Virtual Spaces as Artifacts:
Implications for the Design of Educational CVEs

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ABSTRACT

Space is important for learning and socializing. Cyberworlds provide a new space for socialization and communication with a great degree of flexibility, allowing users to create and manipulate virtual land. This suggests considering virtual spaces as artifacts. In this paper we use different theoretical approaches on artifacts and experiences of usage of a virtual world we have created to revise the original design and to derive a new set of requirements for virtual places and spatial artifacts.

Keywords: CVEs; social awareness; spaces as artifacts

INTRODUCTION

Collaborative Virtual Environments (CVEs) and Cyberworlds have been lately proposed as a tool for supporting learning in different contexts (Bruckman, 1997; Talamo & Ligorio, 2000), ranging from K-12 to higher education. Mainly, they have been adopted for their potentiality of offering a new space for promoting socialization and communication. Bruckman (1997) points out that the presence of collaborators offered by (text-based) CVEs plays a key role in augmenting student motivations and in improving the learning process. In addition to the facilities offered by textual CVEs, graphical CVEs, either 2D or 3D, offer a richer collaborative arena for social encounters and community building (Neal, 1997). Graphical CVEs have also widely been used in educational settings for the purposes of simulation and demonstra-

tion of, for example, scientific concepts (Chemeet, (ActiveWorlds)) and art and history exhibitions (VanGogh (ActiveWorlds)), which for practical reasons may be complicated in real-life classroom.

An integrated part of the educational process is knowledge sharing and communication. Students share knowledge not only with the persons in the same class or group but rather also rely on a complex network of communities spontaneously emerging within any educational context. It is therefore difficult for students to get an overview of the existing social structures. This is a problem because awareness of, for example, experience distribution and community membership creates occasions for knowledge sharing. Lack of this awareness creates continuous breakdowns in the flow of knowledge and it impacts negatively on learning. Hereafter we use the term *social awareness* to indicate awareness of

the social situation in a group or community in a shared environment. This awareness includes knowledge on learners' resources, roles, activities, positions, status, responsibilities, social connections and group processes, with a time-span from a momentous overview of the social situation in a community, to a long-term memory of a community's social life.

In this connection we look at the possibilities offered by 3D desktop-based cyberworlds. Cyberworlds have promising potential for supporting social awareness in educational context because of their capability to provide a social arena where students and teachers can meet, overcoming the barriers of the physical world (Neal, 1997). The virtual space provides occasions for chance encounters and therefore informal communication and an environment where learners can have and share experiences, which is acknowledged as one of the main requirements for learning (Maher et al., 2001). On the longer term, the space also becomes a container of artifacts used by the students for their daily social and educational activities. It can also substitute or complement the physical space normally inhabited by learners. This opens for new possibilities of cooperation among distributed users.

Cyberworlds not only provide an additional place for the community using the system, but also a space with a higher degree of flexibility than the physical one. In such an environment one can create and manipulate "virtual" land to create places suitable for current social and learning situations, such as a meeting place for a student group, an exhibition yard and so forth (e.g., Euroland, (ActiveWorlds); Talamo & Ligorio, 2000)). This is usually not possible (or too difficult) in real life. This flexibility is very important because it allows a community to progressively build, structure, and restructure the space according to its evolution.

This suggested us to look at virtual places as artifacts, that is, as objects built by users for further use. In order to understand the implications that this perspective has on the design of educational cyberworlds, this paper starts with a classification of educational CVEs along the dimensions of learner, place and artifact and discusses an extended concept of artifact within the framework of CVEs. We also look at how artifacts are considered in different theoretical approaches: activity theory, distributed cognition and coordination mechanisms. Then, we describe a virtual world, Viras, that we have developed for social awareness support in an educational context. To identify the limitations of the original design, we reconsider the results and give examples of different usages of artifacts and virtual places in Viras from a new perspective. This reconsideration leads to a new set of requirements for virtual places as artifacts in educational CVEs.

CHARACTERIZATION OF CVEs

CVEs are generally characterized according to the used technology, for example immersive versus non-immersive, or number of dimensions (2D vs. 3D). Here we suggest a characterization of CVEs inspired by activity theory. In educational CVEs we consider activities performed by learners who belong to various groups and communities. Activities are mediated by artifacts. Learners and artifacts are contained in space. Space is a key resource for establishing and enabling an activity (Benford, 1999; Giddens, 1984), allowing different modes of participation and nego-

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