



Hypermedia Modules for Distance Education and Virtual University: Some Examples

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ABSTRACT

The explosive growth of the Internet and the convergence of information and communication technology is opening up new educational opportunities. In fact, the rapid development of digital, networked multimedia technology such as the Internet, e-mail and computer based and video conferencing can redefine the learning environment. This paper describes two different experiences of the use of hypermedia modules inside the distance learning and the virtual university. First experience is an activity developed by the Department of Electronic (Dipartimento di Eletttronica) - Politecnico of Torino (Italy) in the field of computer-based training in electronic instrumentation and measurements, where the author was a supervisor for the educational process. This project has been developed for Italian research of distance education named "Consorzio Nettuno," which involves different undergraduate courses (Electronic Engineering, Information Technology, Economic Science). Several modules have been developed, using multimedia technologies, to assist the students to acquire the fundamentals of the basic instrumentation. A client-server system has been designed in order to allow the students to operate on a remote laboratory for experimental training. The courseware includes lessons, exercises, and training on virtual instruments which emulate actual instruments. The students can also carry out several real laboratory experiments without actually being in the laboratory, by using a client-server structure based on the Internet. Second experience, named "Cybermath," is an example of virtual university course, in fact the aim of this project is to realise a hypermedia course of mathematics using the collaboration between different European universities.

Keywords: information and communication technology; distance learning; hypermedia

HYPERMEDIA MODULES FOR DISTANCE EDUCATION

The education experiment named "Consorzio Nettuno" (Neptune Consortium), started in Italy in 1991, to create a distance education university using the television as a medium in the learning process. The "Consorzio Nettuno" comprises:

- 34 Italian universities and the Open University (UK);
- 285 university courses (electronic engineering, economic sciences; etc.)
- 14,000 hours of television lectures;
- 7,000 exercise in the Internet;
- 2,500 tutors and professors;
- 2 television channels.

The project's targets are:

- to offer a formative approach free from space and time encumbrances;

- to create/develop national and transnational collaborations;
- to use the new technologies inside the learning process.

In this experiment the lectures are broadcast on TV or distributed on video-cassettes, and it is possible to use the Internet as a medium to create an educational cyber space (see Figure 1).

Using these media, there are some problems in transmitting the correct information on some particular technical subjects, for example to train the use of the electronic instrumentation because students are still required to attend laboratories to achieve practical experience under the guidance of an instructor.

In fact, education in fields such as electronic measurement requires students to gain a reasonable skill in using various kinds of instrumentation (Pisani et al., 1995). Such a skill cannot be achieved by theoretical lessons only; an intensive laboratory activity is also always required. This problem exists both for the first level and for qualifying courses (Sala 1999a). Basic instrumentation teaching is required for first

level courses that are followed by a large number of students. The cost of basic level instruments is often low, but large classrooms means large workbench availability and a massive and qualified assistance that is not easily found.

Qualifying courses are followed by only a few students so that the assistance problem is reduced, but the instrument cost in such a case is often rather high, thus preventing the possibility of arranging more than a few workbenches.

For these reasons, some years ago the Department of Electronics, of Politecnico di Torino, was involved in activating traditional degree and diploma courses in several educational structures for the "Consorzio Nettuno". At that time requirements stemming from a large demand for education on experimental subjects and laboratory training had to be met with limited human and financial resources (Sala, 1999b).

While trying to find a solution, it was realised that most of the time the students spent in the laboratories, especially for first level courses, was devoted to learning the operating functions and the use of the same basic instruments.

It was therefore decided to invest time and resources to develop an alternative solution to the laboratory replication by using the new technologies offered by computer based multimedia courseware.

The goal was to allow the students to carry out a pre-training

Figure 1: Consorzio Nettuno's educational cyberspace



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