A Case of an Institutional PLE: Integrating VLEs and E-Portfolios for Students

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Abstract
This paper presents an exploratory study of the potential for offering students elements to construct their own personal learning environments, through a combination of an e-portfolio and integrated learning platform. The intention was to integrate an institutional virtual learning environment; an e-portfolio for assembling work, where the students can include ideas and reflections and create their own work; and social networks as powerful communication tools, particularly of an informal nature.

The study aims to find out whether students think that an e-portfolio can improve project assignments when used in collaborative group work; whether this independent way of learning enriches collaborative work and reciprocity among the members of each group so that a knowledge-building process is generated in the case study in question; and whether using e-portfolios contributes more effectively to the achievement of the course’s proposed learning outcomes.

Keywords
PLE, communication tools, shared learning, e-portfolio, project-based method

1.- Introduction

A personal learning environment (PLE) is a response to the technical and policy-based limitations imposed by institutional learning management systems (LMS or VLE), both in educational settings and in the workplace, which are seen as representing obstacles to personal learning styles. In such contexts, the different applications that can be combined to form a PLE can be situated at the intersection of LMS, 2.0 web services and e-portfolios.

Within this framework, the exploratory study presented here is derived from project EDU2008 05345 “Designing Methodological Strategies for the Use of Shared Knowledge Spaces through Software Tools and Knowledge Management Systems in Virtual Learning Environments”, directed at developing new models. From a technological perspective, the aim is to overcome the rigidity of LMS by integrating other environments and, from a pedagogical one, to use student-centred educational strategies.

2.-Reference Framework

PLEs are becoming an important reference, since they are achieving widespread recognition for their educational value, for the framework they offer, and for their components.
From among all the different perspectives from which PLEs can be viewed (Fiedler and Valjataga, 2010), in this paper we will concentrate on an institutional one (iPLE) and on the integration of different environments within an institutional context.

2.1. - Background

PLEs have already sparked off quite a lot of reflection, debate and research. Leaving aside some dichotomous proposals - which are all too common in this field - that confront schools with the Internet, formal contexts with informal ones, accreditation with social recognition, teacher control with student control, etc., interesting issues on the subject of virtual learning environments have been revived in educational circles.

- The rigidity of LMS. The model currently used in higher education VLEs continues to be mainly transmission-based, and not customized or collaborative.
- Relations among formal, non-formal and informal education. This topic ranges from a refusal to lend any value to formal education - and, by extension, to university or school - to proposals for integration (Liber, 2005; Attwell, 2007). Our stance is that the three are inseparable: just as informal or social learning largely depends on what one's formal education was like, so we can also improve formal learning by integrating informal and social learning, integrating social networks and virtual learning communities in order to construct Personal Knowledge Networks (PKN) (Couros, 2010).
- The increasing potential for group work and exchanges offered by new developments in web technologies. We highlight the importance of social networks in informal learning as tools that put people and knowledge into contact.
- The need for new teaching/learning models that take into account individual students’ specific characteristics and involve them in their own learning process. The aim is to incorporate aspects of social networks and personal environments, able to offer increased learning opportunities, into a new emerging learning model integrated into conventional LMS (Salinas, 2009).

We focus on seeking more open models that can improve teaching/learning processes in higher education. We are therefore exploring the possibilities of different technological configurations that facilitate student-centred teaching methodologies by incorporating LMS, PLEs, e-portfolios, etc. (Chaffert & Hilzensauer, 2008).

We seek alternatives to the dominant designs; that is, the typical virtual teaching/learning environments found at universities and training centres. Following Mott and Wiley (2009), by proposing an open learning network (OLN) - a hybrid mix of a CMS and personal learning environment (PLE) -, the idea is to explore an alternative to institutional environments, taking advantage of the potential offered by the Internet in improving the learning process. This idea fits in well with the concept of learning ecologies (Siemens, 2006), construed as an environment that supports and fosters learning, characterized as being adaptable, dynamic, self organized/individually managed, informally structured, varied, and evolving.

