THE SEARCH OF THE RIGHT COURSE MANAGEMENT SYSTEM

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Abstract*:* In the educational system the use of computers and the internet had only a supporting role during the previous years. The conventional model required the physical presence of both the professor and students and the lectures took place in amphitheaters.

Nowadays, we use the internet in our numerous activities everyday, henceforth this model has changed. Educational institutes offer e-learning services, as a basic way of education. In addition a lot of Educational institutes offer remote study programs exclusively and courses delivered online.

Course Management System (C.M.S.) is a software which provides operations of complete course management, including e-learning content, tracking the learners' progress and communication between students and professors. It is mainly used as a tool for distance education, but it is also used to supplement the face-to-face classroom.

The Technological Educational Institute (T.E.I.) of Crete begins in collaboration with the City University, Washington-U.S.A, a postgraduate study program starting October 2007. This program will take place entirely at the facilities of the T.E.I. of Crete while the teaching professors will be from both educational institutes. In addition the fact that the City University professors will not be physically present on a daily basis, requires a C.M.S.

In this paper we will trace all the necessary steps in the choice of suitable CMS:

- design - analysis of requirements,
- which criteria were taken into consideration for the initial selection of software packages,
- how we compared and tested the software packages,
- their evaluation,
- which one had the highest rank and thus was selected as the one that meets the needs of our postgraduate study program.

Keywords: *Course Management System, T.E.I. of Crete, Internet, E-learning*

1. INTRODUCTION-HISTORY OF DISTANCE LEARNING

Distance Learning is a general term used to refer to a field of education that focuses on delivering knowledge (teaching) to learners (students) who are not physically present.

This field of education has always been dependent on evolution of technology.

It began with the development of industrial technologies (postal communication and transport) in the late nineteenth century. Academic and other Institutes offered study programs via correspondence, so teachers and students could communicate asynchronously (at times of their own choice) by exchanging printed material.

Audiotapes and videotapes were later added by the evolution of sound and video technologies in the 70s and 80s.

During the first steps of computers revolution, the exchange of electronic media was added in the form of floppy disks and CD-ROMS.

The use of computers in training gained ground and changed the conventional model of teaching that required the physical presence of both the professor and students while lectures took place in amphitheatres.

That model was enriched by the use of electronic material like multimedia presentations which finally replaced the chalk and blackboard.

At that time (in the 90s) computer-enhanced learning had an important supporting role in face-to-face teaching and the term Electronic learning or E-learning appeared.

That term was also used extensively in the business sector where it generally referred to cost-effective online training.

It's a fact that the Internet evolution in the late 90s boosted E-learning which nowadays is used to refer to internet enabled learning while World Wide Web has become the most successful educational tool in recent years.

It is combined Web-based technologies that made all this possible:

- The methodology of client-server programming,
- Web programming languages like Java, .NET,
- Markup languages like HTML, XML for data transport and presentation on the Web.
- Script languages like
  - ➢ VB Script, JavaScript (client side)
    added functionality to HTML pages (such as simple mouse-over-image effects, animation, and form field validation to complex dynamic menu systems),
  - ➢ php, ASP (server side)
    for using, creating, and modifying files on the server.
    Data is retrieved and included on the HTML-page and information entered on a previous page can be stored as data on the server. Typical examples are visitor counters and guest books.
- Plug-in technologies like Flash significantly enhanced interactive and graphic aspects of Web pages

Using web-based software someone can browse and have access to content independent on hardware or operating system platform.

In addition the development of broadband technology was of vital importance because the delivery of content in multiple formats (pictures, audio and video) needs extensive bandwidth.

Nowadays many Educational Institutes offer remote study programs and courses are delivered online while synchronous online learning allows for real time interaction between students and the instructor.

The increasing popularity of the PDAs and smart phones has provided an additional medium for the distribution of distance education content and finally real mobile learning (m-learning) has been achieved.

2. ADVANTAGES OF E-LEARNING

- digital content can be easily adapted: customization, openness and flexibility.
- e-learning knows no time zones, as location and distance are not an issue. For the instructor, tutoring can be done at anytime and from anywhere.
- learners can use the Internet to access up-to-date and relevant learning materials. Online materials can be updated, and learners are able to see the changes at once.
- learners communicate with experts in the field they are studying.
- situated learning is facilitated, since learners can complete online courses while working or in their own space

3. DISADVANTAGES OF E-LEARNING

- A benefit of the older educational model is that it retains human interaction. Meeting with people, discussing, sharing, asking questions, and learning the symbology of kinesics are subdued in internet based communication.

4. WHAT IS C.M.S.?

Course Management System (C.M.S.) is software which provides tools of complete course management.

It includes modules for creating and organizing e-learning content, supporting many multimedia formats. A C.M.S. makes it possible for a course designer to present material to students, through a single, consistent, and intuitive interface.

It tracks the learners' progress which can be monitored by both teachers and learners. Teachers design quizzes and exercises selecting from a variety of templates such as multiple-choice, true/false, one-word-answer.

It provides all the necessary tools for the administration of the user groups (teachers, students) through access control lists.

It provides strong security and separates the material to be published based on user authentication.

