

Personal Learning Environments: Integration of Web 2.0 Applications and Content Management Systems

Lino Oliveira¹ and Fernando Moreira²

¹Escola Superior de Estudos Industriais e de Gestão, Vila do Conde Portugal

²Universidade Portucalense Infante D. Henrique, Porto, Portugal

linoliveira@eu.ipp.pt

fmoreira@upt.pt

Abstract: This paper presents an ongoing project that implements a platform for creating personal learning environments controlled by students, integrating Web 2.0 applications and content management systems, enabling the safe use of content created in Web 2.0 applications, allowing its publication in the infrastructure controlled by the HEI. Using this platform, students can develop their personal learning environment (PLE) integrated with the Learning Management System (LMS) of the HEI, enabling the management of their learning and, simultaneously, creating their e-portfolio with digital content developed for Course Units (CU). All this can be maintained after the student completes his academic studies, since the platform will remain accessible to students even after they leave the HEI and lose access to its infrastructure. The platform will enable the safe use of content created in Web 2.0 applications, allowing its protected publication in the infrastructure controlled by HEI, thus contributing to the adaptation of the L&T paradigm to the Bologna process.

Keywords: Web 2.0, Learning Management Systems (LMS), Personal Learning Environments (PLE), e-portfolios, higher education

1. Introduction

The use of Web 2.0 applications in learning and teaching (L&T) has intensified in recent years, more driven by individual teachers' initiatives in their classes than by strategy of the Higher Education Institutions (HEI). It has been prompted by a new approach under the Bologna Process and encouraged by a new generation of students with skills in new information and communication technologies (ICT), not only due to the use of computers and the Internet but also mobile phones, portable music players and game consoles. We now know the benefits of this practice in L&T. However, the publication of contents in classes using such applications has certain drawbacks, since it is done in public servers and therefore beyond the control of HEIs and without warranty of its preservation.

Distance learning (DL) has already taken its place in the Higher Education Institutions (HEIs) in Portugal, especially as a complement to traditional teaching (blended-learning or b-learning), through the use of virtual learning environments (VLE) or learning management systems (LMS).

There are countless examples of HEIs in which DL is used and in, some cases, there are complete online courses (eg, Universidade Aberta <http://www.univ-ab.pt>) (Hasan et al. 2009).

However, in Portugal, we don't know cases in which HEIs LMSs are complemented with Web-based applications, commonly known as Web 2.0. The experiments which have been carried out are the result of individual teachers' initiatives in their classes (Coutinho & Bottentuit Junior 2008; Sankey & Huijser 2009; Oliveira & Moreira 2008b), using applications hosted on public web servers, exterior to the infrastructure of the HEI and, therefore, outside their control, making its use inconvenient in students assessment (Franklin & van Harmelen 2007). Some studies indicated that integration of Web 2.0 Applications and Content Management Systems improve the relationship between teachers and students and the contribution in the activities of these course units (CU). (Siemens & Tittenberger 2009; Oliveira & Moreira 2008a).

Several international studies present experiences using these applications as a supplement to school activity, face-to-face classes or distance education (Anderson 2007; Evans 2007; OECD 2007; Armstrong & Franklin 2008; Hughes 2009; Redecker 2009) and anticipate emerging technologies that will have impact on teaching, learning and creative expression in education (NMC & Educause 2007; NMC & Educause 2008). They foresee that some of the technologies that are discussed in this project, will be part of HEIs everyday, in short and medium term, considered as key trends. Further, their use should be taken into account by HEIs as critical challenges to be overcome in the near future (NMC & Educause 2007; NMC & Educause 2008).

The technologies considered in these studies and incorporated into this project are:

- user-created content;
- social networks;
- emerging forms of publication;
- collaborative environments on the Web.

There are many examples of Web 2.0 applications use in L&T process, using Web-hosted platforms on public servers outside the control of HEI. In Portugal there are no case studies about the use of such applications installed on servers belonging to the HEI and, therefore, under their control, creating a controlled environment for assessment.

This paper presents an ongoing project that implements a platform for creating PLEs controlled by students, integrating Web 2.0 applications and content management systems, enabling the safe use of content created in Web 2.0 applications in assessment, allowing its publication in the infrastructure controlled by the HEI.

