A Methodological Strategy focused on the Integration of different Learning Contexts in Higher Education

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ABSTRACT
In this paper, we describe the design and validation results for the second rollout of a learning strategy integrating formal, informal and non-formal learning and boosting interaction in a degree course for pre-service teachers at the University of the Balearic Islands, after a first implementation in the previous academic year (2012/13), following the iteration cycle of the research-based design. The learning strategy is based on the idea of the personal learning environment (PLE) as a model for ICT integration, and is applied as such in the course. We used student questionnaires to validate the second implementation of the changed learning strategy with regard to reactions, learning and transference of the different items of the strategy. We present the results as a refined model of the methodological strategy and highlight some conclusions related to the use of this model and future research lines directed at learning design by teachers.

Categories and Subject Descriptors
K.3.2 [Computers and education]: Computer and Information Science Education – computer science education, curriculum, information systems education, literacy.

General Terms

Keywords
Personal learning environments, personal learning networks, formal and informal learning, higher education, open learning, student-centred design, pre-service teacher training.

1. INTRODUCTION
At present, the majority of higher education institutions around the world use virtual learning environments (VLE) to support blended and online courses [6]. These tools are useful for managing courses in educational institutions but, recently, some limitations and restrictions have been identified concerning the student-centred design [5]. In fact, VLEs are centred on the administration and delivery of courses and set the focus on the teacher [20]; however, the way they are mainly used, does not enhance or enrich the learning-teaching experience, but replicates face-to-face classrooms online.

In this sense, the challenge is in including student-centred methodologies into this scenario, heading towards open and flexible learning environments [21]. In these new open learning environments, VLEs can coexist with other didactic options that set the focus on the learner and their interaction with teachers, classmates, etc. On this other side, there are personal learning environments (PLEs), understood to be the combination of tools, data sources, connections and experiences of activities habitually used to learn [1]. The PLE is a pedagogical concept of the idea of an environment centred on the learner, who chooses what, when, where, with whom and with which tools to learn.

Mixing ICT learning strategies derived from VLEs for formal learning and PLEs for informal learning may help in moving away from actual classrooms to a networked ‘learning communities’ model for the educational environment [19], in which interaction is the key element and life-long learning is the goal.

The aim of this paper is to describe the design and rollout of a methodological strategy for integrating formal and informal learning in virtual and open environments, boosting students’ participation and interaction in their own learning by developing their own personal learning environments (PLE).

This study is part of the research project EDU2011-25499, entitled “Methodological strategies for integrating institutional virtual environments, personal and social learning”. Its research focus is on emerging models for VLEs, together with the configuration of learning scenarios and professional development aimed at training teaching competences to deal with different teaching-learning modalities.

2. BACKGROUND
This educational experiment is the implementation of an iterative phase in the cyclic process of the research-based design (see Figure 1).
The process was as follows:

1. In the first place, a generic model of learning strategies for integrating formal, non-formal and informal learning was designed, taking into account aspects like the definitions for the different kinds of learning [3, 4], the components for designing open learning environments [9], the participation and collaboration features of the Web 2.0 [25, 11] and the functions of a PLE [26]. An overview of the resulting model was as follows:

Therefore, the generic methodology designed was structured around three dimensions, which consisted of the three functions of the PLE according to [26]: content generation, connection with others and information management. In each dimension, elements from the PLE and the VLE are integrated: the VLE offers access to basic documentation on the course, private communication spaces and task delivery, while the PLE enables development of further information management, creative processes using an e-portfolio and participation in learning networks (and creation of the personal learning network, PLN).

2. After this first design of the model, a specific adaptation was designed and implemented in a degree course with their lecturers' consensus [15]. At the end of the course, the lecturers and students involved validated the learning strategy applied, in interviews and questionnaires, respectively. The results of the validation from the students were generally positive in all the items on the questionnaire (liking, usefulness, possibility of transference to personal and professional future, and easiness; this latter was the less positively valued at approx. 62%, in part because of technical problems and workload, the others gained more than 80%). On the other hand, the lecturers were also positive about the strategy when being interviewed, although they also highlighted the difficulties of implementing it at the beginning related, in some cases, to technical problems and also to workload.

