COMPARISON BETWEEN VIRTUAL MUSEUMS

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Abstract

Drawing a taxonomy of virtual museum, that can fit to represent all the known cases of virtual museum in the last years, I tried to try my meta-model of classification in two very different examples of virtual museums, to prove the validity of my taxonomical meta-model.

Keywords

Virtual museum, Museum studies, Digital humanities

In this paper is presented an experiment with the ambitious goal of proving the theories that I explained in my book about a taxonomy of virtual museums (Caraceni, 2012), and later on a wider work that will be published soon and had a peer review by AVICOM italian members, museum experts and academic, in order to find out real and tangible similarity between the 6 categories of virtual museums (Caraceni, 2014). The taxonomy as explained in my previous and for now unabridged work includes very different types of virtual museum in a single category. This experiment to prove this taxonomy, because if the definition of virtual museum that is given in 2012 (Caraceni, 2012) works and the consequent taxonomy is allowed to include very different types of different museums, proving that those different examples are comparable, then it can be said to work.

This comparison may seem strange: comparing a virtual theatre and a website. It seems something like comparing apples with oranges (Sandford, 1995: 1) but given the nature of my research work up to now, this is not the case. The Genus Bononiae virtual theatre and MuseoTorino are both virtual museums, and the costs of both museums are comparable and similar. The concept of virtual museums covers so many different experiments that most (if not all) of the experiments conducted up to now are covered.

Tab. 1: Genus Bononiae Virtual Theatre

Need	EXHIBITION
Category	Projection inside a museum gallery
Technology	3D projection
Content	Digital 3D movies, dolby surround sound
Virtual/real	Virtual with virtual
Visitors experience	Passive watching film, sitting

Tab. 2: MuseoTorino

Need	Experimention/complex museum identities
Category	Interactive browsing and interaction with objects
Technology	Web technologies, geo-referenced information
Content	Digital movies, texts audio (spoken words, music), geo-referenced material
Virtual/real	Virtual with real
Visitors experience	Interactive retrieving information, browsing the timeline and exploring the map

The comparison between those two examples was undertaken because one, the Genus Bononiae 3D theatre is a very 'old-fashioned' conception of a virtual museum, consisting in a 3D cinema, for passive consumption, that is defined as a Category C virtual museum (Caraceni, 2014). This is also an example of the 'borderline' field of my taxonomy, as explained in the methodological explanation of the studies on fuzzy logic and complexity theory (Hofstadter, 1979: 1985). This room in the Museum of the History of Bologna consists of a non-interactive, closed, spatially and interactively, 3D film about the history of Bologna in Etruscan times.

The film tells the story of 'Apa the Etruscan', the cartoon made by Cineca for the Museum of the History of Bologna Genus Bononiae, winning the award for best short feature in the audiovisual section of the International Audiovisual Festival in Museums and Cultural Heritage – International Audiovisual Festival on Museums and Heritage – FIAMP of AVICOM in 2012. Apa has already won other international awards: at Siggraph Asia 2011 in Hong Kong, in the Multimedia section Posters, and was ranked in first place at the event eContentAward Italy 2011 as the best product in the category Italian eCulture and Heritage. On the same occasion it also received a special mention for the eLearning and Education section.

This 3D stereoscopic cartoon made for Cineca Genus Bononiae tells the story of the city, combining great philological rigour with cutting-edge innovative technologies and was produced entirely using computer graphics by most powerful supercomputer in Italy at Cineca[1].

This example will fit in the category for enhancing museum education, because it is a closed pattern in a closed space, with no way for interaction. However, as it is located in a museum gallery and is projected by a 3D projector in a real virtual theatre, even without using all the interactive features of a 3D interactive virtual theatre, it will fit in the category devoted to virtual museums enhancing museum exhibits. It is disturbing to note that the commissioning of this virtual theatre inside the Genus Bononiae museum was the same as that of the University of Bologna's Museum of the IX Centenary, where the former Rector Fabio Roversi Monaco and the former President of the Carisbo Foundation, now President of Genus Bononiae Museums, both asked for something stunning, wonderful and amazing in 'their' museums.

This gallery in Genus Bononiae and the MuseoTorino represent more advanced examples of virtual museums introducing refined patterns of interactivity with heritage and **users**. Even though they are contemporary in their realization, they are located at the extremes of a line of interactivity (Genus Bononiae virtual theatre – passive; MuseoTorino – interactive), in a very different type of medium (Genus Bononiae – presential 3D cinema, MuseoTorino – the website).

