

# Visualising the Past through the Virtual Image

## Virtual Reconstitutions as interpretations of knowledge

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**Abstract:** The image has the power to mean something, to tell, to express, to represent, and to present. Based on a reflection upon the place of the virtual image in the visualisation of the past, the present article seeks to answer to the transformations that result from the digital revolution, with implications in our relationship with History and in our experience of the built heritage. With the aim of returning the old Convent of Monchique to the city of Porto (Portugal) and its community, the interpretation of knowledge is explored here by using the virtual image as an instrument for the visualisation of the past, in its visibilities and invisibilities, through interpretative exercises of the past, guided by historical accuracy, authenticity, and scientific transparency. Due to the profound formal and functional changes it has undergone over time—even prior to its foundation, in the 16<sup>th</sup> century, and up to the present—, the convent presents itself as an ideal example to test the use of scientific methodologies and their validity in an interpretative visualisation of the past.

**Keywords:** *Virtual image—digital reconstruction—data authenticity—uncertain data—reconstructions*

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## Introduction

The visualisation of the past through the virtual image poses important challenges to our interaction with History, namely by questioning the transformations that the digital universe influences our experience of the built heritage. Starting from the very definition of virtual—here understood, in a broad sense, as the whole of the digital universe—, the virtual image must be perceived in its deep need to “give a representation of itself, to represent its interiority, to represent the visible and invisible worlds, to show these representations, to create, therefore, a universe that duplicates, unfolds, or exists parallel to the digital universe (...) (Goliot-Leté et al., 2011). This whole set of intentionalities is manifested in the relationship of the virtual image with the digital universe, by the desire that it has to dominate it, understand it, approach it, exorcise it, honour it, appreciate it, and enjoy it, or in the search to affirm its specific existence in it (Goliot-Leté et al., 2011). It is also in this sense that it can be said that “digital (or virtual, or artificial) environments are nowadays helping us to understand our physical world” (Rubio-Tamayo and Botelho, 2018).

However, one should not confuse image with medium. The concept of image can only be enriched if we “speak of image and medium as two sides of the same coin, though they split in our gaze and mean different things.” (Belting, 2014).

As we have seen before, great expectations were placed around the image, perceived, in its multiple functions and potentialities, as an instrument at the service of knowledge. By recording built heritage in the present moment, we are also contributing to its preservation and to the creation of memories for the future. As they can present different origins, images are able to fluctuate between a physical and a mental existence (Rubio-Tamayo and Botelho, 2018). Furthermore, a distinction can be made between natural images and those that are man-made (with or without the help of machines). By exploring the semiology of image, we would obtain other categories, such as: single image/multiple images, fixed image/moving image, and man-made image/image produced by a device (Belting, 2014).

On the other hand, and as it is clearly evident, digital technology has allowed to be brought up for debate new questions to the philosophy of the image, which has had an impact on the reformulation of well-known concepts based on the study of painting or photographic image (Rubio-Tamayo and Botelho, 2018). At the same time, the image of the past has accompanied the digital switch-over of important epistemological debates, present in disciplines such as Art History and Archaeology, that are, in turn, heirs of an existing duality between modern and post-modern thinking.

The aim of this article is not to take sides with any of the antagonistic positions defended by either Virtual Archaeology or Cyber-archaeology. We are sensitive to their arguments, and we are aware of the importance of this debate for the clarification of the significance of the image, in the documentation of the Cultural Heritage, especially in what concerns the built heritage.

In conclusion, this article also takes into account the consensus generated by the international scientific community, in particular with regard to the production of international charters and protocols, around computerised visualisation and virtual archaeology that aim at their application in a wide scope, as well as the good practices carried out in similar scientific exercises, applied internationally.

## **The Knowledge of the Past and Cultural Heritage in the Digital Age**

The Digital Age, characterised by technological development and the practically unlimited dynamization of information flows, is changing the way human knowledge is built. “If the human knowledge is rapidly migrating in digital domains and virtual worlds, what happens to the past?” (Forte, 2014). In light of this new approach, of a Digital Cultural Heritage, it is necessary to adopt a memorial practice that conditions/inform innovation, without nostalgia for the past, and that rejects the various forms of museumization (Suppia, 2008). Given the past was always observed from the present, the knowledge of cities and their built heritage implies, as well, the understanding of our place in contemporaneity (Forte, 2014).

