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Collaborative Open-Source software: the case of e-learning at University Fernando Pessoa

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Abstract

We present the elearning project at University Fernando Pessoa (UFP). We briefly present some of the current issues, review the terminology and the techniques, and present the main guidelines we adopted for choosing an elearning platform. We present the overall approach that has been taken at UFP, together with the short and medium term goals that we aim to achieve.

Introduction

We briefly present some of the current issues, review the terminology and the techniques, and present the main guidelines we adopted for choosing an elearning platform. We present the overall approach that has been taken at University Fernando Pessoa, together with the short and medium term goals that we aim to achieve. By elearning platform we mean a generic software and hardware infrastructure that can be used to deliver different kinds of computer mediated learning: at a distance, blended, partially in the classroom, and as an add-on to classroom only classes. We are here mainly concerned by what we can have right now to support an elearning initiative and what are the relevant issues to consider when making a decision. We are here not concerned by elearning concepts, trends, or techniques.

The elearning project at UFP was defined by the following characteristics:

- a large majority of courses taught at UFP are in the Social Sciences and Health Sciences areas, and only four courses in the Science and Technology areas; this means the vast majority of users (learners and instructors) is not technology-oriented, and so we should expect a wider range of adoption questions;

- the platform should support regular university courses, graduation courses, and several formats of training courses; the platform should not constrain instructors to follow a rigid pedagogical model; it should on the contrary be also a tool for research, by allowing several configurations and functions to be tested and included as needed;

- the platform should be open in the sense of being able to integrate with the existing student and course rosters. New features and requirements, not known beforehand, should also be easily included in the system; this was a major requirement, as UFP didn't want to rely solely on commercial vendors to integrate the system with legacy software and to add functions;

- features such as localization were secondary in a first stage, although the system should allow in the future to support a multi-language interface.

The elearning project had a timeline of 2004-05 for requirements identification, tests, and candidate selection (the current phase we are now), 2005-06 for a medium scale pilot, and 2006-07 for a full implementation. The first stage consisted of literature review, technical literature review and gathering of experiences from commercial elearning systems − including visits and interviews at Portuguese and Spanish institutions that had deployed in production such systems.

This paper is mainly about the issues that are currently being addressed and those that will be addressed in a near future. The next section discusses some of the current issues related to elearning systems; then we briefly characterize a Learning Management System, and present in the next section what we selected as important to choose; them we present the selected system, and close with some final remarks about this project.

Current issues

Blico *et al* (2004) identify three technology categories that have to be considered when talking web elearning systems implementation:

- infrastructure that is specially designed to support elearning;

- infrastructure that is not elearning specific but it is essential in deploying elearning systems;
- more widely deployed infrastructure that may be useful to support elearning, although not required in any way.

In the first category we find specific authoring and content management software, and computing and communications infrastructure. The second category provides authentication, security, file upload and download, email, and other tools and techniques. The third category provides for example more options of communication links (e.g. wireless), medium (e.g. TV or video), distributed servers, and load balancing applications.

Following the web trend of closer interconnection and interoperation, the elearning infrastructure will certainly be scattered among an institution's several and increasingly omnipresent web services and it will certainly not be a single system. As higher education institutions offer more learning and training options, the learners needs and goals are different − for example, adult education, skills acquisition, training, refresher modules. It is already a trend seen in current commercial and open source elearning systems, and a trend that will certainly be reinforced in the short term. Service Oriented Architectures − see for example (W3C, 2004) − can provide the foundation to develop software that has to be used by different profiles, with different content, with different service requirements. Elearning systems will probably evolve to service managers, adopting their interface (the services they offer) to the profile of the learners; otherwise, the current level of integration complexity will kill any serious large scale elearning effort.

Other technological advances are making their way, although their adoption in elearning contexts has not been as expected. The newer generation of learners, an internet generation, will probably contribute to a widespread adoption of new techniques and tools, such as instant messaging, mobile devices, collaborative software, blogs, use of digital libraries and digital content repositories, gaming, and more interaction.

On the other hand, other players, from the content side (the major scientific publishers), are packaging their content (adopted and recommended books) to be used inside the major elearning systems. Once again, the choice of open standards seems the only reasonable way to go. Content production is the most time and cost expensive activity in an elearning setting, and reusability is the key factor.

Finally, different styles are adopted by instructors, and an elearning system should not constrain them to all use the same set of techniques, learning design, and methods.

Learning Management Systems

Learning Management Systems (or LMS for short) should provide the following five functions:

- Managing access to the system; this function should control password-based access, identification of groups of users and their rights, and a list of courses and registration policies. Most of the time, these functions are accomplished with a high degree of customization, for example by connecting the system with a roster of students and courses. Services such as “single-sign on” using a variety of techniques − for example Yale Central Authentication Service (CAS) (Mazurek 2004), or LDAP providers − allow for a smoother integration with legacy systems.

- Content assignment and management; this function should display course catalogs, targeted to specific audiences, allow for registration, and allow for synchronous and asynchronous content distribution, assessment creation and delivery, syllabus creation, and the management of personalized learning paths. It is expected that most of these services should get information from external providers, such as rosters of students and courses. Scheduling functions can also be added.

- Communication; the third function deals with establishing, and maintaining communication between learners and instructors. Several options exist for online, offline, synchronous, asynchronous, one to one or broadcast communication. The choice of a specific technique should maximize people engagement, and allow for the expected impact to take place.

- Tracking and reporting; this function should allow for tracking of student progress, and for reporting on studied materials (compulsory, optional). Should also report on study paths, student preferences, and study styles. Besides collecting information on what, when, how and for how long, this function should include institution's specific requirements concerning tracking and reporting.

