Developing an Effective and Efficient eLearning Platform Using Open Source Software

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Abstract

The Web Based Training (WBT) or eLearning is emerging to replace traditional training. "eLearning", is rapidly becoming the preferred route to building and maintaining advanced performance capabilities via improved efficiencies and effectiveness. It transcends the normal classroom mentality in favor of a Web-based method of delivery that meets specific needs and is self-paced, extremely interactive, and measurable. Two main components of an eLearning system are the contents and the platform or LMS. Contents are prepared by the content experts or the Subject Matter Experts. The contents are then converted into multi media based material for presentation to learners on demand. For many organizations, especially those in the developing countries, acquiring a commercial LMS could be very costly in order to host the contents. The purpose of this paper is to introduce Open Source software and how it could be used in implementing a free LMS system and to introduce how the College of Internet Distance Education at Assumption University has achieved it.

1. Introduction

Learning Management System (or LMS) is a software package that enables the management and delivery of learning content and resources to students. Most LMS systems are web-based to facilitate "anytime, anywhere" access to learning content and administration.

At a minimum, the LMS usually allows for student registration, the delivery and tracking of eLearning courses and content, and testing, and may also allow for the management of instructor-led training classes. In the most comprehensive of LMSs, one may find tools such as competency management, skills-gap analysis, succession planning, certifications, virtual live classes, and resource allocation (venues, rooms, textbooks, instructors, etc.). Most systems allow for learner self-service, facilitating self-enrolment, and access to courses.

All software is written with source code. With open source software, the code is protected by a special license that ensures everyone has access to that code. That means no one company can fully own it. Open source software is often free of charge and freely available on the Internet for download. Open-source software now plays a crucial role in the majority of large information technology (IT) organizations. In the last two years Open Source Software has made an increasing impact in education. Open Source Software provides better quality software, it increases pedagogic choice, enhances flexibility and it facilitates new business and social models. Following the success of Open Source software the idea is being extended into other areas including open science and open books.

2. Open Source Software for LMS

There are a couple of thousands of open source projects ranging from email clients and browsers, i.e. Thunderbird and FireFox to World Wide Web servers such as Apache and operating systems like Linux. There are a few open source softwares available for LMS, the engine behind the eLearning, such as Moodle, ATutor, and Sakai. The Author has installed and implemented Moodle as the LMS for School of ICT at the College of Internet Distance Education at Assumption University. The following open source software is needed in order to create an LMS:

2.1 WWW Server System

Apache is a World Wide Web open source server software which is hosted on the server computer. Most Apache servers work alongside with PHP, which is an open source scripting language and MySQL, which is an open source data base management system. The Package of Apache, MySQL, and PHP is available for easy download and installation for both Windows and Linux operating systems. AppServ is one of the many sites from which this package could be downloaded:
http://www.appservnetwork.com/

2.2 Moodle

Moodle is a course Management system (CMS) – a free, open source software package designed using sound pedagogical principles, to help educators create effective online learning communities. Moodle supports more than 70 languages and its ease of installation and maintenance has been the main reason for more than 100, 000 official registered users of Moodle over 150 countries [1]. Moodle has got one of the best support systems and with its online communities any question could be answered easily and promptly. It is easily customizable for different use and application.

Some of the more important features of Moodle are as follows:

- **Forums (Webboards)**

This activity can be the most important – it is here that most discussion takes place. Forums may be structured in different ways, and can include peer rating of each posting. The postings can be viewed in a variety for formats, and can include attachments. By subscribing to a forum, participants will receive copies of each new posting in their email. A teacher can impose subscription on everyone if they want to.

- **Blogs**

Blogs allow students, teachers and administrators to have a public web log. This online journal has various settings to control who can read them.

- **Lessons**

A lesson delivers content in interesting and flexible ways. It consists of a number of pages. Each page leads to another page. Students are given content and choices which determine the next page they see. The question page is the most common type. It has content which ends with a question and the page shows a number of possible answers. The student's answer choice determines the next page they see. Branch tables are another type of page where students see content and can choose to move to different parts of the lesson by labeled buttons. Navigation through the lesson can be straightforward or complex and depends upon the structure of the material being presented

- **Question Bank**

This allows the creation, preview, and editing of questions in the course question bank. These questions can then be used in any supported course activity such as Quizzes.