From the concept of Virtual Archaeology to the approach proposed by Cyber-archaeology, a new paradigm is emerging. M. Forte, referring to the latter, highlights the idea of “potential past” as the most appropriate way to classify the process generated by the co-evolution of information deriving from human evolution, and cyberinteraction generated by different worlds, with knowledge being validated by the relationship between the present and the past (Choay, 2015). Based on the

assumption that the past is something that cannot come back into existence, it was argued that the images we can obtain from it are only simulations. Thus, from the same past, we will be able to formulate different hypotheses, capable of coexisting with one another, in a digital ecosystem. The systems of digital recording and 3D information align themselves in this assumption, marking a difference in relation to traditional systems.

In the context of what we have been describing and due to the importance that the digital computer has gained, concepts such as “computerised visualisation” have been asserting themselves and gaining popularity. According to the London Charter, this is the “process of representing visual information with the aid of computerised technologies” (Câmara et al., 2018). “The setting up of the digital format and computers as means of visual representation requires an awareness of the image as a virtual object, that is to say, the image as a set of data that can be manipulated mathematically (Barceló et al., 2000). Since a digital or virtual image is, in its essence, a set of bits arranged on a surface, the idea of vision must go beyond the mere idea of sight, by including factors such as multisensoriality, memory, imagination, readability, and interpretation. In this context, digital technologies, intersected with the historical practice, allow the convergence of a perspective of the past as a sensorial-perceptive reality (2010). On the other hand, they create conditions for a prophylactic preservation of heritage assets by their communities (Denard, 2014), linking them to the future, by creating a memory/record in the present.

The creation of augmented and virtual realities, with different forms of interaction, simultaneously reveals new forms of visibility and visuality, with the screen acquiring an enormous cultural relevance (Matias, 2016). The screen, by definition, is a “flat surface that reflects light and on which images are projected (...) [is] where the image, in the spectator’s eyes, is materialised” (Câmara et al., 2018). Nowadays, the screen no longer assumes the place of the mere visual representation, profiling itself as a space where the spectator conducts operations, interprets and chooses what is in front of him, thus, as a consequence of technological development, being able to immerse himself in the image. It lies in the power of the spectator the possibility of translating, in his own way, what he understands, making him able to connect the screen—in a scientific-interpretative way—to his singular intellectual path.

The distinction between visible and invisible also leads us to the interpretation of images. It is important to distinguish visibility and invisibility in what it was presented to us, whether we are talking about the real world or the virtual worlds. The interpretation of an image goes through its meaning and through its “reading” by its viewer. “We all know, from direct experience, that images are not visible in a unique way, entirely determined by the perceptual apparatus, and that we only see in them, in the full sense of the term, what we are capable of understanding” (Aumont, 2011). Summoning the concepts of sign and signification,<sup>1</sup> the issue of interpretation is a general semiotic and philosophical matter that goes beyond the image itself. In the years 1960–70, semiolinguistics has introduced the notion of code, which, perceived in its different nuances—from the individual to the universal—, brings an unequal domain to subjects, through its context (Aumont, 2011). While perception could be compared to a process of “decoding”, concrete representation can be seen as a process of “code posturing” (Massironi, 2015).

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<sup>1</sup>See (Eco, 1984).

In a postmodern context, increasingly dominated by algorithms and by the proliferation of subjective criteria, interpretation now plays a decisive role for the social sciences and the humanities, assuming itself as a keyword in this process of knowledge. Aware of its importance, and its application to the History of Architecture and to Digital Humanities, it is necessary to attribute new meanings to the unknown, and interpreting was also a way of learning how to manage the lack of knowledge. In the case of derelict and transformed buildings, as is the case of the example that will be addressed below, this issue is particularly relevant.

Jacques Rancière, in his attempt to overcome the idea of image, either as a double of something or as a medium at the service of the performance of an art, comes forward with the idea of thoughtful image (Aumont, 2011). As it is well known, an image will not hypothetically, be a thinking object, but rather an instrument of thought. “Thus, a thoughtful image is an image that contains unthinking thought. A thought that is not likely to be attributed to the intention of the one who produces the image and causes an effect on the one who sees it, without the latter linking it to a particular object” (Aumont, 2011; Matias, 2016). In other words, a virtual image of the past—reflecting a rigorous methodology of scientific research—may contain levels of knowledge that go beyond the very intention of the one who produced it. Here, once again, we bridge the gap to Cyber-archaeology and to the concepts that serve it, such as autopoiesis, enactivity, and affordances, among others.

In conclusion, the virtual image of the past should allow its evaluation by other researchers, by making it easier to verify its authenticity and historical accuracy. On the other hand, we must ask ourselves how can these images also be thinking images? That is, how can their interpretation—also conditioned by factors such as historical and visual culture—bring new knowledge beyond what was being intentionally transmitted by its author? These questions are of the utmost importance and reinforce the need for scientific rigour in the processes of creating virtual images, particularly with regard to international protocols and procedural consensus resulting from the broad debates in this sector. Only in this way can the possibility of a truly transparent and interdisciplinary shared construction of knowledge be guaranteed.

## Digital Reconstitution Processes

As mentioned here before, the new technologies associated with the sector of Cultural Heritage bring a renewed debate to this discipline. By valuing visuality and by seeking to offer experiences that recreate the past that are increasingly realistic, we also get closer the concept of time travel, with an attempt to show historical environments, inhabited by virtual characters (Câmara et al., 2018).

With the emergence of the avatars of the historical monument (Carpetudo and Lopes, 2017), one questions how to put the technologies at the service of the visualisation of cultural content and contribute to the visualisation and interpretation of the past. This question also extends itself to the elaboration of propositions of virtual reconstruction and recreation (or simulation, as Cyber-archaeology points out) of the built heritage. We recall here, once again, the rupture established by Cyber-archaeology in the epistemological debate. We retain the words of M. Forte, when he suggests that the past could not be reconstructed but simulated (Aumont, 2011). While it is true that this denies the exact (or even approximate) nature of a virtual reconstruction or recreation, for example, the importance of the context in the characterisation of a reality was reinforced. Once again, and as

opposed to this, Virtual Archaeology defends the scientific and objective aspect of its methodology; on the other hand, Cyber-archaeology, flatly refuses the existence of a single reality, but rather its multiplication according to the existing points of view.

In addition, it is necessary to be aware of other parallel phenomena. It is therefore essential to bear in mind that the boundaries between reality and simulacrum tend to fade out, which may lead to substitution phenomena in a new way for us to apprehend and relate ourselves to the world.

Moving away from the debate polarised by modern and postmodern thinking, we will now focus our attention on the process of image production. In this sense, it is important to keep in mind that, through their technical reproducibility—along with the debate concerning fundamental issues, such as authenticity and aura, mentioned by Walter Benjamin (Ranci re, 2017)<sup>2</sup> –, the processes of image production live in a situation of constant questioning. As it has been seen, throughout history, the discourses on the image and the ways of producing and thinking about it have changed (Hamurco and Hamurcu, 2018). However, “creating an image of an object means extracting all its dimensions, successively: weight, depth, smell, space, time, continuity, and, obviously, meaning” (Choay, 2015). Thus, its results will not be only visual, because they result from a multimodal and multisensorial interaction (2010), and are syntheses of complex research processes, on themes such as spatial experience or its relationship with its surroundings.

Digital reconstruction processes were presented as a viable, non-intrusive, versatile, and completely reversible solution in the way we know the built heritage, in its diachrony and synchronicity, allowing the discussion of different hypotheses. They are also a key element in the dissemination of the built heritage, by seeking to dilute the barrier between scientific research and its interpretation and presentation to the civil society. On the other hand, it is also possible to elaborate three-dimensional models that evolve in parallel to the research phase, and even surpass it. They must be characterised by their transparency, not only from the perspective of the validation of the scientific methodologies used, but also as a dynamic process that brings the theoretical neutrality of information to the higher level of knowledge (Sol -Morales, 2016). As it will be seen later, all these topics have been discussed and theorised in protocols with international and transversal application to Cultural Heritage. Following the plea of the London Charter (2006, 2009, and 2012), criteria have been defined for its application to specific sectors, such as digital archaeology (Seville Principles, 2011–12).

