Towards an eLearning 2.0 provisioning strategy for universities

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Abstract
The institutional Personal Learning Environment (iPLE) constitutes our vision of how Web 2.0 tools and services, and people arrangement and data sharing could be applied for delivering open, flexible, distributed and learner-centred learning environments to university members. Based on the iPLE, this paper explores a strategy that universities could follow in order to take advantage of the benefits and opportunities that offering eLearning 2.0 tools and services to learners could bring.

1.   Introduction

In evolutionary terms, being the first type of systems in a TEL environment, VLEs were designed and have been used in a logical way as a virtual extension for physical classes (Weller 2005). Although nothing will replace the features of a VLE, we suggest that there should be a progression towards other systems that will help dealing with the many issues that current education must address for both individuals and institutions.

In recent years we have seen how social software, cloud-computing, web mash-ups and ubiquitous computing have changed the way we develop and use applications, and create and consume information. Despite this, the impact of Web 2.0 on education has been less dramatic than its impact on other spheres of society (Conole 2008). eLearning should adopt and adapt some of the patterns learnt from Web 2.0 in order to succeed. We argue that eLearning 2.0 (Web 2.0 services adapted to learning needs) should follow a distributed model that gives access to services inside as well as outside the institution, while maintaining a community awareness to support social nature of learning, and it should be learner-centred regarding learning development.

2.   Successful patterns from Web 2.0

The patterns that successful Web 2.0 services have in common are: distributed model regarding both software and data allocation and use; community-centred model for social data management; and user-centred model for proactive actions.

There are many software and data models to be put in practice for eLearning 2.0: Cloud Computing and the exploitation of software (SaaS), platforms (PaaS) and infrastructure (IaaS) as a Service; storage of personal data in the cloud; use of distributed web applications, etc. This paradigm offers some advantages like continuous improvements of web applications which users can experience straightaway, public APIs that allow developers to employ services in new ways

("mashups") that original creators did not even imagine, and constant and automatic synchronization with all our data and applications because they are not linked to a single computer.

This distributed model for software and data allocation leads to the existence of specialized and dedicated servers that attend thousands of users related to a specific service. This takes us to the next paradigm: community-centred model for social data management. Software developers have taken advantage of having so many people interacting with their software and they have used all the user-generated information in order to improve the functionalities. In addition, most of the services generate a sense of community awareness and information is human-filtered through folksonomies, rankings and schemas of reputation. New communities formed by people with the same interests spring within these services.

Finally, user-centred model for proactive actions represents the way in which users can read and write the web their own way, effortlessly and using those tools that best suit their needs. Instead of huge portals aimed to cover all the needs a person could have, today we have a myriad of little services that cover every single need and users select among them. As we have stated before, the end-user is less likely to have one internet application to solve for all their needs, but rather to have an application with simple interfaces for each particular need.

3. iPLE-based strategy to embrace eLearning 2.0

This section plots a strategy that universities could follow in order to take advantage of the benefits and opportunities that offering eLearning 2.0 tools and services to learners could bring. This strategy is centred in the provisioning of institutionally powered Personal Learning Environments (iPLEs) for learners (Casquero et al., forthcoming)

3.1 Strategy Step 1: expose institutional services within iWidgets

The rapid growth of information technologies inside and outside higher education institutions to support learning, research, library and management services, has led to the appearance of software islands which are very difficult to deliver outside the institution. iWidgets (institutional Widgets) will be small hooks created by the institution, which learners can install and execute in any HTML-based external web page, in order to pull relevant live content or functionality that university offers.

3.2 Strategy Step 2: merge both personal and institutional spheres by providing iPLEs

The iPLE is an attemp to build a PLE from the point of view of the university, so every institutional service can be integrated, but flexible enough to interact with the wide range of external services learners could consider important during their life-long learning. The iPLE is based on an architecture of information channels that allows distributing any specific resource among the different elements that mold a web service: from the backed-ends where resources are stored, through Content Management Systems (CMS), to a front-end made up of widgets.

iPLE can also be understood as a preconfigured PLE given 'out of the box' by the institution to a specific learner, incorporating the iWidgets the university considers that learner needs. iPLE is loosely coupled with the institutional software services, but highly customizable by adding external widgets (uWidgets). Of course, power

users may prefer using iWidgets or uWidgets from their own-configured PLE (a web site, a starting page, a widget-enabled email account -like Gmail-, etc.).

Competition for recruiting good students and teacher is becoming harder and more global. This leads universities to get concerned about gaining visibility regarding society for the results they obtain in terms of research and education, as well as trying to extend the relation with graduates during their professional careers. Strategy Steps 3 and 4 address these issues.

