

Abstract

Using 3D technologies in cultural heritage has rapidly grown during the last two decades. However, large museums, which usually have sufficient funds and professional digital staff, apply many techniques and tools as a part of their digital strategies, such as virtual reality (VR), augmented reality (AR), mixed reality (AR), and virtual tours (VT), as engaging tools for education, amusement, and communication purposes. At the same time, high-quality 3D modeling is successfully used for documenting, conserving, and monitoring museums' collections, besides education, designing, and solving problems. In contrast, small and medium museums usually face serious challenges, such as limited resources and the lack of professional digital staff, that prevent them from being involved in convenient digital strategies.

In order to find out convenient solutions that small and medium museums can apply such technologies at low costs without needing advanced digital skills or professional experts, this research first discusses the museum's mission in the digital era for better understanding and determining the museums' needs and challenges, through the ICOM, ICOMOS, and UNESCO definitions and standards frameworks. Second, this research deals with 3D strategies and tools, concentrating on 3D modeling, augmented reality, and virtual tours, as convenient interactive tools. It studies, compares, and evaluates the advantages and disadvantages of selected notable experiences in several museums worldwide. Furthermore, the research critically and practically tests, analyzes, and compares several free and commercial solutions a museum can use according to its circumstances and requirements.

Finally, as a case study, this research proposes an integrated 3D digital strategy for the Mallawi Museum in Egypt for documentation, education, and publishing of its collection at low costs without advanced digital skills or professional digital experts.