Chapter 30
Digital Heritage Systems: The ARCO Evaluation

Stella Sylaiou
Hellenic Open University, Greece

Martin White
University of Sussex, UK

Fotis Liarokapis
Coventry University, UK

ABSTRACT

This chapter describes the evaluation methods conducted for a digital heritage system, called ARCO (Augmented Representation of Cultural Objects), which examines the tools and methods used for its evaluation. The case study describes the knowledge acquired from several user requirement assessments, and further describes how to use this specific knowledge to provide a general framework for a holistic virtual museum evaluation. This approach will facilitate designers to determine the flaws of virtual museum environments, fill the gap between the technologies they use and those the users prefer and improve them in order to provide interactive and engaging virtual museums. The proposed model used not only quantitative, but also qualitative evaluation methods, and it is based on the extensive evaluations of the ARCO system by simple end-users, usability experts and domain experts. The main evaluation criteria were usability, presence, and learning.

ORGANIZATION BACKGROUND

The focus of this case study is the ARCO system, which was implemented through a research and development project that was partly funded by the European Union within the Information Societies Technology (IST) Programme, under Key Action 3, Multimedia, Content and Tools managed by the Information Society Directorate-General of the European Commission. The ARCO system was created by the ARCO Consortium organization – a mix of industrial and university partners across the European Union brought together for the purpose of executing the ARCO research and development project. The organization (or consortium) was comprised of the Centre for Computer Graphics at the University of Sussex, United Kingdom, who was also the project coordinator,

DOI: 10.4018/978-1-4666-6543-9.ch030

the Poznan University of Economics, Poland, the Commissariat a l' Energie Atomique, France, the Giunti Editoral Group, Italy, the University of Bath, United Kingdom, the Sussex Archaeological Society and the Victoria and Albert Museum both in the U.K.

The project's research program was implemented over three years between 2001 and 2004, and was jointly financed by the European Union and the participants to the value of around 3.1 Million Euros. The research and development program was composed of several work packages including: WP1 Project Management, WP2 Requirements Specification, WP3 Object Modeller, WP4 Interactive Model Refinement, WP5 Database Management System, WP6 XML Metadata and Schemas, WP7 Augmented Reality Interface, WP8 System Integration and Evaluation and WP9 Exploitation, IPR and Dissemination. The results of WP5, WP6 and WP7 are the focus of the evaluation discussed in this chapter's 'case description,' while the IPR resulting from WP9 re exploited in a commercial product marketed by ARCO Centrum, see the section on 'current challenges facing the organization.'

SETTING THE STAGE

Quite early on, MacDonald and Alsford stated "… museums cannot remain aloof from technological trends if they wish to attract 21st century audiences" (MacDonald & Alsford, 1997). Since the 1990's Information and Communication Technologies become increasingly a critical factor for the success of cultural organisations, such as museums. "The present fiction in museums – that every visitor is equally motivated, equipped, and enabled 'to experience art directly'- should be abandoned. It is patronising, humiliating in practice, and inaccurate" as Wright (1989, p. 148) points out. Successful choices of ICT tools and methods can support personalised access to cultural information, entertain, educate, please (Silverstone, 1994, p. 165), and enhance the virtual museum experience. This changing perspective led museums to assist visitors to construct meaning about virtual museum exhibits, tell stories about the objects, and establish *connectedness* between the museum objects, various layers of information about their context and the virtual museum visitors (Hoptman, 1992). More and more museums use ICT technologies for the documentation, conservation, organisation and dissemination of their cultural data for extending themselves to new audiences around the world and on increasing visitors' participation, education and entertainment.

Virtual museums are digital collections that provide connectedness between various objects and their context using various ICT tools and methods, in order to provide an interactive and engaging experience to their users. Engagement is defined as the "quality of user experience that facilitates more enriching interactions with computer applications. It is defined by a core set of attributes: aesthetic appeal, novelty, involvement, focused attention, perceived usability, and endurability (willingness to use an application again or recommend it to others)" (O'Brien & McLean, 2009). The virtual museums concept has been introduced as a means to enhance user experience by Tsichritzis and Gibbs (1991), and also to overcome the limitations of brick-and-mortar museums. A key component of these virtual museum environments is 'Presence,' the sense of *being there* in a mediated environment, e.g. the degree to which the users feel that they are somewhere other than they physically are while experiencing a computer generated simulation (Shloerb, 1995; Stanney et al., 1998a; Ijsselsteijn et al., 2000). On the other hand Lee (2004) considers that Presence is also "a psychological state in which virtual objects are experienced as actual objects." Users can feel present in a virtual museum environment, or consider as being present the virtual objects in the real environment for the purpose of entertainment, learning, enjoyment, and subjective satisfaction.