ON PHYGITAL REPRODUCTIONS
NEW EXPERIENTIAL APPROACHES FOR CULTURAL HERITAGE

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PHYGITAL HERITAGE
DIGITAL COPY
DIGITAL ENVIRONMENTS
MUSEUMS

The essay offers an opportunity for reflection on some topical issues based on a critical analysis of the different interactions between Digital and Cultural Heritage. Firstly, we discuss some possible actions which will aid in improving storytelling through a blending of the material and digital, also known as Phygital Heritage experiences. The second theme discusses the advisability of using new technologies more effectively to receive data and not just provide it, in order to make museum spaces and installations more interactive. Finally, the quality and the value of digital copying is commented upon through the thoughts of authoritative scholars, and also through the description of some experiments which were aimed at merging science and humanities, art and technology.

FOREWORD

I have been working in the digital field for about 15 years, devoting particular attention to the construction of 3D models for architecture through the use of BIM approaches that allow the integration of data and geometries within digital environments mainly used in the design field. However, in the last five years I have been working on understanding the process of the creation of interactions between the real world and the virtual one, while also working on the possibility of memorizing information derived from the recording of construction site data and bringing it back into the digital environment for greater process efficiency (Lo Turco & Bocconcino, 2017). At about the same time, perhaps due to taking up employment at the School of Architecture of the Politecnico di Torino, the attention towards Cultural Heritage has grown, from which I have derived research experience aimed at redefining the undeniable benefits, previously summarized in a context which is more complex and better-articulated. However, I would rather focus on the most recent research published concerning the use of museums, with particular regard to research which refers to the relationship between the physical object and its (complementary) digital representation: by blending together the digital skill of cultural learning, entertainment and storytelling with heritage artefacts, activity or environment, heritage constitutes a very interesting field which can give meaning to new and dynamic digital experiences (Nofal et al., 2017).

CULTURE & DIGITAL STRATEGIES

As Ch'ng states, the value of material culture is based on both its physical and immaterial values. These include the aesthetics and authenticity of the object and its condition and quality, along with the intangible values associated with the artefact, such as its symbolism and origin and the histori-

cal development: these characteristics and events contribute to the uniqueness of the object (Ch'ng, 2019).

In accordance with the recent trends which have been moving towards the democratization of culture, we have a general aim of making heritage information more accessible to an ever-widening public audience. And how can we achieve this without the contribution of digital technologies? With regard to the contributions of digital technology to material culture, Antonio Lampis reminds us of the European Union's decision to launch the European Year of Heritage 2018. The work contains a strong reference to the need for a stronger connection to be developed between artistic heritage and the younger generations: the new generations are endowed with great visual skills, body movement skills, rapid reasoning and strategy, all of which is often connected to and developed through the use of video games (Lampis, 2017). These are habits which contribute to the elaboration of cognitive processes and organization of knowledge and perceptive mechanisms, which were completely unknown to the previous generations. These processes are, however, a source of great opportunities for understanding the symbols of the artistic heritage, and must be taken into consideration in order to overcome the static nature of some museum itineraries: some of which are not equipped with multimedia support and are therefore incapable of attracting the involvement of this section of the public (Ferri, 2011). In what ways and contexts can digital strategies (and the products derived from it) be effectively used?

Today, we are fully "immersed" (never was the term so apt!) within the much praised digital revolution that has already transformed our cognitive approaches and the ways in which we work. The use of photogrammetry and 3D modelling has become increasingly accessible, and digital communication allows us to create virtual work environments in which researchers from all over the world can work together and compare their data. It is clear that the new visualization techniques that characterize many digital acquisition proj-

ects, from high-resolution 3D scans to the use of drones, and the subsequent transformation of these new data sets into real objects presented on interactive screens or as 3D prints, allow much more than just enabling us to "see" ancient works in more detail. These tools have become part of a broader policy of "seeing" which is of considerable interest not only for disclosure, but also for dissemination and research.

In this regard, museums must provide new solutions for how technology can truly support new and collaborative forms of interaction.

Today, therefore, it is possible to reconstruct objects in both virtual and material forms. It should be noted that the "technical reproducibility of the work of art", as described by Walter Benjamin and which has now been widely investigated, has reached a level of true excellence: the reproduced artefacts can no longer be considered simple "faithful copies" of the original but representations of "identical originals" from time to time. However, as Ch'ng himself points out, when digitized, the authenticity and value of the copy of the original appears to be lost, for the copy can now be edited, reproduced and distributed at little cost. The Manichean position of the original at any cost is no longer valid: if you want to understand and read the past, you must accept the importance and value of the copy. This will be discussed further in the following paragraphs.