As such, we situate personal learning environments at the intersection between formal and informal learning, through a system that hinges on integrating the virtual institutional environment used for courses, mainly associated with formal learning (generally on an LMS), with the more informal environment (Salinas, 2009).
These networks are managed by a PLE, made up of different systems that help students control and supervise their own learning process. With open learning networks, this includes flexible or connected learning, and support for students in:
- deciding on their own learning goals,
- managing their own learning process: managing both the content and process,
- communicating with others during the learning process,
- and everything that contributes to the achievement of goals.

2.2. Conceptualization: What Do We Understand by PLEs?

One of the first conceptualizations of PLEs can be found in “The VLE of the Future” by Wilson (2005), although the term had already been used in Olivier and Liber (2001). Consequently, we are talking about a relatively recent concept, with a short history, and so there is still a lack of precision and differences in understanding what a PLE is and how it is formed. However, it represents yet another step forward in an alternative approach to e-learning, based on classical models and tends to model student-centered learning (Salinas, 2009).

The term PLE describes the tools, communities and services that constitute an individual educational platform used by students to manage their own learning process and achieve certain educational goals (EDUCAUSE, 2009). Similarly, Lubensky (2006) sees personal learning environments as being a facility or facilities for an individual “to access, aggregate, configure and manipulate digital artefacts of their ongoing learning experiences”.

PLEs help people control and organize the individual learning process, offering support so that they can “set their own learning goals; manage their learning, managing both content and process; and communicate with others in the learning process” (van Harmelen, 2006). As a result, for Chatti (2009), PLEs are a gateway to knowledge, and he defines them as a self-defined collection of services, tools, and devices that help learners construct their own Personal Knowledge Networks (PKN), sharing tacit knowledge nodes (e.g. people) and explicit knowledge nodes (e.g. information).

We start out from the idea that our PLE is made up of different tools aimed at facilitating three cognitive processes: reading, reflecting and sharing (Attwell, 2007). These tools are configured in three groups, technologically speaking: tools for accessing information, tools for creating and editing information, and tools for interacting with other people (Wheeler, 2009).

This concept heralds significant changes in the future of learning and in good educational practice, both at a personal and collective level (Adell and Castañeda, 2010). Web 2.0 and the notion of an “Internet paradigm” entail the idea that users can be more than just consumers of information. They can create and recreate information and even share it in very different ways (Couros, 2010).

2.3- An Integrated Environment or iPLE

This case study focuses on an activity involving an institutional PLE, since the PLE that the students construct is developed from one provided by the institution. The application used for its creation is put at the students’ disposal so that they can combine their personal environment with the academic/institutional design provided by the university.
Consequently, the iPLE attempts to integrate institutional services and those external ones deemed relevant by the students for their long-term learning (Casquero et al., 2010).

Several research studies in Spain and abroad are working on this issue and developing it. Special mention must be made of two projects, developed from a technical perspective:

- Moodle Wave: This combines Moodle with Wookie, a system that facilitates the incorporation and generation of widgets to boost and enrich an environment’s possibilities (Wilson et al., 2007; 2009).
- The MeMeTEKA project: The initial idea was to provide customized support for the everyday activities, allowing social networks to be generated and maintained (Benito et al., 2007). To do this, an iPLE was designed, based on Google Apps (Casquero et al., 2008).

The iPLE integrates:

- LMS. Even though LMS pose certain difficulties when it comes to an environment’s customized management and control, since they are developed from models mainly based on content delivery and on the concept of single student accessing information and performing test-type questionnaires, they offer big potential in formal learning management.
- Opportunities for taking advantage of Web 2.0 tools for learning purposes, particularly informal learning through the use of social networks, etc.
- An e-portfolio. E-portfolios or digital portfolios can be considered to be the third cornerstone in the construction of iPLEs, since they are a collection of electronic evidence assembled and managed somewhere by a user, thus constituting actual evidence of achievement. Although different kinds of e-portfolios can be found, their use in formal learning is closely related to a learning plan, and so they are used to manage learning by individuals, groups, virtual communities and organizations. To the extent that a PLE captures and displays a learning record, it also might be understood to be an e-portfolio.

