Chapter 6

Designing Educational Paths in Virtual Worlds for a Successful Hands-On Learning: Cultural Scenarios in NetConnect Project

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ABSTRACT

“Connecting European Culture through New Technology – NetConnect” is a project promoted by Culture 2000 European Programme, in which three 3D cultural scenarios have been realized and used for educational purposes. This chapter illustrates how the immersive NetConnect virtual worlds offer a technology-enhanced constructivist learning through different educational paths, that have been designed according to different levels: global/particular perspective (cultural goods are known as single historical and artistic product, as well as in relational terms with the urban space); manipulation (users can explore the content and learn by doing); - a multimedia section including videos, Pictures, and texts; details (daily life scenes are reconstructed on the basis of ancient documentation providing specific information).

INTRODUCTION

In recent years, several studies have demonstrated that Virtual Worlds (VWs) are an effective technology which can be used for teaching and training (Bertacchini, Bilotta, Pantano, & Tavernise, 2012; Tavernise, 2012; Vaca Cárdenas et al., 2014; Vaca Cárdenas, Bertacchini, Gabriele, et al., 2015). They have a great potential not only for teaching practices (Vaca Cárdenas, Bertacchini, Tavernise, et al., 2015), but also for reaching a wide public (Kuznik, 2009; Adamo et al., 2010; Duncan et al., 2012; Coban et al., 2015), and the engagement in the process of skill development (Parsons et al., 2006; Dalgarno & Lee, 2010; Dickey, 2005, 2011; Bertacchini et al., 2015). However, a fast growing area of powerful virtual

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worlds investigated as learning systems is related to Cultural Heritage (Bertacchini et al., 2008; Pantano & Tavernise, 2009). In fact, the exploration of archaeological sites from a distance, visualizing the 3D reconstruction of historical monuments that are ruined or no-longer exist, is considered as a precious resource in education. Moreover, the possibility of manipulating specific objects (cultural finds) from diverse and unique points of view, enhances students’ ability to contextualize abstract knowledge (Chit-taro & Ranon, 2007; Mendonça & Mondlane, 2014). In this view, a number of European large-scale projects dedicated to Cultural Heritage have emerged, warranting serious archaeological investigations and offering strong tools for learning (Gaitatzes et al., 2001). A meaningful example of these projects is “Connecting European Culture through New Technology – NetConnect“, promoted by Culture 2000 European Programme, in which three 3D cultural scenarios have been realized: ancient Biskupin (Poland), Glauberg (Germany), and the site of Lokroi for Magna Graecia (Italy). This chapter aims at presenting these three virtual worlds, illustrating their offer of a technology-enhanced constructivist learning.

BACKGROUND

Recent advances in multimedia and Web technology have given rise to different kinds of interactive virtual worlds (Eschenbrenner et al., 2008; Nalbant & Bostan, 2006), offering attractive opportunities both for entertainment and education: this new kind of learning has been called “Edutainment” (Bilotta et al., 2009, 2010; Tavernise & Bertacchini, 2015). In particular, a great deal of research has driven to an increasing effort in the realization of virtual cultural worlds, in order to support and promote knowledge transfer related to Cultural Heritage (CH) (Knipfer et al., 2009; Pantano & Tavernise, 2011). Hence, a large amount of CH educational contents have become available on the web through interactive three-dimensional environments, offering an experience powerful and motivating at the same time (Petric et al., 2003; Owston et al., 2009). In fact, traditional learning of CH is based on static 2D images, which are usually pictures of ruined buildings, and on fragmentary information, without the insertion of a CH find in its wide context. On the contrary, the reconstruction of an entire 3D world allows the visualization of a find in the historical context through the detailed reconstruction of buildings, cities, landscapes, and its use in daily life. Moreover, its original state is recreated through the addition of the missing parts.

These worlds have grown to be more attractive thanks to the presence of virtual agents (Vosinakis & Panayiotopoulos, 2005; Bilotta et al., 2011), as well as the opportunity of an interactive exploration and manipulation. Regarding characters in the historical context, currently there are a number of animated agents used in a variety of computer-based multimedia learning environments, because of the benefits of their presence has been demonstrated: a strong visual presence, the capability of showing emotions, and the combining of verbal and non-verbal forms of communication, strongly increase learners’ motivational impact. Regarding interactivity, digitally reconstructed cultural finds can be visualized through different levels of immersion, providing learners with the great chance to carry on users’ personalized experiences based on their interests (de Freitas & Neumann, 2009; Naccarato et al., 2011; Merchant, 2014). In particular, virtual manipulation launches an interaction with 3D objects as in a videogame (Owston et al., 2009), causing learning as the result of observation, manipulation, and interpretation of the VW (de Freitas, 2006). Hands-on activities can allow students to increase the acquiring of new concepts and procedures, as well as the retention of knowledge: students are not passive, they do not absorb information inactively, but they construct their own understanding thanks to an active role in learning. In a VW, users also perform virtual manipulation tasks as ‘naturally’ as they would do in everyday reality (e.g. to