

# Chapter 25

## Collaborative Learning through Flexible Web CVE: The Experience of WebTalk

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### ABSTRACT

*This chapter describes the technological platform of the authors' learning experiences and its evolution through the years, providing insights into the reasons that led to significant design choices and offering guidelines on how to deal with technological issues.*

### INTRODUCTION

Shared virtual environments, as collaboration tools, CVE, are mainly intended as a way to support collaboration of several users working on a common (virtual) scene (data model). Communication between instructors and trainees (simulation and training applications), sharing data (for visually supported discussions of scientists or decision-makers) (CSCW), support for innovative teaching-learning and support for collaborative e-learning (CSCL), are all examples of use for

shared virtual environments. These applications (re)create a multi-user virtual world, according to Damer (1997), as two or three-dimensional graphical environments inhabited by users (represented as digital actors called “*avatars*”) that share with other users time, space and actions, cooperating together for a common goal.

Several different software systems, both commercial and research prototypes, support today's Collaborative Virtual Environments. We started in 1998 a development, WebTalk, which has evolved, over the years, to the current WebTalk04, described in the next paragraphs.

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## Previous Approaches

Our first original aim was to build a virtual museum where several visitors could “go together”. An application that allowed a virtual visit to the “*National Science and Technology Museum*” (Paolini et al., 1999; Barbieri, 2000; Barbieri & Paolini, 2001a) of Milan, was for some time available to the public, through the web site of the Museum itself. It hosted a 3D virtual exhibition on the machines “invented” by *Leonardo Da Vinci* or, more precisely, of wood machines built according to the drawings left by Leonardo. The application, award winner at the 1999 Museums and the Web international conference in New Orleans, allowed the exploration of a building, vaguely representing the actual museum. A “guide”, playing the role of “Leonardo”, had the task of guiding visitors through the virtual rooms. Virtual objects on display were either reproductions of Leonardo’s machines (on display in the museum) or gateways to web pages on the museum’s website. The reproduction of the machines, rather than being realistic, was playful (also because most of Leonardo’s machines do not work in reality).

The prototype, called WebTalk-I and written in 1998, at the HOC laboratory of the Polytechnics of Milan, was a client/server framework entirely written in Java and VRML: it required a VRML Browser and a Java Virtual Machine to run a Java applet within the browser. The browsers at that time (Netscape 4 and Explorer 4) had Java and a VRML plug-in installed by default, therefore the application was easily available for most PC users.

After six months of experimental usage, it was evident that cooperation (a loose one) among visitors was successful. Finding someone “there”, visiting the museum from a far away place, was an exciting experience: both if the meeting was “prearranged” or it happened by chance. The virtual museum, instead, by itself, was not very attractive to the users. One important highlight from the data we collected at the time, was that when there were no collaboration activities within

the system (no other users, or nobody playing Leonardo in the virtual environment), the connection time of the users was very low (typically below five minutes). On the contrary, when forms of collaborations were enacted, users remained connected an average of 53 minutes, even engaged on a single topic (Figure 1).

We had therefore the evidence that collaboration within virtual environments had a clear, outstanding and unexploited potential for attracting attention and interest of a vast range of participants, regardless of their level of education, sustaining their attention for a long time.

“WebTalk-II” was the term for an initial framework project whose goal was to tackle the issues described above, by drafting a generic architecture that was to be the foundation for all subsequent research and development activities. The idea was to lay out the groundwork for terminology and architecture on which to coordinate all future efforts and to offer a schematic vision of all the features and main components of a possible “total collaborative system”. The conceptual framework describes two main abstract concepts for the management of the shared space: the Scene Builder and the bi-dimensional GUI.

In conclusion, the WebTalk-II part of the research was fundamental to organize the application domain of Collaborative Virtual Environments and to set the path and the direction of future implementations and applications.

The experience with “*Virtual Leonardo*” and the foundational work made with the WebTalk-II framework enabled the team at the Polytechnic of Milan to move toward an educational environment: the idea was to exploit the potentiality for collaboration (among students now) to the maximum extent.

The occasion came with SEE, *Shrine Educational Experience* (Di Blas et al., 2003), developed in partnership with the Israel Museum in Jerusalem. SEE is about the cultural, religious and historical issues related to the Dead Sea Scrolls, found in the Qumran (near the Dead Sea), in Israel.

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