If, in a certain sense, the level of reality could be measured by the degree of iconicity or abstraction of a representation, it is important to undo the misconception that, as Massironi said, its purpose is confined to a credible reproduction of reality (Benjamin, 2018 [1935]). As it was initially seen, the concept of the thinking image is also present here, in which the image is not limited to its capacity to resemble reality. Thus, and notwithstanding what has been mentioned here, the image is subject to countless processes aimed at transforming it into an object of communication of a precise intentionality. That could be observed, for example, in the digital manipulation of the photographic image, with the attenuation of its properties, including the correction of lights and colours, and the creation of homogeneity and visual continuities, in a set of post-production processes (Marques, 2006). This

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<sup>2</sup>John Berger told us about the reproduction, applied to painting. According to him, “(...) reproduction allows, or even makes inevitable, that the image may be used for multiple purposes, and that the image reproduced, unlike the original work, can lend itself to all of them” (2018).

allows, for example, to eliminate the effects of weather conditions and variations in lighting, but, paradoxically, it eliminates the presence of the real context, in the transformed image. In an objective way, the verisimilitude of the image, in relation to its author's intentionality, may not coincide with the perceived reality itself. This means that the virtual image of the past should not necessarily seek photorealism, but it may have an interest in studying other elements, such as volumetrics, altimetry, differentiation of phases of construction, or the identification of stratigraphies, among others.

Before moving into our case study, a final note regarding the documentary properties of the image: we know of its demonstrative capacity and its power of persuasion, which can inform us of the reality, in a close way, but, on the other hand we are aware of the limitations concerning its descriptive or explanatory capabilities; deprived of linguistic categories, the image itself cannot describe or explain (Worth, 1975). "The image is a fascinating document, as it is immediate, but it never, by itself, an explanation: it needs "instructions for use" (Medeiros, 2007). As we will have the opportunity to show, in the methodology we adopted, the images that we produced will be an illustration of what we have just mentioned.

## **Object of Study and Methodology**

The issue aforementioned here has been tested in the built complex known as the Convent of Monchique (Porto, Portugal). Some preliminary results have already been presented in international scientific meetings, namely regarding the documentation of the patrimonial assets and the identification of the different chronologies of its construction.

This convent is acknowledged for its cultural importance in the architectural, historical, and artistic fields, reflecting values of memory, antiquity, and authenticity. Due to the profound formal and functional changes it has undergone over time, even prior to its foundation, in the 16<sup>th</sup> century, and up to the present, the convent presents itself as an ideal example for our reflective exercise around the interpretative visualisation of the past. Selected for its nature, scale, and urban significance, the study of the Convent of Monchique also allows us to question the way in which digital methodologies and tools enable us to better understand a lost or transformed urban environment, while, at the same time, it diffuses its knowledge. This study reveals a great potential for testing the new digital tools at the most diverse levels, both by the methodology and the results that can be achieved. By extension, it also allows us to ask how these strategies are used to re-inscribe the absent/transformed historical city in its multiple layers, within the contemporary environment, and about the connection of civil society with its (in)visible heritage. Due to its peripheral character and its derelict condition, the convent is simultaneously a pretext for the creation of new cultural offerings and a consequent increase in its attractiveness.

This process is attentive, as we have seen, to the epistemological debate between Virtual Archaeology and Cyber-archaeology, and it is based on the principles defined in international charters and doctrines, namely, the "London Charter" (2006, 2009 and 2012), the "Seville Principles" (2011–12), the "Berlin Charter" (2015), the "ICOMOS Charter for the Interpretation and Presentation of Cultural Heritage Sites" (2008), and the "ICOMOS Charter on Cultural Tourism" (1999), answering to the need to ensure the methodological rigour of computer-based visualisation of cultural heritage. At the same time, other models that have already been implemented, that attest to the value and validity of

these methodologies in interdisciplinary processes of study and digital reconstitution of built heritage, such as the work developed around the “Lx Convents”<sup>3</sup> project and the SANTACRUZ project<sup>4</sup>, are taken into account.

