

## THE MULTIMEDIA ROOM OF THE SCROVEGNI CHAPEL: A VIRTUAL HERITAGE PROJECT

**MAURIZIO FORTE**  
CNR ITABC, ROMA, ITALY  
MAURIZIO.FORTE@MLIB.CNR.IT

**SOFIA PESCARIN**  
CNR ITABC, ROMA, ITALY  
SOFIA.PESCARIN@MLIB.CNR.IT

**EVA PIETRONI**  
ARACNET, ROMA, ITALY  
EVAPIE@TIN.IT

**CLAUDIO RUFA**  
4ARACNET, ROMA, ITALY  
CLARUFA@TIN.IT, WWW.ARACNET.IT

**DORINA BACILIERI**  
SRL, BOLOGNA, ITALY  
INFO@ARCHE-SRL.IT, WWW.ARCHE-SRL.IT

**DAVIDE BORRA**  
NO REAL, TORINO, ITALY  
INFO@NOREAL.IT, WWW.NOREAL.IT

### ABSTRACT

The Scrovegni Chapel of Padova has been re-opened in March 2002, after a long closing period, due to necessary restoration activities on Giotto's frescos conducted by Italian ICR (Central Institute of Restoration). Giotto's masterpiece was given back to visitors and citizens, but with some restrictions: the chapel is solely visible for group of 20/25 people and for a limited period of 15 minutes. In order to get over this limitation, Padova Municipality decided to employ an empty and unused room, to be used as a multimedia centre for the visitors. The project was developed by Archè srl, under the technical direction of Sofia Pescarin, with the founding of an American Foundation (Wiegand Foundation). The multimedia room is planned to represent a cognitive space where the visitor can interact with the monument, with different approaches (active and passive fruition) through seven installations. The équipe of CNR ITABC (Institute of Technologies Applied to Cultural Heritage), directed by Maurizio Forte, was in charge of developing a Desktop Virtual Reality application (DVR) for the Chapel. With this application the visitor can interact with the frescos, through the 3D model of the Chapel (that is a three-dimensional, metrically reconstructed and interactive menu itself), and can access all the complex information, made immediately comprehensive by virtual reality and by the navigating metaphors. This application is one of the first examples of DVR system, made really accessible to a various public, who can use it, autonomously and without a guide, just discovering the VR world and the content.

### INTRODUCTION

Because of serious problems of preservation, Giotto's paintings, in the Scrovegni Chapel in Padova, have been restored in the last two years. One year ago (March 2002) the works were finished and the chapel was finally given back to the visitors. Unfortunately the accessibility to the monument was limited to 20 people any time, while the visit cannot last more than 15 minutes. This is not enough, obviously, not only to understand this complex and wonderful piece of Italian 13th Century art, but also to have a complete view of the monuments and its frescos. Moreover it is almost impossible to see properly at least the 20 % of the paintings, because of the distance from the visitor.

When the municipality of Padua decided to face this problem of fruition, accessibility and comprehension, we proposed an integrated project that could be a possible solution: a system of seven multimedia and VR installations. The municipality completed the project by offering an unused space of 200 m<sup>2</sup>, an hypermedia room under the City Museum and by finding out a financial support, contacting an American foundation

(Wiegand Foundation). The aim was to realise a "multimedia centre" in order to give the visitors appropriate tools to examine thoroughly, understand and appreciate Giotto's frescos, the Chapel and the 13th century background.

### [1] Musealising the Virtual

"Without context there is no communication" (Bateson 1973), so only in an alphabetised space we identify rules of learning. Then, it is on the basis of these concepts that a territory called museum can become a place, a coded space. How is cyberspace being used to reconnect people in a new environment? What rules can be used in this digital ecosystem of virtual heritage? According to the cybernetic principle "the map is not the territory" (Bateson 1973), we have no information about the space without maps. The map is the visual grammar for getting information about and through a digital ecosystem. According to these premises it is possible to distinguish four domains of digital learning through maps (coded spaces) showing the relations between spaces and places:

1. Territory - Space - real. Territory is the space and it is in the Reality.
2. Map - place. The map is an alphabetised space, namely it is a place.
3. Map - virtual. In short, the map is the Virtual, in terms of virtual heritage.
4. Musealized area - Metaterritory (non-territory).

Finally, what is a museum? A musealised area can be identified in the middle between map and territory, therefore it is a meta-territory.

The main features of a virtual museum are mentioned below:

- Multimedia-interactive.
- Multidisciplinary.
- Multisensorial.
- Multi-dimensional (geometry of the museum and of the linked information).
- Multi-temporal (museum evolution).
- Connective (in the sense of spatialised information).
- Dynamic (information changes through the time).
- Meta-context (the virtual space is an informative space aimed to multiply quality and quantity of information).
- De-territorialised (museum information is referenced within an informative space, out of a physical territory);
- Meta-alphabetised (digital learning through complex metapzors);
- Cognitive. As structure-system the virtual museum becomes a cognitive space, therefore it is increased of significances according to the context it creates, namely the totality of information and association it includes.
- Inter-connected (with other real and virtual environments).
- Narrative. It can show not only objects, but events or activities (Forte and Franzoni 1998).

