

INTRODUCTION

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In the last two decades the exponential production of CGI (Computer Graphic Imagery) in archaeological and historical visualizations for the public has reached a point where computer-based visualization has become an integral part of archaeological and cultural heritage representations. On a commercial level, historical blockbuster films and realistic video games are shaping our perception of the past. This could be because the aesthetic and visual language used by fiction has become more effective and believable than scientific publications or documentaries (Daverio, 2013). A lot of scientific TV programs and documentaries have long adopted different cinematic styles as a way of communicating with the public becoming a true new genre to be watched also at the cinema. In 2013 documentaries accounted for a good percentage of the Cannes Film festival.¹

It can be said that nowadays the objective of this productions is not only to recount the facts but also to involve the audience and to propose an emotional experience such as in fiction. This is often achieved, as in fiction, by trying to make the viewer emotionally connected with a character (Alderson, s.d.) or by deeply engaging with a digitally rebuilt historical place.

On the other side contemporary aesthetics in digital communication of archaeological and historical researches are sometimes trying to achieve the same goal in order to engage more with the public. However, the lack the cinematic qualities compared to any blockbuster titles is still quite evident when presenting the final product. This happens because the work of a researcher that learns how to operate the visualization tools cannot replace the one of a CG (Computer Graphics) production company professional, specialized for such a task. Even if some excellent cinematic examples of archaeological virtual reconstructions have been produced (see for example the work of Eduardo Barragán² and also the latest work of our author Carlos Carpetudo³), in general the DIY philosophy does not always succeed for various reasons: such as the presence of a hard learning steeping curve when using 3D programs, the lack of understanding of special communication languages and other type of intrinsic cinematic properties (Schiaivottiello, 2016). This is leading to the perpetuation of an entanglement between Virtual Archaeology and CGI in digital heritage communication. We certainly agree with Benicho when he argues that: *'virtual reconstruction that include a large number of elements that have not been verified either archaeologically or historically cannot be considered as virtual archaeology, but rather as historical narrative, in other words, a genre in which reality and fiction become blurred, in which*

it impossible for the viewer or the public to distinguish between the two. The same thing occurs between history book and historical novels or between documentaries and filmed based on historical facts.' (Benicho, 2013, p. 270)

Nonetheless, besides scientific research based on 3D documentation, virtual reconstruction, 3D digitization, virtual anastylosis and in general digital scientific visualization, CGI has become a fundamental tool in the formulation of cultural heritage's facts divulged through narratives to be enjoyed by the public.

Drawing from Benicho, but taking our argument forward, we argue it is important that CGI in cultural heritage, though deeply rooted on Virtual Archaeology, should be addressed for the public as a different part of the production of Cultural Heritage knowledge, oriented to communicating a narrative that is non-the-less scientific.

On one side archaeological research needs to feed from the public appreciation of visual hypotheses of each presented project, while on the other, the public is often looking for an emotional experience when attending an exhibition, visiting a museum and, with recent mobile augmented reality technologies, looking at an archaeological site. CGI interpretation for the public can be considered a different beast from the apparently closely related scientific one. Whereas the former is still usually derived from the latter, we can argue that CGI in archaeological and heritage's visualization for the public should derive from the definition of heritage's interpretation, especially referring to the Tilden's vision (Tilden, 2007 [1957]).

On the semantic level, we need to reflect on how the story can reveal the specificities of the archaeological way of knowledge. So being archaeology a scientific and a humanistic discipline at the same time, the language or languages that are chosen, in order to promote such knowledge, should be encoded with a rigorous and transparent methodology but also in a simple and stimulating way. In turn the necessity is not only to validate the accuracy of the research data and the process to represent them, but also the accuracy of the storytelling and to present it in an appealing visual form to the final audience.

Although this process can result time consuming and expensive, if the aim is to create realistic representations, due to the relatively complex and closed nature of the used tools, the gap that divides real-time and rendered imagery is rapidly fading (Lebowitz *et al.*, 2011), eventually coming to a point where there will be virtually no quality differences between a 3D real-time environments and the rendered ones (see for example the work of Benoit Dereau⁴). This situation opens amazing possibilities because, within a 3D real-time environment, edibility is much easier than in post-production (in this sense we don't refer only to the use of complex video games engines, but to the use of a sandbox like editable

1. <http://www.economist.com/blogs/prospero/2013/08/rise-documentary-film>. Access date: 25/04/2016.

2. <http://italicaromana.blogspot.pt>. Access date: 21/02/2016.

3. <https://www.youtube.com/watch?v=TnBuJ1PM2TA>. Access date: 03/04/2016.

