Ontological Issues in Architectural Digital Heritage Interdisciplinary World

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ABSTRACT

The growing of digital tools – often of ease and affordable use –, the rise of ICT, the diffusion of digital devices, have brought to the spread of 3-D models, computer-based visualization, and the rise of advanced applications and of new scientific methodologies. The common practice with digital heritage, its affordances, and the interoperable use of digital instruments favour interdisciplinary works and collaborations between scholars and professionals. According to this context, aim of the paper is to offer a critical reflection on characteristics of architectural heritage and how digital heritage has influenced the discipline, to define references on which root interdisciplinary collaboration, underline peculiar aspects and suggest critical approaches for a wise use of digital tools, foster the study of experiences made in different fields, and support a useful collaboration between researchers of different fields.

KEYWORDS

3-D Model, Architectural Heritage, Digital Heritage, Interdisciplinarity, Ontology, Visualization

INTRODUCTION: FROM DIGITAL HERITAGE TO INTERDISCIPLINARITY

In 1999, on UNESCO’s “World Heritage Magazine”, R. J. Stone defined Virtual Heritage as: “the utilization of technology for interpretation, conservation and preservation of Natural, Cultural and World Heritage” (Stone, 1999). Later, many pages have been written about the concept of “Digital Heritage”, especially from the publication of the “Charter on the Preservation of the Digital Heritage” by UNESCO in 2003. Here the “Digital Heritage” is made by: “…cultural, educational, scientific and administrative resources, as well as technical, medical and other kinds of information created digitally, or converted into digital form from existing analogue resources including different kinds of products such as texts, databases, images, audio, graphics, software and web pages…”

The growing of computing capabilities, the development of Information and Communication Technologies, the “affordances” (Gibson, 1979) of digital heritage for different purposes, and the diffusion of non-expensive – often free – software and apps of easy use have made digital tools ever more affordable for everyone and used indifferently and simultaneously in dissimilar research fields with the diffusion of digital contents. There is a constant ever rising of digital products, and a wide overlapping and mixing of tools, methodologies, and research object and aims made by different kind of scholars, such as computer scientists, topographers, surveyors, archaeologists, architects, engineers. Consequently, Digital Heritage is often intended as a cornerstone on which academic fields are making an ‘ecosystem’ growing.

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Commenting papers presented at the two congresses on “Digital Heritage” of 2013 and 2015, Pescarin (2016) writes “Although the accepted UNESCO definition of Digital Heritage concerns any digital material referred to our heritage that has a value and needs to be preserved (UNESCO, 2003), Digital Heritage is used today by the scientific community in a wider sense, referring to ICT applications and technological approaches to our cultural and natural heritage, or, better, to the use of digital media in the service of heritage (Cameron & Kenderdine, 2007). Digital Heritage is a domain that comprehends several different research fields and disciplines, from museography to computer graphics, from archaeology to design, from art history to engineering, from archives to statistics, etc. It is therefore a general term, which includes many ICT topics and heritage themes, and in most cases, most of nowadays research lays in the overlapping and interconnection among them” (p.1).

Today there is the awareness that technologies cannot be seen as mere aid instruments for surveying or visualization, but they favour a development of research methodologies for knowledge, understanding, interpretation, presentation, and conservation. Computer-based visualization takes ever more importance, according to the line of visual computing, i.e. the analysis technique based on the visual representation of data. It favors the study of large amount of data, and of complex systems of heterogeneous data (textual, visual, audio, etc.). Those data can derive from various kinds or phenomena, also from non-visual ones. In fact, visual computing consists in the representation of multi-dimensional digital environments, where there is a complex interaction of an elevated number of agents simulating different kinds of data and information. The images of data provide information and through the manipulation of the images, we can observe, interact with, compute and control the data and the information, and create new knowledge (Card, Mackinlay, & Shneiderman, 1999).

As a consequence of the diffusion of digital visualization, derives the interest in this subject by many disciplines, in particular those interested in built heritage: humanities scholars – especially ones involved in museography (Parry, 2010. Cameron & Kenderdine, 2010) –, archaeologists (Frischer, 2008; Lake, 2014), architects (Docci, 2005; Gaiani, 2006; Calabi, 2013; Tamborino, 2014), and in general scholars of history (Weller, 2012) have begun to work and reflect on digital heritage derived from tangible artefacts (see Figure 1).

The complexity of heritage issues requires the involvement of interdisciplinary teams, made by scholars of different fields: Historians, humanities, museographers, archaeologists, architects, engineers, experts of ICT, etc. Additionally, new matters arise from digital heritage. The common use of the same digital instruments and applications promotes the intersection of disciplines. Therefore, according to digital heritage characteristics of inter-disciplinarity and/or trans-disciplinarity, the digital heritage has become the subject of dissimilar categories of researchers, for unlike purposes, with diverse levels of engagement. At the same time, scholars work together on the same object. Conferences and journals on digital heritage grow up. Undoubtedly, interdisciplinarity is an important aspect, which can promote results of particular value and high levels of innovation. However, the ever-strict collaboration between different scholars requires the definition of ontologies, thesauri, and glossary useful to allow their collaboration. The common use of the same digital instruments and applications promotes the intersection of disciplines, and in practice, very often the scholars are tempted by hazardous trespassing in other fields. Nevertheless, the crossing of the walls is useful – rather necessary – for a cultural updating and enrichment, but these intrusions require maximum critical awareness (Brusaporci, 2016).

Ross Perry (2003) underlines how the diffusion of digital tools poses disciplinary, cultural, methodological, and operative issues to the academics. In fact, “… disciplines typically preserve their own canon of key works, their own common grammar of research questions, as well as core sets of methodologies and even shared protocols of publishing. Offering identity, community and
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