

A Web-Based Course-Support Environment

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Abstract: - This paper presents a web-based environment that was designed and implemented in order to support the office automation courses of the Journalism & Mass Communication Department, at the Aristotle University of Thessaloniki, Greece. Special issues relating to these courses as taught in the traditional way, together with the given computer and communications infrastructure, pose various design specifications; so they are reported in detail, along with the way they affect the various design aspects. Finally, the main sections of the environment are described, in addition to their functional integration to the teaching and learning process.

Key-Words: - Internet, Education, Web-design, Course-support environment

1 Introduction

The Internet has already become a powerful tool for information exchange and communication. The educational sector is without doubt a major market for computer communications applications and services [4]. The most dominant form of computer-aided communication is the World-Wide-Web (WWW), or simply the Web. The use of the Web has been adopted into every aspect of the educational life and each educational activity seems to be covered by a Web-enhanced teaching system [2, 6, 8-9, 14]. Well-designed Web-based teaching tools can significantly enhance student learning, while decreasing the time spent in traditional classroom lectures [10].

Web-based educational systems are asynchronous, that is, they do not require simultaneous presence of instructor and students. Already prepared lectures are available via the Internet through Web browsers. The front-ends are most often designed in HTML, enriched by Java, JavaScript, or Dynamic HTML. The Web enables worldwide access independent of time and location. Using such systems does not require expensive equipment. A personal computer, nearly any operating system, a Web browser, a modem, and a telephone connection enable entrance to the Web and thus to Web-based educational systems [1]. While Web-based teaching tools are commonly used in distance learning applications, they also provide an opportunity to significantly enhance on-campus learning [1, 10].

An important technical development relating to computer communications in education involves the linking of a Web-compliant (i.e., accessible via a Web browser) user interface and Web-compliant tools and applets with an underlying database. Thus, a new type of system called course-support environment appeared [4-5]. In this type of system a database is integrated with Web-based tools and applications, and used to generate a course-support environment accessed via a standard Web browser. In its simplest form, a course-support environment is a Web site that accompanies an existing course and contains some information about the course. The purpose of such sites is to enrich or increase the efficiency of some aspects of course participation, and/or make some aspects of course participation more flexible to better meet the needs of individual students. Flexibility can also allow the extension of traditional courses to nontraditional audiences, including those who could be described as distance-education students [4]. Course-support sites can be created and maintained by the individual instructor, but increasingly such sites are maintained as part of an integrated system serving an entire department or faculty [12].

Since the beginning of 1998, the Computer Laboratory of the Department of Journalism & Mass Communication (J&MC), at the Aristotle University of Thessaloniki (AUTH), Greece, started to develop and publish material on the Web for its conventional courses [13]. The laboratory web site can be reached

at <http://pacific.jour.auth.gr> (in greek). The purpose of this effort has been mainly the support of the office automation courses and the preparation of a future distance-learning course. In the following, we present this course-support environment, along with the special considerations that determined its design.

2 Design considerations

Although the Internet and the Web, in particular, are significant tools that combine the delivery medium with the instructional content and course management, their effective use requires careful consideration. The academic community supports the use of the Web as a tool to enhance teaching and learning and many scientists believe that well-designed Web-based courses may be just as effective as the traditional classroom lectures [10]. But several considerations must be taken into account before integrating the Web into the courses. In education, the instructor will remain a critical decision maker in terms of if and how computer communications are used in a course. If the instructor is uncomfortable with the use of computer communications, he/she is not likely to persist on this use. Thus, different levels of integration are appropriate for different situations. In any case, Web material can be used to enhance traditional classroom lectures or laboratory courses.

In our case, the aim was to design a system that would be primarily used locally, with students accessing the system from within the campus, as an accompanying tool for the theoretical lectures and the lab courses; that is, not as a mechanism for delivering stand-alone distance education courses.

It is also well known that another major issue on the application of computer communications for learning purposes relates to the user-interface and human-computer interaction aspects, which are extremely important [4]. Thus, user concerns and characteristics need to be carefully considered. With regard to the hyper-linked environments accessed by Web browsers, the following two aspects are critical to the usability of computer communications: (a) Navigation support, that is, how easy it is for the user to find his/her way to what is wanted and back again, and (b) Overview support, that is, how easily the user can develop an accurate mental model of the site and the functionalities offered [11].

Our primary focus in the development was to provide an easy to use, browser independent system for supplying dynamic data-driven information into a common, easy-to-use framework with intuitive overall structure.

2.1 Course-related considerations

The office automation (OA) laboratory courses are offered to the second and third semester undergraduate students of the J&MC Department and cover word processing (MS Word), spreadsheet calculations (MS Excel), electronic presentations (MS PowerPoint) and databases (MS Access). The students have already attended during the first semester an introductory computer science lecture course, which also covers the MS Windows environment, along with basic Internet services.

