ViCToR-Spaces:
Virtual Room Concepts for Cooperative, Scientific Work
Overview:

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- Sample Scenario – eLearning in Virtual Spaces
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ViCToR-Spaces

- Spaces for Virtual Cooperation in Teaching and Research for Mathematics, Natural Sciences & Engineering
- Following a generalized “room metaphor”
- Integration of existing components by adoption and further investigation of different integration technology approaches, in particular:
  - Integration of experiments (virtual laboratories, remote experiments)
Virtual Room Concepts for Cooperative, Scientific Work

- As one part of our project
- Further development and design of the “virtual worlds”
- Providing the rooms in a dynamic, heterogeneous network – rhizomatic, not a hierarchical structure
A functional room will be constructed from three components:
- Room related rights
- Specification of the room users
- Applied tools and communication interfaces

The properties of a room are defined by choosing specifications within the components (e.g. a forum and a shared whiteboard as applied tools)
Room Related Rights:

Two aspects:
1. building, deleting or changing a room
2. pre-conditions for the access to the room

Possible specifications:

- Only certain users have rights to change the room -
e.g. in a room with teaching material only the lecturer has the
rights to change the provided material
- OR all users have the same rights -
e.g. in a group work room build by a group of students

- Tests as a pre-condition for the access to the room -
e.g. for a room with a laboratory, the students need previous
knowledge to control the lab
- AND/OR access to the room only in bookable time slots -
e.g. for a room with a remote laboratory which can only be
controlled by one user or group of users at a time
Specification of Room Users:

Possible specifications:

- A certain number of users have access to the room -
  e.g. a laboratory which should only be used by 2 students at a time

- Only certain users have access to the room -
  e.g. in a group work room built by a certain group of users,
  or the users‘ own work room which can only be accessed
  by the user himself

- All users of the system have access to the room -
  e.g. the “entrance hall” of the system
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Used Tools and Communication Interfaces:

Possible specifications:

• As communication interfaces a forum, chat and/or VoIP can be used - e.g. a group work room can be equipped with all these interfaces so that the users can decide which interface they want to use in a session

• A shared whiteboard provides a consolidated graphical work area for all room users, similarly to a chat client the written and drawn objects are shown identically on all participants’ boards - e.g. a cooperation room of researchers from different institutes can be equipped with a shared whiteboard so that they can develop a new physical theory jointly on the board

• Virtual or remote laboratories will be integrated in the system and can be used in special laboratory rooms - e.g. as a practical seminar for students or for distant researchers who do not have a certain physical experiment in their institute but which is provided in our system
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• experiments form an important part of learning, teaching, and research within technological disciplines

→ most important part of ViCToR-Spaces: integration of virtual and remote laboratories in cooperative knowledge spaces

• Virtual labs – use the metaphor of a “real” scientific experiment as a guiding line

• Remote labs – real experiments remotely controlled from outside the laboratory

• it will be possible to integrate both types – virtual and remote laboratories – in the ViCToR-Spaces system

• they will be treated uniformly
Upload of experiments in the ViCToR-Spaces system as a two-stage process:

- First to a “submission hall” – there, they are automatically checked for technical correctness (semantic description of the metadata), and the propriety of their semantic classification

- After passing the submission hall they will be made available to other users in the “warehouse”
ViCToR-Spaces will be built on top of the cooperative knowledge space system “CURE”

CURE – web-based platform for collaborative learning combining the room metaphor with WIKI concepts and communication tools

Implemented as a set of Java Servlets and follows the “everything is an object” philosophy → rooms, documents, users as plain Java objects

Room structure – entrance hall and rooms below this root room for lectures, seminars, group work rooms etc.

Every room has a user awareness and several communication tools can be added
ViCToR-Spaces – use of already existing components and adjust the system according to our requirements

- Submission hall and warehouse for laboratories
- Adding ability to automatically read and parse metadata descriptions of integrated laboratories
  → used for saving data of the labs
  → search of labs within the system
  → creating ontology of labs within the system
- “Lab Services” – using Java Web Services for time-slot reservations, exchange of data between laboratories
Sample Scenario:
The room is a laboratory as a mandatory element for the students of a lecture.
Students need to jointly work on a hands-on experiment provided in the room.

Specifications of the room:
• The room is equipped with a VoIP client and a laboratory.
• The students are not allowed to change the room properties, as a pre-condition they have to pass a test and the room is only accessible in bookable time-slots.
• The number of users in the room is restricted to 3.
Interaction between the Users:

- All participants have the same view on the laboratory.
- Tasks have to be distributed, because the laboratory can only be manipulated by one participant at a time.
- The construction of the laboratory (measurement devices have to be connected etc.) and the measurements will be discussed over VoIP.

Completion and Data Storage:

- Interactions and measurements are saved in the room and are only viewable for authorized persons like the lecturer or a tutor.
- The saved data should also be available for the respective students for later checking of their results e.g.
ViCToR-Spaces are aiming at projecting cooperative, scientific work onto virtual rooms.

We provide a room concept for different scenarios from educational and scientific work and describe the substantial aspects and components a virtual room.

Thereby, we create a complex community-based learning and research system.

Currently, we are preparing a study with students from a physics lecture to check our concept in usability tests for further development of navigation structures and design.
Thanks for your attention!

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