3.3   Strategy Step 3: gain wider visibility regarding society using iRepositories
When building learning content, the use and proper combination of resources like video, images or documents for generating more complex information units like learning activities, wiki pages and blog posts that are to be published and distributed in CMS is very common. The present approach tries to manage these kinds of resources with iRepositories, which are institutional accounts in the most suitable repository services: for example: delicious for bookmarks, YouTube for videos, Flickr for images, SlideShare for presentations and Scribd for documents.

This approach takes advantage of the added value these repositories give us for our resources (embedding, tagging, community creation), as well as the myriad of services that spring around these successful web services. Moreover, this means that there would be an increasing amount of learning resources living in popular repositories and the institution would make public many materials through these digital channels that aggregate all community contributions.

3.4   Strategy Step 4: strengthen links with former students thanks to Learn-Streaming
The permanent link with former students can be obtained if iPLEs prove to be useful and flexible enough in order to manage life-long learning. To that end, learners should be able to retain their contents (evidences of acquired competences) out of virtual classrooms. We understand life-long learning process as closely related to Learn-Streaming.

The ensemble of the distributed conversations in which one user participate, the life-stream of a person, can be managed and gathered by social aggregator tools such as FriendFeed. From the learning perspective, we define learn-streaming as the activity of publishing and sharing within one user's personal learning network the flow of learning activities and events. It allows students to keep track of his personal progress in the ensemble of learning networks where she or he participates. Institutions can also benefit from it as learn-streaming allows to look up the individual activity of the students as a way for harnessing the collective intelligence of Internet users (Zettsu and Kiyoki 2006). As learn-streaming implies a data flow between different endpoints (from Universities to different external organizations), the present strategy encourages universities to adopt open and distributed federation infrastructures (like the one proposed by Google Wave) for it.

3.5   Strategy Step 5: create a collective intelligence based on data mining and SNA
Social interaction plays a critical role in all forms of formal education (Cho et al. 2007; Ryymin, Palonen, and Hakkarainen 2008). Siemens (2003) describes a Personal Learning Network (PLN) as the set of learning communities where the learner organizes his learning process. Current technology-enhanced learning environments do not fully capitalized on the rising power of social computing to

explore the wealth of social data derived from the PLNs that are formed (Caperuco and Capretz 2009, 241)

- learning environments do not hold all the relationships of their members because people tend to establish new relations dynamically over time inside and outside the institution.

- social data is not appropriately structured and represented at several levels of description. As a result, it cannot be automatically processed in order to extract essential knowledge related to the quality of the task performance and the quality the group performance (Daradoumis, Martizmones, and Xhafa 2006).

- social data is usually acquired through time-consuming surveys, usually on small populations, that introduced methodological issues (Hogan 2007).

If an iPLE is given to each institution member, the resulting iPLE Network will permit learners to form social networks that will lead to successfully deploy PLNs where they can perform learning experiences for many educational purposes. But the iPLE Network is also an opportunity to easily and automatically harvest, collect and digitalize social data because it is already available as side effect of university members using iPLEs. For instance, in an institution like a university it is easy to identify some branches of the social graph because there are a number of latent iSNs (institutional Social Networks) -such us subject, department, research group- that are publicly defined in the institutional data services; besides, the iPLE facilitates the management of user-defined Social Networks (uSN) that emerge by the creation of new relations with other members inside and outside the institution.

Therefore, extending the strategy to integrate aspects of data mining and SNA presents a good chance to discover interesting social findings (e.g. relations, positions, temporal patterns) that students and teachers could use to create opportunities (social capital discovery, information disclosure) to improve their awareness of learning context structure. At the same time, the iPLE Network is a valuable one for delivering the results of SNA and giving feedback and recommendations to learners and teachers. In summary, students, teachers and researchers can benefit in the following way:

- SNA brings the opportunity of studying the influence of different types of network ties and exogenous factors in social networks structure, as well as identifying key actors in collaborative learning interactions (Adamic, 2003).

- Blockmodelling techniques can help capturing relationship patterns, so they can be used to automatically detect topic affinity that will be used for the configuration of PLNs (Rodríguez et al., forthcoming).

- SNA can help identifying the needs of each learner (for reflection) and teacher (for assessment) in every moment and be able to decide what information is required to provide, in which granularity and how to present it (Daradoumis et al. 2006).

- All available expertise and resources in PLNs are exposed, contributing to information disclosure. That will help finding out if PLNs are more likely to be formed and kept when there is a common interest in some form of shared content (Conole et al. 2008).

- SNA can help obtaining a complete and longitudinal network dataset that will allow researchers to understand some real world properties of the virtual classrooms, and to analyze how PLNs evolve over time.

4.   Positioning universities as eLearning 2.0 providers

After identifying in section 2 the patterns that Web 2.0 has successfully applied, this section will try to explain how the concepts introduced in section 3 can help us in translating those patterns to learning.

