Chapter II
Basic Aspects of VLEs and Guidelines for Supporting Learning Communities and E-Collaboration

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INTRODUCTION

This chapter aims to present the basic design principles for virtual spaces for facilitating educational designers and developers by providing a point of reference for making decisions about whether or not to incorporate 3D environments into the resources they develop as well as for extending their capabilities by integrating more functionality.

A variety of tools and technologies have been developed and used for supporting learning communities and e-collaboration. The current components, tools and systems available can be divided into three different basic concepts (Bouras & Tsiatsos, 2005; Spellmann, Mosier, Deus, & Carlson, 1997): (a) document-focused Web-based training tools, (b) meeting-focused tools, and (c) 3D-centered multiuser tools.

In particular, the document-focused Web-based training tools (e.g., WebCT, www.webct.com) focus on the management of documents and on individual learning. As far as it concerns the meeting-focused tools, they focalize on the support of synchronous communication of a user group, which is independent of place. These tools that can be separated into video conferencing tools (e.g., Microsoft's NetMeeting, www.microsoft.com) and synchronous training tools (e.g., Centra Symposium, www.centra.com), offer Web-based communication support, where participants are represented by their name and live video picture. Some of the video conferencing tools were designed especially for the purpose of training

situations. The approach of these tools is to virtually represent the concept of frontal learning. A general problem of these tools is the reduced social presence of the participants that are represented in windows, by means of live pictures. Finally, regarding the 3D-centered multiuser tools, they focus on letting each participant experience the existence of other participants as well as the interaction between them. In 3D-centered tools the participants of a virtual session are represented by avatars, which can navigate through 3D environments, and all other participants can view the actions of all other participants as well. 3D-centered multiuser tools, used as communication media, can offer the advantage of creating proximity and social presence, thereby making participants aware of the communication and interaction processes with others.

It seems that 3D-centered multiuser tools, as well as meeting-focused tools configured for e-collaboration, could be used for supporting learning communities and e-collaboration. However, current e-learning applications have many limitations that should be overcome. Some of the limitations mainly involve the lack of peer contact and interaction of learners/users working alone and the need for flexible, available tutorial support. Furthermore, the main effort is focused on designing environments that could be characterized as "places" of interaction and not simple, plain spaces. Current user interfaces have been proven insufficient to enable the user to be fully creative. In the case of 3D-centered tools, the theoretical advantages of multiuser VR technology are not exploited in an extended manner as they mainly offer text chat communication and users' representation through avatars. For example, advanced communication features, as voice or user gestures, are not commonly utilized.

For facilitating educational designers and developers on making decisions on whether to incorporate 3D environments into the resources they develop, this chapter presents two different tools as solutions for supporting e-collaboration and multiuser communication in Web-based learning communities. The first solution, called Virtual Conference, is a two-dimensional space where participants represented by their photos can use various e-collaboration tools. The second solution, called EVE Training Area, is a three-dimensional space where participants, represented by 3D humanoid avatars, can use a variety of e-collaboration tools. To this direction, the chapter describes the functionality provided by both tools, compares them, and proposes cases for exploiting each solution.

VR IN EDUCATION, TRAINING AND COLLABORATION

This section presents an overview of existing work on the usage of VR technology in distance education, learning and collaboration.

According to Kalawsky, there are many areas where VR could be used to support education:

- **Simulation of complex systems:** The benefit compared to traditional methods is the ability to observe system operation from a number of perspectives aided by high quality visualisation and interaction.
- **Macroscopic and microscopic visualisation:** The benefit compared to traditional methods is the observation of system features that would be either too small or too large to be seen on a normal scale system.
- **Fast and slow time simulation:** The benefit compared to traditional methods is the ability to control timescale in a dynamic event. This feature could operate like a fast forward or rewind preview of a modern video recorder.

Other significant characteristics of VR that could be exploited to support education are the following: