

Communicating archaeology to everyone.

Descrizione

Abstract

Cultural Heritage does not represent a value in itself, but it rather embodies a relational value: an archaeological site, for instance, is whatever value the civil society and the community of reference give to it. The communication of the meaning of our heritage to the public of is hence a duty that belongs to the professionals of Cultural Heritage: archaeologists at Poggio del Molino (Populonia, Italy), in a global archaeology approach, have sought to open the research to the public using digital technologies, thus making operations open and accessible to everybody, on and off site.

Introduction

The material culture is the key for understanding the life of the people who lived in the past, and as a result archaeologists spend much time analysing structures, artefacts, and physical remains in an attempt to answer a wide variety of questions: every detail of an object or a structure guides the archaeologist's interpretation of history^[1]. Therefore, the constant visual and haptic interaction with artefacts and structures has direct influence on how the field's researchers communicate with one another and with the public. Archaeology's value as a public asset is determined by its ability to maintain an open relationship with the community which supports it^[2].

Since 2008, the global archaeology project that takes place at the archaeological area of Poggio del Molino^[3] sets the relationship between researchers and citizens at the centre of its experience (fig. 1). The field research is managed through a field school for students and volunteers from all around the world: the archaeological excavation is where archaeology is shared and where professionals work on behalf of the community, while citizens contribute to the research with excavation assistance activities, well aware that *the past belongs to all of us*.



Figure 1: Aerial view of Poggio del Molino

Communication is at the base of every activity onsite: from the explanation of field archaeology methods and techniques - a *storytelling* which becomes *storydoing* - to the description of the interpretative processes that guide the archaeologist's translation of data into history up to the narrative of this story to the people who want to be involved into the processes of definition and management of our cultural heritage.

The roman settlement of Poggio del Molino

The archaeological site of Poggio del Molino lays onto the northern side of the homonymous promontory that separates the Gulf of Baratti, to the south, from the Rimigliano beach, to the north. The settlement occupies a large plain that lays at 22 m above the sea level which, other than a wide stretch of sea, dominates the vast plain

that in ancient times housed the lagoon of Rimigliano and the hinterland up to the metalliferous hills of Campigliese^[4].

Populonia was under the dominion of Rome for over a century when (around the middle of the 2nd century BCE) a fort was built on the plateau overlooking the canal that connected the sea to the lake of Rimigliano, with the specific strategic purposes of military defence and political control of the territory of Populonia^[5]. The fort was quadrangular in shape with thick perimeter walls of 55×56 meters^[6], defensive towers overshadowing the entrance gates and a watchtower facing Populonia and controlling the hinterland. Inside the building, a large courtyard surrounded by porticoes was closed off to the north by a building, most likely the military barracks. The *castellum* was built as an outpost to defend the territory from pirates attacks, who - especially between the 2nd and 1st century BCE - infested the waters and the coastlines of the entire Mediterranean sea.

Towards the end of the 1st century BCE, once the danger of pirates had diminished, the fort lost its original defensive function and was converted into a rustic villa^[7]: a real farm with an artisanal sector^[8] dedicated to the production of fish sauce (*cetaria*), *garum* and *salsamenta* (fig. 2). The establishment of a productive facility at Poggio del Molino was not only influenced by the presence of a preexisting building available for repurposing, but also by its proximity to the Rimigliano lagoon. This lagoon supplied both salt and fish for breeding and was relatively easy to access and traverse, both important necessities for the commercial trade of *garum* along maritime routes. The farm belonged to Caius Cecina Largo^[9], a member of the rich and powerful Caecina family originating from Etruscan Volterra.

