

# A Virtual Design Museum

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## Abstract

*The "Virtual Design Museum" is a research that aims to investigate the possibilities of representing a virtual product with high cultural content, such as Industrial Design Products, using Virtual Reality techniques and methods.*

*The product design is characterized by multiple facets in all its stages of development, starting from the first idea of the designer, related to historical, social and cultural context in which he operates, up to its forms of representation like initial sketches of the product, the creation of physical prototypes, technical drawing in which details are refined, the engineering that connects the aesthetic with the functional and productive characteristics, taking into account the manufacture complexity and the possible technological innovations and also the phases of packaging and advertising.*

*The research illustrates some interesting opportunity to multiply the levels of narration of a product, analyzing of the concept of "design museum" and how it is declined in a variety of international experiences, and approaching the different meaning of "virtual museum", interpreted very differently depending on the various implementations.*

Categories and Subject Descriptors (according to ACM CCS): I.3.8 [Computer Graphics]: Applications

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## 1. Introduction

In order to understand the development of the project, it is necessary to consider some concepts that are the starting conditions from which the research started. On the one hand the concept of the multiverse, which is used to qualify the design, expresses "the idea of a complex system, both single and multiple. (...) The design cannot be understood without considering the multiplicity of his "poetry" in the variety of points of view from which can be watched. And from which it appears to us in all its growing diversity "[BM04]. On the other hand, the virtual museum: a formable space, which gives the opportunity to highlight the logical connections, historical, formal, social contact between the design objects that are element of museum display themselves.

These considerations have given rise to a project that link many different realities. The project "Virtual Design Museum" examines the possibilities offered by three-dimensional digital representation and uses techniques and methods typical of virtual reality applied to a museum,

containing complex objects such as design products. The project, financed by the Lombardy Region has seen the

involvement of the Triennale di Milano that includes the Triennale Design Museum.

Specifically, the link between design and virtual allows to ensure the dissemination of heritage and cultural aspects related to design objects, collecting and explaining the intangible knowledge embedded in each product. Virtual representations can also go beyond the physical space, providing the ability to collect in the same space objects that are in different places, which cannot be physically exhibited for conservation reasons or lack of space.

## 2. Research objective and project lines

Within this project, the concept of "virtual museum" has been investigated in several ways, among them, an attempt was made to: find a shared definition of terms, determine the availability of online virtual museums to identify and catalog its forms of representation, define the output

devices used and actually usable in those museums which make use of virtual reality for providing information.

In this context, different models of fruition have been declined and their paradigms are:

- The "game museum" in which the visit becomes a moment of learning and where closer examination passes through a gaming interactions;
- The "a la carte museum" based on the potentiality of a museum with endless possibilities of implementation, considering the many expressive opportunities allowed by a variety of digital contents, and with a strong level of personalization. The consumer suits the museum for his own characteristics and needs and the hypertext becomes the modus operandi to enjoy this space and to venture in the stories related to the objects;
- The "culture store museum" developed from the hybridation of shop and museum, that becomes a reasonable hypothesis when the sellable objects become actually the same.

The potentiality of the virtual experience is to open places and documents to the collective dimension, permitting to share knowledge with a diachronic reading. In this way the interpretation of concepts lying behind the design product becomes comprehensible also for inexperienced consumers.

Besides, the virtual dimension allows to deconstruct the physical unity of museum space relocating it in a non-limited conceptual space, in which the fruition of the pieces can be extended over the limits of a physical museum. In this way it is possible to implement a collection in which the products are related by a logical thread such as the author, the historical period or the cultural movement, without the necessity that these are established in the same physical space. This is particularly useful for the exploitation of the so-called "giacimenti del Design", developed on the Lombardy territory.

As a consequence of these considerations, we can define that through the use of multimedia and hypertext, the virtual model becomes a container of knowledge that offers searchable reading paths and different approaches according to the user profile. The intent is to reduce the barrier that stands between experience and actual experience [Riv07] through the use of communication devices for the web and the real experiential space with the aim of improving the use of knowledge and participation of individual. In this sense, the museum communication changes and through the virtual exhibition can be reached in a more expeditious awareness, already sought in the actual exhibition, the collection on display should not be considered the means by which to send a message to the visitor, but a tool to create a bond between the visitor and what the objects are exposed [DeL07]. This leads to involve the viewer in a system of knowledge that goes beyond the specific exposure or individual object.

