architecture, from the French visionaries and their utopian buildings (Etienne Louis Boullé (1728-99), Claude-Nicolas Ledoux (1736-1806) and Jean Jacques Lequeu (1757-1825)), to the modernists and their ideal cities (Le

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6 Idem.
Corbusier’s Plan Obus (1933); Frank Lloyd Wright’s Broadcare City (1932)), to the approaches of the revolutionary groups from the sixties (Archigram and Archizoom), all were driven to certain extent by a practice closer to an art form than to a technical project ready to be built.\(^8\)

The study of cyberspace and consequent analysis of the impact of digital technology in the apprehension of space, however, begun in the nineties with a study from John Frazer entitled The Architectural Relevance of Cyberspace.\(^9\) This study theorized the importance of cyberspace as a sphere for architecture studies. The author explored the possibilities of creating an evolutionary model accessible through the Internet, encouraging a collective participation on the creation of a virtual space. Nonetheless, this essay hasn’t had a major influence on subsequent projects since the production of the following decades didn’t deal with this specific matter of collective involvement.

However for Asymptote, a collective created in the late eighties, architects were confronted with two distinct realities by the end of the nineties: the existence of the built environment and the web and television-exported reality. The path, according to Hani Rashid and Lise Anne Couture should then be the convergence of both real and virtual into one experience.\(^10\) Couture and Rashid were right to a certain extent, as various architects started creating their versions of virtual spaces based on reality. Many of the projects that were in some way visionary expressed the convergence of virtual and real by creating immersive environments. For example, Toyo Ito defined his version of a virtual space in his project for the Visions of Japan’s exhibition with the room, Dreams (1991-92), while Diller & Scolfido, for instance, immersed the body in their Blur Building for the Swiss Expo of 2002. Lars Spuybroek on the other hand materialised his type of convergent space in the project for the Water Pavilion in the Neeltje Jans Water Park in Holland (1994-97).

When analysing projects made exclusively for the cyberspace Asymptote is one of the leading architecture offices having created two major virtual cyberspaces, one for the New York Stock Exchange Market and other for the Guggenheim Foundation, which will be mentioned further on.

Nonetheless, Yehuda Kalay and John Marx remind us the act of conceiving places is, and has always been, architects’ responsibility and cyberspace is by no means an exception.\(^11\) Consequently the authors define four categories of existing places within the digital realm: the hyper real environments that mimic physical spaces; the abstracted-reality spaces that still have references to reality and obey to the laws of nature; the hybrid-cyberspaces that freely mix real and fictitious atmospheres; and the hyper-virtual digital spaces that have no reference to the physical reality.\(^12\)

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\(^12\) Tidem.
Digital processes in architecture

It is, however, imperative to study the correlation between architecture and the digital technology in order to better understand the relation of the discipline with the means that conveys these concepts. Digital technology is indeed the catalyst for cyberspace and the virtual museum to exist, although it is not considered to be the central cause of its existence as we will see further on.

Architecture’s interaction with technology originally started in the sixties with architects using digital software as a replacement for pen and paper, and evolved to them using it as part of the creative process from the nineties on. The importance of digital technologies in the architect’s process relies mostly on the fact that it enabled a better translation of a complex mind-set. This fact was very much related to the emergence of a synthesis between Post-Modern and Deconstructivist theories with the smoothness of topology and nature’s morphogenesis as reconciliatory model for integrating contradiction, complexity and unity as one. As Mario Carpo indicated, architects from that period rarely spoke about computational terms such as ‘splines’, software or even computer. They simply needed a tool able to translate more complex geometries. Therefore new forms were being generated, many of them based on the complexity theories of science (architects were trying to define structures based on nature’s known structures such as swarms and herds) like Shoei Yoh Architect’s Uchino’s Community Centre rooftop; while others were just the result of a truly intricate mind-set, like Frank Gehry’s Guggenheim Bilbao.

As a result, architecture’s interaction with technology generated new forms, and as William J. Mitchell stated “(...) architects tend to draw what they can build and to build what they can draw (...). This means architecture’s progress is dependent on what one can represent and draw, and as Peter Eisenman believes, the digital paradigm reinforced the definition of architecture in terms of its representation. The idea of a drawing (or a representation of a building) being regarded as architecture was strengthened with the advent of technology.