Considering the artefact as a mere historical document or as a surviving witness of a distant and disappeared world does not do full justice to its value. With regards to reconstructing the biography of an artefact displayed or stored in a museum, one cannot overlook the value of the archives that document the history of its acquisition in an antique market or of its archaeological discovery. And it is precisely their direct relationship between different information systems that, if properly digitized and classified, could undoubtedly lead to it gaining added value.

Each object contains in itself a multitude of information, some of which is more hidden, that can be revealed and told

through a complementary narrative structure that draws heavily on digital technology and that allows one to find the answers to a whole series of questions that look at the history of the object itself. In the following paragraphs, we propose three different themes which, although apparently unrelated, are connected by the tension of identifying new experimental approaches for promoting and better understanding Cultural Heritage.

ISSUE N.1. FROM PHYGITAL RETAIL TO PHYGITAL HERITAGE

The term Phygital is a neologism that can take on different meanings. In a more humanistic sense, it can be used to indicate a generation of people for whom the real world and the digital world overlap. In a more technical context, it is used to define the interconnection between the physical and digital layers that increase the meaning and value of the original object.

Many case studies have been focused on the field of retail: large companies are at the forefront of finding ways to enhance customer experience through ensuring immersive involvement, stimulating various senses, offering useful content and arousing strong emotions in the customer. The virtual dimension becomes increasingly involved in every moment of the purchasing process: from web marketing, to the immediate availability on the web of information and product reviews and to the integration of digital technologies in physical stores. But as it often happens, some considerations, processes and activities designed for the commercial field can be usefully declined in the field of Cultural Heritage. If instead of products, you think of museum collections and instead of shops, you think about the exhibition rooms that contain them, the difference is minor. On the other hand, it would not be the first time that a cross-fertilisation of knowledge and experience is witnessed: for example, like the relationship between applications used to create cinematic ef-

fects and video animations used in the more popular field. There is an equally close relationship between the real-time rendering engines of video games and those used to make the animations, used to set up increasingly photorealistic navigable scenarios. In recent times, the connection between architecture and the videogame environment is even closer, as well as that between gamification and Cultural Heritage.

To summarize, we can say that every time a physical object is connected to a digital platform to become a carrier of information in relation to which actions and experiences are triggered, we are in the field of the phygital.

In this regard, we must mention a very interesting contribution by Eslam Nofal, published in his PhD thesis, which describes in detail the most relevant qualities that a digital medium can include: providing access to a rich and vast form of information / personalization of information; information immersion / psycanalization / situatedness The abovementioned characteristics have been combined within a proposed "phygital heritage" model, mapped along two axes: the physical affordance of information and the level of how this information is communicated (Nofal et al., 2017). Beyond technicalities, in order to maximize the effect it is appropriate to know how perceptive mechanisms work; for this reason, some considerations relating to the relationship between neuroscience and museum institutions are summarized below.

ISSUE N. 2. HUMAN BEHAVIOUR: NEUROSCIENCE & MUSEUMS

For about ten years now, new technologies have been used in museum design and exhibitions to make a decisive contribution towards promoting knowledge and culture.

New digital visualization processes are expanding the ability of museums to define new experiences of the perception of cultural heritage. In the book Museum Object Lesson

for the Digital Age, the author argues for the need to include the proliferation of digital projects in museums in a broader historical context (Geismar, 2018), thus opening up new possibilities for understanding the collections. As mentioned above, in addition to 3D scans and prints, there are also applications of virtual and augmented reality available; machine learning and artificial intelligence experiments are working in parallel to bring alternative educational scenarios into the sphere of museum collections, changing our understanding of what could actually be learnt from the collections.

From the analyses of some experiences conducted by fellow pedagogues with whom we share the cultural project of the magazine, we have found that the technologies of VR and AR can have a fundamental role in the enhancement of a second heritage: knowledge, reworking and participation (Panciroli & Macauda, 2017).

