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Stefano Campana, Roberto Scopigno,
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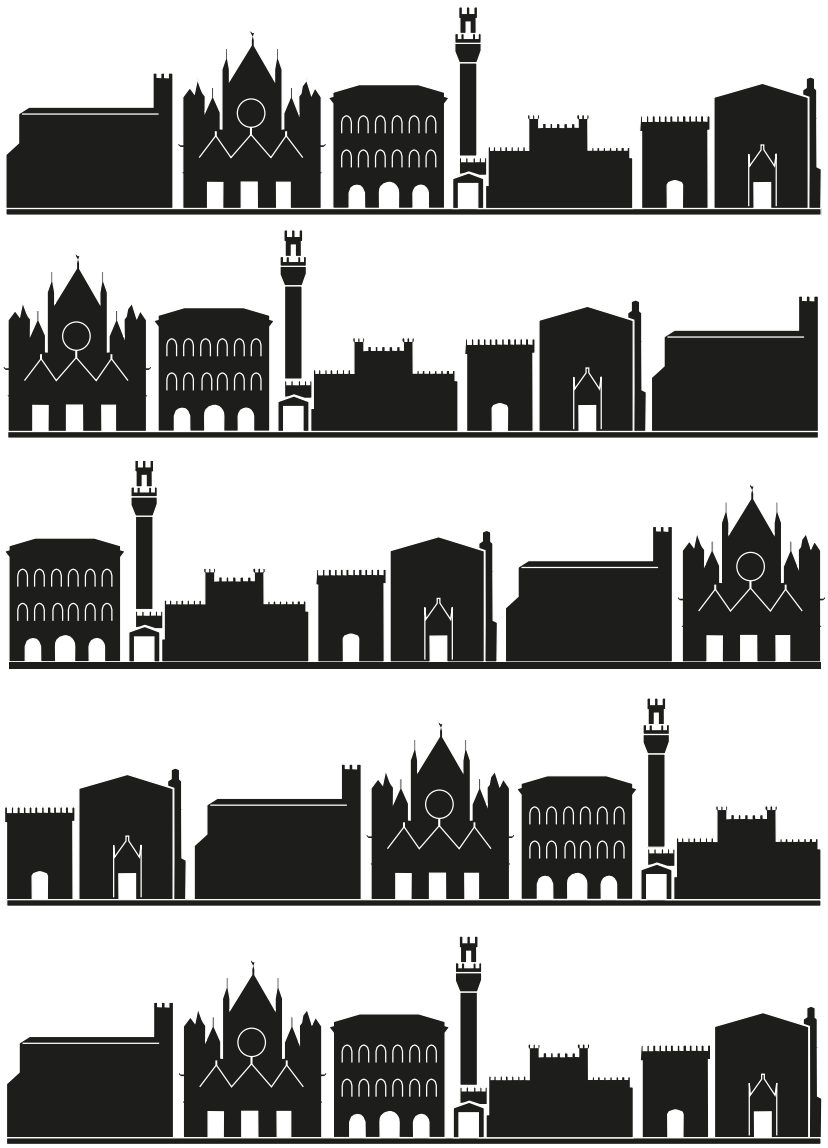

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The New Trend of 3D Archaeology is … Going 2D!

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Abstract: Nowadays we cannot imagine any archaeological activity – fieldwork, lab work or historical analysis and synthesis – without the support of information technologies. 3D is an important part of this scenario, considering that archaeology is a reality composed of 3D entities that have to be analysed, understood and reconstructed. It comes as no surprise, therefore, that the 3D reconstruction of monuments and sites is one of the most important applications of IT to archaeology, given its ability to recreate, in a perfect and realistic form, something that no longer exists with a strong visual impact. But what if we move our aim from visualisation techniques to content? If we focus on communication aspects, we need to consider the fact that 3D may not always be the right solution: if our goal is to make the real meaning of archaeology fully understandable to a wider audience we need something more: we need a story.

Keywords: 3D archaeology, Storytelling, Digital animation, Popular communication

1 State of the art

It is impossible to imagine any archaeological activity today that does not have the support of digital technologies: their impact on archaeology has grown continuously over the last few decades. Digital technologies have become so rooted in the procedures of analysis, recording, interpretation and reconstruction that we might even begin think of the advent of a veritable digital archaeology in the near future (Evans, Daly 2006), in which the application to archaeological methodology of tools devised for other purposes will not only speed it up, automate it and make its results more efficient, but also transform it from the inside, by exploiting and supporting the innovations that digital has to offer. This is not only true of archaeology: the same kind of integration can be clearly perceived throughout all fields of cultural communication, in which it plays a growing and expanding role.