To illustrate the conception of virtual spaces both exclusively in the digital space and the territory of convergence between virtual and physical, we have chosen three utopian approaches to the architecture project. Firstly, Marcos Novak is one of the main architects to explore the digital space. Having coined the term ‘liquid architectures’, the self-proclaimed transarchitect seeks to combine the non-Euclidian notions of space with principles of algorithm morphogenesis. For him architecture faces now new paradigms of conception, having identified them as algorithmic conception, interactive spaces, robotic construction, instant communication and non-local socialization. The existence of a new virtual space, the changing notion of the physical space/time and the new methods of production define Novak’s approach to the project and express a new kind of architecture, one that makes an effort to expand its presence to non-local realities.

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16 Peter Eisenman - “Visions unfolding: Architecture in the age of electronic media”, in Mario Carpo (ed) op. cit., p. 16.
The second example studied is the Water Pavilion from Lars Spuybroek from NOX office. This pavilion is part of Water Park ordered by the Dutch Ministry of Public Transport, Developments and Water Management in 1994. This project expressed some of the central topics from the first theories about digital design, namely the construction of winding and complex curves, the support in close to nature morphologies, the creation of interactive and immersive environments enabled by the digital technologies and the fusion between reality and potentiality. This project, as a pavilion dedicated to water, excelled for empower an experience instead of a presentation of water, as most exhibition pavilions did. The space was made of touch, lights, sounds, colours and all of the senses were involved in the experience. In this project architecture freed itself from the conventional and established an immersive experience based on the fact that there were no windows and the building had no notion of horizon whatsoever, merging floors with walls.\textsuperscript{17}

The third project consists of a dual environment. This project was commissioned by the New York Stock Exchange to Hani Rashid and Lise Anne Couture from Asymptote, with the main goal of creating a virtual space for the Trade Floor of the Stock Market. The architects addressed the project as if it was a physical one but soon realized the virtual space had to comprise many hardware, which had to be located somewhere. Hereupon the architects decided to create two spaces, one located in the actual trade floor and one virtual. The Operation Centre was then conceived as a working hub to provide technological support to the virtual trade floor. The virtual trade floor itself was a digital space envisioned to present information about the stock market in real time. This was an interactive application that allowed workers to analyse the information more immediately as it was read graphically in a three-dimensional space. This project created a duality between virtual and physical by establishing a continuum among cybernetic and real.

The hypotheses for the Virtual Museum

Architecture’s relationship with technology is certainly multifaceted and complex, but indeed generates new understandings about space. As we come closer to defining what the virtual museum can be we have to study the influence of the 20\textsuperscript{th} century avant-garde artists in exhibition design.

Although it is widely believed that the virtual museum is a product of digital technology, one can go back to the end of the 19\textsuperscript{th} century to find evidence that not only the accessibility to art but also its transmission was something several artists were concerned about. During this analysis it was possible to isolate three relevant aspects about the avant-gardists that can have influence on the virtual museum today, namely: their will to revolutionize the spaces where they exhibited, the interactive factor that started to characterize their art (until then defined by non-touching) and finally their determination to bring art closer to the public by carrying it into the domestic realm. According to Erkki Huhtamo these aspects have contributed more for the emergence of the virtual museum than the advent of technology solely.

Drawing on the first aspect, after taking a stand about the places where they exhibit their art, avant-gardists started to raise awareness about their art’s correlation with the environment,

\textsuperscript{17}Lars Spuybroek - “Motor Geometry”, in Mario Carpo (ed) op.cit., pp. 111-113.
as opposed to the French Salons where paintings were displayed regardless of the setting\textsuperscript{18}. In some way, artists sought to become independent from the Academy and one of the ways to do so was to choose and organize the exhibitions by themselves, displaying in unusual places. The self-governing attitude of moving to new and unconventional spaces (considering the cyberspace as one) is something that also characterizes the Web nowadays.