3. In this current third phase, we took the results from the first implementation and redesigned our learning strategy for this course, with their lecturers getting involved in appropriating the strategy. The improvements were directed at minimising technical problems, especially changes in the selected tools, and the enhancement of the communication and information management systems. Then we rolled out this improved strategy as iteration in the design-research based process. For this purpose, we started from the refined model for previous course, but changed some tools at the beginning:

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3. LEARNING DESIGN

3.1 Context

The study was carried out on a group of teachers and students on the "Technological media and resources for primary education" course in the third year of studies for the Primary Teacher’s Degree at the University of the Balearic Islands, during the 2013/2014 academic year. For students, the main objective of the course is to develop skills in the use of technology that will facilitate teaching and learning processes at school. The course group was made up of four teachers and 233 students organised
into three large groups of approximately 80 and 21 practical
groups of approximately 25.
According to an initial questionnaire, answered by 218 students,
the majority were women (72%) and under 24 years old (76%).
The development of the course was based on learning principles
centred on the student and methodologies that focus on collaboration and social construction of knowledge [23].
According to Figure 3, the elements of the strategy are described structured in the three dimensions of the proposal for generic methodological strategy (Figure 2):

- Information management:
  - The basic resources for ad hoc design are the course study guides provided by the lecturers which are available on the University’s institutional VLE, based on Moodle, called ‘Campus Extens’. These materials were mostly based on concept maps created with Cmaptools software.
  - Additional self-designed resources are obtained by locating and saving materials through different means, like specific search engines, social bookmarking (the lecturers used pearltrees to offer supplementary resources and links to the students), social networks (especially Twitter, which was used as the social communications space for the course).
  - It was suggested that personal organization of information be done with Symbaloo, but students could continue using their own previous personal ways of organizing their information.

- Content generation:
  - Course tasks delivery was done via the institutional VLE and consisted of links to the pages of the students’ e-portfolios.
  - During the course, students built their e-portfolio (using blogs with Blogger, or web sites like Wix) with the tasks they had to do. Learning evidences published were different educational resources applied to primary education (podcasts with e.g. Audacity, video with e.g. Movie Maker, interactive multimedia and activities with Powerpoint, Educaplay, etc.) and reflections on teaching practice.

- Connection with others:
  - Apart from the use of forums and private messages, mainly with the lecturers, through the VLE, an open space for social communication and collaboration was also set up on Twitter so that students could share interesting resources and their tasks with others, and build their own personal learning networks (PLN), outside the course. This is an important tool for encouraging interaction, participation and communication [12].

3.2 Methodology

To validate the learning strategy, we used the same data collection tools as in the first rollout: student questionnaires and lecturer interviews.

This validation was based on Kirkpatrick’s first three levels of evaluation [13]: Reaction, Learning and Transference. Therefore, in the questionnaire, we included items relating to each level of evaluation: Reaction associated to the degree of enjoyment and ease, Learning in relation to usefulness and relevance, and Transference associated with the opportunities to of apply the elements in their personal and professional future. Transference, especially for the professional future, is rather relevant for us, since one of the main objectives of integrating different learning contexts is supporting life-long learning for students.

The questionnaire was adapted from the previous one used in the first rollout, which was validated by experts on the International Panel for Research on Educational Technology1.

We present the answers of the students to the final questionnaire delivered via online, in which they had to assess the learning strategy of the course, below.

Out of the 233 students enrolled to the course, 166 (71.2%) took part in this questionnaire. There were two questions relating to validation of the strategy implemented:

- Assess the following statements in relation to the strategy of the course.
- Assess the following elements of the strategy according to the statements.

3.2.1 General statements relating to the strategy

In this question, students were asked to rank different statements depending on their agreement (Agree or Totally agree) or disagreement (Totally disagree or Disagree) with them:

As can be observed in Figure 4, the results were similar to those in the validation of the first rollout of the strategy for the course (mentioned before), but even more positive. Although the ease of following the strategy was valued less positively than other elements, in this case it had more positive scores than in the first implementation of the strategy (62% previously, as against 71.4%) as the changes had been introduced.

3.2.2 Assessment of the items in the strategy

In this case, students were requested to rate, on a Likert scale from 1 to 4, the different items that formed part of the strategy according to the statements in 4.1 and as described previously, 1 being "Totally disagree" and 4 being "Totally agree".

1 PI2TE: Panel Internacional de Investigación en Tecnología Educativa: http://gte2.uib.es/panel
A general overview of the data shows that, in the main, students assessed all the elements of the strategy positively. It is worth noting that the statement "I think I would apply it in my personal future" was the one with the highest scores for agreement and disagreement, but the other statements were basically high.

