MULTIMEDIA ENHANCED COURSE MANAGEMENT SYSTEM: WEB BASED INTERACTIVE APPLICATION DEVELOPMENT FOR UNIVERSITIES

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ABSTRACT

Of the fields on which developments related to information and communication technologies are effective will keep increasing is education. That's why the methods and techniques that have been formed over the long years may change relatively. In the past years, the field of higher education has been impacted very much from the developments and improvements on the Internet and web technologies. Due to this technological improvement, multimedia enhanced web based course management system is also aimed to improve the level of instruction quality on higher education in universities. This project aims to serve and present online multimedia information interactively to the academicians and the students within the department and institute enrolled within the courses. This web based interactive application forms as a bridge between the student and the academic staff of the department and the institute. Using multimedia content effectively enable the lectures within the courses more comprehensible and intelligible.

Keywords: Course Management Systems, Multimedia Enhanced Learning, Web Based Education, Multimedia Information Systems

INTRODUCTION

Developments in technology, especially the Internet and the Web made information unrestricted and easily accessible. Web based course management systems aim to increase the level of quality in education by taking advantages of such technological developments for the use of both academicians and the students. We can simply describe Course Management System (CMS) as a system for enabling the instructors on the web supported learning environment to manage all the resources related with the course without any knowledge of Internet and Web programming. With this system, the instructor who is responsible for the related course can administer personal and student information, course content, multimedia support, evaluation results, news and announcements on the CMS web site.

Purpose

Managing course web pages requires plenty of time and effort for the instructors even though using WYSIWYG (What You See Is What You Get) editors, for example, Macromedia Dreamviewer and Microsoft FrontPage. Baskent University Course Management System, BUCMS, aims to support course content with multimedia elements such as picture, audio and video without the knowledge of Internet programming. For the academicians and instructors, it is very easy to integrate multimedia content in the course curriculum by using the BUCMS. The developed system, BUCMS, aims to allow the instructors to manage the course by logging in to the web system to administer multimedia data, send to and receive messages from students and other instructors, show news and announcements, search multimedia content by keywords to support teaching and learning activities within the related courses.

Scope

This study is conducted at the Department of Computer Engineering on the Institute of Science within the Baskent University Graduate Program, during the 2006-2007 Fall Semester. For collecting data about the instructors' views of such a system for supporting the courses with multimedia enhanced web based course management system, an online questionnaire was prepared and located on the web. This online questionnaire was announced to the instructors and academicians and 84 people from different universities of Turkey responded. The distribution of the attendees of the questionnaire was; 22 professors, 10 associated professors, 14 assistant professors and 18 instructors.

METHOD

First of all, to discover the pre-opinions of the instructors about web based course management systems, an online questionnaire including 3 divisions (Personal Information, Information Systems and Technologies Usage, Course Management Systems) and totally 22 items about their views for integrating multimedia data into course content and managing the course curriculum by the BUCMS. During the 2006-2007 academic year, autumn term, 84 academicians, 22 professors, 10 associated professors, 14 assistant professors and 18 instructors from engineering, education and science faculties of different universities in Turkey participated in the study by filling out the online questionnaire. For this study, statistical survey, cross-sectional analyses and brain imaging methods are used. The results of the questionnaires are analyzed through a statistically significant tool, SPSS (Statistical Package for Social Sciences). Considering the results of the

questionnaires and views of the academicians participated in the study, BUCMS – Baskent University Course Management System is designed and developed.

BUCMS – BASKENT UNIVERSITY COURSE MANAGEMENT SYSTEM

Prologue

The academicians enrolled within the study stated their views about the web based course management system prior to design and development of the BUCMS in the questionnaire, as listed below. According to the instructors, the developed system should;

- Be fast, easily accessible and interactive,
- Allow sending messages to all course participants,
- Present effective and productive courses,
- Provide permanent communication with students,
- Provide easy access to information sources,
- Allow students to get documents quickly with trusted security,
- Support for multilingual interface,
- Provide visual support for courses that will be presented during lectures,
- Allow searching actual and comprehensive information which can be attractive for students and making them understandable,
- Support attachment of animations easily,
- Allow integration of flexible content formats to the system,
- Provide effective course content presentation and absorbing of intended information to students,
- Allow students to access homework and self-study applications.