This project is being developed at the School of Industrial Studies and Management (ESEIG) of the Polytechnic Institute of Porto (IPP) by the Knowledge Management, Interactive and Learning Technologies Research Group (KMILT).

The paper is organized as follows. Section 2 presents the framework of this project. Section 3 describes the work in progress. Finally, Section 4 sets perspectives for some future developments in this work.

2. Project framework

The adoption of the Bologna Process requires a change in the teaching/learning paradigm, in which the teacher is no longer the owner of knowledge and its transmitter and the student takes responsibility for the learning process, developing the necessary skills (Keeling 2006). The teacher should assist and guide this learning.

ICT play an important role in this context because they allow students to manage their learning in a more efficient way, since they are not limited in time and space, and the distance of the communication teacher/student becomes shorter. However, for students, this implies a greater workload outside school.

Aware of this, HEIs have invested in VLE/LMS such as Moodle or Blackboard, enabling their teachers to manage their CUs online (management), making learning resources available, interacting with students and getting feedback of their work for assessment (learning).

But not only the Bologna Process has motivated changes in L&T process and has increased the importance of using ICT.

The new generation of students who now join the HEIs feel at ease using technology. This capacity was not necessarily acquired in high school, but could be a result from an early and regular use, not only of computers and Internet, but mostly mobile phones, portable music players and game consoles (Prensky 2001).

The availability of more affordable broadband Internet has allowed access to simple tools and easy to use, intuitive, available and free to all. The success of social networking websites, like Facebook, YouTube, or Wikipedia are proof of that. Therefore, many of them are regular users of this type of virtual social networks and reinforce their use.

Therefore, there is the need for a different attitude in Higher Education.

The widespread use of LMS, being Moodle the most used in Portugal (DeltaConsultores 2007), allows not only the availability of content, but also the use of new tools in L&T, like asynchronous interaction (news, discussion forums, syndication, wikis, etc..) and synchronous (chat) with the student, and the necessary assessment (scheduled publication and reception of works, assessment tests, online

surveys, publication of grades, etc..). These systems allow the HEIs to make the management of teaching and the control of students' learning.

But the change in the paradigm caused by the Bologna Process means that the student is responsible for the learning process. Therefore, it is important that HEIs offer means that enable students to create personal learning environments (PLE).

The use of Web-based applications known as Web 2.0, along with Distance Education activities, was the first step. The LMS was intended for the CU management, such as providing content and resources and evaluation results, while Web 2.0 applications serve to explore the motivational behaviour in the relationship with students because they are housed outside the HEI, and therefore outside its control (Jesus & Moreira 2008) (see Figure 1).

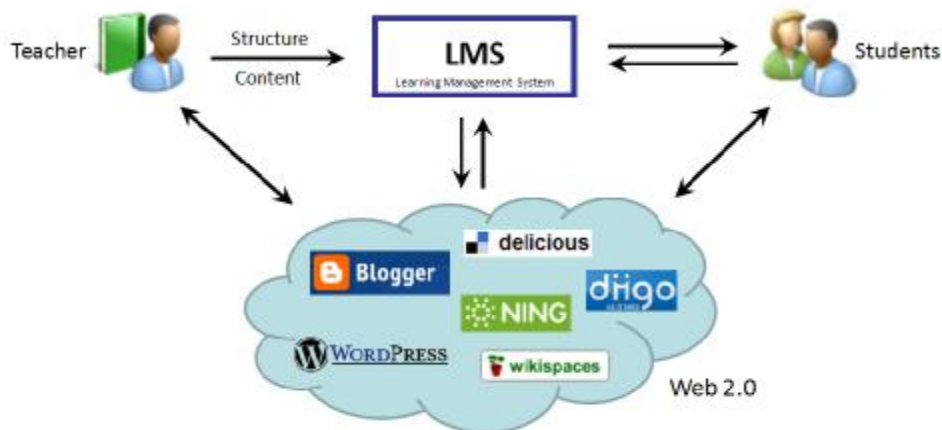


Figure 1: Combined use of the Learning Management Systems (LMS) and Web 2.0 applications

As Oliveira & Moreira mention (2008a), based on their experience and success in the use of Web 2.0 tools, already supported by some studies (Siemens & Tittenberger 2009), there is a belief that the combined use of these applications will enable improvements in the following areas:

- Increased virtual interaction between teachers and students, without the constraints that usually occur in a face-to-face relationship;
- Increased participation in the CU activities promoted in the LMS, with the feeling that the teacher is present and available;
- The development of habits of research, study, writing and discussion of subjects.