The OA courses are taught in weekly three-hour lessons that combine both lectures and computer practice and take place in the computer laboratory. During the semester, each student has to deliver two projects, in addition to the weekly assignments that are completed during each lesson. There are also the final exams at the end of the semester.

It has been observed that for the students to carry out an assignment during a lesson, to have discussions, and to reflect on assignments, it is necessary for them to have a basic understanding of the subject matter before they come to the class [5, 12]. This can be greatly facilitated by distributing copies of key materials, rather than expect students to take extensive notes during the class period. In this way, not only students are appreciative, but also they have more time to concentrate on the material being presented [7].

2.2 Laboratory infrastructure

The LAN of the computer laboratory consists of thirty Pentium PCs. The installed software includes MS Windows '98, MS Office 2000 Pro, MS Internet Explorer v.5, and Adobe Acrobat Reader v.4. The computers have Internet access though the campus WAN. Furthermore, students are offered a free dial-up access from home to the campus WAN and the Internet, through a series of 28.8–56 Kbps modems.

3 Environment description

3.1 Technical aspects

For maximum flexibility, we chose to design and build the course-support environment using the available servers and targeted at the specific needs of the students. This approach is frequently the least expensive, but it requires the highest resources in terms of the instructor's time. Also, this approach has the highest technical risk; it may not be possible to meet design requirements within reasonable time frames [3].

3.1.1 The Web server

The hardware configuration of the Web server includes a PC with an Intel Pentium III processor running at 600 MHz, with 256 MB RAM and also a 15 GB HD. The MS Windows NT Server v.4.0 (SP.6) was chosen as the operating system, and the MS Internet Information Server (IIS) v.4 as the Web server software.

3.1.2 Web design

The MS FrontPage (FP) 2000 of the MS Office 2000 Premium edition was used as the Web authoring and management software. For the design of both the individual Web pages, and the entire Web site as well, various well-known Web usability rules were taken seriously into account [11]. In this context, special consideration was given to the overall simplicity of the Web pages and the site navigation. The pages were designed for the current most common screen analysis of 800x600 pixels. There were not used any frames, but instead the shared borders and navigation capabilities of the FP were used extensively. There is a shared border at the top of each Web page that contains the page title and a navigation bar with links to all the pages at the same level and their parent page. Furthermore, the Web page size was kept to a minimum in order to achieve small response times, and each page can be reached within three clicks from the Home page.

To create a richer and more useful online system requires the use of programs running on a server that can dynamically generate Web pages based on user interaction and information stored on the server. The Active Server Pages (ASP) consists of standard HTML tags along with inline server script tags containing code that is executed on the server. When a user requests an ASP page, the server processes the file, from top to bottom, executing any scripts, and then sends the results back to the user's browser as HTML. Thus we are able to query information from a database and present this information in a standard HTML format readable by any Web browser.

3.2 Content description

The main sections of the web site are shown in Fig. 1 and their contents are described in the following.

Homepage: This is the first page that views someone entering the individual course web site. It contains a brief welcome message together with the names of all the course instructors and links to their own homepages. Furthermore, on the left side there are links to the main sections of the web site and a flashing button that links to the most recent announcement.

Course Description: This section provides an overview of the course objectives and a brief listing of the course contents.

Bibliography & Notes: This section provides a full listing of the proposed bibliography, comprising of Greek and mainly international book editions. There are also links to the lecture notes that are coded in Portable Document Format (PDF) files.

URL library: This section facilitates the student's access to supplementary on-line material, through links to various international web sites.

Grading Policy & Degrees: This section states in a straightforward manner the course grading rules. On the right there are links to the subject matters of the current-semester assignments and projects, as well as, matters from past exams. Finally, there is also a link to the course grade book where each student can view its own degrees, so long as a special form is correctly filled-in with the student's unique password.

Project Gallery: This section is mainly an exhibition of all the past students' projects, in MS PowerPoint file format.

Course Syllabus: This section provides the course syllabus in a weekly basis, along with instructors' office hours. Also, though a drop-down menu, there is a link to a monthly calendar, where, after selecting the lesson's date, the student can view the specific lesson's contents and access supplementary course material in PDF files. Exactly the same destination can be reached through another drop-down menu of the timetable section, where the student can directly select the lesson number.

Announcement board: This section provides a list of all the course announcements; in reverse chronological order, i.e. the most recent one resides on the top of the page.