The participants in the study also pointed out that the system will be useful for students for improving abilities of using new technology and information, accessing contents related to courses, communication with teachers, and attendance of students to courses. Accordingly, they have stated that benefits and facilities of such a system must be explained clearly to the teachers and students, so that their desire for both teaching and learning can be improved. As a result of the survey, BUCMS project was formed and the online multimedia support system was developed according to the views and opinions of the academicians from the different universities of Turkey.

Features

BUCMS system has three modules; they are; for the academicians, students and administrator. Users can easily access to the related module by authentication over password protected interface. All the modules have special interface and designed according to requirements. Instructors and students can sign up online and for entering the system, they need activation approval from the BUCMS administrator.

Modules

The users of the BUCMS - Academicians, students and administrator - can only access allowed module. The users should login to the system to see the content, as shown in figure 1. User registration can be done on the system online by the user as shown in Figure2.

Figure 1: User Entry / Registration Screens

Figure 2: Registration / User Login Screens

Academician Module

On the main page, information about the last visit of the academician is shown, these records are automatically saved when they logged into the system. Academicians are authorized with access to only their lessons (adding announcement, creating material related to the lessons, etc). System automatically forms hierarchical page for each lesson.

Figure 3: Main page of the Academician Module

Adding Course Content

BUCMS has three methods of adding course material. First method is by uploading files to the BUCMS system. Supported file extensions are ppt, txt, doc, xls, rtf, html, htm, pdf, mp3, avi, mpeg, mov, rm, swf, gif, jpg, png, zip, gz, rar, c, c++, exe, etc. These files are categorized by their type (picture, video, text, application, etc) and that helps the system users for easy access during documents search. Second method is giving link to the materials that are already in the BUCMS system and data duplication is prevented. Third method is adding course material using the editor built in to the system. Editor supports adding multimedia content inside the text. Using these three methods adding content is very easy and simple.

Figure 4: Adding Course Content by the Instructor

BUCMS controls the content by their status, so that the students can only access the permitted content. This feature helps the reuse of content, no need to add content twice, future subjects can be deactivated until next use. The search system of the student module can not access the passive subjects.

Academician can arrange the subjects in each lesson by order. The course content with multimedia data can be previewed before presenting to the students. Assigning keywords and descriptions for the documentations related to subjects helps for easy access from student module's multimedia search. There is no limitation for entering keywords and separating them with comma is a common way of practice. Similarly, there is no limitation on adding subjects, materials and documentations. Academician can add unlimited content. If content is made with built-in editor, multimedia data such as picture, animation, video, etc also can be inserted within text.

Figure 5: Adding Multimedia Data by the Instructor

Program Installation

The applications - Adobe Acrobat Reader, Adobe Flash Player, WinRAR, Apple QuickTime, etc. - are needed for viewing and reading the multimedia content. Hyperlinks to their installation web sites are provided.

Message system

The message system is aimed for sending messages to the students of the courses from academicians. Instructors can communicate with the students by this way; these messages are also shown on student / administrator modules.

Multimedia Supported Search

Main feature of the BUCMS system is searching multimedia data inside the course content or from uploaded files by their keywords and by categories (audio, archive, document, picture, video, program). Instructors can search only from their lessons. The search results are displayed as paged and 25 record shown for each page.

Updating Information

Academicians can update their information online on the BUCMS.

Students Module

Students' module has multimedia course materials prepared by the academician and the message system.

Course Pages

Students can access their participated lessons from the main page. Each course page has subjects, files, homework and announcements. Students have permission for reading course content, but not for changing.

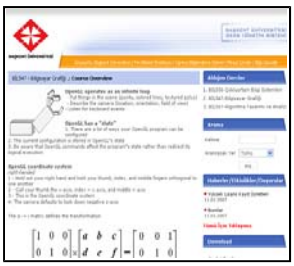

Figure 6: Detailed Course Content for the Students

Messaging System

By using the messaging system, students can send messages to the administrator and the instructors of the courses.

