

DeskTOP, a System based on Virtual Spaces to Support and to Promote Collaborative Learning

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ABSTRACT

The collaborative virtual environments have become a good alternative to construct collaborative learning systems. In this paper we present DeskTOP, a collaborative virtual environment implemented on the Web to support and to promote collaborative learning in university courses. This environment is designed mainly from the perspective of the *desk* and *room* metaphors. It makes use of design patterns in its architecture, promote the creation of customized collaborative learning environments and support a communication, collaboration and social interaction between lecturer and students through a shared virtual space.

Keywords

Virtual environments, collaborative learning, groupware

1. INTRODUCCION

Educational entities have began to get aware of new teaching-learning ways in the classroom [6] to achieve an integral students' formation. During the learning process in classroom, this formation depends on a balance in the development of the learning environments: individualistic, competitive and collaborative [5]. However, collaborative learning environment has been promoted in smaller degree, and in this environment the importance of the social interaction during the collaborative learning process has been left aside.

The objective of our work is to support the collaborative learning process with a virtual environment that allows the creation of different learning environments (according to the users' communication necessities), and that supports and promote the social interaction between students. This proposal is endorsed by the necessity of providing different computational support types, during the collaborative learning process and by the necessity of providing configurable environments so that users can choose the interaction forms during the learning process [2].

2. DESKTOP'S CONCEPTUAL MODEL

2.1 Functional features

DeskTOP is designed to support social interaction through the Web; provides different communication channels to promote different interaction forms and to satisfy the condition that Dillenbourg establishes for an effective collaborative learning [1]; provides a collaborative learning environment through a virtual environment [8]; provides awareness about users that are using the system to facilitate the social interaction among them [4]; and

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provides a coordination mechanism to help to maintain an interaction order among the participants and to make it more efficient.

2.2 Metaphors used in DeskTOP design

The DeskTOP system uses the *hall* and *collaboration rooms* metaphors, as metaphors of place [3]; and the *desk* metaphor, as metaphor of interface [9].

The *hall* metaphor establishes a virtual environment which promotes public casual and informal interaction among its users. The *collaboration rooms* metaphor helps to represent shared environments within which the user can work in group. Through this metaphor, a common area is created for private interaction which provides users with working tools. Figure 2.1 represents the idea of these two metaphors.

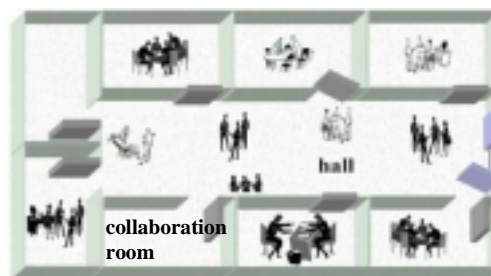


Figure 2.1. Representation of the *hall* and *collaboration rooms* environments

2.3 The desk tools

The desk of DeskTOP provides tools for communication, collaboration, coordination, and awareness. Communication tools provide different communication channels; collaboration tools allow to work in groups; coordination tools help to organize the interaction process and awareness tools offer user information on the state of the shared virtual environment as well as users who are there.

3. DESKTOP ARCHITECTURE

The DeskTOP system architecture [7] is based mainly on the *broker (client-broker-server)* design pattern. The shared context of the DeskTOP system is maintained in the *server* component, and the desk tools are run in the *client* component. The *broker* acts as an intermediary component between the client and the server, abstracting the communication aspects over the Internet. The broker architecture is combined with the *model-view-controller* design pattern in order to design the interface of the collaborative tools in the client component.

4. THE DESKTOP SYSTEM PROTOTYPE

Figure 4.1 shows a group of users working with the Desktop system prototype.

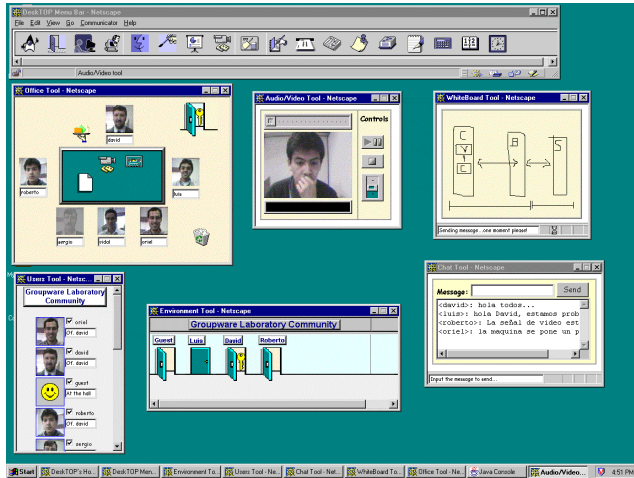


Figure 4.1. Some users working in a collaboration room

DeskTOP support the lecturer in the cration of new learning experiences between students. He mainly has to promote the work in groups through the course tasks, to push the discussion in classroom and to provide information sources to the students.

DeskTOP is used as a support tool for the courses' teaching, in the classroom. Lecturer and students use the *slider tool* to present some exhibition slides in classes; the *audio_video tool* to introduce a videoconference; the *newsgoup* tool to respond the doubts that the same students publish in this tool, pushing the discussion among them with topics related to the course. Students also use the DeskTOP application outside the classroom to study in groups in a local or a distributed form.

5. CONCLUSIONS AND FURTHER WORK

The developed DeskTOP prototype proves the feasibility of developing a collaborative virtual environment on the Web to support the creation of various interaction environments that promote the collaboration, communication, coordination, and social interaction among users. Each user in the DeskTOP system has his own virtual space (the *desk tool*) which provides tools that the user can customize according to his interaction needs. With these DeskTOP tools it is possible to cover different interaction modalities, affording individual users with the capability to participate in a way they feel most comfortable. Users can enter to the DeskTOP's virtual spaces and meet other users in an informal-casual way at the *hall* space, or in a more formal way inside a *collaboration room*.

We are planning to create distributed collaborative-learning communities, in order to promote the interaction between students and lecturer among different universities. DeskTOP can be used by many universities, affording each of them with the opportunity to configure their local virtual communities so that users, from other universities can do virtual visits.

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