Creating a Repository of Community Memory in a 3D Virtual World: Experiences and Challenges

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Motivation

From an epistemological perspective, knowledge resides in and is accessible from these repositories. The choice of 3D VWs is motivated by the potential and capability of such environments to support collaborative activities and work with various types of content. Most VWs allow creating, manipulating, and sharing 3D objects and other media.

Background

In order to better understand the notion of community memory we refer to the Wengers work on communities of practice and the theory behind organizational memory. Continuous negotiation of meaning is the core of social learning and involves two processes: participation and reification. The collection of artifacts appeared in these processes comprises the shared repertoire and history of the community. We describe learning process and creation of knowledge as characterized by narratives, collaboration, and social constructivism. Narratives are used for the diagnosis of problems and as repositories of existing knowledge, be that tacit of explicit. They contain the tacit knowledge of a given domain and field of practice, and provide a bridge between tacit and explicit knowledge. Through collaboration in shared practices, knowledge may be created as well as distributed among the participants. Such a socialization process may give the learning access the episteme or underlying game of a discipline, the most difficult knowledge to access.

Walsh and Ungson propose that interpretations of the past can be embedded in systems and artifacts as well as within individuals through the narratives they may convey. An important concept for community memory is 'boundary objects' that exist on the practice and social boundaries and are used across them. They contain sufficient details to be understandable by all parties. Organizational and community memory consists of mental and structural artifacts, but it can also be thought of as a process and representational states. In addition, an integral part of community memory is the histories and trajectories of its members as expressed in narratives that are represented as the community's shared repertoire.

Further, we present our prototypes and discuss how 3D VWs can be used not on-ly as place of enactment, but also for accessing data to be enacted or collaborated into knowledge. In this way, our idea of a repository is more connected to narratives, artifacts, and boundary objects than to traditional data.

Summary

Our experiences show that collaborative 3D content creation has enriched the reflective dialog in the communities with innovative expression forms. It has contributed to creation of a shared repository of community knowledge, consisting of such elements as narratives, boundary objects, and virtual places. The prototypes we presented afford the learner to develop knowledge through explorative and constructive methodologies, and through access to narratives and the development of relations. 3D VWs may thus offer richness in available resources for learning rarely found in a real-life situation alone.

The epistemological landscape is in this perspective augmented with sources for knowledge commonly not included. At the same time, the situated, contextualized, and partly ephemeral nature of these repositories suggests the following challenges, especially when comparing to 'traditional' repositories.

Challenges

- Platform and context dependence
- Rights management
- Indexing and annotating
- Shared sense of place
- Traces of activities vs. 3D recording

Acknowledgments

The work is supported by the Norwegian University of Science and Technology. The authors wish to thank their colleagues from the Multimedia Systems Laboratory at the Volga State University of Technology and Virtual Spaces LLC, especially M. Morozov, A. Gerasimov, A. Smorkalov, and A. Tanakov.

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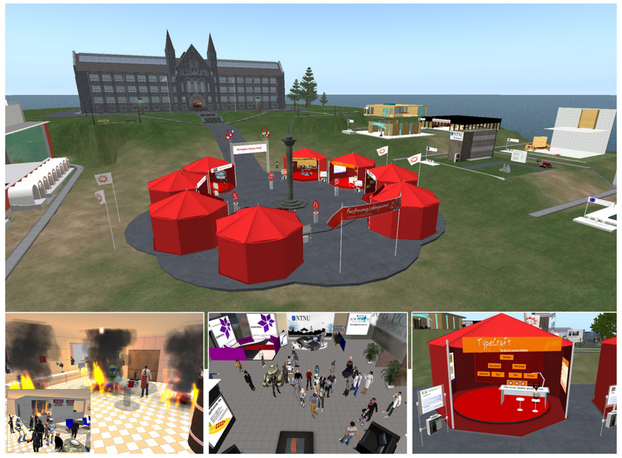
Virtual Gallery

The Virtual Gallery was intended to assist constructing, presenting, and storing student 3D visualization projects in a shared repository and designed based on the results of a case study. A library of pre-made 3D objects, scripts, and textures could allow concentrating more on the creativity instead of technical details. In addition, student 3D visualizations occupied considerable amount of space in our virtual campus in Second Life, and a better storage solution required. The VG prototype was implemented, including a realistically reconstructed building, a gallery for storing and pre-senting 3D constructions, and a library of pre-made resources.

Virtual Research Arena

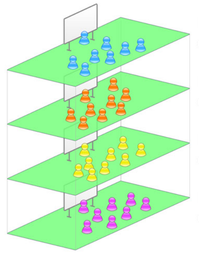
The Virtual Research Arena (VRA) is a framework for creating awareness about educational and research activities, promoting cross-fertilization between different environments and engaging the public. It provides appropriate atmosphere, tools, and facilities for the community activities. VRA is a place, where students and researchers can ex-press themselves trying out, visualizing and sharing their ideas (using VG resources). It should accumulate 'reifications'/traces of community activities over time, thus be-coming a community repository, containing different layers of community activities.



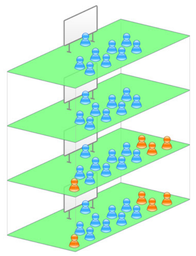
vAcademia

vAcademia is a 3D virtual world designed for collaborative learning. It is developed by a Russian company Virtual Spaces LLC in collaboration with the Volga State Technical University.

Layers of space



Layers of time



3D Recording

The nature of 3D recording is difficult to grasp. It is often misunderstood and treated as an embedded screen capture mechanism. However, it is conceptually different from the video recording or screen capturing. A replayed 3D recording does not only delivers a virtual camera image and a synchronized communication messages, but much more. A 3D recording contains the entire 3D scene with all 3D objects and avatars. It can be entered by a group of avatars. All the actions of the avatars and in the environments are also saved in a 3D recording. These actions happen again when a 3D recording is replayed or, better to say, visited. In such a way, this feature allows creating a new type of content that comprises both space and time.

Training scenario implementation

- Script
- 3D design
- Actors or teachers play agents
- 3D recording R_a is generated
- Actors or teachers play agents and trainees
- 3D recording R_b is generated

Training scenario use cases

R_a + live training

R_a agents environment

trainees

R_a + live training + support or control

R_b - best/worse case + live training

R_{R_a/R_b} + analysis or reflection