Multimedia Supported Search System

The main feature of the BUCMS system is the searching multimedia data within the participated course contents or from files by keywords and categories (audio, archive, document, picture, video, program). The search results are displayed as paged and 25 record shown for each page.

Program Installation

The applications - Adobe Acrobat Reader, Adobe Flash Player, WinRAR, Apple QuickTime, etc. - are needed for viewing and reading the multimedia content. Hyperlinks to their installation web sites are provided.

Updating Information

Students can update their personal information online on the BUCMS.

Administrator Module

The BUCMS system supports more than one administrator account with controllable permissions on modules and inside modules (Adding / Removing / Editing / Listing). This module consists of "Academicians", "Lessons", "General Settings"

and “Statistics” pages.

Academician Operations

Administrator; can approve online applications of academicians, add new academician and update existing academician’s information. For each academician ID number, department, employee number, password, first name, last name, place of birth, date of birth, title, email, web address, room number, telephone number, fax number, internal number, address, foreign languages, specialties, personal information, status (Active / Inactive), date of registration to the system, information update date, last visit date information are kept on system.

Academician Course Operations

On this module, academicians can be assigned to the courses for each semester. These records are also for the academician permissions on courses. So, academicians can do the operation only to the assigned courses of them.

Course Operations

This module includes all courses of the institution / department. Changing course status (active, inactive) allows operations on it. For each course, department information (Computer Engineering, Industrial Engineering, etc.), course name, course credit, catalog definition and status information are kept on system.

General Settings

This section includes all the settings for the BUCMS system and can be changed where / when necessary. Site title, institution address, domain used, e-mail, fax number, university telephone number, SMTP (Simple Mail Transfer Protocol) information needed for mail (SMTP - Server, SMTP - From, SMTP - Password, SMTP - username) and maximum picture file size can be edited. On this section, permissions on adding and removing are not allowed.

Departments

This section includes the departments of the institution. Each department has its name, code, introductory message, and telephone number, fax number, e-mail address, address and order list number information. If a department is deleted, related all the records also will be deleted (Courses, course contents, etc.).

Administrators

On this section, an administrator can be created for this module. Each module may have different permissions (Adding / Removing / Editing / Listing) and this allows different operations’ rights on different modules.

HTML Content

Texts used on the system can be updated; they have dynamic structure (Introduction text of the institution / department, academician and student welcome message, etc.).

Announcements/News/Activities

This section includes the announcements, news, activities of institution about academicians and students. The rate of each news (number of visitors read those news) is kept in the system.

Messages Received To System

The messages that are sent to the system administrator by messaging system are shown here. Each record includes personal information of academician / student, communication information of academician / student, and the message status (read / unread) and the sent date. “Answer message” option helps sending response messages to the users.

Statistics

The usage statistics of the students and academicians for the courses and subjects in yearly, monthly, weekly and daily intervals are shown in this part.

Logs

BUCMS keeps all log records of modules. Each record has a date, IP, user (student / academician / administrator), log type and description information.

System structure

This system, BUCMS, is developed by using the tools; MySQL as the database provider, PHP for the programming and Adobe Photoshop for the graphical interface. BUCMS is tested with around 150 students simultaneously. It is assumed that BUCMS can handle 2000 online users, with no technical limitations. It depends on the server's configuration and connection. The graphical user interface is designed for the web based access and all type of browser and operating system are supported.

CONCLUSION

Multimedia enhanced web based interactive course management systems are getting popularity and playing an important role in the academic enterprise of teaching and learning at the field of higher education in universities. They have many alternatives, despite none of them fulfills all the requests. On this project and study, multimedia content are being used in high level structure and we experienced the use of the Internet and the Web resulted in increase which has video module, multi-optional multimedia search for the entire database and the communication for both the students and the academic staff. In conclusion, the academic staff gives the lectures within the enrolled courses much more effectively due to the interactivity of the web based multimedia support system. The developed system, BUCMS, presents specific topics within the courses easily and effectively with the technological support of animation, video and audio. For the students, accessing to the clear and reliable academic resources is much simpler.

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