Through an intensive historical and bibliographical research, and a systematisation and analysis of the existing archival, cartographic, and iconographic documentary material (as recommended in the “London Charter” and in the “Seville Principles”), it is possible to obtain the identification, the reconnaissance, and the documentation of the stratigraphic layers of the building and of urban spaces. The Seville Charter recalls, for example, that archaeology is not an indisputable science, and that its hypotheses must be capable of being interpreted according to a scale of veracity, giving the possibility of distinguishing remains preserved at the site from anastylosis and reconstructions. During our visit to the site, a photographic survey was also carried out, making it possible to assess the state of conservation of the building and its current characteristics, such as functions, stocks, alterations, and demolitions. Other indirect methods, such as photogrammetry, have already been tested on elements of the convent, scattered throughout the city, as is the specific case of the Manueline portico that is in the Soares dos Reis National Museum’s possession, and whose result has already been presented at an international conference in the USA (iLRN 2018, Missoula).<sup>5</sup>

Moving forward with a comprehensive historical and artistic reading of the spaces and their successive occupations (see the Seville Charter, namely Principle 5.2: “All historical phases recorded during archaeological research are extremely valuable”), we proceeded with an exhaustive contextualisation (historical, cultural, economic, and social, among others), based on the cartography, the engraving, the photography, and on the written sources, following the guidelines of the Charters and International Conventions that have been previously mentioned. This way, we intend to read not only the existing physical remains, but also its crypto-artistic memory. Therefore, it is necessary to go back and reconstitute the places, in their multiple dimensions, contextualising them, by way of example, historical, artistic, and economically. New perspectives make it possible to include other metaphorical or imaginary languages, translated into a new perception of the built heritage and of the landscape heritage itself, in a reading that includes the territory and the communities. “In architecture, far beyond what the designer-architect may suspect, the thought, the taste, and the pretensions of an era are drawn and witnessed. That is why the architecture lesson is extraordinarily rich and multifaceted, but also very cryptic” (Almeida, 2001).

Covering a very broad chronology of construction, the area corresponding to the old conventual fence contains documentary evidence of occupation since at least the 14<sup>th</sup> century, when there was a Jewry there, with its synagogue and its private cemetery. Later, from the 15<sup>th</sup> century, this site was occupied by a manor house (a noble palace). Although we do not know exactly what elements have been taken of the pre-existing buildings, it is proven that the construction of the convent made use