On the other hand, as moving to new spaces required artists to design the space by themselves, exhibition’s design then emerged as a discipline. Consequently, the integration of the visitor grew into a key point of the space design. Artists managed to engage guests by endowing their art with interactive characteristics, more appealing to the ordinary visitor. One of the first projects to set this type of exhibition was the Abstract Cabinet from El Lissitzky (1927-28), in which the artist-designer conceived a room where the visitor was able to move the paintings across the wall. This rather changed the paradigm since now an art lover was now able to touch paintings once kept unapproachable. This also enabled the visitor to be a part of the exhibition’s design, hence making it interactive.

Another fruitful example of how the avant-garde exhibition’s design can unveil contemporary action is the strategy adopted by Frederick Kiesler for some of his designs. Kiesler’s proposal for the Exhibition of New Theatrical Technique was, in fact, one of the first projects to explore the three-dimensional aspect of exhibition’s design. As stated by Erkki Huhtamo this exhibition was one of the first to establish a non-linear notion in museography, resembling “a non-linear navigable data-base”\textsuperscript{19} similar to the notion of hypertext described previously.

Similarly, the exhibition made in Peggy Guggenheim’s galleries, Art of This Century, became paradigmatic of these aspects. In this design, Kiesler not only allowed the visitor to manipulate the works displayed but also explored the notion of a three-dimensional navigable space, creating flexible structures to sustain the works\textsuperscript{20}.

Nonetheless, these approaches although innovative and groundbreaking lacked an essential dimension for the success of the virtual museum, which is the “domestic” factor that characterizes the private access from a computer. Actually some avant-gardists were aware of this aspect and artists-designers like Moholy-Nagy and Kiesler envisioned some proposals for the home environment. Moholy-Nagy, for instance, describes in his celebrated book Painting Photography Film from 1925, how to turn the home into a “Domestic Pinacoteca”. This idea consisted of creating a “domestic data-base of works” and displaying the works in a rotative system as well as making use of new technologies such as projectors in which other works could be presented.

In the same way, Frederick Kiesler imagined the Telemuseum (1926) in which he would transform the walls of a home into canvas for projecting famous art-works. For Kiesler, this idea symbolised the custom museum and an opportunity to own important art-works in a domestic context. To the same extend, the series *Boîte-en-valise* from Marcel Duchamp embodied an anticipation of the virtual museum in the way they were micro galleries, accessible to anyone, containing some of Duchamp’s most famous works.


\textsuperscript{20} Idem, p. 124.
It is, however, believed that the apogee of the virtual museums’ anticipation is André Malraux’s Imaginary Museum. This proposal comprehended the use of photography to reproduce and share art-works. The author believed the representation of a work to be an art-work itself, therefore legitimating reproduction as an art form\(^{21}\).

These examples bring us closer to the limits of the contemporary virtual museum and demonstrate that its existence is not a mere consequence of the emergence of digital technologies, but something extensively theorized and speculated since the beginning of the 20\(^{th}\) century.

### Contemporary Virtual Museums

A virtual museum has today multiple meanings and diverse formats, although for it to be considered a virtual experience it has to remain mediated by some technological device (computer, smartphone, tablet, etc). Currently, many museums adopt their virtual version as an extension of their physical representations, although museums exclusively created for the digital realm are increasingly recurrent. Nevertheless, both online museum types need to respond to particular key aspects of digital production, according to Klaus Muller. The author considers that virtual museums have the task of transmitting information just as the physical museum, although currently virtual ones lack the interpretative dimension, usually assigned to curators. Hereupon, the author presents seven main characteristics for virtual exhibitions to be fully functional, whether they are exclusive for the web or representing a physical institution: time, space, links, storytelling, interactivity, production values and accessibility\(^{22}\).