With reference to the experiences of Phygital Retail as described above, it is interesting to remember that through the use of integrated technological systems, it is possible to acquire enormous amounts of data (big data) concerning the use of stores by customers: including the time spent in the various sectors, products that attract more attention, products that are sold in higher numbers. Regarding a possible application in the context of Phygital Heritage, it can be observed that the exhibits collected in museum spaces are characterized by formal values and "less measurable" values: the latter are attributes that are generated over time and derive mainly from the historical, artistic, social and media that have characterized the exhibits, which are informal properties as important as the formal values of the work. The relationship between these values can help to create an attractive impact for the work of art within the exhibition project and therefore become the subject of analysis for a correct prefiguration of visitor flows. We are looking for automated procedures with which to show, through graphic representations, the complex phenomena triggered by the attractive weight of the works on display. The elements that come into

play here are the space (the graphic field), the collection (the attractive elements) and the users. The procedure devised, once automated, can become a product which can support the fitter to control the design of the fitting-out and possibly make it more efficient as compared to the quality of the objects on display. This procedure can be validated through the real registration of the users' behaviour for ex-post analysis and for the verification of congruity with the proposed forecasting phenomena (Lo Turco & Calvano, 2018). Now that neuropsychology and psychology of perception have, albeit partially, provided some models of the mechanisms that govern the fruition of an object with an artistic content or aesthetic value, the curators of museum installations cannot ignore this knowledge. In recent years some museums such as the Peabody Essex Museum in Salem, Massachusetts, have started exhibiting interesting experiments, including those by the neuroscientists in the working group that designs the museum displays: its aim is to make the experience more engaging and intense using digital aids (Robertson & Mack, 2017).

Even the Egyptian Museum, in its recently opened temporary exhibition entitled "Invisible Archaeology", has decided to entrust to digital media the history of the objects displayed and the scientific techniques used to discover their secrets: thanks to neuroscientific studies we know that, from the cognitive point of view, they are tools which are complementary to the exhibition of the original. They are useful to give experience that completeness that only access to knowledge, to the so-called semantic memory of the object is able to provide. This approach facilitates but does not replace the emotion aroused by the original, even when using immersive techniques such as virtual reality or interactive mechanisms such as those used in gamification techniques.

The paradox of fruition based on the concept of learning through interaction allows us to overcome traditional modes of the presentation/observation of heritage through display cases, thus stimulating the visitor to become an active spectator and making him the protagonist of the object in his vi-

sion. In fact, he will be able to navigate the 3D model, turn around it, touch it, manipulate it, investigate it, activating different multimedia and complementary contents on the same physical object (images, texts, videos). At the same time, it is possible to guarantee a better use of valuable goods, as when they are observable only through display cases, the appreciation of their value and the knowledge of details about them becomes greatly limited (Clini et al., 2017).

The experiential intensity of the visit is therefore enhanced. Thus, they will find more and more place in museums, in support of the pleasure we feel in finding before us an object that has come down to us from past centuries through countless risks and hardships (Ovadia, 2019). Certainly the cognitive landscape linked to digital environments and the complex narratives that can connect one, especially the very young, to the artistic heritage that they have in common along with a constant expectation of the evolution of the story regarding an artefact: an expectation that today, as stated previously, is not satisfied by static installations and works of art in museums and archaeological parks, and even less by the stillness of the stories presented in the vast majority of museum rooms and archaeological parks and on which there is much work to done. In this scenario of "enhanced" fruition, it has been repeatedly stressed that a two-way dialogue between the real and the virtual is strategic. However, the difference between the original and the copy (understood as the real result of a digital elaboration) is now more nuanced and is worth taking into consideration.

ISSUE NO. 3. REAL, VIRTUAL, AUTHENTIC, COPY

Let us take a step back. It has been said that the value of an object also lies in what we know about its history: where it was found, what road it took to get to the room in which it is currently exhibited and what restorations it has been subject to. For the same reason, we are willing to work for hours

in a row to see an original object, while we do not think to go and observe a reproduction instead, even if the difference between them is indistinguishable to the eye. For now, that is the case. But the crucial question is: will digital artefacts ever hold the same value? Are concepts of value in the real world transferrable to the virtual world?

These new digital products are a challenge to the existing models of testimony and authenticity that are the basis of our experience, especially in museums. They ask us to rethink our cultural codes and the policies that underlie all visual systems. Who produces the data that creates the new images? And with what authority? To date, the contribution of information, even from those who collect and analyse data, has not been traced within the history of digital objects. Therefore, just as the task of museum anthropology consists of recovering these lost stories and bringing out the complex socio-political grids that are the basis of the constitution of the collections and their exposition, digital anthropologists are called upon to do the same with the new digital products. There is an interesting book on this subject entitled Copy Culture: Sharing in the Age of Digital Reproduction (Cormier, 2018) which poses the following argument about these instances: "Should we or should we not copy?" The question is, "What should we be copying and for what purposes? And that inevitably brings you to political questions."