Nowadays, students take the responsibility for managing their learning and ICT assumes an increasing role, namely, the electronic portfolios (e-portfolios) which are a mean to achieve this objective.

An e-portfolio is the product created by the student, which contains a collection of digital objects (*artefacts*), articulating experiences, developments, achievements and learning. For this purpose, the student must plan, synthesize, share, discuss, reflect, give, receive and reply to comments. The primary aim of an e-portfolio may be to collect evidence for summative assessment, to demonstrate achievement, to record progress and to set targets (JISC 2008).

Thus, the construction of e-portfolios in the learning process could contribute to (JISC 2008):

- Improving understanding of the self and the curriculum;
- Engaging and motivating students, both individually and as part of a community of practice;
- Personalising learning;
- Supporting models of Learning appropriate to a digital age;
- Promoting reflective practice.

The e-portfolio enables the students to construct a structured collection of their knowledge, skills and competencies. Therefore, it may be an important tool in students' learning.

3. Project development

The platform under development enables integration of a content management system and Web 2.0 applications. The main objectives are:

- Making Web 2.0 content available in the ESEIG infrastructure, allowing greater control and ensuring conditions for its future conservation;
- Implementing an infrastructure for creating learning environments controlled by students, allowing the configuration according to each type of CU attended.

This platform will be developed using only open source software and will be integrated with the LMS used in ESEIG (Moodle).

3.1 Availability of Web 2.0 in the HEI infrastructure

There was an educational experience involving students in last year of undergraduate Sciences and Technology of Documentation and Information (CTDI) of ESEIG and using Web 2.0 applications, whose content is managed by teachers and students directly in a web environment (see Figure 1)

- Wikispaces (<http://www.wikispaces.com>) for wikis;
- Wordpress (<http://wordpress.com>) and Blogger (<http://www.blogger.com>) for blogs;
- Delicious (<http://delicious.com>) and Diigo (<http://www.diigo.com>) for registration of references (social bookmarking).

The benefits of this practice are proven (Anderson 2007; Armstrong & Franklin 2008; Evans 2007; OECD 2007; Redecker 2009). In spite of the researches made, there are no studies about the institutionalized use of this practice in Portugal. Therefore, this preliminary study carried out in CU taught by teachers confirms the results presented by international studies. It followed the methodology presented in Figure 2 and documented in (Oliveira & Moreira 2008a).