But what are the terms of this growing interaction and what can we expect for our field in the future? The challenge in the coming years will certainly not be to continue to spread digital technologies but rather to elaborate a new methodology (Barcelò 2009) that fully exploits their cultural potential. The real objective, in other words, is not to be confused therefore with technological development, which, as we can easily imagine, will grow enormously and will always lead to experimentation with new tools and solutions, in archaeology as well; but rather to construct a new and richer integration which aims to make the archaeology of the future a shared, public and sustainable one (Volpe, De Felice 2014).

In short, the new approach to a better integration between archaeology and digital technologies must necessarily overcome the present phase of 'triumphalism' (Orlandi 2009) and proceed to a complete renewal of methods (Forte 2007: 5-6; Forte, Dell'Unto, Issavi, Onsurez, Lercari 2012) involving all sectors and a wide span of possible technical solutions (Doneus, Neubauer 2006; Lieberwirth, Fritsch, Metz, Neteler, Kühnle 2013) for research, training, safeguarding, but also the profession itself, including communication (Rua, Alvito 2011; Tsiafaki, Michailidou 2015). Indeed, communication is the real channel between the discipline and the public (Fowler 2007: 90), the true path to follow toward the transformation of archaeology from a self-referential discipline to a tool for cultural growth, which is not merely illusory, but increasingly real and self-aware (Kulik 2007: 112). This means continuing to shift the objective from ever-more advanced technologies to the quality of the contents, to identifying the right languages for communication and creating the right styles for visualisation.

Historically, the rise of virtual archaeology has always been supported by the desire to recreate in 3 dimension a complex and stratified reality; on one hand renewing the documentation methods using 3D survey and analysis technologies and on the other using the potentials of computer graphics to transmit research hypotheses and reconstructions.

On the side of analysis, documentation and interpretation, the technologies of ever-more rapid and efficient three-dimensional surveys have greatly improved the phases of data collection and analysis, contributing to develop new documentation methodologies both in a site or landscape perspective. The use of 3D spatial analyses, Digital Terrain Models or large-scale 3D surveys is deeply changing the core of archaeological research. This is hardly strange when we consider that the reality investigated by archaeology is made up of three-dimensional entities that have to be measured, analysed, understood and reconstructed (Barcelò 2001).

On the side of reconstruction, digital technologies have provided valid solutions for reconstruction, visualisation and interpretation. Fascinated by the prospect of technologies that can make the process of reconstruction both rapid and precise, archaeologists have soon embraced new visualization technologies for their communicative purposes. It is not surprising that the reconstruction of monuments and sites represents today one of the most important applications of 3D digital technologies to archaeology, given their capacity to measure and recreate, in a perfect and realistic style, something which no longer exists. Relying on such strengths, 3D visualisation is today the principal medium of archaeological communication: the demand for multimedia products in museums and parks or other cultural institutions remains high, while the pursuit of ever more beautiful and attractive products is in full swing.

Nevertheless, a side effect of this approach to 3D technologies for communication is that sometimes it is the technologies that are exhibited, and archaeological heritage has sometimes swiftly become a collection of finds and monuments from which to choose, case by case, the one that will most enhance the technical capabilities of computers and software. 3D surveys of entire monumental complexes or ancient art objects, immersive models of famous archaeological sites, as well as high quality virtual reconstructions have drawn the attention away from other components of archaeology: its deductive processes, its interpretative ends, its social vocations. Indeed, archaeology is not only concerned with individual finds or huge monuments; on the contrary, it deals every day with fragments (of a whole that no longer exists) and seeks to reconstruct activities, stories, visions, cultures, of which those fragments are often the only traces. This notion, however, is not always sufficiently represented in the world of virtual archaeology, where it could constitute the basis of communication strategies by promoting more profound interconnections between research and divulgation.