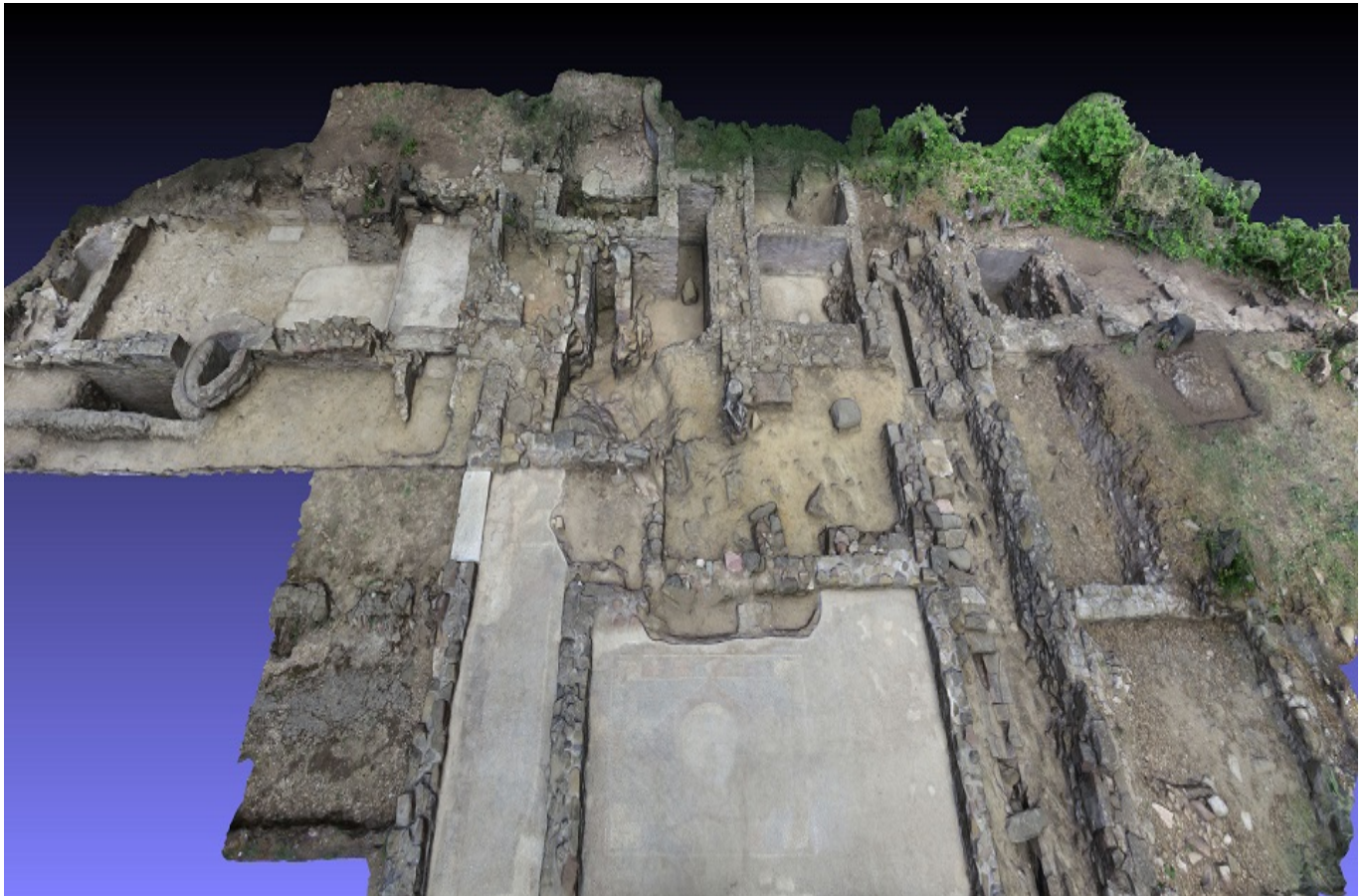


Figure 2: North sector of the settlement

Historical sources attest the existence of a Populonia economy based upon fishing activities. The Greek geographer Strabo informs us that beneath the promontory upon which the city rests was an installation for monitoring the movements of tuna fish in nearby waters (a *thynnoskopeion*). Archaeologically speaking, the *cetaria* (fish-sauce factory) at Poggio del Molino represents the most significant evidence for such activities in the territory. Previously, archaeological evidence consisted only of a series of anchoring chains connected to the seafloor to hold fishing nets in place, today preserved at the Museo etrusco di Populonia Collezione Gasparri^[10]. Furthermore, vats discovered along the beach of Baratti may suggest further evidence for the processing of raw fish.