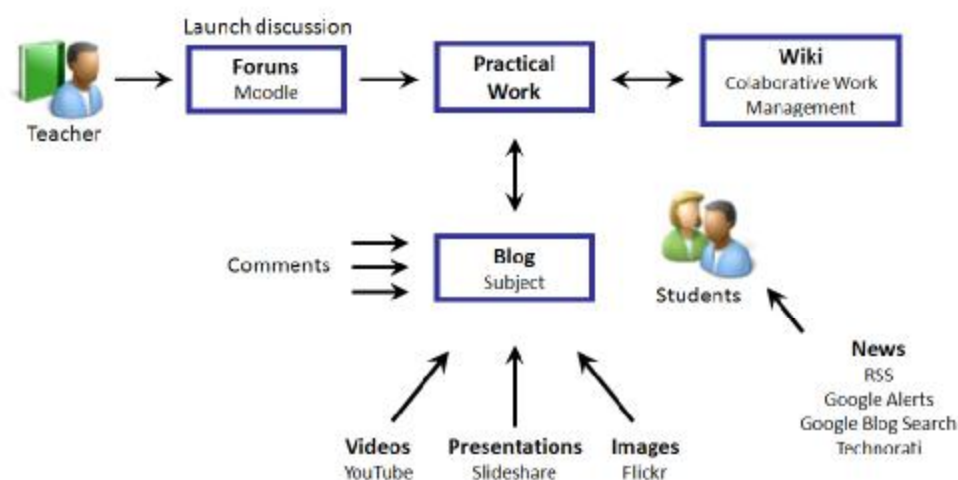


Figure 2: Methodology used in the study on the use of Web 2.0 applications

This practice was combined with the creation of a social network in the platform Ning (<http://www.ning.com>) – Rede Social de CTDI (<http://redesocialctdi.ning.com>) - aimed at students, alumni and teachers of CTDI. Its main purpose was to strengthen the relationship between students, teachers and graduates, outside the scope of courses involved in the experiment.

The combined use of these two strategies - Web 2.0 and social networking - has been promoting a regular exchange of experiences, creating an environment of ad-hoc learning community or community of practice (Downes 2005; O'Hear 2006).

The use of Web-hosted platforms poses difficulties in managing L&T, especially in the assessment (Franklin & van Harmelen 2007; Sankey & Huijser 2009):

- The service can be interrupted at any time (possibly unannounced) resulting in the loss of the content published that were not backed up by impossibility or difficulty;
- The previously free service can become charged;

- Reduced supervision by the teacher;
- Possible dispersion of the content.

That is, in general, there is no guarantee of the preservation of the content published as part of work to be evaluated, since they are hosted on servers outside the ESEIG infrastructure and, as consequence, outside its control.

Therefore, it is already in course the implementation of a platform in servers belonging to ESEIG, using only open source software, integrated with LMS Moodle, in order to maximize shared use, as shown in Figure 3.

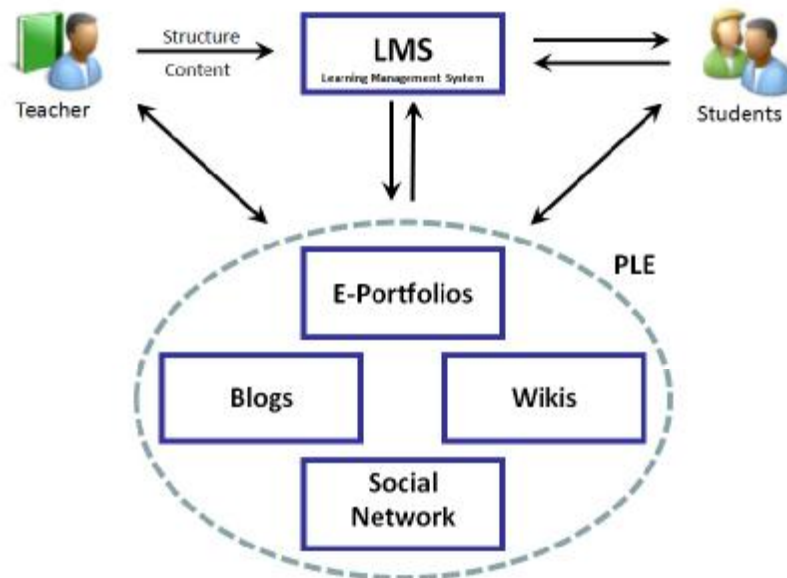


Figure 3: Integrated platform of Content Management Systems and Web 2.0 applications

For this purpose, there is a wide selection of open source applications that focus on the needs of social software which has been discussed before. We have considered the following:

- Blogs: Wordpress MU (<http://www.wordpress.org>);
- Wikis: Tikiwiki (<http://tikiwiki.org>) or MediaWiki (<http://www.mediawiki.org>);
- E-Portfolios: Mahara (<http://mahara.org>);
- Social Networks: Mahara or Elgg (<http://elgg.org>).

3.2 Implementation of an infrastructure for creating learning environments

The integrated use of these applications will be achieved through the use of learning environments controlled and configured by the students, according to each of the CU attended (interaction with the LMS Moodle, created content, relationships with peers and teachers, etc.), and allow each student to create his academic portfolio (see Figure 4).

The student may supplement this content, not necessarily with material related to the academic activity, but also with personal data, e.g. his own curriculum, thus preparing the process of entering the labour market (the Bologna Process encourages teachers to carry out various activities which may enrich students' diploma) (Keeling 2006; Wächter 2004).