Compared to the widespread perception that is common to all museums and exhibitions, which considers the virtual world as "the absence of materiality" in this project it was decided to consider the potential of the virtual museum and

to consider this type of approach as a "interactive communication system" that is rooted in connectivity and information sharing, using emotional involvement to reduce perceptual barriers separating the end-user from the museum. Therefore, there is an intersection between the real user experience and its corresponding virtual counterpart, that comes alive when the museum is explored and becomes an attribute of the user [WBJ71].

A significant example of these concepts is represented by the "the Art of Storytelling" on the website of the Delaware Art Museum

([http://www.delart.org/education/art\\_of\\_storytelling.html](http://www.delart.org/education/art_of_storytelling.html)), in collaboration with the company Night Kitchen Interactive. In this section, the museum offers an interesting gimmick of bringing their visitors, users have the ability to insert its own story inspired by the paintings on display, read and listen to stories posted by other people or even invent your own painted backgrounds since the and characters, suitably insulated, the collection of paintings. During the conference Museums and the Web 2008, Fisher M., Twiss-Garrity BA, Sastre A. presented the results of a survey on users of the site. The data that have emerged in this approach to identify successful application in the interaction with the user and in promoting the work of art emerges from the questionnaires suggested that 92% of people who took part in the experience feels more involved in the works of the Delaware Art Museum, and of these 59% perceived a greater involvement in relation to the art museum in general [FTS08].

Besides the case study just mentioned, other characteristics considered significant were identified, especially as a consequence of the requirements for the virtual museum expressed by Forte and Franzoni [FF98]. It has also been produced a web search on the availability of virtual museums, using search terms similar to those proposed by Schweibenz [Sch04], applied in the Italian context.

Among the case studies, to name a multidisciplinary approach in which the suggests different routes according to users, it is interesting to the Database section of the website of the Kartell Museum (<http://www.kartell.it>). The peculiarity in this case is within the differentiation of the search keys. The choice may in fact be articulated: scope of use of the object, object type, product name, design and technology used to produce the object. In addition, specification sheets provide information on culture and communication in which the product is placed, as it is possible to pass to other objects of the same family.

Starting from the state of the art and case studies within this research has been possible to define the aspects that constitute the theoretical framework that bind Virtual Design and find their expression in the creation of the Virtual Museum Design. The result of this phase on design museums and virtual museums scenarios, users and how to use and collection of data provided as output the construction of a prototype web site that collects and expresses, through a series of communication devices (links to other museums and business, how to define your profile and search for objects, links between objects, etc...),

the choices that revolve around the project and from research. Three-dimensional models of objects selected for the museum have been made since their importance, taking into account the platform on which will be displayed.

### 3. Characteristics and purpose of the museum

On the base of Forte, Franzoni [FF98] requirements and considering the theoretical concept identified from the analysis, we define the characteristics and the purpose of our Virtual Design Museum:

- To show a collection of design objects using the virtual reality tools and using innovative scenarios of fruition with the purpose of conservation, study, education and amusement;

- To emphasize the design nature as a cultural heritage [Lup09] making available the logical, historical, formal and social connections and to enable the creation of a personal and sharable experience;
- To extend the collection with the exhibition of objects that cannot be placed in the real museum due to the lack of space or due to the critical situation of the object in terms of conservation; to widen the museum connecting other realities, in order to create a network among museums [MPR01];
- To create a database of digital models through the use of three-dimensional survey and modeling processes, and that contains all the information related to the object, the exhibitions and the architectural space.