At the end of the 2nd century CE, the entire building of Poggio del Molino underwent a profound restructuring, taking on the characteristics of a *maritime villa*^[11]. The layout of this villa featured a colonnaded (peristyle) garden around which was placed a residential quarter, a domestic quarter and a private bath complex. The villa was delineated by the perimeter wall of the republican fort, the access door of which was still in active use. The western entrance led to the residential quarter and the baths,

while the eastern door provided access to the domestic quarter and the rear part of the baths. Outside the domestic quarter was a portico supported by a series of small brick columns, a few of which remain *in situ* today.

The residential quarter^[12] consisted of a bedroom (*cubiculum*) and a dining room (*triclinium*) which opened onto a corridor running along the west and southwest sides of the peristyle courtyard. The rooms excavated thus far feature mosaic floors in black and white, decorated with geometric or floral patterns.

The bath complex (fig. 2) consisted of two distinct sectors^[13]: a so-called *laconicum* and then a more traditional bath complex. The *laconicum* featured an entranceway that led to a dressing room equipped with a basin for cold water baths. Next, this section led visitors to the sauna (*sudatorium*), which was equipped with a heated floor propped up by the small tile-columns that remain *in situ* today. Finally, the *laconicum* featured a rectangular room sometimes called a *districtarium* or a *unctorium*, in which we find beds for massages and the application of aromatic oils to the body. The more traditional part of the bath complex was situated along the southern walkway of the peristyle courtyard, but its northern portion would eventually crumble into the sea due to a landslide. Currently, excavations have exposed a *caldarium* (a room for hot baths) featuring a *praefurnium* (a furnace for heating water) as well as a *frigidarium* (for cold baths) featuring two basins.

The domestic quarter^[14] was oriented around a small courtyard featuring a cistern for the collection of water and a small storage space for tools. The eastern and western sides of the courtyard featured a walkway leading to the kitchen and a few small service rooms. In the first phase of the villa these functioned as personal lodging spaces.

The villa underwent a process of impoverishment starting with the middle 3rd century CE and culminating with the definitive abandonment of the structure during the beginning of the 4th century CE.

Between the late 4th century and late 5th century CE, the site was inhabited by a community which systematically dismantled the villa's construction and decorative materials^[15]. In particular, marble was sought as a raw material in lime production while metal objects were recycled into new products. Additionally, numerous indications (fig. 3) suggest that a cult area, probably for early Christians^[16], was established in the residential quarter of the villa.



Figure 3: Circular bronze lock of a wooden box

The Archeodig Project: when archaeology meets the public

Archeodig began as a pilot project in Italy in 2008, with the aim of coordinating the scientific research of systematic archaeological excavations, specifically organised as field schools for students and young archaeologists (fig. 4). The field research is led by professional archaeologists and cultural heritage specialists. Volunteers from all over the world and high school students carry out ancillary research activities, i.e. all those tasks which do not require specialist training. Following the principles of crowd-economy, the scientific research is funded by those who take part in the excavations, by means of micro-patronage and of sponsorships from private companies^[17]. The funding is collected by the cultural association Past in Progress.



Figure 4: Italian and American students digging at Poggio del Molino

The archaeological field school at Poggio del Molino is open to everyone. On site, tasks are allocated depending on the different ages and the personal goals of the participants. Italian students and volunteers work side by side with American, European, Australian and Japanese colleagues, and English is the language on site. American students come from the Project partner universities: the University of Arizona, Hofstra University, Union College, Whitman College and University of Florida. Foreign volunteers participate through the non-profit organization Earthwatch Institute [18], which has been supporting the scientific research of Poggio del Molino since 2009.

The aim of the project is to organise and create a shared archaeological area at the Roman site of Poggio del Molino^[19]: a public area accessible to everyone where citizens can spend their free time and be involved in the excavations process. In the hopes of *Archeodig's* professionals the creation of this Park will lead to an increase of the reception capacity of the site by organising spaces shared by archaeologists and the community, by further improving the educational and communicational programs. In addition to this, the project will aim to restore a portion of a unique and extraordinary territory that can be given back to the people, so they may take benefit from their own cultural heritage.

