

# Chapter 11

## Evaluating the Use of Virtual Reality and Multimedia Applications for Presenting the Past

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### ABSTRACT

*Virtual reality applications offer various possibilities for cultural heritage interpretation, such as giving users the feeling of immersion and appealing to all their senses, making their experience lively and memorable. In order to test their effectiveness for assisting learning and successful integration in exhibitions, the authors carried out an extensive evaluation study using three case studies: the exhibition “Immaginare Roma Antica” at the Trajan Markets, Rome; the permanent displays at the Ename Museum, Belgium; and the VR displays at Hellenic Cosmos, Foundation of the Hellenic World, Athens. The chapter analyses how the applications were used, the type of learning different systems supported, how this was affected by the conditions of use, and their suitability for different groups. It also offers guidelines on evaluation methodology when studying the use of ICT in cultural settings. The study contributes to the construction of a substantial body of empirical and methodological knowledge aimed at guiding future designs and evaluations of ICT tools in exhibitions.*

### INTRODUCTION

Virtual Reality (VR) applications provide various possibilities for use in cultural heritage interpretation. They offer users (to varying degrees, depending on the type of application) the feeling

of immersion in a multimedia environment, giving them the sense that they have been transported to the recreated space, be it the streets of an ancient city or the stadium where the original Olympic Games took place. At the same time, VR applications can appeal to all the users' senses, which contributes to making the experience lively and

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memorable. Some of these possibilities have been used for informal education purposes, aiming to encourage mainly younger audiences to learn about the past, history and ancient cultures.

However, the suitability of these technological tools for assisting learning and integrating effectively in exhibitions should be tested with systematic evaluation, as their use can also raise several issues. For example, research has shown that although ICT applications can be effectively used in formal educational environments, they are sometimes poorly integrated in informal ones, such as museum exhibitions, as they follow a different communication paradigm.

In order to test the effect of various VR and multimedia applications on the visitors' experience, the Museology Laboratory of the Department of Cultural Informatics of the University of the Aegean, Greece carried out an extensive evaluation study using different case studies in different cultural institutions in three European countries, Italy, Belgium and Greece. The main part of this research was integrated in CHIRON, the Cultural Heritage Informatics Research Oriented Network<sup>1</sup>. The case studies examined in the research were compared with other similar ones from around the world, from both formal and informal educational environments, taking into account each time, the particular setting and aims of each case.

The chapter will discuss the results related to the type of learning different VR and multimedia systems support, how this is influenced by their conditions of use, their integration in museum exhibitions, and their suitability for different visitor groups, particularly children and young people. It will also analyse the guidelines we reached on evaluation methodology and the best way to study the complicated set of parameters involved in cultural heritage visits, as well as use of ICT applications.

## **THE EVALUATION STUDY: AIMS AND APPROACH**

The wider aim of the research programme was to understand the particular role of ICT in cultural heritage settings and to evaluate their effectiveness. More specifically, the programme aimed to investigate the effect of ICT applications on the visitors' experience and on their learning in informal settings. It also wanted to compare the effect of different types of ICT applications and investigate the role of the particular conditions of their use, such as the role of a human mediator and the effect of particular types of interfaces.

The study started with a critical review of existing research in museums and formal learning environments (Economou & Pujol, 2007), from which we outline very briefly here the summary of main findings. Previous studies in museums have shown that new technologies can trigger an interest and motivate visitors to examine more carefully displays and exhibition themes. On the other hand, they create problems as they:

- do not always support group interaction (as they usually follow the one-to-one communication paradigm of the personal computer.
- often conflict with the other exhibits (as they are a medium within another medium) but also with the other original objects (digital surrogate compared to original), while
- sometimes, their communication and learning objectives are compromised due to usability problems (related with their design and with the users' experience).

On the other hand, research studies in formal learning environments (schools, universities, etc) have shown that in cases of discovery learning, ICT applications allow self-evaluation and testing and increase motivation, attention and memorisation, while they can often encourage social interaction.

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