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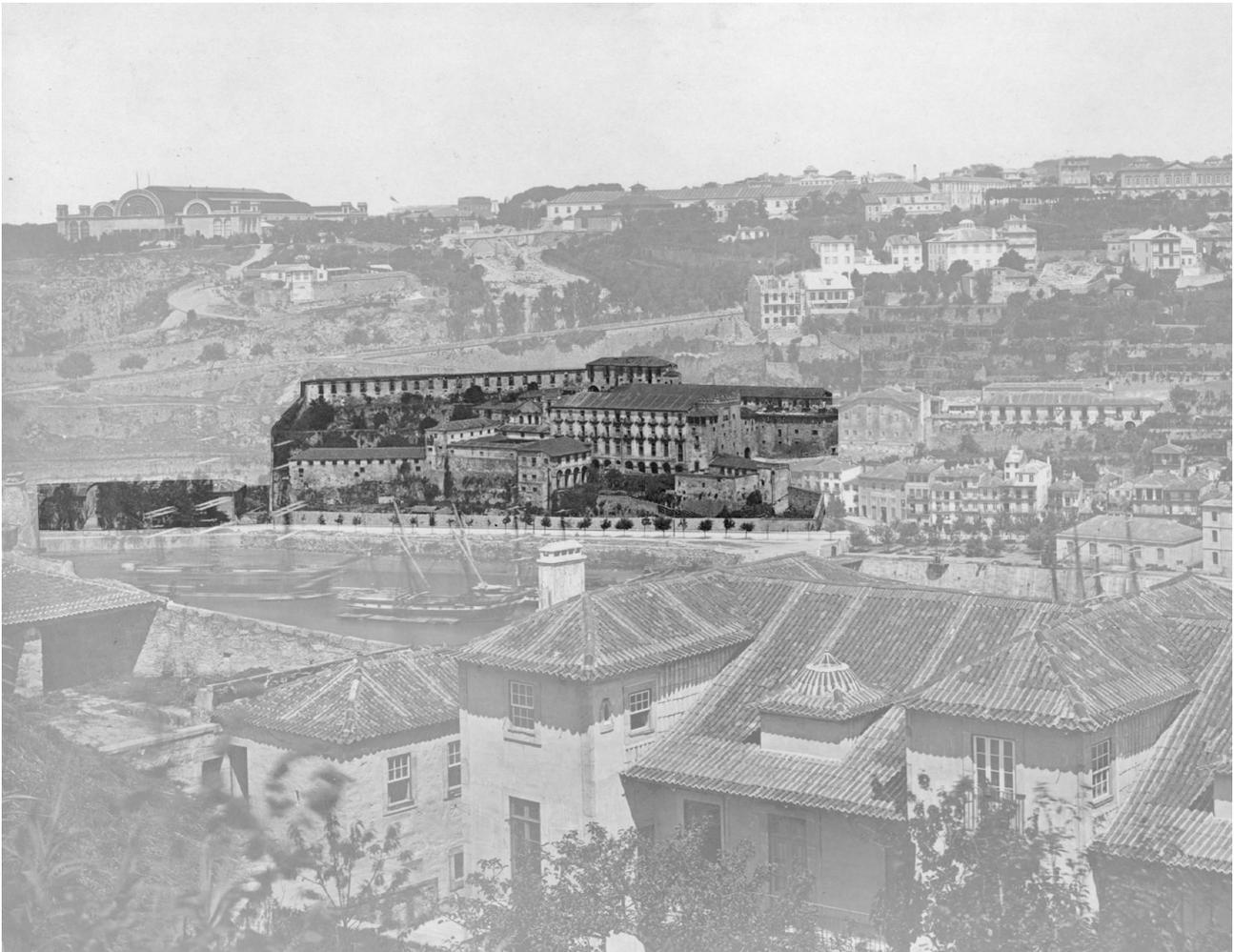
<sup>3</sup> This project was conducted by Raquel Silva and hosted by the Institute of Art History of the Faculty of Social and Human Sciences (UNL – Universidade Nova de Lisboa). LX Convents Homepage, <http://lxconventos.cm-lisboa.pt/> (Accessed: 30 September 2019).

<sup>4</sup> Project started in 2018 and scheduled for completion in 2021. SANTACRUZ Homepage, <https://santacruz.ces.uc.pt/en/home/> (Accessed: 30 September 2019).

<sup>5</sup> Tiago Cruz. 2018. Digital Heritage: Digital Drawing and new Research Tools for Investigation in History of Architecture. Hypothesis of virtual reconstruction of the Convent of Monchique (Porto, Portugal). In “Proceedings from the Fourth Immersive Learning Research Network Conference (iLRN 2018 MONTANA)”.

of the structure of the palace, also previously used as the residence of its founders: Pedro Coutinho and *Dona* Beatriz de Vilhena.

From this perspective, studying the Convent of Monchique, with the aim of creating virtual images of its past, is also an exercise that presupposes and includes the study of the occupations prior to its foundation: the Jewry, with its synagogue, and the noble palace.



*Fig. 1. Convent of Monchique in 1865 (© Municipal Historical Archive, Porto).*

## THE VIRTUAL IMAGES OF THE CONVENT OF MONCHIQUE

The former Convent of Monchique is now a set of complex volumetry with an area of 11,065 sq. m and a perimeter of 644 metres. Its urban river front is approximately 235 meters.

The site presents a great topographic variation, with implantation quotas between +5.00 meters and +33.72 meters. The altitude variation of its volumes goes from 5.36 meters (annexe belonging to the municipality of Porto – CMP) to 22.47 meters (east turret). For these reasons, as well as for reasons of functional diversity and conservation, we have opted to proceed to its study after dividing it into different lots. With this, we intend, above all, to make the proposed work feasible in a timely manner (according to point 6 of the “Seville Principles”: efficiency). It should also be noted that this work is in progress and is expected to be completed in 2021.