In this interpretation of virtual museum the concept of virtual heritage can be identified: virtual heritage is the perceived heritage, an information coded by a cognitive, inclusive interactive action of learning. In this sense the virtual museum can be even seen as "virtual model of museum", open museum, digital emission of an exhibited place. This kind of virtual musealisation can embrace contexts, works or objects, disseminated through space and time in a non-territory, a map coded by the Virtual and not by the reality.

In our case, the Scrovegni Chapel Project represents a pilot case of "itinerary of the virtual", an attempt to describe a communicative interchange and cultural assimilation throughout a virtual exhibit (five installations) and a physical musealisation (two installations). Therefore, the museum dialectics evolves between real and virtual, with different degrees

of immersion and interaction. Musealising the virtual means to describe new spaces of composites geometries, or physical whether virtual; the physical interaction is with the environment, the virtual interaction is only within the multi-interactive space, making remote actions towards the context of digital information. That is what we see within the display systems is remote in comparison with the context of the digital information, but very close in comparison with the sensorial involvement: in this way we define the deterritorialisation of the space from real to virtual.

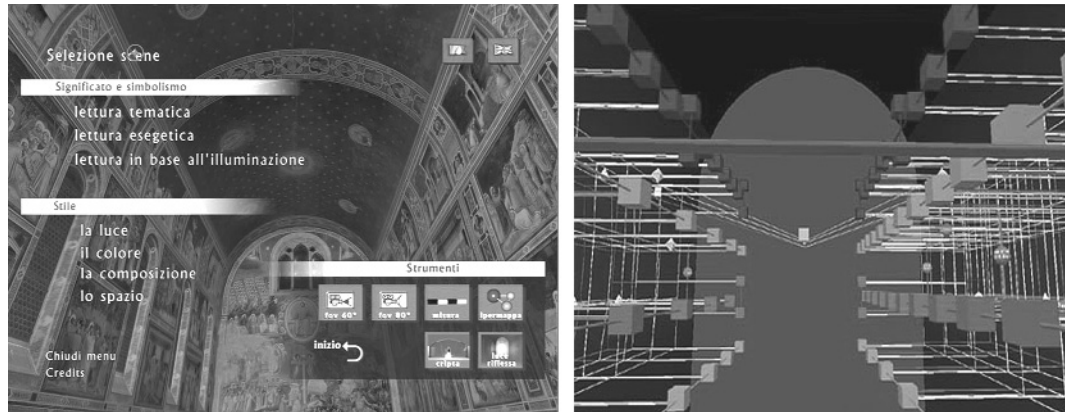


Figure 1 The Virtual Reality application. On the left: the main menu, on the right: the Cybermap

#### THE MULTIMEDIA ROOM

The Wiegand Multimedia Room is accessible to the public from the 25th of March 2003 ([www.cappelladegliscrovegni.it](http://www.cappelladegliscrovegni.it), [www.mlib.cnr.it/itabc/giotto](http://www.mlib.cnr.it/itabc/giotto)). It has been planned and realised as a 'cognitive space' for the visitors. In this space it's possible to interact in different ways with the paintings, the monument and the city, through seven installations that bring the visitors across passive learning and active interaction phases. The entertainment aspects have been considered, but always in connection with a more complex scientific approach. This approach, obtained by words, voices, images, sounds, 3D worlds, etc. was reached even thanks to the strenuous work of the team composed by art historians, topographers, architects, graphic artists, communication and IT experts. Even the staging of the room was thought to stress the historical, didactical and technological aspects. Hardware systems, together with Software applications and Content, were considered all part of the same world. The installations are thought as content keeper but also as physical part of the virtual museum, the multimedia room (Fig.2).

The Multimedia room is not just a sequence of computers and monitors. To complete the exhibition, a few real spaces were created, such as the reconstruction of St. Anne's house (Fig.2, left). This model, realized such as it is painted in the scene "Announcement to St. Anne", is particularly useful in order to complete the explanation on Giotto's architecture. Moreover it has been recreated even a model, an example of an artist's workshop, with tools and material, while panels are placed, in another area, to describe the painting of a scene, through its different work stages and the fresco technique.

## THE INSTALLATIONS

Apart the above mentioned installations, other five applications were realized, partly non-interactive, partly interactive, partly semi-immersive. The first Installation is an introductory DVD, a multivision that welcomes the public in the virtual museum (Fig.2, right). This is a non-interactive video, in five languages, realized with compositing techniques, using only graphic materials and 3d animations. The visitor feels to be involved in the story because it is made by Enrico Scrovegni himself, with his human vicissitude, his relation with Giotto, in a dramatic tone.



Figure 2 The Wiegand Multimedia Room

The second and third computers host two DVD interactive application, on Padua in the 14th Century and Everyday life, nature and architecture in Giotto's frescos (Fig.2, left). With these DVD applications the visitor can receive information on the context. These applications have been thought even to create a "space of experiences". In some cases, such in the multivision, this means that the visitor can use its own memories to find out a relation with passed history. The history of a monument and of its paintings can be explained, indeed, even in a narrative way, without losing any scientific precision.