Consumption of contents in virtual theatre is passive; in MuseoTorino it is active, as two very different types of media: cinema and the web. Given the fact that they are both based on two media (McLuhan, 1967; DeFleur, 1989; Flichy, 1991). In addition to this, both examples are part of a wider museum: the Genus Bononiae's virtual

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[1] In the new Museum of the City of Bologna (http://www.genusbononiae.it), in an immersion room ready for 3D stereo movies designed ad hoc by Cineca (http://www.cineca.it), the public will encounter a unique experience halfway through their visit: a journey through time, a sort of Big Bang of Bolognese history, 2700 years in just 14 minutes. This visit will be led by a friendly 3D character: the Etruscan APA, whose name means 'father'. … It is the first 3D Blender-made stereo movie with high historical standards applied to an entire city with four different geo-referenced scenarios and six historical periods: Etruscan, Roman, Renaissance, XVII and XVIII century and the present day. The methodology developed for this realization, focused on open source and an inter-disciplinary framework, has been of great help in this endeavour and will be the main point of this presentation. (Guidazzoli, 2011: 1). As for the 3D movie shown at the Virtual Theatre, CINECA in the person of Antonella Guidazzoli, Team Leader, and: «the experience of modelling a philological three-dimensional scenario (the Sala Bologna) as a set for a 3D stereo cartoon

movie in the Cineca MDC ('Museo della Città', i.e. museum dedicated to the history of the city) cultural heritage project». In 2009-2011 Cineca was involved in the challenge of reconstructing three-dimensional historical scenarios to show Bologna in different ages as it probably was (the sets are philologically accurate). This movie will be part of the museum itinerary in `Palazzo Pepoli' and displayed in the immersion room especially designed by Cineca. The aim is to take advantage of computer-based visualization methods to deliver information (culture) minimizing cognitive overload. The choice of Open Source software made the production pipeline a case-study highlighting interesting features such as model reusability. Cineca MDC Project is a case study for V-MusT.Net. The modelling of the Sala Bologna is proposed as a significant example of the issues dealt with in this new production pipeline which actually faces a twofold challenge: include philological constraints inside a traditional 3D movie pipeline production and test the multi-disciplinary ability of three-dimensional reconstructions to support both communication and research activities. (Guidazzoli, 2011: 2)

theatre is a gallery in the building of the Museum of the City of Bologna dedicated to the history of Bologna in the time of the Etruscans. The MuseoTorino website is a part of MuseoTorino, consisting of the city of itself, a website, an app and an 'interpretation centre'.

What could be comparable in this case of a museum study is visitor experience. There is a broad literature on the evaluation of museums (Hooper Greenhill, 1999), mostly investigating the efforts of museums in the field of education (see i.e. the studies of Hooper-Greenhill) and there is a field of analysis within museum studies devoted to this. In my research I have found certain approaches using the observation of visitors inside a gallery very interesting (see i.e. Ciolfi, 2004) and also methods and software devoted to this mission, such as the *Miranda method*, developed by the Fitzcarrando Society[2]. However, given the important role of amusement, over educational roles and my personal interest in subjective methods of analysis, in this comparison are examined objective indicators of the museum experience inside a virtual theatre and a website; that is to say the length of the visit, and the space that was 'covered' in both the examples, in a similar way to other museum evaluation tools that are not based on the impressions of visitors themselves. If a visitor spends an hour in a gallery, looking at a single picture and another visitor spends an hour in the same gallery, looking at all the objects on display, reading all the captions or taking a tour with the aid of a guide, then the goal of the museum to educate, but also to surprise, enjoy and entertain visitors can be said to have been performed (Silverstone, 1992).

So, in this comparison between the Genus Bononiae virtual theatre and the MuseoTorino website the experience of the visitors inside those two virtual museums is the focus, as obtained by objective indicators as the time spent and the 'space' covered inside the two galleries. The purposes or results of this space and time journey inside the museum are not *objectively* measurable at all.

Genus Bononiae Museum is unique in the world due to its virtual theatre, a singular example for the study of the relationship between a tangible museum, perhaps even a diffuse museum that describes itself as "*a cultural,*

artistic and museum itinerary running through buildings in the historical centre of Bologna"[3] that have been renovated and rehabilitated for public use, and the most ambitious and rare example of virtual reality: the virtual theatre.

The experiment consisted at first in carrying out a survey of the visitors of the Genus Bononiae Museum, their number and the length of their stay inside the exhibition, comparing that survey with the statistics from the MuseoTorino website[4].

Given my theory that the museum is a medium that has space as its channel (Caraceni, 2014), I wanted to find out how many of the visitors to the museum physically enter the virtual theatre, and whether they stay to see the whole film. This experiment is made whithout using the approach of surveys that try to get impressions from visitors, as Antinucci's survey at the Vatican Museums in Rome is also of interest here (Antinucci 2004). Antinucci in fact proved in a survey taken for a huge sample of visitors leaving the Vatican Museums that people were often unable to recognize what paintings they have or have not seen, basing their knowledge on false memories or a general ignorance of the history of art. This research therefore concerned the physical occupation of the space, and it is considered the time spent inside the theatre as equivalent to a virtual 'walk around a gallery'.