This description of the components of the iPLE is closely related to the objectives of the project that we are carrying out—and, of course, to this exploratory study. As it has been mentioned previously, the project is directed at developing new models to integrate LMS with other environments, and iPLE could be one of these models. At present, we are heading towards the construction of a Flexible Learning Model, which uses dashboard from e-portfolio as the connecting bridge between formal and informal learning environment. The schema of this model can be seen in the following figure:
3.- The Study

3.1.- Background Context to the Activity

The activity around which this exploratory study revolves took place during the academic year 2010-2011, with students of the course ‘Distance and Flexible Education’ (fourth year of teacher training degree, Faculty of Education, University of the Balearic Islands). For the course, an e-portfolio was used as a tool, based on the Mahara software application. Individual and collective learning was organized through each student’s Mahara dashboard, where the integrated views could be personally controlled.

The course methodology is based on projects. So, one of the objectives was designing a prototype in groups of 3 students to be developed in different phases. They could choose between three possible prototypes:

1. A prototype for a course in a virtual environment: The development of a model aimed at improving a subject, course or degree course, using a VLE. The final model had to feature a suitable interface, some interactive content matter, and appropriate communication tools.

2. A project for an IT strategy: The development of a strategy to reinforce education and/or educational management through information technology, focused on a degree course or institution.

3. A project for a virtual community: This was to be presented as a functional, operating community, with members able to interact through tools integrated into the prototype, with activities to encourage active participation and to link the members’ real environment with that of the virtual community.
To develop any of the three options, a group project methodology was to be used, with deliverables to be produced during the different phases of the project. The theoretical fundamentals were studied, the implementation and development of each phase was worked on, and practical classes to learn how to handle the different programmes required to develop the prototype were held.

Given Moodle’s limitations, we decided to use the e-portfolio system, seeking:

- A management system for compiled and created data, both at an individual and group level.
- Tools to facilitate exchanges, reflection and dialogue among students and with teaching staff.
- The presentation of successive deliverables, via views visible for the group and teachers, for all the students, or for some selected students.

Several course dates must be highlighted. These mark turning points in the activity and they explain changes in the graphs related to the observation and monitoring of the activity:
- The course began on September 26th.
- A workshop on the e-portfolio was given on October 4th, where PLEs and the e-portfolio integrated into Moodle were explained. Groups began to be formed to work as teams.
- On October 20th, the first phase in the development of the project ended and there was an important increase on presentation views.
- On November 8th the second phase ended.
- On December 15th, the third phase ended.
- Finally, on January 17th the final phase started (formal Moodle submission).

3.2. Questions to be Answered During the Study

The questions that we sought to clarify in this study were the following:
- From the students’ work with the e-portfolio, is it a useful tool in the personal organization of their academic data?
- Does this system of working with the content matter give them more control over their own learning process, by allowing them to work in accordance with their personal needs and preferences (timetable, pace of work, style of learning, etc.)?
- Does the e-portfolio offer more flexibility in the learning process?
- Does the e-portfolio facilitate group work and collaboration?
- As the project work develops during the different phases, do the students customize their learning environment more (incorporating new blocks in views, etc.) and, by extension, does the learning process become more customized?

The following information is presented on the result of the e-portfolio’s implementation as an integral part of the students’ PLE:
- The students’ perceptions of the e-portfolio’s use and their assessment as a complementary tool in developing a prototype design project, bearing in mind the questions posed above.
- Their handling and use of the views and dashboards, through observation of personal and group views and some students’ dashboards at the end of the course. This ties in with the question concerning the extent to which the learning environment is customized.
- Quantitative changes in the creation of views, groups and blocks, by monitoring Mahara's internal statistics periodically. This ties in with the question concerning the extent to which the learning environment is customized, but at a quantitative level.

3.3.- Methodology

For the study, an intentional sample of 73 students was used. As for previous familiarity with the web tools, they had a medium-to-high level of familiarity because, prior to taking this course, it was compulsory to have studied Educational Technology I and II.

The methodology used for this exploratory study was that of a case study, since the activity involving the integrated use of Moodle and Mahara was monitored.