Focus of the virtual museum is the virtual reality system located towards the end of the room (Fig.1-2): the starting interface of the application is the entrance into the chapel, where the user is free to navigate through the global 3D space. This spatial dimension represents the first level of detail. At the beginning of the navigation no themes are activated and no elements can be selected. For querying the scenes and for opening other types of contents it is necessary to visualize the main menu. The main menu is composed by two sections

(Fig.1, left). The first section can be defined VISIT (available for both levels of detail) and it is relative to the sequences of the virtual visit according to the available documentation and to the level of detail of visualization; the second section can be defined TOOLS and provides some typological interactions and utilities in order to interpret the space of the virtual chapel and the organization of the structured contents. Some of these tools have been just implemented, other ones will be added in a future development of the project. In the use of texture mapping we have provided for two levels of detail: a first intermediate level of detail for a comprehensive vision of the model and the scenes, and a second high level of detail where it is possible to appreciate every particular of each scene from a very near distance, simulating, in this way, a quality of visualization that is totally inaccessible during the real visit. For navigating through the model, the user can use the mouse (free rotation) and some keys of the keyboard (linear movements in all the directions).

## CONCLUSION

The Wiegand Multimedia Room can be considered the first Italian Virtual Museum and one of the most important digital-virtual environments in Europe for the Cultural Heritage on the semantic level of the informative and communicational aspects. In the domain of the Virtual Heritage the risk is to enhance the amazing aesthetic features despite the informative/narrative feedback and cognition within the virtual worlds. How much information

can I get from a virtual system? How does it communicate? How can we process this kind of interactive information? The importance of the virtual reality systems in the applications of cultural heritage should be oriented towards the capacity to change ways and approaches of learning. The Virtual communicates, the user learns and creates new information. Typically we define a linear learning, tools and actions, such as books, audio guides, catalogues and so on (in this case the communication is a linear sequence), and reticular learning VR systems where the user is immersed within reticules of information and visual data.

Psychological and cognitive learning in the museum cultural exhibition can be interpreted as the principle of communicating vases: the communicative flow of information crosses the museum's territory and the user's territory. The relations between Virtual and psychological reactions (action/reaction) are the basis of any cognitive processing: a good impact corresponds to a good memory, a good memory very probably will be a good tale. In a museum exhibition, for instance, in order to interpret an object, we compare old mental "maps"

with our newer "maps": this mutual interaction can create an aesthetics of the fruition, a new context.

In this project we have embraced the philosophy of the ecological thinking for the Virtual reality applications, interpreting the virtual worlds such as ecosystems. According to this cybernetic approach, we consider these basic concepts in the virtual reality: feedback or retroaction, circularity, redundancy of information, difference, hierarchical levels of information, map, connectivity, metaphors, context, narrative visuali-

ty, aesthetic of the fruition. "Complex systems are those that include large numbers of components interacting in nonlinear ways, often leading to unexpected behaviour. Complexity sciences explore how parts are related to wholes, describing the interactions between environment, system, and observer. In common language one is reminded of the saying that 'the whole is greater than the sum of its parts.' Understanding art as a language, the historical development of art, and the creative process itself are all key areas in which art and complex systems have a common ground" (Levy and Galanter 2002).

#### REFERENCES

ARNHEIM, R., 1969. Visual Thinking. University of California Press.

BATESON, G., 1973. Steps to an Ecology of Mind. Paladin Books.

BOWEN LOFTIN, R., 2002. Psychophysical Effects of Immersive Virtual Reality. In Proceedings of the IEEE Virtual Reality Conference 2002:145-148.

FORTE, M., 2000. About virtual archaeology: disorders, cognitive interactions and virtuality In Barcelo, J., Forte, M. and Sanders, D., 2000 (eds.), Virtual reality in archaeology, ArchoPress, Oxford (BAR Int. Ser. S 843):247-263.

FORTE and FRANZONI, 1998. I musei virtuali - Comunicazione e metafore. In Sistemi Intelligenti.

FORTE, M., PIETRONI, E. and RUFA, C., 2002. Musealising the Virtual: the Virtual reality Project of the Scrovegni Chapel of Padua. In VSMM 2002, Proceedings of the Eighth International Conference on Virtual Systems and Multimedia, "Creative and digital culture", Gyeongju, Korea, 25-27 September 2002:43-52.

FORTE, M., PIETRONI, E., RUFA, C., BIZZARRO, A., TILIA, A. and TILIA, S., 2001. DVR Pompei Project: Reconstructions of Archaeological Contexts in Desktop-OpenGL Environments. In Thwaites, H. and Addison, L. (eds.), VSMM 2001. Proceedings of the Seventh International Conference on Virtual Systems and Multimedia. Enhanced Realities: Augmented and Unplugged, 25-27 October 2001:77-85.

GREGORY, R.L. Eye and Brain: The Psychology of Seeing. Princeton University Press.

LEVY, P., 1997. Becoming Virtual: Reality in the Digital Age. Plenum, New York.