It is also possible to differentiate virtual museums that reproduce reality and convey representations of physical art-works, like Google Art Project and the ones that focus primarily on the digital paradigm and exhibit works made exclusively for this context, such as the projects studied at the end of this essay. Considering now the museums and exhibitions that are orientated to the digital paradigm, according to Rachel Greene the first artists to use the Internet as an artistic means and communication platform were motivated by the disbelief in the established system\(^{23}\). The Internet broke the elitist tradition of museums being accessible only to an elite, and prioritized the relationship between artists and visitors. The point in Digital and Internet Art, in fact, is that it compels to be presented within the means it was created in, and today the Web is the only context that enables this. Within this framework several examples of how artists and institutions took ownership of the where they exhibited their art started emerging from the 60’s on. One of the first to embrace the web as an exhibition space for Digital Art was The Alternative Museum\(^{24}\). This museum, firstly made in brick and mortar, was created to develop a support system to artists that were not comprised by respected institutions and

\(^{21}\) Antonio M. Battro - “From Malraux’s Imaginary Museum to the Virtual Museum”, in (ed) Ross Parry op. cit, p. 139.

\(^{22}\) Klaus Muller - “Museums and Virtuality”, in Ross Parry (ed) op. cit, pp. 301-302.


was considered an important indicator of the current state of the art, due to a faster tracking of artists constantly reshaping themselves\(^{25}\).

Countless examples of museums created for the web exclusively, whether by artists wanting to dissociate themselves from the system or build a personal collection, such as the Portuguese Improbable Museum of Image and Contemporary Art created by the artist João Serafim; whether by institutions willing to support groups of artists like the Museo Uruguaio de Artes Visuales (created to represent Uruguayan artists), the Digital Art Museum (that exists to aid digital artists from around the world) and the Museo de Arte Contemporaneo de Lima, LI-MAC that is a curious case of a web-exclusive museum in which the user is led to believe the museum is located somewhere; all took a stand on where their at should be entrusted.

Notwithstanding, nowadays we are witnessing a phenomenon associated with the emergence of the social web that also portrays a part of museums’ interaction with the Internet. This phenomenon is mostly concerned about developing a close relationship among users and museums than actually exhibiting art-works. As Andrea Bandelli reminds us, one of the main characteristics of a museum is being a social place\(^{26}\). However, serendipitous interaction is very difficult to induce among strangers and the social web provides an encouraging environment for this type of communication. Museums are already present in social platforms such as Facebook, Twitter, Flickr and Youtube, which undoubtedly generate a closer relationship amongst museums and their visitors. Guggenheirn Foundation, for instance, has an “online” website tab for all possible virtual interactions including questions to curators. MoMA has a blog in which virtual visitors can interact with news and build a personal collection thus becoming their own curators. Google Art Project also provides a “be your own curator” feature with the main difference that this cultural project gathers the collections of about 538 institutions. Similarly, Tate Gallery’s website has a social media directory in which Twitter is widely used as a communication and artistic tool.

Still, for Konstantinos Arvantitis the realization of Malraux Imaginary Museum happened at first with the advent of the Internet and secondly when mobile devices were introduced in the equation\(^{27}\). Mobile devices enhance the “museum without walls experience” since they become portable communication tools, consequently providing a closer relationship among museums, their public and the everyday.

Attached to the mobile devices discussion is the one about applications. Throughout recent years museums have been developing exclusive applications to enhance the museum experience and reach new publics\(^{28}\). One of the most relevant features of these apps, besides providing exclusive information and offering motivating games, is the interaction with the physical reality. Through the QR Code, for instance, one is able to access links related to the work one is looking at in the physical museum, in real time. There are also applications that interact with the physical space involving notions of augmented reality. In fact and as a conclusive note, these projects are gradually creating a bond between virtual and physical reality and this circumstance leads us to a problematic framed by Juan Martín Prada, which is the need for geographically referencing these virtual experiences. As the


\(^{28}\) Idem.
The author states, the web changed from “social” to “local” in which the first focuses on virtual participation and the second carries this concept to the local space²⁹.

Three referential projects

We observe, however, that the use of three-dimensional visualization techniques falls short of expectations considering what the digital space allows, which is virtually anything. These referential projects reflect on other kind of language, not subjugated to the built reality, proposing distinct approaches.