The experiment at the Genus Bononiae Museum took 15 days, between 21 February and 6 March 2013, and involved all the visitors to the museum that also decided to visit the virtual theatre, 799 in total. Given my assumption that they all had to follow the 'corridor', because space is the channel of the museum, in this experiment it is measured the time that people spent in the virtual theatre, whether they stayed for the whole projection or if they left before the end[5]. This was very simple to measure, because as the 3D movie requires 3D glasses to be viewed, the ushers noted when the visitors returned the glasses. This is because the visitors can also enter, have a look and carry on, in the case that they did not feel like watching the whole film. It was not possible to

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[2] http://miranda.fitzcarraldo.it. Retrieved on 01-06-2014

[3] Official brochure of the Museum.
[4] Thanks to Massimo Negri, the Scientific Director of Genus Bononiae who gave the possibility to make the following recognition.
[5] This shift between space and time will be better explained as part of the conclusions.

count all the visitors who passed the virtual museum and decided not to enter. This fact will become important further on.

Space and time are dimensions, and for me the shift between space and time is possible. Space and time can be compared because new scientific (philosophy and physics) theories are going in the direction of considering space and time as a continuum (Barbour, 2000; Hawking and Penrose, 2010; Barrow, 2010; Lachièze Rey, 2006). So looking at the data that I have presented it is possible to make a switch and consider the time spent in MuseoTorino, instead of space, also taking into consideration data traffic; this provides us with data on the quantity of information absorbed from the virtual museum. Further analysis about the 'space', or cyberspace covered in the time at the MuseoTorino will be discussed below. Here are the data for access to the virtual theatre at Genus Bononiae over 15 days.

Tab. 3: Access to the virtual theatre at Genus Bononiae

DAY	Visitors to the Theatre	Total of visitors at the museum	Time spent in the theatre
Thursday 21 feb	21	95	13 minutes
Friday 22 feb	23	59	13 minutes
Saturday 23 feb	62	154	14 minutes
Sunday 24 feb	73	113	13 minutes
Monday 25 feb			
Tuesday 26 feb	70	87	13 minutes
Wednesday 27 feb	85	138	13 minutes
Thursday 28 feb	66	128	13 minutes
Friday 01 mar	38	49	13 minutes
Saturday 02 mar	122	229	13 minutes
Sunday 03 mar	110	174	13 minutes
Monday 04 mar			
Tuesday 05 mar	32	55	13 minutes
Wednesday 06 mar	97	66	13 minutes

For MuseoTorino they were consulted the statistics from the website, for the Museum of the City of Turin as well as the city of Turin itself. At first I looked at the data from one year of the history of the website.

At first for the comparison was filtered the year's 157,349 visitors who had an average visit greater than 2 minutes. This is because the average visit is between 2.47 and 2.31 minutes during the museum's opening time; there may be visitors who are searching for other kinds of information than visiting MuseoTorino itself, also taking Schaller's comments into consideration (Schaller, 2002) on the average time in visiting virtual museum educational resources. However, another parameter could be applied here: the total K that the website traffic generates. This means the space, or cyberspace, that the visitor 'walks through', without involving the concept of time spent on the page. But here I must also consider that for a website, these two 'facts': time spent on a page and data traffic is deceptive - one browser may stay for an hour on one page, really paying close attention to it. And it is this important shift between space and time that can be better explained. In the example above, a visitor can spend one hour in a gallery, contemplating a painting, enjoying the wonder of the artwork in all its detail. From the data from MuseoTorino that is examined, a visitor opening a page of a digital object and contemplating the details, enjoying the wonder of the object cannot be measured. Even in a tangible museum a person can go and sit in front of a painting and read a newspaper, but in this case the observer or the person performing the survey can have a perception of what is happening and change the result of the study for that case. There is also the issue of the speed of the visit, as invoked by Dean by dividing the visitors to a museum in three categories: "*people who rush*", "*people who stroll*", and "*people who study*" (Dean, 1994: 25-26). However in this work, and due to the nature of Google Analytics, it is impossible to know whether visitors that spend more time in MuseoTorino are really browsing and reading/observing the web pages, or if they are doing something else. Other visitors may tour the whole website, even downloading it in a cache, without paying any attention whatsoever, or there may be a bot (such as search engine bots) that makes statistics. As Antinucci noted (2004) there are several ways to explore museum

galleries, and running around the galleries is a quite different experience from walking slowly, reading all the captions, taking time for wonder and learning.