2 Toward a new digital communication in archaeology

Today much of the virtual game of archaeology still involves the creation of breath-taking reconstructions and models; the rapid and uninterrupted development of computer graphic techniques seems to be taking archaeological communication (and hence most of virtual archaeology) toward what we might call a virtual neoclassicism (De Felice 2012; 2014): while archaeology continues to construct its own digital perspective (Evans, Daly 2006), the rest of the world does not seem to have realised this at all and still seems to consider it as an adventurous occupation (Brittain, Clack 2007: 16), delving into ancient secrets, strange objects and mysterious monuments, or else a dry and dusty routine of observation and cataloguing. The basic problem, therefore, is not guaranteeing, along with design quality, the scientific accuracy and reliability of the contents (Brittain, Clack 2007: 24), which should be an indisputable prerequisite, but rather to experiment with potential new forms of communication.

So what are the terms for constructing something new? This theme obviously goes beyond the limits of this paper, although I shall attempt to describe here some of the Digital Archaeology Lab's activities whose objective has been experimentation with a different approach to archaeological communication. But first some premises are necessary.

Foremost, every archaeological site, and every single find, is a complex item, which has had a long life, accumulating and superimposing many chapters of history. A site, for example, is a three-dimensional object (although these reflections can be applied perfectly well to any class of object, from the smallest fragment to the most extensive landscape); it is characterised by a multiplicity of evidence, which can be translated and recounted following various interpretative paths, not only by reconstructing its material form:

- the documentation, that is, the nearest point to a reality no longer existing.
- the diachronic dimension, that is, the successive phases of life and abandonment that are superimposed in every single object.
- the various hypotheses, which are the result of the interpretation.
- the material remains.

In other words, the significance of an archaeological object is more complex than its material aspect (Barcelò 2003; Carver 2011) and is profoundly linked to the story it conceals and yet could reveal. In only a few cases can an archaeological site be attributed to a single phase of life and just as rarely can the function of a find be easily understood. Indeed, alongside the archaeology of the monument and masterpiece there is another kind of archaeology: one which sees archaeologists involved daily in toilsome excavations without any glory, both for scientific research and professional activity. Excavations, or more generally field research (for example, the survey), rarely lead to clamorous discoveries but rather they amass, datum after datum, a quantity of knowledge which is cumulative: the same quantity of knowledge that is accumulated in archives and academic publications, in that 'grey literature' which constitutes the greater part of our knowledge and so is also the main vehicle of communication for archaeology. This is a corpus of writings destined for experts, which rarely comes into contact with didactic communication, except for being, in some cases, its remote source.

So, undoubtedly, the greatest challenge for the future of archaeological communication is that of finding new connections between technical solutions and the expressive potentials of the discipline (Forte 2006), which can go beyond the attention toward the material and monumental aspects, and aim instead to use the data and information that are the true assets of archaeological heritage and the work itself of professional archaeologists. So new languages and expressive forms are needed, which can overcome the tendency toward photorealism and an anachronistic concept of reconstruction. What is needed is the creation of writing styles and narratives that can animate the bulk of knowledge scattered throughout archaeology. Apart from requiring formal perfection and the visualisation of hypotheses in high resolution, we could require digital technologies to support a narrative plot, to tell a story, to help transmit cultural messages in different ways and forms.

3 From technologies to contents

What happens when we shift our interest from the techniques of visualisation to the contents? From the viewpoint of the message conveyed, what types of products are the outcome of the application of 3D computer graphic technologies to archaeology? The impression is that, to the detriment of a methodological evolution, which has shifted the focus from the monument to the site and from the object to the context, there persists an interest by 'virtual archaeologists' for the monumental and antiquarian dimension of archaeology, which I have called virtual neoclassicism.

But in the dissemination of archaeology, as in any other scientific discipline, it is always better to start from the need to consider objects and contents first and foremost and then to select the right technique or technology for their realisation. If we start with this consideration, we can easily reach the conclusion that sometimes 3D might not be the ideal solution. No one is trying to deny the multidimensional nature of the archaeological record, but the fact remains that every man-

Fig. 1. The archaeological collection at Palazzo Branciforte. One LCD panel in the foreground.

made fact, every eco-fact or site, is always more complex than its material aspect and that even the most accurate 3D survey and the most amazing 3D reconstruction are merely parts of the research process, or rather tools that can support interpretation.

If our goal is to make fully understandable to the public the true significance of archaeology – that is, the process of analysis / synthesis, recording / reconstruction – then a 3D model is not enough; we need a story. And in certain cases it might happen that the story an archaeologist can imagine in order to describe the results of his/her research, is not 'compatible' with the language of 3D computer graphics, but can be better conveyed by other expressive means, which can transmit and translate the messages such research bears for the community.

