SEBASTIAN: Educational System Based on Internet Technology

José Luis Carrasco Sanz, Liliana Patricia Santacruz Valencia, Carlos García Rubio, Peter T. Breuer, Carlos Delgado Kloos, María del Carmen Fernández Panadero

Telematic Engineering Area
Universidad Carlos III de Madrid
Avda. De la Universidad 30, 28911
Leganés – Madrid – España
sebas@it.uc3m.es

Abstract: This paper describes the work of the Carlos III University in the project SEBASTIAN (Educational System based on Internet Technology). The aim is to develop a tele-educational tool, providing to educators/trainers with a simple mechanism that makes possible the use of the network for the broadcast of educational content and enabling the creation of multilingual courses based on XML (Bray, 1998) and SMIL (Stephan, 1998) technologies.

Introduction

As soon as web technologies first became available, they were adopted for educational purposes. Hypertext technologies had already been used in learning systems, and the Internet facilitated the overcoming of distance. Higher education is now undergoing structural changes in terms of the composition of student populations, learning paradigms and curricula. As distance education becomes an integral part of higher education, student bodies are expanding to include more non-traditional students and the contents of courses are richer than before, and incorporate more interactivity.

In this new world, students participate more actively in class and collaboration becomes a more important component of the learning process. These changes have stimulated the development of new ways to represent information (for example: animations, simulation, hypertextual navigation and so on). In particular, multimedia content has been introduced via the medium of the WWW. However, there are problems associated with the variety in present day formats. Facing up to this situation, The Carlos III University of Madrid is working on a project named SEBASTIAN.

System Architecture

The system serves to integrate multimedia learning experiences into the network enabling it to be visualized according to the preferences and characteristics of the student. The courses generated are described in EML 2.0 (Educational Markup Language 2.0). This language is based on XML and includes spatial information (multimedia objects place, presentation size, etc.), temporal information (duration of multimedia objects, scenes, etc.), and information about students profiles (learning styles). The professor will eventually have one tool with three integrated functionalities for the creation of courses, see [Figure 1]. The functions are:

- **LG (Layout Generation):** Allowing the description of the spatial distribution of multimedia elements that comprise each scene of the presentation. A description language, SLML: Space Layout Markup Language (based on XML), has been designed for this purpose. This functionality will provide the creation of multimedia templates. Initially, some predefine templates will exist, but the object is that professor generated its own templates.
• **STG (Synchronous Text Generation):** The files generated are based on a new language STML: Synchronization Text Markup Language, and provide textual content in several languages. These files contain synchronization labels which synchronize the text with audio or video, as in a karaoke session.

![Diagram](image)

**Figure 1:** Contents generation, distribution and visualization process.

• **CG (Course Generator):** Integrates multimedia files and files generated by the two previous applications. The result is a presentation composed of a sequence of "abstract scenes". Each scene is a compound of the different presentations that may be presented to different students. The view presented to each student depends on their preferences and pedagogic profile. These profiles are generated automatically in accordance with the Learning Style Model (Richard Felder, 1996), the PAPI (Public and Private Information, 2000) and the LOM (learning Object Metadata 1999) specifications.

**Acknowledgments**

The work reported in this paper has been partially funded by the project SEBASTIAN 07T/0015/1997 of the Spanish CAM and the project INFOMEDIA CICYT TEL 1999-0207. We wish to acknowledge fruitful discussions with our colleagues in the Department of Telematics Engineering in the Carlos III University of Madrid.

**References**

- Stephan, L (1998). *Synchronized Multimedia Integration Language 1.0 (SMIL).* W3C REC-smil-19980615