Content development; this function allows for in house content development, and should help instructors with templates, import/export facilities, and easy editing. Compliance with industry standards – for example the "Sharable Content Object Reference Model" (SCORM) (ADL, 2004), IEEE LTSC (IEEE 2005), IMS (IMS, 2005) and OKI (2005) − helps with course creation, import and export of courses, and integration with other materials (for example book materials). Furthermore, the trend to move to Web services, ePortfolios and LMS and portals integration adds to the distributed nature of learning content. Another important issue deals with content copyright and licensing: the new Creative Commons licensing scheme should play a major role here.

The last function, Content development, is often used to distinguish between LMS and L(Content)MS, or LCMS, depending on their sophistication. It is mainly a managerial and technical question if content is going to be produced in the same system that is delivering it, or rather using more sophisticated tools. As such we used either LMS ore LCMS, meaning elearning platform.

In the next section we list and discuss some of the tools, or services, that a LMS/LCMS or a combination of both should present.

Tools and functions

From a survey of existing LMS we could identify the following tools and functions that we would like (and in some cases require) our system to have. Most are summarized in (Wilson *et al*, 2004):

- Course management: supports creation and management of courses, modules and other units of learning;

- Assessment: supports the creation, delivery and scoring of assessments;

- Grading: supports grading of units of work and evaluation;

- ePortfolio: supports recording information about the learners, such as achievements, work, and artefacts;
- Drop-box: supports two-way exchange of documents between learner and instructor;
- Reporting: provides output such as reports for supervising bodies (such as the Ministry of Education);
- Resources: allows the creation of lists or pools of resources in various digital formats;
- Learning flow: allows for the definition of learning paths;
- Alert: allows for the dissemination of news, alerts and announcements;
- Archiving: allows for the long term archival of courses (exporting and importing functions);
- Authentication: verifies the identity of a given user, can be provided by an external source (CAS or LDAP provider);
- Authorization: establishes a realm for deciding which user which actions;
- Audio/Video conferencing: includes one to one or broadcast audio and video conferencing;
- Scheduling, calendars: allows for personal calendar management;
- Chat: supports multi-user chat rooms;
- Email: supports access to an email tool or integrates an email tool;
- Digital Rights Management: provides facilities for Digital Rights Management, managing access to resources depending on the user’s profile;
- Logging: provides logging facilities for applications;
- Membership: provides for membership of users in groups, or courses;

- Messaging: provides for broadcast or one to one messaging services;
- Metadata management: supports metadata management for resources;
- Presence: allows for some kind of presence tool;
- Profile: provides for online basic information about users;
- Roles: supports the definition of roles such as security realms and organizational roles;
- Search: supports the search of any kind of information within the system;
- Whiteboard: provides some sort of collaborative function where users share materials and ideas.

These were the most important tools and services we selected in the first phase, and that would guide the selection of the elearning platform. Either these tools would be present or it should be possible to include them without major modifications to the system and to the code.

Choosing a LMS

In this section we give an overview of the additional criteria we used to select an LMS (the generic name we are giving to an e-learning platform), besides the tools and services list we presented in the last section.

By looking for the features underlying the tools and services described, we the most important issue we have identified so far has been open standards compliance (not proprietary standards compliance). But other issues are important in an higher-education context:

- the cost trade-off of the “buy-build” dilemma; there is evidence (at least in the US) that locally built software is being replaced (Lambert, 2004);
- the level of open standards compliance; for an anecdotic example of exporting data from an existing system see (Wheeler, 2004);

- the level to which the system adapts to the university culture and values;

Lambert (2004) pointed out that although universities are asked to be run as businesses, they have different values than "normal" businesses. Innovation, sharing, research, collaboration are intrinsic higher education values, and these do not fit the commercial software offer. So, why not use these values as the foundation for "scholarly information systems" as Lambert calls them?

The UFP choice

The Sakai project (Hardin 2004, Sakai, 2005) is a collaborative open source software development project, led by Stanford University, MIT, Michigan State University and Indiana University, being also financed by the Andrew-Mellon Foundation. Sakai started with the ambitious goal of being commercially competitive by the end of 2005. Sakai relied on previous efforts and systems by the founding institutions that realised they all were doing the same. Sakai is defined as a "collaboration and learning environment", the "best of refactoring" of the existing systems (Hardin, 2004) presenting most of the tools and services we listed before. As interesting features we could name:

- it will integrate with portal software, according to the JSR-168 specification (JCP 2005);
- it will be based on WSRP (Web Services for Remote Portals);
- it will be based on open standards (IMS-QTI, OKI);
- it has an "open-open" licensing scheme (open for deploy and open for commercial use);

As for version 1.5.x (now a couple of months old), Sakai offers:

- a syllabus tool;
- a quiz and test tool;
- integration with course and user providers;

- a calendar tool;
- an announcement tool;
- a resources tool;
- a email archiving tool;
- an assessment tool;
- a drop box tool;
- a gradebook (still under development);
- a profile tool (still under development).

These tools and services are currently being tested in a small pilot involving around 500 students, 70 instructors and 80 Sakai sites, corresponding to courses, research projects, and interest groups. The same platform can be used for any collaborative activity, which allowed for instructors to choose their approach strategy to the system: by creating course pages with support material, managing assessments, managing the schedule, among other "creative" ways. No one felt pressed to use a LMS, and to learn in a short period of time "how to do e-learning".

Final remarks

Although the Sakai project has gathered funding and institutional support until the end of 2005, there remains to be seen what will happen beyond that date. Will the collaborative effort have gained momentum and can remain organized? Will the governance rules established or implicit so far keep the community together? Will this open source choice prove economically viable in the long run? We hope the answers are positive, and that the encouraging results we had so far in a limited pilot could be extended to the production phase.

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