The first project dates back from 1999 and was commissioned to Asymptote by the Guggenheim Foundation as part of a three-year enterprise to implement an innovative museum structure in cyberspace. The Virtual Guggenheim studies the mutable and flexible architecture inspired by the liquidity of fluxes. This museum included digital temporary exhibitions, a digital architecture archive as well as virtual replicas of the existent Guggenheim galleries from all museums. Despite this extensive content the museum also had a link to reality through augmented reality projects implemented in the New York Museum in the form of holographic projection. This museum intended to create a new architectural paradigm focused on the intersection between a virtual and a physical experience.

The second significant project is the Adobe Virtual Museum of Digital Media from 2010. This model is considered to be a hybrid model for it exists only in the Web but holds several physical references, such as its urban framework, contrary to the Virtual Guggenheim Museum. This museum would become a digital space to adequately maintain, preserve and present works conceived solely in digital environment.

The third project studied was developed in the framework of the Master of Research in Advanced Spatial Analysis and Visualization of the Bartlett University College London. The interest of this project resides in the fact that it is an adaptable model that allows the analysis of custom made virtual space, as it is defined algorithmically. The user has thus the possibility of choice not only concerning the content of the exhibition but also about the configuration of the museum. This project is based on the idea of the Web 3.0 that establishes semantic relationships with the users.

Final Thoughts

As a result of this study, we can conclude that the contemporary context is indeed the one that better admits the existence of a virtual museum. Pierre Lévy’s new public space is the framework of this museum, which places itself as a part of the world’s ‘digital memory’. The virtual museum will emerge thus adjusted to this virtual space associated with an architecture that highlights the object amongst the Web.

Moreover, since the 18th century the ideas about immaterial architecture are taken as essential points in the reflection. The transposition of these utopian ideas to the technological domain is therefore a logical step in the development of the discipline. The physical spatial experiences of innovative atmosphere, such as the Water Pavilion (NOX, 1997) or the Blur Building (Diller Scofidio and 2002), are the focus of many offices that combine architectural practice with artistic practice. At another level, projects for the digital space also emerge as virtual, immersive conceptions, such as Marcos Novak’s approaches, in the nineties and the 3DTF by Asymptote later in that decade, disassociate the body from architecture, continuing a practice long initiated by architects.

By analysing the possibilities of the discipline in the confrontation with digital technology it is concluded that there is indeed room for further reflection about the presence of architecture in virtual space and, consequently, on the role of architecture in the design of the virtual museum. Still, the research confirms that contemporarily, the use of cyberspace by architects is though reduced to few authors.

Parallel to with the definition of architecture over the centuries, is the development of ways to exhibit art that establish a deep relationship with the built space. Since the beginning of the 20th century, artists explored other means and spaces, creating new paradigms in the exhibition design. It appears from the analysis that many artists aspired to bring its production closer to the public and that this ambition would only be achievable after a significant change in their approach. Nevertheless, Kiesler’s, Moholy-Nagy’s, El Lissitzky’s and André Malraux’s approaches and ideas have undeniably restored the relationship...
between art and space and as a consequence of architecture with art. This fact is considered a starting point for the definition of a new kind of museum.

It seems, however, that projects such as the Domestic Pinacoteca (Moholy-Nagy, 1925) the Telemuseum (Frederick Kiesler, 1926) and the Musée Imaginaire (André Malraux, 1951), which completely altered the relationship of the work with space and of space with the visitor, did not possess the means necessary for its dissemination and consequent success, lasting, therefore, simply in the hypothetical plan.

In the 21st century, it is believed that the means available to the dissemination of art are consistent not only with the type of art that started to be produced since the 60’s, but also with the transmission of the work of art desired by the avant-gardists. It is precisely in the contemporary context that the condition is more favourable to the virtual museum to succeed.

The referential projects studied define multiple paths for the virtual museum. It is regrettable, however, that the projects are not available today, but we consider that this fact may be related to the still challenging maintenance and conservation issues of online projects.

In the Portuguese context, the unplace project: a museum with no place, to which this dissertation is bound, can become an international both theoretical and practical reference to the design and the study of the virtual museum, as it integrates simultaneously academic articles from multiple authors and an actual virtual exhibition.

BIBLIOGRAPHY


