The emergence of sophisticated distributed teaching and learning environments

Extended Abstract of Opening Keynote Presentation

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1 Introduction

More than three decades of efforts to use (networked) computer environments for training and teaching applications are finally starting to bear fruit. A number of substantial undertakings are being carried out all over the world that show promise to achieve the final break-through. In this short summary we report on one such undertaking that is based on Hyperwave, one of the most advanced WWW server systems currently available (see [3, 6, 7, 8] for further information). The project at issue is called MANKIND, an acronym standing for *Multimedia And Networked Knowledge-transfer Introduces New Dimensions*. It is described in more detail in [5], is based on the earlier paper [4], and is archetypal for most similar efforts.

2 The difference between teleteaching and distributed teaching

A substantial number of efforts are trying to provide electronic distance education in the sense that a lecturer teaches in one location, yet (almost) everything done is communicated to other physically separate locations, where additional students can follow what is happening and interact with the lecturer. In MANKIND this kind of synchronous teleteaching is not an essential element, since some of the advantages of teaching electronically get lost due to the fact that speed is dictated by the lecturer rather the student, nor can the students afford to look up further information without loosing the thread of what is presented.

Hence the basic scenario of MANKIND is slightly different: high quality electronic courseware is made available on a server and accessible to students through a network. While working through the material, students can refer to background literature available as digital library [2]; they can add comments ("annotations") for themselves ("private annotations") or for others ("group" and "public annotations"), which in turn can be annotated by others, leading to asynchronous computer conferences; they can also ask questions both asynchronously and synchronously to fellow students or to tutors and teachers. Appropriate questions and their answers are incorporated into the database, so that similar questions can be answered later by the system. The course material typically consists of a videoclip presenting the lecturer and a sequence of "slides" that may involve pictures, videos, animations, simulations, etc., with spoken or written further explanations available for those wishing to receive them. Thus, the courseware students work through is very similar to the experience of sitting in a classroom: the lecturers are (virtually) present through videos, pictures, and their voices, while the material is explained as in a classroom using high-quality presentation aids. In addition, there are the communicational and referential possibilities mentioned earlier.

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3 The ten guidelines of MANKIND

3.1 No matter what technology is used, insights obtained from traditional courseware design, both from a pedagogical and a content/form point of view, must be taken into consideration: this is important since many persons today seem to think that putting a few beautiful HTML pages on a server is enough to provide electronic courseware.

3.2 The production of high-quality courseware has to be made as easy as possible: this can be done by using a high degree of modularity when the material is developed at sufficiently fine granularity and can be very much eased by "Authoring on the Fly" concepts as pioneered in [1].

3.3 We need guidance but not dictatorship: students need definite guidance, but also enough freedom to explore and consult material on their own.

3.4 Facilities for annotations are essential: students have to be able to make comments for themselves and for others.

3.5 Facilities for asynchronous computer conferencing are imperative: such facilities are available automatically, if the annotation mechanism is sufficiently rich.

3.6 Question/Answer dialogues should be possible where the students need them: i.e. at any point students should be able to ask questions.

3.7 Question/Answer dialogues should become part of the multimedia database: this is an extension of item 3.6, i.e. questions of general interest and their answers should be recorded for future students.

3.8 Synchronous communication facilities must be provided: spontaneous discussions with other students, one-to-one discussions with a tutor, and other advanced synchronous facilities are essential to break the isolation of learners.

3.9 Testing and checkpoints are important: this is to allow students to monitor their progress, to encourage further study, and possibly even for examination purposes.

3.10 MANKIND cannot live without customization: the courseware has to cater to different learning styles (e.g. verbal vs. visual), and has to adjust readily to the level of knowledge of the students.

4 The implementation of MANKIND

To implement a system such as MANKIND using the WWW, it is necessary to use a WWW server that supports structuring to eliminate many links (only this way modularity can be achieved), customization features (such as annotations and links only visible to certain groups), powerful searching facilities within well defined scopes (to have material from a digital library available that fit the courseware being used), attributes for all types of documents (to facilitate searching and customization), user profiles (to accommodate different learning styles and background knowledge), and a number of other features.

There is only one WWW server system that delivers all that is needed without add-on scripts or programming, the WWW server system Hyperwave [3, 6, 7, 8]. This was therefore the natural choice for MANKIND and should be the natural choice for similar undertakings.

5 Summary

The basic ideas behind a sophisticated distributed teaching and learning environment MANKIND have been presented. Similar efforts should be compared with MANKIND as a kind of benchmark: if they do not offer at least the features mentioned they are not likely to succeed.

6 About the author

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3 Maurer, H. *Hyperwave*. Addison-Wesley-Longman, London, 1996.

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8 http://www.hyperwave.com.