4.1 Distributed model for learning software and contents

Universities have started to build virtual libraries within VLE platforms that allow only university members to access those digital resources created by the institution. While removing the need of a physical place, institutions still put high virtual walls around the content they generate. In this sense, Open Course Ware has to be mentioned as a great initiative that makes the most of Internet capabilities and spreads learning contents all around the world. Anyway, it is only a first step and promoting eLearning 2.0 is something more than building virtual clones for the old learning infrastructures we have.

It is not just the content nature what it has changed, the channels used for content distribution and the tools related to that content are also being transformed. While the classical book publication, classification and consumption model is well-known, the nature of digital learning resources is diverse. VLE platforms are an attempt to fulfill the whole cycle that has proved to make a limited use of the real power of the Internet because instead of breaking down walls it builds virtual walls.

Furthermore, the arguments for developing, hosting and maintaining certain institutional services are becoming increasingly weak when it can be done externally for free, or at least much more cheaply. Institutions can benefit of Cloud Computing technologies and use as commodities many of the software services that today are still developed, self-hosted and maintained inside the institution. Not only are institutional data and software moving to the cloud, also personal desktop or workspace is gradually being unlinked from a single computer and flowing among servers and several devices we use (desktop, laptop, cell phone,...). In this context, it is increasingly easy to manage from the same environment personal and institutional spheres, formal and informal learning, classmates and friends, etc.

The iPLE is an answer for the needs that a distributed model for learning software and contents introduce. Unlike VLE platforms, it is not the answer given by the teacher to a specific learning need during a course, but the answer persons build around their lifelong learning process. Learners cannot expect the university to provide them with all the digital resources they need in their learning process. Moreover, it is important that students learn how to find what they need outside of the institution. This is part of the learning process and the do-it-yourself ability applied to digital issues will be essential in their careers. Finally, learners cannot live absolutely unlinked from some of the online resources university offers and that is why iPLE mantains the 'i' for 'institutionally' powered. On the other hand, VLE platforms make difficult to engage external organizations and learners who are not registered within the organization. This is in opposition to lifelong learning where there is an important role for cross-organizational learning and informal learning.

4.2   Community awareness

Universities generate a huge potential regarding social relations between university members (teachers, researchers, students) from the same institution, between people from different institutions and even relations between people from the university and people from outside. iPLE architecture will make easier, not only the access and manage of already known communities or social networks, but discovering underlying relations and make arise new social networks.

Besides, universities already controls a great social graph for every member, that is, past and present human relations depending on academic career, assigned classes, research groups and projects, etc. iPLE should make possible for every person to make use of his social graph in order to send a message, share some information or ask for help to the right people.

If iPLE proves to be valuable during the degree, users will also use it to manage relations with people and web services from outside the institution because learning occurs everywhere, everytime. iPLE will become, not only the easiest way to contact with my learning peers, services and data, but a source where the learner can discover new learning peers, services and data because the system can recommend what his social network is consuming. Social Network Analysis (SNA), when applied to all the information a network of iPLEs generates, can pay an important role in making explicit relations between people with similar interests.

But the importance of some kind of community awareness exceeds the temporal bounces of studying in the institution. Learners can benefit of it before entering the university and after finishing their degree. Moreover, university should have greater visibility for the general public and iRepositories try to share with the Society part of the generated knowledge. Every node of the iPLE network serves to create, filter, publish and consume digital resources that iRepositories store.

4.3   Learner centred approach

Previous VLE platforms have tried to create a comfortable place for teachers where they could display every digital resource they thought their students would need for learning a subject. From the beginning it is conceived as a limited space for a limited kind of resources during a limited time. VLE platform could be described as teacher-centred (teachers design the virtual classroom), subject-centred or institution-centred (institution hosts and give access), but it can be hardly described as a learner-centred approach.

iPLE tries to give an answer from the learner point of view. Learners can be comfortable with something they feel of their own and it can be morphed and adapted to their needs: it is not limited by the kind of resources; it is valuable for the whole life-long learning; it connects the learner with a wide range of users and services offered by external institutions.

5.   Conclusions

Based on the iPLE, this paper has explored a strategy that universities could follow in order to take advantage of the benefits and opportunities that offering eLearning 2.0 tools and services to learners could bring. The proposed strategy focuses on the following aspects: exposing institutional services within iWidgets (institutional

Widgets), small hooks created by the institution and used by learners from their (i)PLEs in order to pull relevant information or services that the university hosts; gaining wider visibility regarding society using iRepositories (institutional Repositories), learning resources managed by the institution but hosted in external services and available in public channels; strengthening life-long learning thanks to Learn-Streaming, contents coming from different distributed services, linked into one single stream that plots the learning process over time; finally, extending the strategy to integrate aspects of SNA presents a good chance to discover interesting social findings that students and teachers can use to create opportunities that improve their awareness of learning context structure and PLNs.

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