Knoware, a Concept Map Based Collaborative Virtual Environment

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ABSTRACT

Knoware is an on-going research project between the Swiss Federal Institute of Technology (<http://www.epfl.ch>) and the International Institute for Management Development (<http://www.imd.ch>). Its main goal is to create a distance learning CVE that improves learners' synthesis capabilities. Knoware is a Concept Map based environment. This paper briefly describes Knoware and some questions related to intercultural issues as well as some lessons learned during the intercultural workshop that may be important for the future of Knoware.

MOTIVATION STATEMENT

Most Collaborative Virtual Environments (CVE) are text based and draw upon physical metaphors such as rooms, desks, doors etc (Notable Exceptions are the Belvedere project [2] and, to some extent, Teamwave [4]). These features produce several problems:

- It is very difficult for users to navigate in text-based environments
- It is even more difficult to create relationships between concepts and ideas.
- Physical metaphors do not scale well into the virtual world. Creating environments based on Physical metaphors may make novice users feel more comfortable but this comes at the expense of creating unnecessary barriers, which are inherent in physical objects but dispensable in the virtual world.

The Knoware project is a joint research project between the Swiss Federal Institute of Technology (<http://www.epfl.ch>) and the International Institute for Management Development (<http://www.imd.ch>) both in Lausanne, Switzerland. The goal of the project is to research the feasibility and suitability of a CVE for distance learning, based on concept maps, for management education.

We chose concept maps [3] as the main representation vehicle for our CVE because the main goal is to improve learners' synthesis capabilities. Concept Mapping is an excellent tool for improving learners' synthesis and creative thinking capabilities [1].

ARCHITECTURE

The Knoware CVE is web based and is made out of 2 classical components:

- The server side relies on a relational database and a Web server with server side scripts. These scripts are invoked by the web client through

standard http requests, they access the database to either pull out the concept map description or to make changes such as insertion, deletion, renaming etc. The concept map description is sent to the client in the form of an XML string.

- The client side is a pure Java applet that displays the concept map and relays user actions to the server through simple http requests. The applet continuously polls the server for changes so that modifications made by one user are immediately visible by other users.

FEATURES

Figure 1. Hierarchy of Concept Map Spaces

Users can create multiple, hierarchically related concept maps (figure 1). Each concept map can be independently displayed or hidden. Relationships can be created not only between concepts within individual concept maps but also between concepts that belong to separate concept maps (figure 2).

Figure 2. Links between concepts in separate spaces

Knoware enables users to collaboratively create and modify concept maps, but in doing so it actually manages a collaborative knowledge repository. Indeed, users can attach content to any concept or relationship. Content can be:

- any document such as Word processor documents or Spreadsheet documents
- free text
- Web links

Users can perform searches in the knowledge repository. Found concepts and relationships are displayed within their concept map context.

Figure 3. Named relationships

For now Knoware supports only 2 types of node representations and one type of relationship representation. Rectangles represent concept map spaces and central concepts. Ellipses represent concepts. Relationships are represented as straight lines linking 2 concepts. Relationships can be named to convey their meaning (figure 3).

INTERCULTURAL QUESTIONS

The IMD, for which Knoware was designed and developed, receives several thousand students every year from all over the world. The student community is, culturally, very diverse. One question that springs to the mind is how well a technique such as Concept Mapping scales to a culturally diverse community. Concept Maps are based on the sharing of symbols and it is well known that symbols have different meanings in different cultures. Some can be offending in one culture whereas in another they are well accepted. Knoware has a very "neutral" and limited set of symbols. Is this one size fits all approach an advantage or a disadvantage in a multi-cultural context? How well will this concept map representation help learners understand the points of view of other learners?

CONCLUSION

Not surprisingly, the Group 99 workshop didn't provide me with any ready-made answers. However, Bill Stubblefield's and Alan Munro's presentations made me

understand the difference between space and place: Place is an inhabited space and that the same space can represent different places to different groups of people. This will be an important distinction for the future of this project.

Knoware is now in early testing. Our goal is to perform complete evaluations in order to further enhance the tool as well as to understand how well it supports the collaborative learning process and synthesis making.

An instance of Knoware was allocated for the follow up discussion of the intercultural workshop of Group 99. It is publicly available at the following URL:

<http://icapc4.epfl.ch/G99Space>.

Note that Knoware doesn't run in Netscape on the Mac due to the lack of AWT 1.1 support.

REFERENCES

- [1] Angelo, T. A., Cross, P., K., Classroom Assessment Techniques: a Handbook for College Teachers. San Francisco, CA. 1998. Jossey-Bass.
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- [3] Novak, J. D., & Gowin, D. B. (1984). Learning how to learn. New York. 1984. Cambridge University Press.
- [4] Teamwave: <http://www.teamwave.com>