

Chapter 12

How to Combine Virtual and Reality in Archaeology Communication: A Brief Overview of Mixed Reality and “Its Surroundings”

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ABSTRACT

Within digital archaeology, an important part is centered on technologies that allow representing, or replaying, ancient environments. It is a field where scientific competences' contribution to contents makes a difference, and pedagogical repercussion are stimulating. Among the other reality technologies, the Mixed Reality, giving the possibility to experience in front of the users' eyes both static models of individual objects and entire landscapes, it is increasingly used in archaeological contexts as display technology, with different purposes such as educational, informative, or simply for entertainment. This chapter provides a high-level overview about possible orientations and uses of this technology in cultural heritage, also sketching its use in gaming within the role of gaming itself in smart communication of archaeological contents and issues.

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INTRODUCTION

Advances in Computer Vision, graphical processing power, display technologies and input systems are finally making reality technologies something actual and key elements in several communication fields.

The rivers of ink used to emphasize the potential enclosed in all applications that leverage reality technologies within the cultural heritage sector (a recent, but non complete, survey in Pierdicca, Frontoni, Maliverni & Gain, 2018), in particular in disciplines such as archaeology, which have to do with structures, environments and in general objects and things that are well suited to be rebuilt and explored, are far from exhausting a topic that needs to be outlined over and over, because in becoming is the discipline itself, especially, but not only, from a point of view of refinement of the employed techniques.

A high-level overview focused on the evolution and the main characteristics of one in particular of these technologies, the mixed reality, opens to new scenarios for archaeology communication in the broader framework of a communication that becomes perception and knowledge through direct contact.

BACKGROUND

Technological advances have been and are particularly vivid in the technologies reality field, and over time there have been diversified manifestations, scopes and purposes of use, while simultaneously multiplying terminologies and denominations, often confused between them.

The terms of Virtual Reality (VR) and Augmented Reality (AR) define in fact substantially different concepts: simplifying, if the former is a fully virtual environment browsable in immersive navigation through special devices, in the latter there is the overlay of digital content or virtual objects (images, videos, or interactive data) on the real-world environment.

The term ‘Mixed Reality’ (MR) is more recent and defines a more complex panorama (not to be confused with the AR one), placing itself at the center of the so called “Virtuality Continuum” (Milgram & Kishino, 1994). MR is in fact the “*blending of the physical world and digital world*” (Bray, McCulloch, Schonning, & Zeller, 2018).

In MR virtual objects are inserted in the real context in an immersive and interactive way and, unlike the VR, the user still has real-world perception and real and virtual contents can interact with each other in real time. This happens in two possible scenarios: the first one starts with the real world in which digital objects are included, such as holograms, as if it was really there; and the second one starts with the virtual world – the digital environment is anchored to and replaces the real world to help users avoid physical objects.

Allowing people wearing a holographic device to see reconstructed 3D objects immersed in the real environment, this technology gives the possibility to experience in front of the users’ eyes both static models of individual objects and entire landscapes, and at the same time with immersive devices it is possible to hide the real world replacing it with a digital experience.

Looking at the application fields of reality technologies, considered as a whole, there are virtually no limits or boundaries: experiments, projects, tests and final products have covered areas ranging from communication to educational, marketing to medicine, from industry to travel, to human sciences and more.

MR application in the Cultural Heritage world, and especially in archaeology, are very recent, and owe a lot to the other reality technologies with much more history, also in relation to the other emergent technologies.

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