Quoting Cormier, Ch'ng is of the following opinion regarding these themes: "Reproductions has a very real currency". Aguerre and Cormier stated, "The proliferation of images of works of art, in fact, has become a significant driver for going to museums – the opportunity to see the original, finally, after having seen the reproduction so many times over" (Cormier, 2018). Whilst copying has become a positive activity, digital copying is in urgent need of a mechanism for securing ownership. The question therefore arises of the authenticity of not only the object itself but also of the digital product used to give structure to the data, in search of a code of guaranteed authenticity.

Over time, replicas can also take on the role of the original and perhaps replace it (Ch'ng, 2013). Do digital copies have the same value as the originals? There is no simple answer to this question, at least until the digital has completely mediated our physical world and digital content is consumed with the same fervour as physical objects, and when signs and symbols replace and simulate our reality. The precession of simulacra may already be at work (Baudrillard, 1994).

We can agree that, apart from the tangibility of digital copies, there are no differences in their appearances. Moreover, physical artefacts are not as accessible as their digital replicas. One thing is clear: while the intrinsic value of a copy is not equivalent to the original, the instrumental value of the copy is significantly higher. If two values are put together, the combined value may become greater than the original.

CONCLUSIONS

The article does not provide all the answers regarding this subject, but it raises questions and offers food for thought on some topical issues that have as their common thread the critical analysis of the different interactions between Digital and Cultural Heritage. The first discusses possible actions which can be taken to improve narration through a blending of the material and digital. The potential of the application of innovative technologies to the indispensable revision of the stories connected to museum collections and to the necessary radical revision of the installations is immeasurably valuable. Rigour in their application is certainly needed so as not to run the risk of a simplification which may lead to trivialisation.

On the other hand, most curators and other professionals base their training on traditional museology. The new generation of art historians and archaeologists must therefore work with the new languages that deserve to be able to be expressed once again by being more involved in the necessary renewal process in museum institutions.

At the same time, the second theme is aimed at thinking about the opportunity to use these new technologies more effectively to receive data and not just provide it, in order to make the spaces and installations of the museum more efficient. In the direction of language renewal itself, there are some research paths to which the best university must turn. These are central themes on which our scientific community is questioning itself, in the different forms that a university structure can take, starting from its first mission of teaching, where we witness the first experiments of the merging together of science and humanities, and art and technology.

The third important reflection is on the quality and value of digital copying: the solution to the fundamental need to identify, classify and authenticate digital copies has crucial implications for the permanent digital documentation of cultural heritage, especially when damage, erosion, abandonment and destruction by anthropogenic risks and conflicts threaten our physical cultural heritage (Ch'ng, 2019).

At the same time, a rethinking of the role of art historian and archaeologist will make possible the creation of digital environments that leave time and opportunities for direct confrontation with the original work: moreover, it create effective opportunities to get, from home or school, some information tools to prepare one for the discussion with the works of art or the tools for ex-post analysis.

As for the role of the museum, there will certainly also be new forms of cultural enjoyment. Their task will always be to improve the visual, aesthetic and intellectual experience of each visitor when he is faced with an artefact of the past, and to attempt to provide all the information necessary to enrich his understanding. Therefore, the future of museums, as has always been the case, is research (Greco, 2019).

The scientist and the humanist must work more and more in tandem to try to unravel the complexity of the contemporary world. Increasing collaboration that goes beyond the dogmatism of individual knowledge, and the definition of a shared semantics and development of a true multidis-

ciplinary approach are the methods we have in order to face the challenges of the future.

As Luigini recalls in his preface to the book Ambienti Digitali per l'Educazione all'arte e al Patrimonio – Digital Environments for Education to Art and Heritage, on the one hand are scholars of representation who have always been largely involved in the documentation and enhancement of heritage, and on the other, scholars of pedagogy of the arts and museum education who seem to forge two sides of the same coin: in particular, it is applied technology that presents itself as a "mirror" in which scholars of representation and pedagogues reflect, look at and resemble each other, and digital technology that is applied to arts and heritage (Luigini & Panciroli, 2017).

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