4. Benoit Dereau is an architectural visualization professional using the latest Unreal Engine 4 [<http://www.benoitdereau.com>. Access date: 22/03/2016].

real-time environment or easy architectural visualization tool such as LumenRT⁵ or Lumion⁶). In the area of 3D storytelling for education a very interesting tool is V-SIM⁷ which gives the possibility of virtual storytelling starting from real archaeological and historical resources. While archaeological practice can lead to new discoveries and therefore can furnish the basis for the reconstruction of an accurate or less accurate static 3D models, in order to describe these models to a broader audience we need to fill these 'ghost-like' environments with historical events. The form that we use in order to tell the story can highly influence the final product and its message. Historical facts can be transmitted in various forms. However, it is mostly the level of engagement with the public and its emotional side that determines the success of such a communication. Recently, with the advent of hyper-realistic 3D graphic environments and characters, not only in films and TV drama series but especially in more interactive form of media such as video games, we are rediscovering a new way of telling our history, mainly to the young audience. We can argue that these methods are effective for a particular audience. We can also compare interactivity with more linear form of storytelling, although games engage in a form of interactivity where one is compelled *to play* in order to interact. Historical video games are probably as old as video games themselves, showing how this formula (history + game) successfully propagates from generation to generation and demonstrating also how graphic realism is not the only key issue for the success of this genre. In this context we can certainly reference the work of Filipe Penicheiro which in an interview available online⁸ explained how video games have an important relevance in the field of education, and more specifically in teaching history. He states in his article that the '*educational value of games is not a secondary product of their ludic dimension but rather there is a confluence between the construction of scientific models that can simulate the construction of society.*' (Carvalho and Penicheiro, 2009). The told stories, in this case, are intended as both hypothetical and factual. The focus here is not only on the scientific validity of the initial raw data and their scientific interpretation, but especially on the methodology used when communicating the final story, or different stories, to the public and how the public has perceived them. In contrast, we can discuss the 3D modelling and the acquisition processes not only as simple documentation techniques, but also as a research tool in order to exploit a specific studied site or artefact. Doing so, we tried to understand if it is possible to communicate in an easy and engaging visual form the scientific, archaeological and historical discoveries and the processes that formulate the hypothesis. Drawn from these conclusions we delineate the main topics of the discussion and the critical approach that we should always maintain when using CGI for the reconstruction of our past.

5. <http://www.lumenrt.com>. Access date: 21/03/2016.

6. <https://lumion3d.com>. Access date: 21/03/2016.

7. <https://idre.ucla.edu/research/active-research/vsim>. Access date: 25/03/2016.

8. http://www.uc.pt/noticias/07_NL_2010/nUC01_072010. Access date: 25/03/2016.

THEORETICAL REVIEW

We opened our session with Ricardo Dias (researcher of the Faculdade de Letras of the University of Porto, Department of Heritage Science and Technology), who gave us an introductory talk showing the different languages and techniques of the CGI, digital reconstruction and their validity when used in the cultural heritage material context. After reviewing the different techniques spanning from the earlier 1970's up to contemporaneity, he presented a case study showing different methodologies and tools used for both: the study and the conservation of material cultural, with those used for the cinematography and video games industry. This inside review permitted to find the basis for a confrontation on the decoding of how cultural heritage digital representation and communication has evolved alongside its techniques. Initially, Ricardo defined the meaning of the word CGI and most importantly the areas in which this technique is applied. In this case we can say that the possibilities are many within the visual communication paradigm such as '*arts, films, television programs, videos, etc...*'. He then moves to some of the most emblematic examples, related to heritage, within the film and video games industry such as *Gladiator* and the *Assassin's Creed* series. He asserts that during the production stage a team of historians and researchers was consulted.

Although the concept of digital reconstruction starts only in the 21st century, he cites Albrecht Meydenbaue, a pioneer from the previous century, who for the first time explored photography as a mean of documentation for monuments that were damaged; this was a 2D technique that he used it in order to project a possible reconstruction.

In this sense the different between digital heritage reconstruction and CGI according to Ricardo '*is the form in which we present the data, throughout specific storytelling and utilizing as matrix for the graphical component*'. He then presented an example of his major work (Dias, 2014) which was the reconstruction of two Portuguese castles depicted in the *Livro das Fortalezas* [Book of Fortresses] of Duarte de Armas (Dias, ed., 2016), a book that contains the drawings and descriptions of almost all the castles at the borders of Portugal in 1509-1510. After showing his reconstruction methodology and workflow of the latter he resumes his intervention with some important final points. One is that CGI is just a tool to reach an objective and is not restricted to the film industry, since nowadays video games are quite affordable and its learning is more understandable. Second, we should not state that CGI is something that presents scientific information because it is up to each researcher to determine it. And, finally, we should always rely on the most innovative graphic forms.