The indicators 'cyberspace' and 'cybertime' spent in a website of a virtual museum from statistical tools are deceptive, but they are the most common data used to evaluate whether a website works for the its stated aim; given the fact that the statistical programme used by MuseoTorino (Google Analytics) does not provide data traffic of data, only page views and time spent on the website during the visit, it was decided to opt for time, according to the data from the observation of the Genus Bononiae virtual theatre.

Making the comparisons, the Genus Bononiae virtual theatre has an average of 66 visitors a day. It is also important to note that, in addition to the entrance fee to the museum, visitors wishing to enter in the virtual theatre must pay an additional 10 Euros.

The average data for MuseoTorino is more difficult to process, because the only data that the institution were able to provide were Google Analytics for the website[6]. Many visitors reach only the first page: this is the same as saying that a person arrives at the entrance of a museum and decides not to enter. It was not possible to count all the people that pass in front of the Genus Bononiae Museum and decide not to enter. Also because a website can be accessed from anywhere, it is much more difficult for someone to decide to go to Genus Bononiae in order to enter the museum and then decide not to do so. This lies in people's intentions and is therefore not measurable. However it was possible to have the data of all the visitors to Genus Bononiae museum, including those who decided not to enter the virtual theatre (and not to pay the additional fee).

As for the virtual theatre, where is examined the amount of visitors taking a look inside the theatre and passing by without deciding to enter, the data is compared with that from the MuseoTorino website, without measuring home page visits and visits viewing less than 2 pages, because this is similar to a visitor passing the virtual theatre without entering. The section of the website that is the museum itself not including the home page was most relevant.

In this case we have a direct comparison between the 7,524 persons that viewed only one page of MuseoTorino in 15 days, and the 54 visitors to Genus Bononiae that decided not to enter the virtual theatre. Both figures are very different, and stress the potentiality of global participation that the web has introduced in our lives and in the field of study of virtual museums.

However, this comparison is not 'real', so it was decided to skip all the data for MuseoTorino indicating that a visitor has accessed less than 5 pages, so MuseoTorino visitors (also for one page) in the period of observation stand at 1,549, around 103 per day. If we take as a comparison the time spent in the virtual theatre (all visitors have seen the whole movie), and we compare this data with the visitors that viewed more than 20 pages in MuseoTorino, 424, we have for MuseoTorino an average of 28 'actual' visitors per day. Comparing this number with the frequency and duration of the visit, we can discern a difference between an 'occasional' visitor, someone who takes a look and then leaves the page, and an 'actual' visitor.

Due to the fact that visitors to Genus Bononiae and MuseoTorino visit the museums in such different ways, it is necessary to make a comparison of numbers, and to do so it is necessary to skip all the people at MuseoTorino who have spent less than 600 seconds on the website, starting the comparison of MuseoTorino and Genus Bononiae only with those persons that spent more than 601 seconds at MuseoTorino. In this way the average figures are 66 for Genus Bononiae and 48 for MuseoTorino. Those two numbers, given the total amount of visitors to both museums, are both similar and substantially comparable, making for the same results, meaning that the taxonomy of six categories of virtual museums (Caraceni, 2012, 2014) show similar examples of the same phenomenon: virtual museums, considered in their diversity, such as the examples I gave as categorized as different manifestations of a same whole.

What is important to note in the comparison between Genus Bononiae and MuseoTorino for me are not the figures, but the shifts between space and time, as the channels (what interests me is the fact that they are objective and measurable channels) of the virtual museum as a medium: time can be understood as the time passed inside the interactive gallery or in browsing a website. This variable must be compared in some way to space: the space covered in the interactive gallery, or quantity of K, of data traffic, generated by the website. These two indicators are highly similar to other ways of evaluating museums, in a wider field of analysis that also involves active observation of visitors in museums. Whit this work it is intended to provide museum professionals with basic tools for the analysis of virtual museum websites, similar to Google Analytics, in addiction to the aforementioned studies on the evaluation of visitor experience inside virtual museums, conducted highly scientifically. Many were generated by a precise profile action of visitors for the interactive resource through a survey.

The situation of museums in approaching different ways to communicate heritage as a museum professional is in some cases critical: there is a generalized lack of funding and museum professionals' awareness of technology is often lacking. Or there may be many situations where the awareness is there, but lack of funding means that a serious evaluation study of visitor experience in the virtual museum must be postponed to an unspecified date. This comparison aims to provide a fast, simple but structured analytical base for museum professional to evaluate the efforts of virtual museums, whether this consists of a website, a learning resource, an interactive gallery, an example of my categorization as a base for more detailed studies.

This comparison, proving the validity of my taxonomy, may generate further studies: on the validity of my meta-model, but also as a realistic and practicable way for museum professionals to evaluate the impact of virtual museums at this critical historical moment.

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