Three data-gathering procedures were used:
- Observation and monitoring of the evolution of the Mahara activity. Throughout the course, statistics were recorded, showing changes in e-portfolio activity.
- A student questionnaire. The students were asked to fill in an online questionnaire to assess the e-portfolio experience individually. In the questionnaire, they assessed items like group work through Mahara, control over their own learning process, adaptation to their individual pace, Mahara’s usefulness as an organizer of academic and personal data, or use of blocks and views.
- Observation of student output (dashboard and views). To assess the use and degree to which blocks, views and the dashboard had been customized, personal and group output was examined.

3.4.- Study Phases

The study was conducted in four phases, as outlined below:

- **Prior or initial phase**: The design and development of the Mahara environment to suit the characteristics of the course, academic content and registered students.

- **First phase**: The teachers’ familiarization with the different tools, applications and possibilities that Mahara offers, and experimentation with them. It was also necessary to become familiar with the concepts that it involves, such as views, the dashboard, artefacts, blocks, etc.

- **Second phase**: Applying it to the students. This was done in various sub-phases:
  - A face-to-face session was conducted to give a brief explanation of PLEs and Mahara (the e-portfolio integrated into Moodle). The students were encouraged to make full use of the pre-configured PLEs (mainly the Mahara dashboard and views), to be creative, and to be actively involved in and take control of the learning process, thus customizing it.
  - During the course, they had to work with the e-portfolio and develop a prototype design project, as explained above. This necessarily meant that material had to be reviewed.
  - During practical sessions, problems in handling the e-portfolio were solved, together with any queries regarding its potential for group work during the different phases of the project.
Each group showed the lecturer how their project was evolving via the different views for each phase. A theoretical presentation was given of each one and the lecturer corrected and guided each group with their projects and prototypes.

Finally a presentation of the developed prototype was given.

- **Third phase:** The students’ evaluation of the activity. To analyse the students’ reactions and perceptions, a questionnaire was drawn up. At the same time, some personal and group views and dashboards were examined, together with Mahara’s internal statistics, in order to analyse progressive quantitative use of the e-portfolio.

### 4.- Research Results

In accordance with the data that was gathered, according to the procedure outlined above, the following results can be highlighted:

#### 4.1.- Observing and Monitoring the Evolution of the Activity

As mentioned previously, activity within the Mahara e-portfolio application was monitored. The information that it provided was of a general nature, like the profile of the average user (number of friends, groups, occupied space, etc.), the number of groups and views that were created, and the most widely used blocks in the views.

The number of views gradually increased during the course, particularly at the beginning, reaching a total of 243 views. It was during the first week of October, from October 4th, coinciding with the workshop on the e-portfolio, that there was an exponential growth in the number of views. From the second half of October, coinciding with first deliverables, the number of views continued to grow. Basically, they were group ones, coinciding with the development of the project. At the end of the course, from the monitored data, each participant had an average of 4.05 views.

![Figure 2: No. of views during the course.](image-url)
As for the most commonly used blocks in the views, most were directly related to course work (in particular, downloads and textboxes). What stood out was the discontinuity of the external news feeds. Initially, they constituted a habitual block, but later they gave way to recent forum posts, with the same quantity being maintained throughout the course. When the timeline is examined, it can be seen that the blocks’ customization and a subsequent increase in them begin once the exponential growth in views is over, from the second half of October when the projects start to be developed.

4.2.- Student Questionnaires

From the results of the questionnaires filled in by the students, a series of graphs were drawn up to show salient data relating to student perceptions. In total, 40 questionnaires were filled.

![Weekly dedication to the e-portfolio](image)

Figure 3: Weekly dedication to the e-portfolio.

![Work with the e-portfolio requires more effort and dedication than other methodologies](image)

Figure 4: Work with the e-portfolio requires more effort and dedication than other methodologies.

Almost 80% of the students devoted less than 2 hours a week to the e-portfolio, and only 5% devoted more than 4 hours a week. It is important to bear this in mind when evaluating the following items in the questionnaire.

Almost half the students considered that working with the e-portfolio required more dedication than other methodologies. Despite this, as the previous figure shows, most students did not devote more than 2 hours a week to it. These data are consistent with other investigations carried out by our research group. Any active and student-centered methodology is perceived for students as more difficult than traditional ones.

Following these considerations, we will now analyse data associated with assessments of group work based on use of the e-portfolio:
75% of the students think that this methodology facilitates group work, while just 12.5% disagree. This seems to indicate that e-portfolio is an interesting tool and method for boosting group work in this context.