And so here is the next step, which has involved the Digital Archaeology Lab (LAD) of Foggia University in the production of a series of CGI films as part of the activities of the project Living Heritage, concluded in March 2015. The broader project has led to the realisation of a framework of storytelling for cultural assets, that is, to the production of narrative episodes which do not require specific technical skills but which allow the authors to create an app (see De Felice 2013b, De Felice, Santacesaria 2013 and De Felice 2015 for a more detailed description of the project) and distribute it in the major stores, both for mobile devices and desktops. In any case, perusing the episodes is extremely intuitive and simple and comes about through simple gestures on a touch screen or with the mouse on a desktop.

The storytelling framework allows for the creation of episodes composed of different scenes, cartoon strips and other types of content, but it also envisages user interaction with a series of materials for a more in-depth analysis, in a separate menu. In this way the narrative and the scientific contents are kept separate yet linked by a story. The follow-up materials can be of different types: texts, audios, images and, of course, videos.

The first experiment with this framework was the exhibition (in 2012–13) of the archaeological collection of the Fondazione Sicilia in the Palazzo Branciforte in Palermo (De Felice 2013a), for which 23 narrative episodes were created, dedicated to Greek ceramics and their social, technical and iconographic aspects (a demo is available at www.branciforte.archeologiadigitale.it).

The interaction between the 5000 objects (mostly pottery) of the archaeological collection and the visitors to the museum has been entrusted to a natural gesture interface based on common multi-touch gestures like tap, swipe, pinch and so on. By simply touching the screen of two large LCD panels installed in the museum, the visitor can browse a network of 46 different episodes linked to the history of Greek Sicily, in which the main inspiration comes from pottery and material culture. By moving objects, playing games, reading texts, browsing through images the visitor can build his/her own itinerary, experiencing a visit to the museum that is always new.

The inspiration for both the contents and the staging techniques was the vast repertory of images on the vases in the collection, given that there were not a lot of data allowing for a detailed setting of the collection pieces, which moreover lacked any context related to their discovery, as often happens in archaeological museums, in which the quantity of exhibited objects and the absence of a narrative thread create an alienating effect that does not arouse the visitor's curiosity. The second, and final, experiment, for which three episodes were created, was in the archaeological museum in Bari, which is about to reopen in a new home after being closed for 20 years (De Felice 2013b).

In both cases, among the contents populating the episodes were some brief animated clips (from 30 seconds to a minute in length) produced with computer graphics, which were inspired by the respective collections, especially the antique ceramics,

and by the anthropological, social and technical aspects which these objects convey. Greek vases in the case of Palazzo Branciforte, indigenous vases from the Peucetian culture in the case of the archaeological museum in Bari. In both cases, right from the start of collecting source materials, (for the work flow see De Felice, Santacesaria 2013), it was clear that an accurate reconstruction, of the structures, homes, landscapes and so on, of these elusive peoples (for whom we have only a few traces, related to their homes and material culture) would be impossible, given the scarcity of existing studies on them and the objective difficulties of interpretation and reconstruction.

Finally, both experiments were dedicated to contexts from which it was difficult to extract data or sources of inspiration, contexts in which the finds are the 'mute' testimony of a remote world that is difficult to reconstruct. Nevertheless, it is important to reiterate, this state of affairs does not represent an exception in the archaeology of the 'everyday', which is far removed and different from the archaeology of the outstanding discovery, of the monument and the masterpiece. There are many archaeological sites and museums containing objects, finds and structures that are as numerous as they are humble, as fragmentary as they are incomprehensible.

So in order to respect and enhance this 'everyday' archaeology, not only is it possible but absolutely necessary to devise a different kind of communicative style, one that goes beyond the monumental reconstruction, which is inapplicable to such contexts. If the 20th century has taught us that archaeology is not a study of monuments but a quest for humankind and its activities, often these reflections, which are now held to be self-evident by the archaeological community, do not reach the public and society in general, for which archaeology continues to be confused with a treasure hunt.