The division of the area of study into lots and sectors takes into account the property division when the religious orders were abolished in Portugal, in 1834, and the consequent sale by public auction. In this sense, the division was made from the property register, a factor that has had profound implications on the function and on the identification of volumetric or typological units. Finally, it should be noted that this procedure makes the research more operational and allows for a more significant number of elements to be studied, which would not otherwise be possible.

Next, we will show, with a section of the old Convent of Monchique, the methodology of using the virtual image as a tool for the interpretation and visualisation of the past. In the methods used, we cannot forget that any “codification” requires a choice (Forte and Pescarin, 2012).

“Any graphic representation is always an interpretation, no matter how faithful to reality it is in proportion and attention to detail. Thus, graphics are always attempts to explain reality” (Massironi, 2001). On the other hand, the balance between emphasis and exclusion is also taken into account, according to which certain principles of the image are highlighted in order to increase its readability, while others are ignored voluntarily and practically omitted (Goliot-Leté et al., 2011).

### **Lot 1, Sector A**

As we have seen, in order to facilitate the application of the predefined methodology, the extinct convent was divided into four different lots. With regard to lot 1, it was also necessary to divide it into 4 sectors, defined by their volumetry and functionality. Here, we will follow the study process related to Sector A, which fulfils, therefore, the exploratory functions of this article.

This area, peripheral to the conventual ensemble, was bounded by the walls of the fence, having housed a small Manueline chapel—the chapel of “Nosso Senhor dos Passos” (16<sup>th</sup> century). Later, the chapel was demolished, and the headquarters of the Clemente Menéres Company was built in its place. This construction was also carried out in a phased manner, throughout the 20<sup>th</sup> century (according to work permits consulted in the Porto Municipal Historical Archive – AHMP). Currently, it still houses the headquarters of this company, as well as an art gallery, and a car repair shop.

For information concerning the previous occupation/configuration of this place, we consulted the historical cartography, as well as old engravings and photographs, together with the photographic survey of the present situation, carried out by us. Since the new technologies complement, rather than replace the traditional methodologies (as recommended in the Seville Charter, Principle 3: “Complementarity”), the observation drawings of the building were made on site.

For the survey drawing of the current building, we have based ourselves on the survey provided by the architect José Paulo dos Santos, along with the academic studies carried out by Pedro Ferreira (2018) and Ana Vendeiro (2014), as well as on the archaeological survey reports.



Fig. 2. Stratigraphic reading of one of the sectors of the convent (© Tiago Cruz).

## Final Considerations

As it has been pointed out several times, throughout this article, we are facing a paradigm shift. Technology marks and conditions our perception and our vision of the world. In this sense, and in the confrontation of positions that are often irreconcilable with each other, the historical city can be analysed through different digital perspectives (Hamurco and Hamurcu, 2018). In the context of the establishment of digital ecosystems, the current place of the virtual image of the past was questioned. As we have observed, opposing theories propose both their affirmation, as a form of reconstruction/recreation of the past (Virtual Archaeology), and the assumption of the image at the service of a simulation of it (Cyber-archaeology).

What we intend here is to highlight the unequivocal importance of the use—in the different processes involved in the creation of virtual images of the past—of scientific methodologies and their validity as an objective way of addressing the unknown, bringing us closer to knowledge. We know that, regardless of eventually knowing its exact configuration, the Convent of Monchique existed, and that,

according to the Principles of interdisciplinarity; purpose; complementarity; authenticity; historical rigor; efficiency; scientific transparency; training; and assessment (Seville Principles, 2011–12), the pondered construction of knowledge may lead us to an approximate virtual image (more or less realistic, and not necessarily photorealistic) of its past. Sharing a positivist view of learning, this exercise of knowledge should also be available to a wider community, through processes of dissemination, acknowledged for the importance of their work, by diluting the barriers between researchers and civil society.

Finally, a few words for the promotion and dissemination of knowledge and of the virtual image of the past: “we are often used to think of “communication” as the final part of the own archaeological process, related to content dissemination. On the contrary, we believe that scientific knowledge and communication should be integrated in one process” (Choay, 2015). Although we consider that this factor may, at the end, open doors to subjective elements, we welcome the questioning surrounding communication as a final part of the archaeological process.

As we do here, communication can be made at different stages of the process, contributing to its assessment (Principle 8, Seville Principles).

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