Students can thus create their own PLE while they are building their e-portfolios.

This environment will be developed using open source applications to create e-portfolios (Mahara) and social networks (Mahara or Elgg) and increasingly implemented with the LMS Moodle.

All applications share the identity of the student via LDAP (Lightweight Directory Access Protocol) so that the student will only have a single set of authentication data (login and password).

The environment and the content created will be preserved and developed after the students leave the ESEIG, because the platform implemented will accept a different authentication of that used at school. These can also be exported and integrated into other platforms, using features available in the applications used, since the Mahara includes an import/export system that supports LEAP2A protocol (specification for portability and interoperability and portfolios) (JISC-CETIS 2009; JISC-CETIS 2010).

The platform will be tested by a group of students who will create learning environments, tailored to their own reality, in a controlled setting and integrated into the ESEIG infrastructure. The feasibility of its use will be validated through the diversity of content that is created, the number of CUs involved and the undertaking of surveys concerning students' satisfaction.

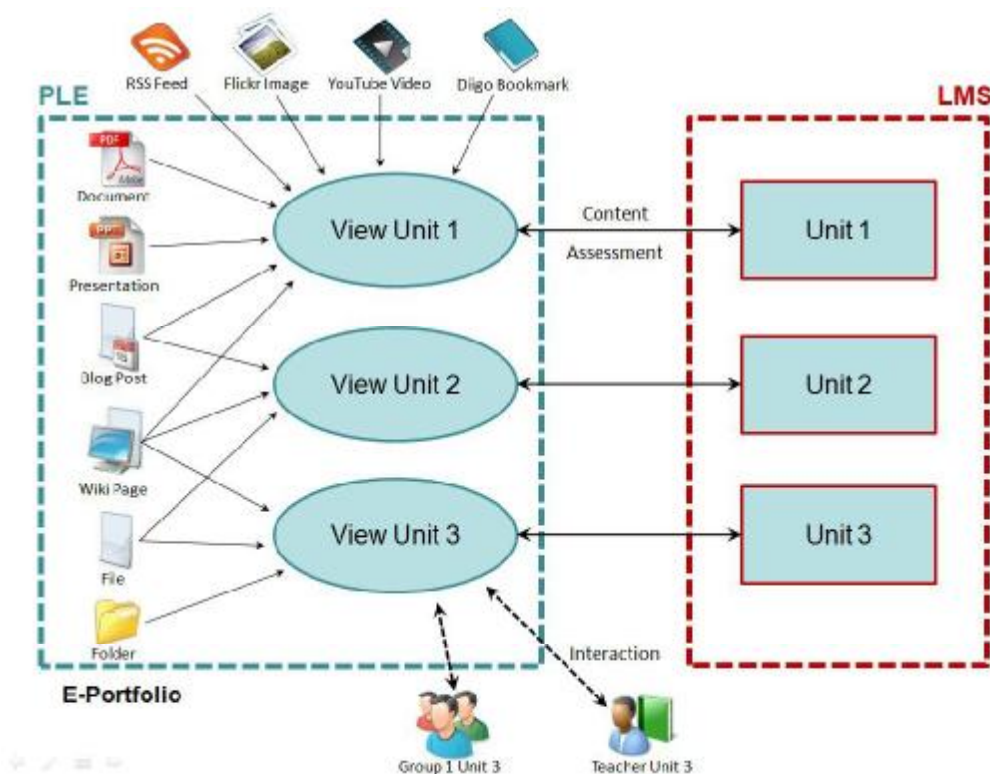


Figure 4: Integration of E-Portfolio, PLE and LMS

4. Future work

The project presented in this paper is part of a wider project developed by the KMILT research group, which is the creation of a global ESEIG VLE, involving the integration of various content management systems: LMS Moodle, digital library, digital repository, digital magazines, digital platform for management of conferences, etc.

Given that the focus is on L&T, from the ESEIG point of view (education), the VLE focus will be on the LMS Moodle that will be powered by content from the various content management systems, while for the student (learning), it will be managed and controlled from his own PLE and embedded in his portfolio.

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