4 Implementation issues

In terms of the needs of a critical mass of users, quality of service indicators relating to high-bandwidth applications, such as videoconferencing, are less important than indicators relating to secure connections to the database systems that are rapidly becoming integrated with Web-based course-support environments. We agree with the opinion that Web environments supporting asynchronous access are and will continue to be in much broader use in education than situations that involve real-time communication [4]. But it must be stressed that face-to-face contact between the instructor and the student, as well as between the students, are still not-to-be neglected instructional activities, even when

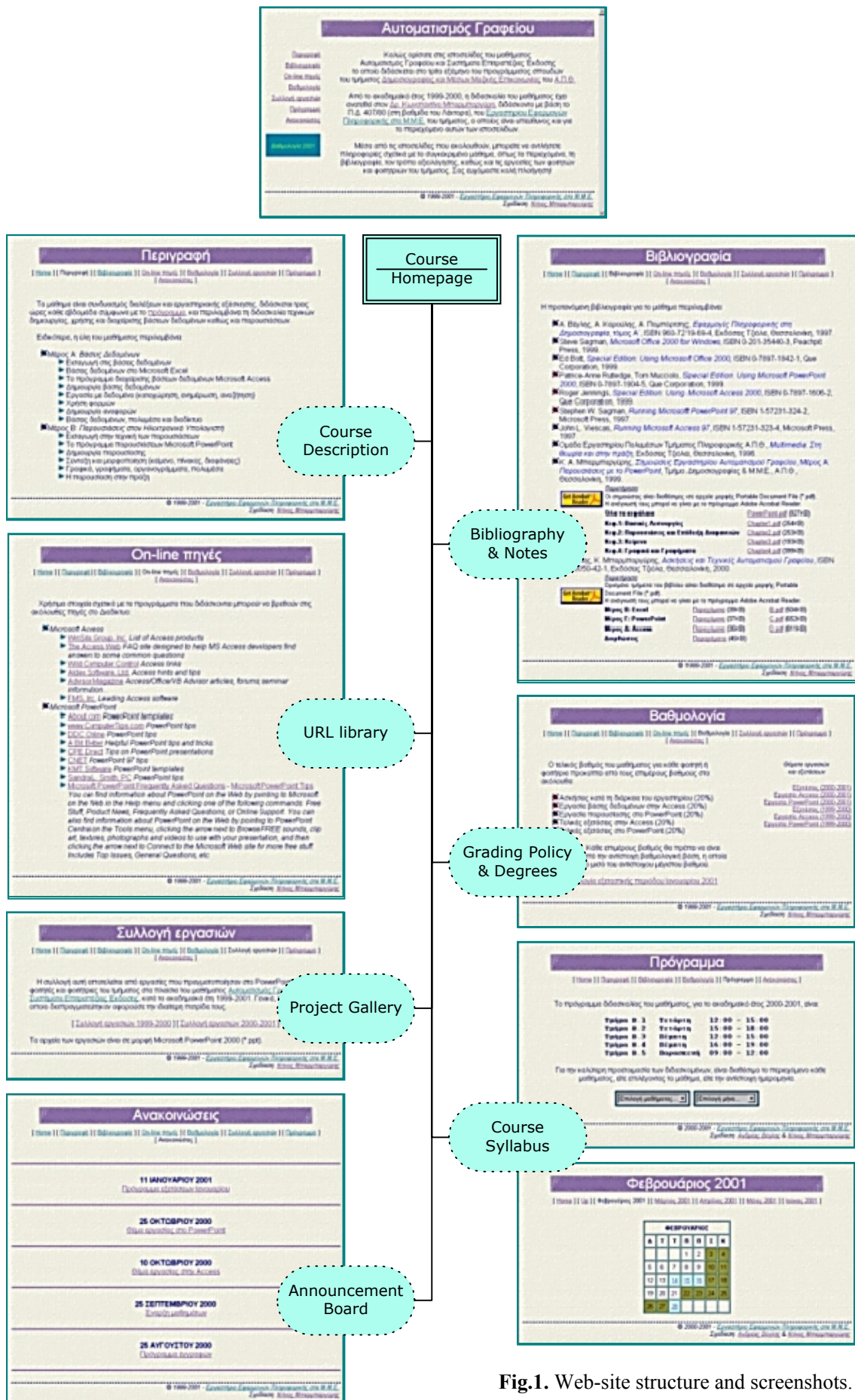


Fig.1. Web-site structure and screenshots.

the Web is extensively used [12]. Web-based course materials can be exploited to prime students for classroom lectures or laboratory practice, or even to make classroom time available for alternative learning activities.

Care should also be taken not to overwhelm students with on-line information, because excessive postings distract students from the focus of a lesson and decrease its impact. This has a negative effect on student morale, focus and learning. A small concise lesson is much more effective than a large encyclopedic lesson. Breadth and depth can be provided during classroom discussion and presentations. Moreover, it must be noted that the technology can intimidate students who are less computer literate. It is important to make sure that these students do not fall through the cracks and to get them comfortable with the course software and the Internet as quickly as possible [10]. Thus, the gradual integration of the Web and the Internet, in general, into the conventional courses brings forward the students to familiarize themselves with the use of this valuable tool.

5 Conclusion

The web-based environment that was designed and implemented for the support of the office automation courses at the J&MC Department of AUTH has been proved an invaluable tool both for the students and the course instructors. Its gradual integration into the teaching and learning procedure makes its adoption from both sides –instructors and students– a natural consequence of the information age we all experience, and has already attracted some useful suggestions for its future improvements.

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