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Communicating archaeology at Poggio del Molino

With this spirit of sharing and openness to the public the *Archeodig* project begun to develop a sustainable infrastructure to support the visit of people to the excavation and make it accessible to everyone.

One of the elements of this infrastructure is the communication of the excavation. The continuous contact with the local and global community of volunteers, students and enthusiasts, led *Archeodig's* professionals to focus on how to communicate archaeology, with particular care towards non-specialists. Most students and volunteers come to the excavation with limited experience or even without any, and their success on site depends on the project's ability to explain its complexities and involve them in the research process. At the same time, when the excavation is in process the archaeological area is open to anyone who wishes to visit it or wants to participate in the operations: the result of this opening to the public is that tourists and members of the local community visit the excavation regularly, hence further motivating *Archeodig's* interest in communicating the development of the scientific research to a public audience.

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The digital outreach project

After ten years of operations Poggio del Molino appears to be widely excavated, and many of the structures, belonging to different phases of the site, are cleared of the soil that preserved them for centuries. Many of those structures have been built, destroyed, used and repurposed throughout the centuries, thus complicating their

correct reading and placement in the chronology of the site. The constant visual and haptic interaction with the ancient material culture – that is structures and artefacts – is what helps archaeologists to understand history, thus defining every aspect of the archaeological field research. The thorough documentation of the discoveries is therefore indispensable to understand Poggio del Molino's story, as well as communicating it to the public^[20].

The archaeological excavation of Poggio del Molino graphically documents its discoveries using a 3D digital photogrammetric workflow. This method helps producing metrically accurate 3D models faithful to the original in shape and colour with no more than a standard digital camera and a total station, both of which already present on site. The adoption of the Structure From Motion^[21] has had a positive impact on the way *Archeodig's* professionals read and interpret the structures and the sequences of actions that shaped the archaeological site.

Additionally, the visual communication and the interaction with the excavation can exploit 3D models to add levels of communication and involve people to the scientific discovery. Photorealistic models such as those produced onsite can in fact be packaged within user-friendly digital interfaces that mediate between members of the public and archaeological remains. The visualization and the interaction with the 3D models allow visitors to get as close as possible to the kind of visual and haptic interaction with the archaeological material that the archaeologist experiences every day on site.

Sketchfab and Unity3D

Archeodig's professionals share the stories of Poggio del Molino in 3D with the public community via two methods: publishing on the online platform Sketchfab^[22] and producing interactive content in Unity3D^[23]. These two digital platforms, which have pros and cons that are continuously taken into consideration in the process, allow to create numerous forms of experience between the public and the archaeological material encouraging exploration, critical examination and fun.

Sketchfab is an online tool for discovering and sharing 3D models of any kind, that can be visualized and navigated using an intuitive user interface like the YouTube one. The digital 3D models of Poggio del Molino on Sketchfab can be easily viewed and shared on mobile or fixed devices, and are accompanied by contextual information as

captions and dynamic annotations on the digital surface of the model^[24]. 3D models can be visualized without installing applications nor software and can be explored orbiting around a preset centre that can be changed at will (fig. 5). The use of Sketchfab requires low technical skills from the archaeologist and provides immediate results: this approach is in fact proving useful for the *Archeodig* project but remains nonetheless limited in terms of flexibility. Sketchfab does not offer interactive animations, site-level views of multiple models, immersive lighting or movement.