- **Quiz**

The Quiz module allows the teacher to design and set quizzes consisting of a large variety of question types, among them are multiple choice, true-false, and short answer questions. These questions are kept in the course question bank and can be re-used within courses and between courses. Quizzes can allow multiple attempts. Each attempt is automatically marked, and the teacher can choose whether to give feedback and/or show the correct answers.

- **Wiki**

Wiki is a website used by a group of people to collaborate, to build, edit and modify with no programming or HTML. MediaWiki is a simple and easily-managed wiki system at: wikipedia.sourceforge.net. The Moodle wiki module enables participants to work together on web pages to add, expand and change the content. Old versions are never deleted and can be restored.

3. Implementation of Moodle at Assumption University

The executive committee at the College of Internet Distance Education at Assumption University approved a plan to use the open source Moodle and other open source softwares to implement an open source LMS for the eLearning program of the School of ICT at the College. A Windows 2003 server was purchased for this purpose and all the open source softwares needed for this project was downloaded and installed for the platform. In order to develop ICT courses, it was proposed that a team as shown in Figure 1.

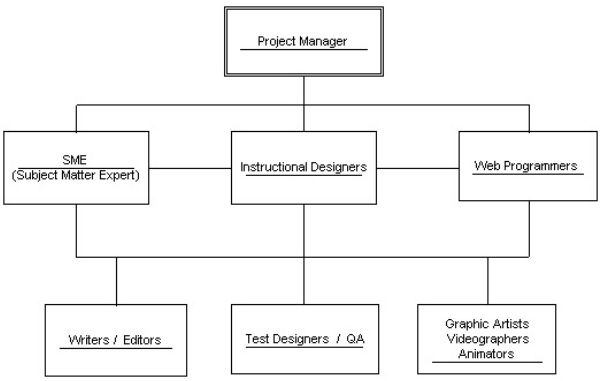

Figure 1. Course Development Team

The executive committee at CIDE approved to hire 4 staff as follows to work in the Technology Division of the College:

Instructional Designer: 1
Web Programmer: 1
Web Designer/Web Developer: 1
Graphics Artist/Designer: 1

Multimedia based course contents have been the obvious choice for eLearning. Multimedia technologies combine several communication media such as text, graphics, video, animation and sound. Simply defined, the term multimedia refers to a computer-based presentation that delivers information integrating two or more media [2]. For many learning tasks, multimedia methods are not only more appropriate, but also more efficient, and multimedia instructions frequently motivate learners more effectively [3].

Video is by far one of the most powerful and expressive non-textual media that captures and presents information [4]. For this reason, the content experts were video taped while lecturing a subject and these videos became the main part of the open source LMS system after being edited and rendered. Any given course is divided into 13 to 15 units of approximately 2 hours of video tape per unit. Every unit is broken down into several modules. The digital videos are interactive. Interactive video-based instruction reduces limitations

associated with linear video communication by providing variable control over the learning process and the course of instruction and being actively responsive to learners' performances. The convergence of computing, knowledge management, and digital library technologies is standing by to produce an all-digital, interactive, and multimedia learning environment. High interactivity of an eLearning system can enhance learner engagement. A study examined engagement in two types of multimedia training systems – a more passive medium (videotape) and a less passive medium (interactive software) [5] . The measures were a quiz and a questionnaire, which showed that learner engagement was stronger for interactive computer-based training than for the videotape based training.

4. Conclusion

The platform or learning Management System (LMS) is the core of any eLearning courseware. This LMS could be prepared and installed free of charge using open source software. The content experts could be video taped while lecturing a subject. A small team of an instructional designer, a programmer, a web designer, and a video/graphics editor could produce a interactive multimedia based format of the course with the interactive video at the core of eLearning. The more a student is involved interacting with the elements of the LMS, the better he/she learns the subject under study.

In order to select the most suitable open source LMS for a particular eLearning environment, the organizations providing eLearning should consider the following points:

- What are the program objectives for the individual learners, training institutions, and sponsoring organizations?
- How will progress be measured, tracked, and reported?
- What learning content will be required for each learner, now and in the future?
- What support tools (labs, references, collaboration, etc.) will be required by the learners?
- How well are the various components integrated?
- How well does the platform (LMS) support a rigorous instructional design model? Does the platform allow full exploitation of the qualities of the content?
- How well does the platform manage professional development objectives including specified learning paths and bricks-and-mortar events?
- How well does the platform support administrative objectives?
- Is the platform secure?

5. References

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