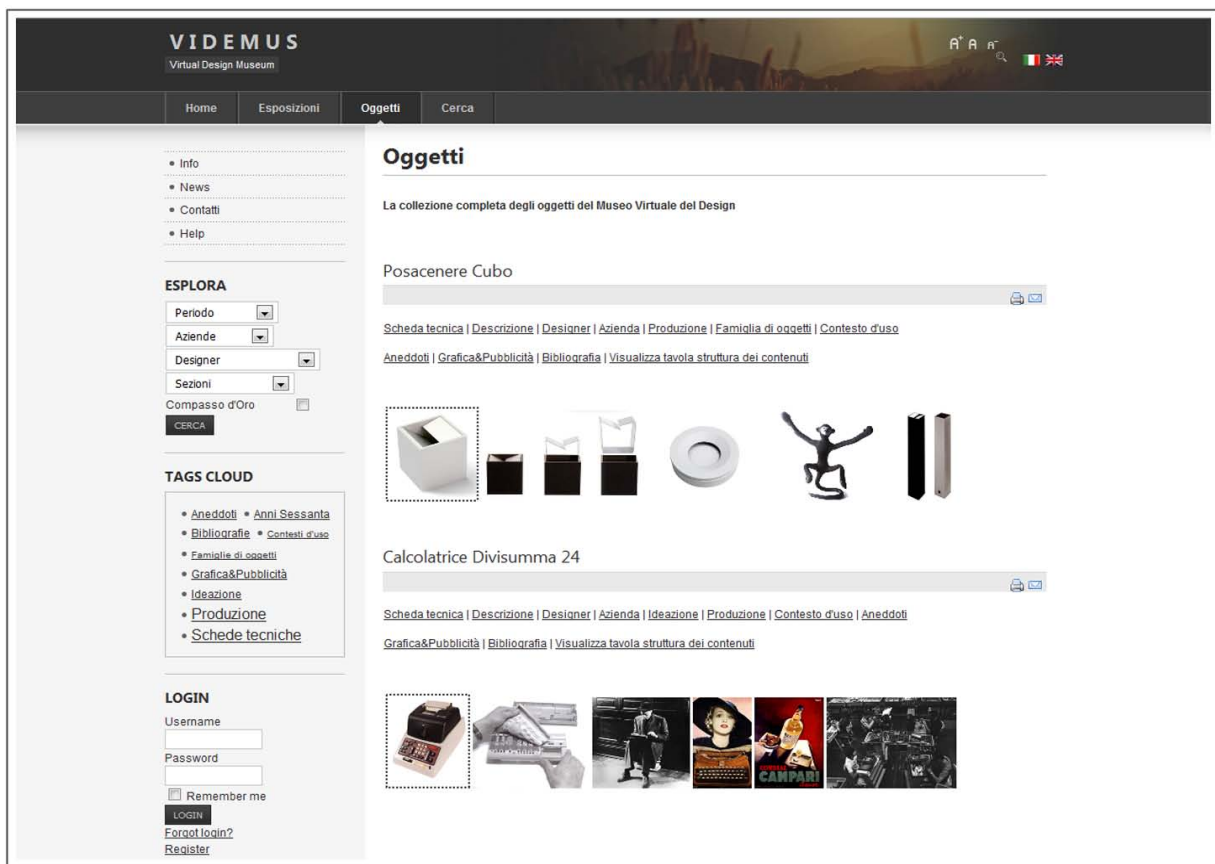


Figure 1: Videmus prototype.

### 4. 3D digital survey, modeling and visualization

Another important phase of the project concerns the definition of the methodology of survey, modeling and fruition of the objects we intends to propose the three-dimensional model.

In the analyzed websites, the solutions foresee the employment of tools based on VRML (Virtual Reality Modeling Language) models that allow the navigation through simple transformations (e.g. rotate, zoom, pan) and

require the installation of specific software (e.g. plug-in VRML or external display devices); otherwise they use some tools for the visualization of proprietary formats that add information to the models, and functions of animation and interaction. These formats need the plug-in installation for the browser. The lack of a diffused instrument for 3D visualization provoked the add of these plug-in, necessary for the visualization of the single formats (e.g. 3dvia Player, Exhibit 3D Player or Unity3D). A further category of languages has been developed in order to allow the

interaction among more players inside 3D scenes: the Massively Multiplayer Online Games (MMOG) use sophisticated software or a browser web.

The survey of design objects is particularly important not only for their modeling, but also when there is the intention to give a conservative function to the museum, and it must have to done with tools that guarantee the acquisition of details that, for the greatest part of these objects, are around one millimeter.

For this reason, the survey has been realized with the employment of triangulation scanner [GBR10]. The surveys data are used therefore as reference for the modeling of the objects. Considering the shape that characterize the design objects, the address of modeling is represented by the use of a surfaces modeler, ideal to represent free-form surfaces.

## 5. Conclusions

Through this research it has been possible to define the facets that constitute the theoretical aspects connecting Design and Virtual and that find their expression in the implementation of the Virtual Design Museum.