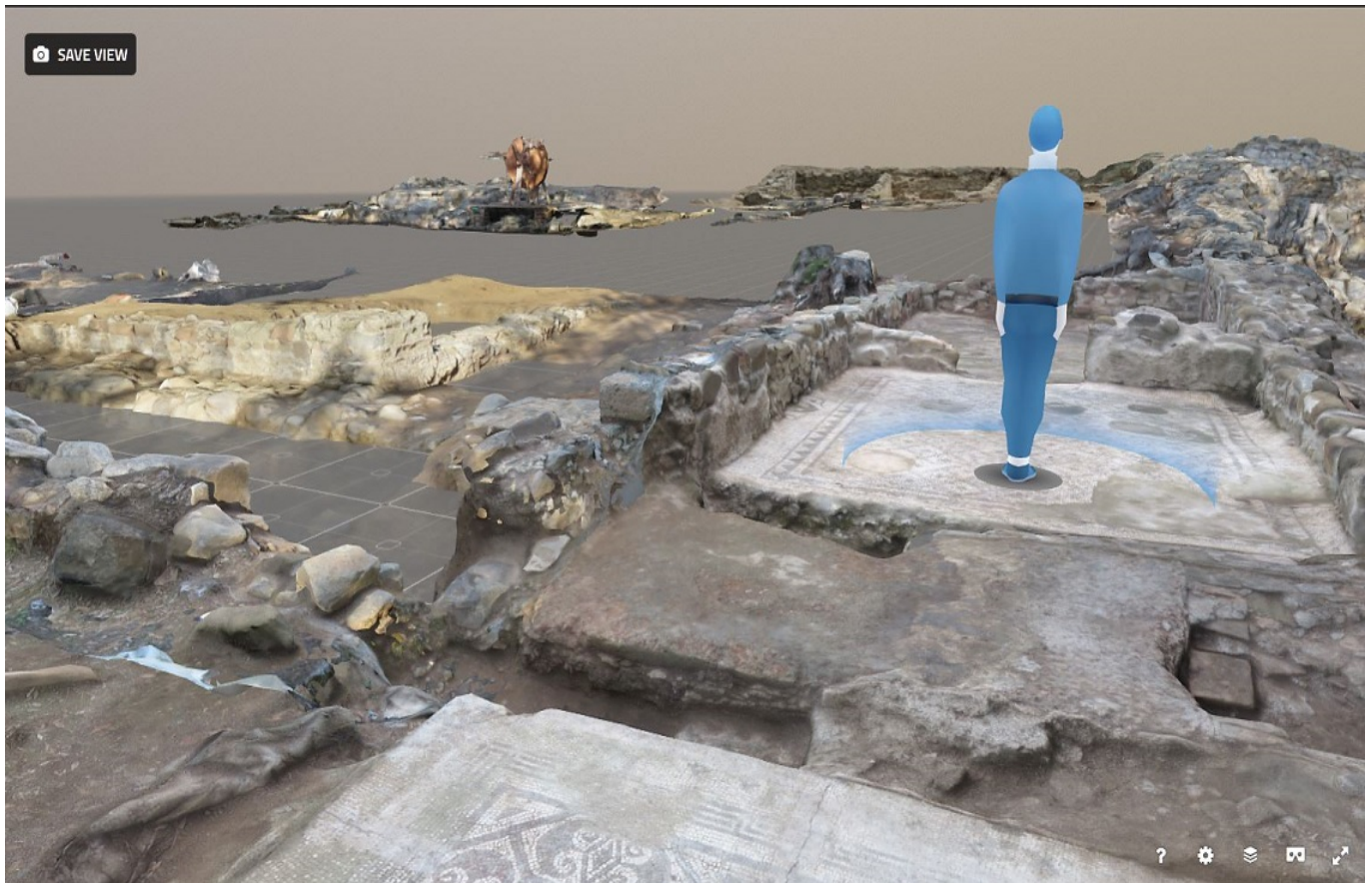


Figure 5: 3D VR settings in Sketchfab

In order to explore the benefits of this type of 3D design elements, *Archeodig* began designing a custom-made visualization of the excavation area with the game engine Unity3D. Game engines like Unity

3D ensure great flexibility in terms of formatting and allows the creation of immersive forms of navigation and exploration of virtual environments. On the other hand this project requires higher technical skills and longer development timelines. This approach, whose results are not immediate like the publication of 3D models on Sketchfab, promises several communicative advantages. Unity3D virtual environments are being designed to provide an intuitive, engaging and rich in

information virtual experience of Poggio del Molino, to which will also be added reconstructions and animations.