SCIENTIFIC INTERPRETATION VS. INTERPRETATION FOR THE PUBLIC

We discussed the role of 3D virtual archaeology compared with CGI communication for the public and argued that, since the beginning of CGI in archaeological re-

construction and cultural heritage, the division has been almost absent (at least officially). In this sense, we questioned if the 3D models adopted for research could also be used for the final public. Carlos Carpetudo's paper faces the problem with his case study and draws the line

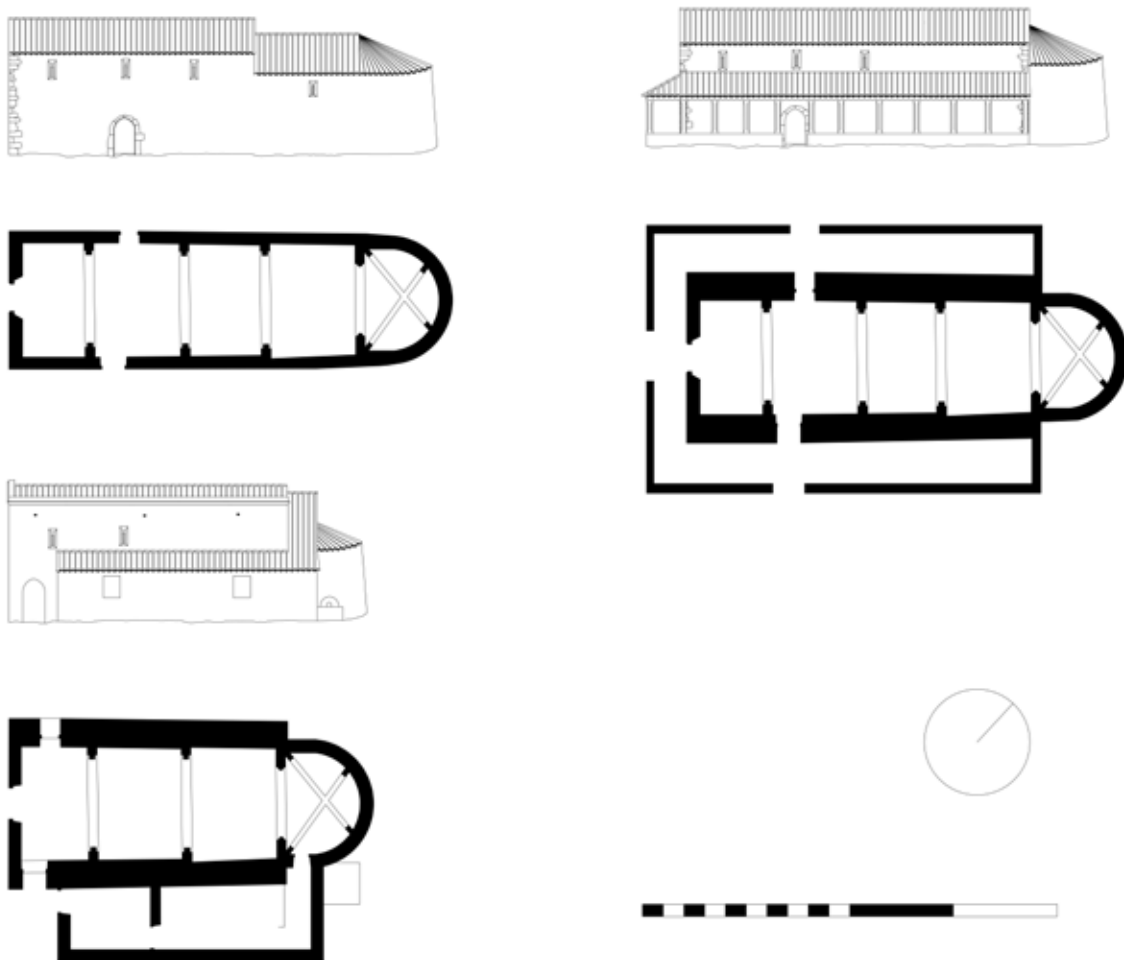
when 3D reconstruction and CGI imagery are used in a highly scientific environment. In the process of transmission of knowledge to the general public he does not forget the translation of his work in an appealing and attracting visual form.

SANTO ANDRÉ DO OUTEIRO HERMITAGE CHURCH: AN EXAMPLE OF VIRTUAL ARCHAEOLOGY TO PROMOTE PUBLIC ARCHAEOLOGY

CARLOS CARPETUDO



1. Current state of the ruin of the hermitage church of Santo André do Outeiro.



2. Santo André do Outeiro hermitage church construction phases as identified by Gonçalo Lopes: upper left – the 1st phase corresponding to the late 13th century - early 14th century; upper right – the 2nd phase corresponding to the late medieval period; lower left – the 4th phase corresponding to the 1st quarter of the 17th century.