The result of this analysis on the museums of design and the virtual museums, on the scenarios, on the end users

and the fruition and the data-gathering, gave as output the realization of a prototype website. Through a series of communicative expedient, this prototype collects and expresses the choices that rotate around the project, resulted from the research (connections to other realities such as institutional and company museum, definition of the user profile and criterions of search of the objects, connections among the objects, etc.). The website is accessible at [www.videmus.it](http://www.videmus.it). The 3D visualization has been implemented in collaboration with Laura Pecchioli, researcher at the Institute of Geodesy and Geoinformation Science, TU Berlin (for further information <http://isee.kitabi.eu/>).

If we consider in general the benefits that the project can create, in conclusion we can assert that it is advantageous for a number of areas: from the cultural point of view is expected to increase visits to the museums of design and dissemination of a culture of design, in sharing the economic value of Made in Italy leads to an increased flow of trade and cultural tourism, and finally, the implications of a scientific concern the creation of a synergy between the museological field studies, museums and new methods of representation applied to the cultural heritage system.

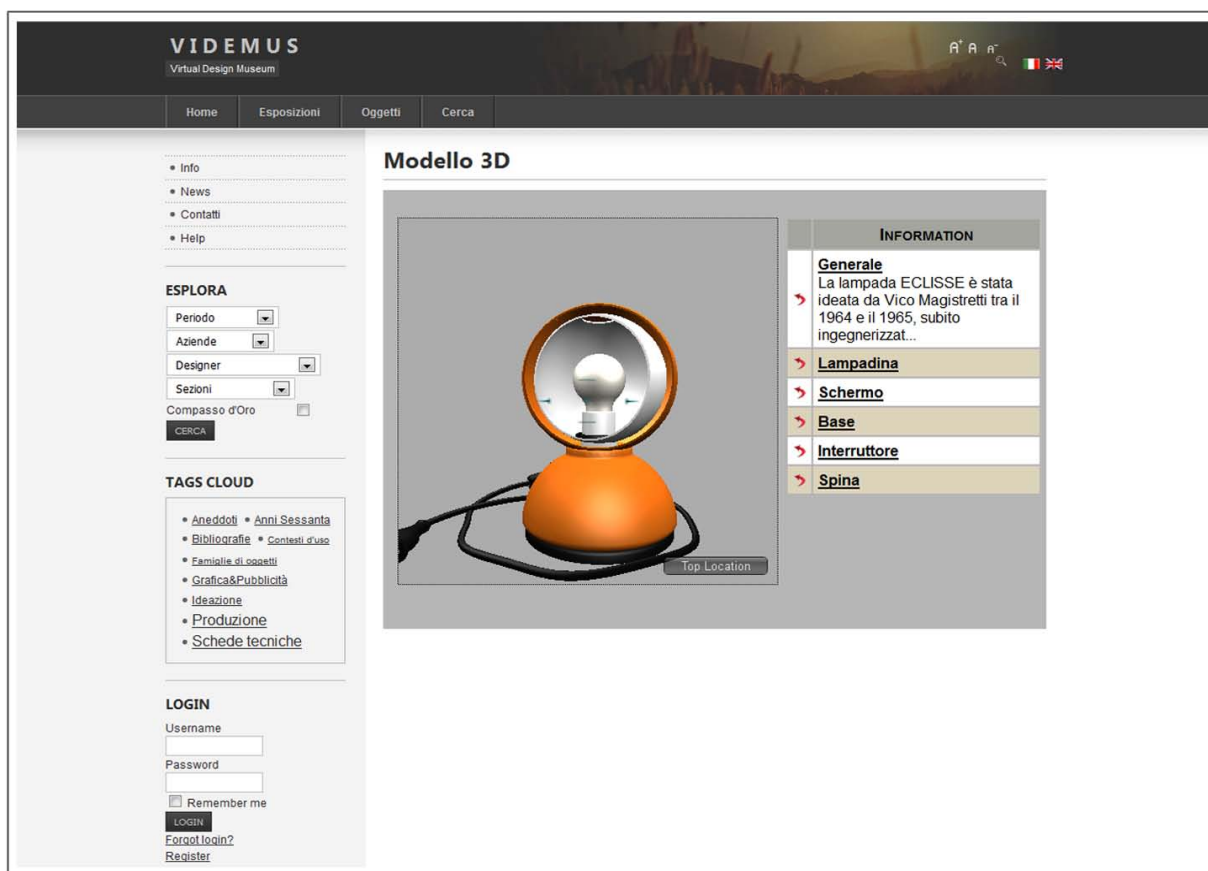


Figure 2: The Eclisse lamp (Magistretti). 3D digital model visualised in ISEE

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