As for social interaction among users, via the e-portfolio, the students were more sceptical and hesitant, even though half of them did consider that this tool facilitated social interaction. We sensed that they had continued using familiar ways to interact not integrated into the dashboard (Facebook, Messenger…).

As Figure 7 shows, work performed through the e-portfolio was mainly done via group views, with a more moderate use of personal ones. In contrast, the collections were barely used. This responds to a proposal more institutionalized and seems to indicate that there was a need for better knowledge of the tool in order to take maximum advantage of it, in this case in terms of the collections’ use and how they work.

The following figures reflect the students' assessments of the e-portfolio as a means of organizing data and controlling the individual learning process:
Figure 8 shows that, generally speaking, the students’ assessment of the e-portfolio as an organizer of academic and personal data is positive, although differences can be observed, depending on the type of data. 72.5% think that it is useful for organizing academic information but this percentage drops to 55% in the case of personal information. There is also a significant difference in the negative assessment in each case.

Figure 9: Their opinion of control over the learning process.

The assessments are mainly positive with regard to control over the personal learning process: 72.5% of the students coincide in agreeing with the method’s flexibility and its adaptability to their own learning process.

There is hardly any doubt among the students that the e-portfolio will be useful in the near future, both in academic and professional circles. 75% of the students agree on this.
As for use of the dashboard or Mahara main desktop, half the students state that they would not use the dashboard as their Internet start page. This indicates that the application’s use was mainly limited to the subject they were taking, rather than also using it as a possible personal learning environment. This iPLE confirms one of the most common aspects of this kind of environment; that it was used almost exclusively for academic purposes. This was also corroborated by differences in their assessments of its usefulness in organizing personal and academic data.

In general, the e-portfolio experience was regarded as a positive one, since 70% of the students totally agree with the statement. It should be mentioned that 25% answered that they were not sure. This could be attributable to various different reasons: they were late in starting to use the tool or in joining the course or they failed to understand Mahara’s functionalities or perceived them as being complicated.

4.3.- Observation of Output.

Some personal and group views were examined in order to ascertain to what degree they had been customized. The course portal was designed on an open-access group view, accessible by all members of the course. This view is shown in the following figure.
Most students did not make significant changes to the dashboard, although some did add images, news feeds, profile and contact information, or a list of friends on Mahara.

As for group work on private group views, in general it consisted of available downloads for each individual member to work on. In some cases, coordination and communication systems were included in the same environment.

Some students also created other personal views, apart from the initially available profile view and dashboard and the group view created for the project. These personal views were given quite a customized touch, incorporating a variety of elements.

Figure 14: One group view

Figure 15: Personal view belonging to a course student.
5.- Conclusions

From an analysis of the results outlined in the previous section, the following conclusions can be drawn:

- The e-portfolio (on Mahara) is a good tool for the personal organization of academic information, and the students regard this as being the case.
- Students consider that the configured iPLE is suitable for academic work, but not very appropriate for organizing personal data. Indeed, few of them add personal features to the iPLE.
- Students regard this way of working as giving them more control over their own learning process, since they can work in accordance with their own preferences and personal needs (timetable, pace, learning style, etc.).
- The e-portfolio facilitates group work and collaboration. However, it is not perceived in the same way when it comes to its possible role as a tool in social interaction. This is probably because the students also work on a non-virtual basis, sometimes having face-to-face sessions.
- As the students’ work evolves, during the different phases of the project, the students incorporate an increasing number of views, incorporating some new blocks into the views. Nevertheless, there is little customization of the views and they tend mainly to feature downloads and textboxes.

With regard to the above conclusions and the considerations posed in this document, we would like to highlight possible future research activities:

- To review the initial idea behind the study once again in order to put into practice a new integrated design, aimed at using Mahara’ dashboard as a iPLE, integrated into the formal education platform (Moodle), together with personal views that reflect each individual’s personal facet, group views for collaborative work, and presentational views for assignments, and incorporating social interaction.
- Improvements in the integration of Moodle and Mahara, making optimum use of the potential that both tools offer for integration, so as to improve each version of the applications.
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