It supplies communication tools between students and professors, either enabling direct communication with modules such as chat and video conference, or indirect communication with modules like e-mail, discussion forums and blogs.

Most C.M.S. are web-based to facilitate "anytime, any place, any pace" access to learning content and administration.

It is mainly used as a tool for distance education, but it is also used to supplement the face-to-face learning.

5. T.E.I. OF CRETE CASE STUDY

The Technological Educational Institute (T.E.I.) of Crete in collaboration with the City University, Washington-U.S.A, begins a 2-year postgraduate study program starting October 2007. It leads to corresponding Master of Science degree "Computer Systems – Web Development Emphasis" awarded by the City University. This program will take place entirely at the facilities of the T.E.I. of Crete while the teaching professors will be from both educational institutes. The fact that the City University professors will not be physically present on a daily basis requires a C.M.S. as the basic learning tool.

6. DESIGN ANALYSIS

The C.M.S. which will be selected, it should have some fixed specifications to cover the needs of the postgraduate study:
- modules for designing, creating and publishing e-content. (e.g. the syllabus for the course, multimedia presentations),
- management of courses and users with differential access rights for instructors and students,
- student registration and tracking facilities,
- self-evaluating quizzes/exercises which can be scored automatically,
- indirect communication tools (e.g. e-mail, blogs and threaded discussions),
- direct communication tools (e.g. text chat),
- course calendar with event management,

- automatic learner messaging and note-posting regarding up-to-date course information,
- dictionary (e.g. built-in wiki platform),
- module for additional outside resources and links
- the option of having many teachers per course

7. INITIAL CRITERIA

With minimum effort someone can discover the existence of a few dozens of C.M.S. Most of them have been developed for years and are stable and mature software packages. It is impossible to compare and evaluate each and every one so the following criteria have been used for initial selection of them.

- web-based software. It should not be dependent on operating systems run by user's computer. (Linux, Microsoft Windows, Mac-OS, etc). It should be independent on hardware platform (x86, PowerPC, etc),
- software should be released under freeware and open source license. That means source code is available and necessary modifications can be made initially for the right tuning and increasing functionality with add-ons later. There is no cost for acquiring it. The only possible cost will be for future development.
- Software should have adopted standard content packaging specifications (e.g. SCORM), allowing content developers to create reusable content that can be swapped between different e-learning systems.
- Software should have been developed/tested for a long time and should have installed and run in many Institutes
- Software shouldn't require dedicated servers for running. Our servers host several internet services (e-mail, Web sites, DNS, remote access) and run a variety of databases so quite common server setups are used not allowing changes on system modifications to be made.
- Software should have a familiar user interface. Students are used to many C.M.S and they shouldn't make an extra effort to learn another one with different user interface approach.

The previous criteria prevent some of more popular and powerful packages to be included in our comparison such as Blackboard, Lon-Capa, dotLRN, Embanet and Bodington.

8. COMPARING

During the process of comparing the C.M.S packages which cover all the above criteria, every one has been installed locally at our Linux server and tested for a specific period of time. Both teacher and students accounts were created and used for the evaluation of software.

Obviously we didn't take into account how easy or tough the installation process was. On the other hand we did consider how good the implementation of their features was, giving special notice to communication tools and interactivity. We tested course management and administration tools thoroughly and compared the functionality and ease of use.

The results of our testing for each one are following:

Product	Admini-stration tools	Content & Teacher tools	Student tools	Commu-nication tools	User friendly	Overall
Atutor 1.5.4	●●●●	●●●●●	●●●●●	●●●●●	●●○	●●●●○
Claroline 1.8.4	●●○	●●	●○	●●	●●○	●●
Dokeos 1.8.2	●●○	●○	●●○	●●○	●●○	●●○
Moodle 1.8	●●●●●	●●●●	●●	●●●○	●●●●●	●●●●
Nextgen 1.4.0	●●●	●●○	●●●	●●●○	●●●●	●●●
Olat 5.1.3	●●○	●●●○	●●●	●●●		
Sakai 2.3.1	●●●●	●●●●	●●●●○	●●●	●●●○	●●●●

Table 1: Comparison of C.M.S packages

9. CONCLUSIONS-EVALUATION

There are many powerful packages under open source license with numerous features covering the needs of a modern C.M.S.

- Atutor is the most powerful one with whiteboard module and excellent openness (import/export).
- We like in Claroline the feature of statistics per exam and the built-in MediaWiki module.
- In Dokeos which is Java servlet based, we love the video conference module
- Moodle has the most user friendly interface and it has strong permission management.
- In Nextgen we approve its modularity but we deal with many Internet Explorer crashes. In addition if many modules are enabled, it seems like login process (home page opening) slows dramatically.
- In Olat which is Java servlet based, we like the enriched user interface.
- Sakai which is Java servlet based, has many features but we dislike the complicated administration and the somehow different user interface. In addition it is under merging with Bodington.

From the above table is obvious that the Atutor software has clear advantage among others. It has the highest overall ranking and it outdoes others in almost all categories. Moodle and Sakai takes the second and third place respectively.

Atutor is our selection for covering the needs of the postgraduate program which starts next October. We only hope professors and students of the program will share the same satisfaction we have using that C.M.S. and eventually they will agree with our decision.

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