

Reviews

Renato Angeloni

Rappresentazione digitale e realtà estesa. Soluzioni per la fruizione del patrimonio culturale

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In contemporary debates on digital cultural heritage, there is no shortage of highly technical volumes on surveying and many, often more popular, texts on virtual and augmented reality. Renato Angeloni's book, *Rappresentazione digitale e realtà estesa. Soluzioni per la fruizione del patrimonio culturale*, occupies an interesting intermediate position: it is neither an operational handbook nor a simple catalogue of 'immersive' experiences, but rather a deliberate attempt to establish continuity between the culture of architectural surveying and digital fruition practices, taking the 3D model as a shared infrastructure between documentation and access.

Published by Aracne in the series *Architettura, Costruzione e Recupero del Patrimonio - Ricerche*, it proposes a concise yet articulated trajectory that connects the normative and methodological framework of digitisation with exemplary case studies, in which the digital model becomes a device for knowledge, access, and cultural mediation. The structure is clearly organised into three parts. Following Paolo Clini's preface and an introduction that recalls the European Year of Cultural Heritage 2018 and recent European strategies for heritage protection and enhancement, the first chapter is devoted to techniques for the digital representation of heritage, the second to fruition from physical reality to extended reality, and the third to models and applied experiences. The decision to distinguish sharply between the acquisition phase and the fruition phase, and then converge on a set of emblematic case studies, produces a coherent framework that guides the reader from theoretical methodological premises to operative outcomes.

In Chapter I, the author provides an up-to-date overview of the main survey and data acquisition methodologies, distinguishing between image-based and range-based methods. The former are presented along a trajectory that runs from traditional photogrammetry to recent automated procedures and the potential of image-based

reconstructions assisted by artificial intelligence; the latter focus on active sensors, particularly terrestrial laser scanning, highlighting both technological evolution and its implications for workflows and pointcloud management.

Chapter II constitutes the conceptual core of the book, shifting the focus from digital replica to the construction of experience. Angeloni adopts Milgram and Kishino's Reality-Virtuality Continuum as a theoretical framework to define the different declinations of extended reality – augmented, mixed, and virtual – and organises the discussion around degrees of immersion, the nature of interaction, and the relationship between the physical world and digital content. Within this framework, AR is described as an *in situ* enrichment device, MR as a hybrid space in which users interact with physical and digital objects, and VR as a fully simulated environment granting access to remote, fragile, or lost places. Perhaps the most original aspect of this chapter does not lie in the taxonomy of technologies as such, but rather in the effort to root their use in a perspective of accessibility and cultural rights. By emphasising the possibility of 'virtually' bringing works and sites into homes, schools, and distant communities, Angeloni interprets digitisation as a cultural and political act, capable of reducing geographic, economic, and physical barriers and enabling forms of informed participation. In this sense, XR is not presented as a merely spectacular device but as a tool for modulating the visitor's experience, calibrating it to users' skills, needs, and constraints.

The reference to the ThreeYear Plan for the Digitisation and Innovation of Museums (Direzione Generale Musei - MiBACT) and, more broadly, to national guidelines for 'aware' digitisation of heritage allows the author to situate his argument within a clear institutional and policy framework. The adoption of the lexicon of digital transformation – management, conservation, access, innovative services – is, however,



constantly mediated by a disciplinary perspective firmly anchored in the culture of drawing and surveying, which remain the devices through which data quality, and consequently experience quality, are constructed.

The three examples presented in Chapter III are not mere appendices but genuine argumentative devices. Federico da Montefeltro's *Studio* in Urbino is interpreted as a laboratory for recomposing a 'scattered' interior, in which the digital replica restores a spatial and semantic unity weakened by the history of collecting and dispersion. The underground chambers of Palazzo Campana clearly demonstrate the substitutive – and not only integrative – role of virtual experiences: closure to the public for conservation reasons makes the VR environment the only possible access, turning the 3D model into an interface between conservation and fruition. Leonardo's machines, finally, exemplify the didactic potential of extended reality: virtual disassembly and reassembly of the devices makes mechanical logics and relationships between parts explicit, shifting attention from mere 'wonder' to functional understanding.

Overall, the volume stands out for several evident strengths. First, the clarity with which it articulates the relationship between technical and experiential levels: the digital replica is never an end in itself, but is consistently related to usage scenarios, user typologies, and educational and communicative objectives. Second, the attention

to the normative framework and national strategies for digitisation helps to situate individual experiments within a systemic horizon that goes beyond the single project. Finally, the coherence among the three parts – methods of representation, extended reality, case studies – produces an effective narrative, suitable both for readers approaching the topic for the first time and for scholars and practitioners already involved in digital heritage projects.

At the same time, the book's deliberately programmatic stance reveals some room for further critical inquiry. The emphasis on the potential of XR technologies in terms of accessibility and engagement sometimes risks overshadowing problematic issues such as the digital divide, dependence on complex technological infrastructures, or the dangers of information overload and 'spectacularisation' of experience at the expense of interpretative depth. Moreover, reflection on the epistemological implications of digital replicas – the relationship between original and copy, the construction of authority in reconstructions, the role of paradata in governing interpretation – remains in the background, even though it is evoked through references to the London Charter and the tradition of scientific visualisation.

Despite these limitations, which can be read more as an invitation to future integrations than as actual shortcomings, *Rappresentazione digitale e realtà estesa* offers a significant contribution to studies on the relationship between

digital representation and heritage fruition. The writing maintains an effective balance between clarity and scientific rigour, and the volume presents itself as a useful tool not only for the community of drawing and surveying scholars, but also for museum curators, heritage professionals, and students interested in understanding how the transition "from the physical to the virtual world" can be governed with methodological awareness and careful attention to the cultural and ethical dimensions of digital transformation. *Rappresentazione digitale e realtà estesa* is, ultimately, a bridging text: between the tradition of architectural surveying and the cultures of interactivity; between the language of norms and that of experimental design; between the rhetoric of conservation and that of participation. It serves as a structured introduction for those approaching the topic for the first time – in particular students and early-career researchers – and, at the same time, as an operational synthesis for practitioners already working in the field of digital documentation and fruition, offering a concise framework within which practices and experiments can be repositioned. In this sense, rather than closing a phase, Angeloni's work appears to open a construction site: that of a mature reflection on the ways in which extended reality can become a 'third place' between research, design, and fruition, without renouncing the critical complexity of the cultural heritage it aims to serve.

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