Novel Client Representations for the Collaborative Virtual Learning Environment sTeam

Projektgruppe sTeam
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Abstract:
The Paderborn Open Source Project sTeam (Information Structuring in a Team) currently develops a net based environment to assist cooperative learning in virtual communities. The following paper describes the activities of a group of students involved in the project at the University of Paderborn, who researches various approaches for presenting information, interaction and communication structures in a virtual learning environment. A prototypic implementation of a two- and three-dimensional client for the sTeam system does create new ways of interaction between learners and the learning materials in a virtual space.

Introduction
Learning is a socially embedded design process. But most of today's hypermedia systems fail to properly support both the design-related and the social aspects of learning. Authoring and web-publishing systems aim to support the authors' design process. Consequently, learners' activities are confined to selecting and reading. Based on some fundamental reflections on the role of technology in learning processes, we conclude that top priority must be given to the construction of infrastructures that support cooperative learning processes if we are to properly harness technology's potential.

In Paderborn we focus on a learner-centered – wholly java-based – approach for structuring information in teams (sTeam). (cf. http://steam.uni-paderborn.de) The key concept in sTeam is the virtual space. It draws together cooperation and communication, at the same time embodying the common external memory of a (virtual) learning group. Therefore the focus is not on interactive systems for individual accessing of knowledge bases, but rather on the cooperative management and structuring of distributed knowledge bases.

Since the emerging of the World Wide Web, knowledge management consisted of creating and providing information on CD-ROM’s and WWW-Servers. Because of the difficulties in actively providing structured and organized information, most users were forced into the consuming role. Even today, providing information in the World Wide Web, needs a lot of patience and the knowledge of at least one programming language of the WWW.

In its basic sense, distributed knowledge organization means the cooperative generation, management and maintenance of artifacts embodying knowledge. Artifacts represented by documents, graphics, notes and comments, and their linking by learners, thus form the basis of any method for supporting learning processes using suitable environments and tools. Asynchronous mechanisms for handling multimedia learning components or hypertexts, such as are frequently familiar from document management, are combined with strongly synchronous approaches from the area of session based systems. Such a synthesis allows new, less familiar, hybrid forms of asynchronous and synchronous cooperation between learners.

Thus the sTeam system combines the idea of a room-based virtual world with the basic functionality of document management. Rooms function not only as a social meeting-point and center of a virtual learning community but also as a collaborative external memory, providing the primary media functions (cf. Hampel & Keil-Slawik 2001) as a basis for cooperative learning.

This paper presents the work of a students group of the University of Paderborn, who develops new forms of Java frontends for the sTeam system.

Both a two-dimensional and a three-dimensional client visualization were developed (Java/Java 3D). These clients evaluate novel ideas to support the user in navigation and interaction in these structures:

The three-dimensional visualization shows an isometric view of a room. A simple avatar representation of the learners was chosen. The camera position is determined by oneself, which allows one to freely navigate within the room. Various thematic rooms are connected by doors or semantic links (teleporters).

One goal of our work was to evaluate novel forms of interaction within such a virtual world. This includes both the structuring of communication within the room and the semantic structure of the room’s objects.
A good example for the structuring of the avatars communication within the room may be the concept of chat circles. Avatars may easily form a so called chat circle by approaching a virtual conference table. The range of the chat is limited to the members of one particular chat circle. This mechanism can for example represent the usual structure of a tutorial or a course, in which students in small groups work on different topics and compile their results afterward as a group. One advantage of presenting information in three-dimensions is that a large amount of objects (documents, graphics) are easier to position and to display than in a two dimensional space. Additionally, semantic relationships between the objects can easily be represented through grouping them in space or simply by proximity. The realization of the various approaches in a two- or three-dimensional client explore these relationships in particular.

![figure 1: two different client representations for the sTeam system](image)

In the virtual space different avatars have different ways to interact. Documents can be given to others by simply dragging them with the mouse. Each sTeam user owns his personal virtual backpack in which he/she can store and transport documents between rooms.

In a virtual sTeam room various objects and materials (media) can be created, which support the cooperate learning process. These objects include for example graphics, hypertext-documents, links to external web-sites, but also tools such as a cooperative shared whiteboard.

The content of the documents can be viewed and altered in conventional browsers or in a sTeam-module especially created for a certain type of document. Objects representing graphics are displayed in the virtual space and can be viewed there.

Those two approaches correspond to different views on the same information structure of the presented data. They are not competing ways of presentation but rather combine different but basics ones.

The strength of the three-dimensional client is certainly in the field of communicating the information structure. It surely will be attractive to users who explore virtual communities for the first time and are not expert users. The communication in groups is viewed as a main feature and can easily be done for all users.

The two-dimensional client offers main advantages for daily use and structuring of learning- and educational material, because its functionality and look and feel are like conventional applications.

Future sTeam developments will explore in particular further ways of interaction in virtual learning environments and extend the interconnection with the daily learning- and working environment.

**References:**

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The Paderborn Open Source Project sTeam (Structuring Information in a Team) currently develops a net based environment to assist cooperative learning in virtual communities.

This poster presentation describes the activities of a group of students involved in the sTeam project at the University of Paderborn, who researches various approaches for presenting information, interaction and communication structures in a virtual learning environment. A prototypic implementation of a two- and a three-dimensional client for the sTeam system creates new ways of interaction between learners and the learning materials in a virtual space.

In the virtual space different avatars have different ways to interact: e.g. objects/documents can be exchanged simply by dragging them with the mouse. Each sTeam user owns his personal virtual backpack in which he/she can store and transport documents between rooms.

In sTeam various objects and materials can be created, which support the cooperative learning process. These include for example graphics, hypertext-documents, links to external web-sites, but also tools such as a cooperative shared whiteboard.

In the field of supporting the learners’ communication the three-dimensional client offers new approaches. Discussion groups may be formed just through spatial closeness of the corresponding avatars. (Learners sit together at a “virtual conference table”).

Avatars may easily form a chat circle by approaching the table. The range of the chat is limited to the members of one particular chat circle.

For further information cf.: http://steam.uni-paderborn.de