In both cases a narrative idea – or in cinematographic terms, a subject – was immediately sought. Since computer graphics is a cinematographic technique in the full sense, it was deemed wise to follow from the beginning a process resembling the production of a film, beginning with the subject and screenplay and then moving on to the work of storyboarding. Not only. In the initial concept, the style should be considered as an integral part of the narration, since it is the fundamental visual vehicle. Computer graphics was therefore required to play the role that suits it best: creating an imaginary, invented style.

In other words, the thrust of our argument has been from the beginning to temper adequately style with content; and so straight away the idea of entrusting ourselves to photorealism seemed inappropriate, for at least two reasons:

- the glaring contrast between image quality and available data scarcity.

- the sustainability, given that the production cost in high resolution would have used up almost all the available resources to the detriment of other parts of the project.

In addition, a simple style is more sustainable to a small team, not only because it is less burdensome in terms of hardware, but also because it opens the door to animation, even from a technical viewpoint, constituting the true purpose for which CGI programmes have been developed: not just static image creation but proper animation. Indeed, there are cases in which our knowledge of certain aspects of the past is not sufficient for a technical 'reconstruction'. Yet there are also cases in which creativity can fill the gaps left by a lack of data and information, and become the prime vehicle of communication.

The videos produced for the Fondazione Sicilia are dedicated to showing the link between the static scenes on the vases, especially the representation of sporting events, and the movements to which they clearly allude (Fig. 2). In this case the link between image and scientific knowledge is highlighted by the animation, which creates a mini-story around a sporting event or gesture: long jump, javelin throwing, apobates, discus throwing all come to life on the surface of the vases and give a meaning to an action which would otherwise be incomprehensible in its static state. The desire to make a direct connection between the animated scenes and the originals has also influenced the style, which has remained strongly two-dimensional as a tribute to the iconographic culture of Greek ceramics.

On the other hand, the four videos called *Pazzi da museo* – the Italian expression is a pun on the word *pezzo* (piece) and *pazzo* (crazy) – produced for the archaeological museum in Bari are the deliberately ironic and clamorous result of a choice: to convey a message containing what little knowledge we have acquired about the Peucetians, using a simple and ironic style. The distance between the seriousness of the captions and the irony of the short clip is intended to help familiarise the public with what basic knowledge we have of this civilisation.

Actually, we know very little about the Peucetians (and we could say the same about many ancient peoples) except for their ceramics (*idem*), which is practically the only source with a visual element. Peucetian geometric vases are decorated with a myriad of motifs, amongst which stand out those with phytomorphic, zoomorphic and anthropomorphic elements, which represent the only visual traces of this population; traces which are slim and fragmentary, true, but nevertheless original, going straight back to the men who made them. In order to respect these traces and to enhance their uniqueness we decided to use the decorative motifs on the vases in order to create the setting for the clips.

4 Archaeology as a story

In both experiments the uniqueness of the context encouraged us to elaborate a style in which the objects' distinctive elements were not only represented, but constituted the *imaginarium* in which to set the stories, which were reconstructed from the specific scientific literature in each case. The style is necessarily and rigidly two-dimensional, as is almost all of ancient vase painting. Indeed, we must not confuse the plasticity of the support with the absolute flatness of the message it conveys. In the end, 3D computer graphics is merely a branch of computer graphics, a tool that belongs to the world of make-believe. Authoring software itself is just a tool for creating special effects, and is directly linked to the film industry, and more generally to the world of special effects. So it is clear that before choosing the tools with which to produce a communicative act we first need to think of a narrative plot, a director, a setting, perhaps the actors too, and so on.

Telling even a short story is indeed the best way to catch and enthral the public's attention. Telling and listening are