The use of these two approaches to the digital dissemination of Poggio del Molino's discoveries enables a deeper transmission of the knowledge to a vast and diverse audience at different levels, hence making the archaeological communication an active and social process. The users, be they onsite or in remote, can explore the 3D models at will from any angle and, by clicking on the links with information can access, at least in theory, a limitless source of information^[25].

Conclusions

Archaeology is a tale of history and virtuality allows to narrate it in numerous different ways. In fact, virtuality in its many forms does not make less valid the scientific effort of communicate history, but it instead improves the visitor's experience on and off site. Virtual environments can convey more scientific information at many different levels of interest, providing a close to real perception of the archaeological excavation in a double educational and popular perspective.

Archeodig's commitment to communication with the public led to embrace the utilization of Sketchfab and Unity 3D in order to continue a strategy which has been the core of its onsite and offsite strategies. The use of virtual environments in any form, in fact, helps communication and transmits a cultural message that allows full awareness of the existence of the site and its great value as a testimony^[26]. Visual technologies can and must be used to improve the accessibility of the public by offering communication tools that allow effective support for the visit^[27] without in any way replacing the direct experience of the site, but instead enriching it^[28]. Furthermore, the (virtual) graphic restitution gives a more human idea of the spaces and a realistic image of the site (fig. 6) and is part of the archaeological research process^[29].

The digital tools *Archeodig* is using to communicate its discoveries to the public are a means of facilitating an ongoing relationship between the archaeologists and the community who supports it since its inception.



Figure 6: Experiencing Poggio del Molino in VR on site

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Footnotes

[1] Manacorda 2008.

[2] Baione *et al.* 2018.

[3] De Tommaso *et al.* 2010.

[4] A [3D view of the excavation area](#) of Poggio del Molino.

[5] Megale 2016; Genovesi, Megale 2016, 1-7.

[6] Sandstone blocks with inscriptions from Poggio del Molino (today at the Museo archeologico di Piombino), [3D model](#). The engraved numbers indicate the linear measurements of the sides of the fort *p(edes)* 188 and *p(edes)* 191, which correspond to 55,65 and 56,54 meters. The internal area was of about 3,145 sq. m.

[7] Genovesi, Megale 2016, 7-12; Megale, Genovesi 2013.

[8] The vats used for processing the raw fish had a rectangular form (with sides of about 2 m) and were faced with waterproof mortaring (*cocciopesto*). They also featured a circular depression in the middle for the collection of discard and waste. [Here](#) the 3D model.

[9] The name *Caius Caecina Largo* is paint (*titulus pictus*) on the neck of a Betic amphora, [here](#) the 3D model, found in an underground storage at Poggio del Molino.

- [10] [3D model](#) of the so called “Sala del Mare”, with amphoras and anchors, at the Museo etrusco di Populonia Collezione Gasparri, Castello di Populonia.
- [11] De Tommaso 1998.
- [12] [3D model](#) of part of the residential sector of Poggio del Molino. For the mosaics analysis see Bueno, Megale to be published.
- [13] [3D model](#) of the bath complex. For the mosaics analysis see Bueno *et al.* 2012.
- [14] [3D model](#) of the domestic quarter.
- [15] [3D model](#) of the lime kiln built in the bath.
- [16] [3D model](#) of the Early Christian oil lamp found in the villa.
- [17] Megale 2015.
- [18] <https://earthwatch.org/Expeditions/Unearting-Ancient-History-in-Tuscany>.
- [19] <http://www.archeostorie.it/che-cose-il-parco-di-archeologia-condivisa/>.
- [20] Manacorda 2007.
- [21] For other examples of the use of SFM in archaeology see for instance Green *et al.* 2014, Lopez *et al.* 2016, Pollefeys *et al.* 2003.
- [22] <https://sketchfab.com/PArCo-poggiodelmolino>.
- [23] This project is currently work in progress.
- [24] See for example the [3D model of the balneum](#) at Poggio del Molino.
- [25] Gabellone 2015.
- [26] *Idem.*
- [27] *Idem.*
- [28] De Kerckhove 1999.
- [29] Manacorda 2007.

Campi meta