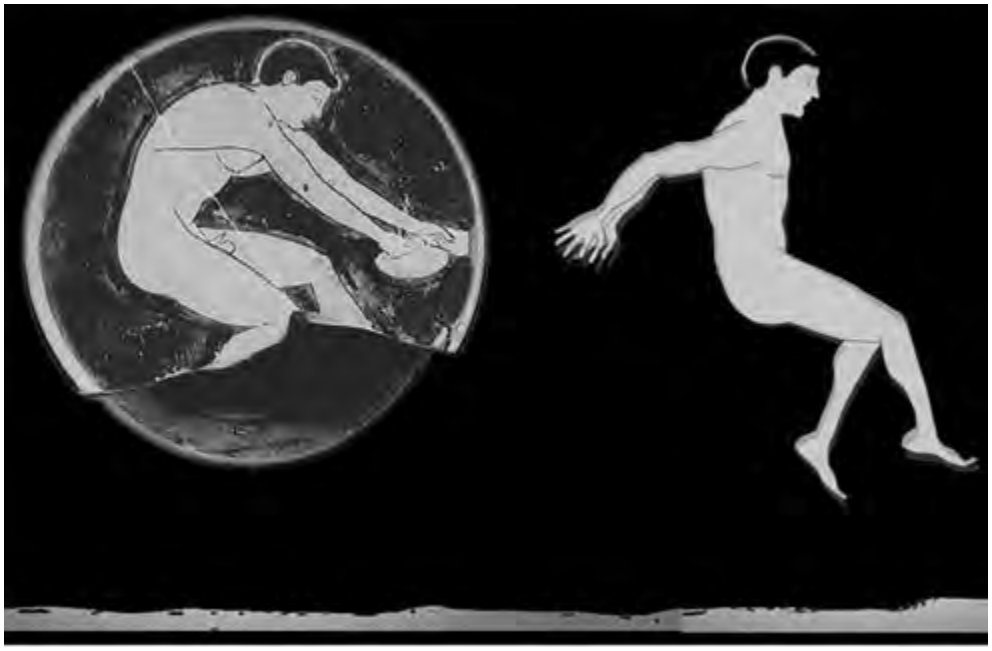

Fig. 2. From picture to animation. Long-jump scene.

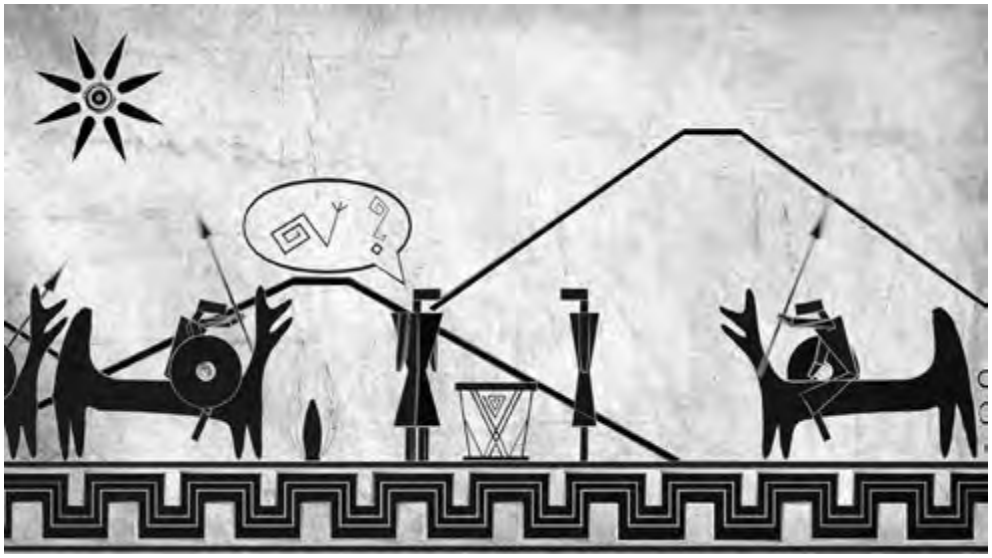

Fig. 3. A still image from 'how I won the war' videoclip.

profoundly human and perfectly serviceable ways to convey even the most difficult scientific concepts. And narrating is a true operation of reconstruction, since only in the moment of exposition to the public can we truly understand not only the object of the narration, but also the best way to make it comprehensible. Reconstruction by archaeologists is very similar to narration, since it concerns not only the material and monumental aspects, but also fully embraces the imaginary dimension. So it should never be confused with anastolysis, which restores an object to one of its many phases of life (whether in virtual mode, material, miniature or full-scale).

More generally, perhaps the basic issue is not guaranteeing the high-quality design, accuracy and reliability of the scientific contents (Carver 2011; Kulik 2007) which should be indisputable prerequisites in any case – but rather experimenting with new forms of communication. In other words, the story first of all! But the good news is that archaeology is already a story just waiting to be told. So in undertaking a communication project about archaeology, the first question to ask ourselves is 'what story do we want to tell?', next 'who do we want to tell it to?', and only then can we ask ourselves 'what is the best means for doing so?'.

All the videos quoted in the paper are on Giuliano De Felice's YouTube channel.

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