Out of all the items in the strategy, "developing the e-portfolio describing individual or pair-work" was the one considered to be most useful and relevant (90.2%), with most possibilities for application to a professional future (85.4%) - after "communicating and collaborating with others (lecturers and classmates) using Campus Extens (88.4%) -, but also the most difficult one to implement (disagreement with ease: 36%).

Other items with higher percentages of agreement in usefulness and relevance were: delivering individual or pair-work tasks using Campus Extens (88.4%), accessing the course study guides in Campus Extens (87.2%), communicating and collaborating with others (lecturers and classmates) using Campus Extens (84.1%), widening my personal learning networks by following other people on Twitter or other social networks or virtual communities (82.3%) and organizing and managing the information in a personal way (80.5%).

With regard to the item that students considered applying to their personal future, "widening my personal learning networks by following other people on Twitter or other social networks or virtual communities" (81.1%) was highlighted. On the other hand, the most valued items in relation to future professional transference, apart from the above-mentioned, were: "widening my personal learning networks by following other people on Twitter or other social networks or virtual communities" (84.1%), "delivering individual or pair-work tasks using Campus Extens" (84.1%), "accessing the course study guides in Campus Extens" (82.3%), "organizing and managing the information in a personal way" (82.3%) and "locating, accessing and saving supplementary materials using other means" (81.1%). It is remarkable that all the items had higher scores for professional, rather than personal, transference, which are interesting data considering that supporting life-long learning is one of the main objectives of a strategy of this kind.

The most valued items with respect to ease were those relating to the VLE used at the University: "communicating and collaborating with others (lecturers and classmates) using Campus Extens" (89.6%), "accessing the course study guides in Campus Extens" (88.4%), "delivering individual or pair-work tasks using Campus Extens" (87.8%). Although there was also remarkably high agreement on the ease of: "widening my personal learning networks by following other people on Twitter or other social networks or virtual communities" (84.1%), "sharing resources and communicating on Twitter using the course hashtag" (83.5%) and "building my own PLE using Symbaloo" (82.9%).

4. RESULTS

The main results of this study relate to the generation of a model for a methodological strategy for the integration of formal and informal learning, that is, with elements from the institutional VLE and the student’s PLE. For that purpose, it is structured around three main dimensions: content creation, information management and connection with others.

The resulting model has been already validated twice, in the academic years 2012/13 and 2013/14, both by teachers and students. It has also been adapted each time to meet detected needs and solve problems.

Taking all of this into account, we believe that it is a valid model for this course and could also be useful for others. After making some changes with respect to the previous implementation in order to enhance integration between the elements from the VLE and the PLE, we present the refined model for the methodological strategy as follows (specific tools are presented between parentheses):

![Figure 6. Refined model for methodological organization of integration of different kinds of learning after second implementation.](image-url)
5. CONCLUSIONS
In conclusion, we can state that the data obtained are similar to those obtained in other previous studies relating to the positive assessment of new methodologies but also, at the same time, the perception from the point of view of students and lecturers that they require more dedication and effort [17, 22, 24].

Now focusing on the methodological strategy itself, which integrates elements from VLE and PLE, it seems to be working fairly well. In the first implementation (2012/2013 academic year), the model was agreed with the course lecturers and then, in the second implementation (2013/2014 academic year), the lecturers appropriated the model and got involved in making modifications to elements of the dimensions to meet their requirements.

In relation to the content creation dimension of the strategy, development of the e-portfolio, as the element of the strategy with the highest disagreement with its ease of implementation, is traditionally considered to be difficult due to the high degree of commitment and effort that it demands from the learner in order to reflect their learning [2, 22].

On the other hand, and with regard to the dimensions of information management and connection with others, the elements relating to the institutional VLE and social communication and sharing connected with tools from the students' PLEs are considered easy to implement, but the most valued as being useful to them are the ones that are closely connected with the final course assessment (delivering the e-portfolio, using the VLE communication tools to solve queries with the lecturer or classmates and accessing the course study guides on the VLE). Other elements more related to personal and lifelong learning seem to be considered secondary, since they do not have a clear evaluation in the course's assessment.

In light of the resulting model and not wanting to be generalists, we believe that we should consider including all the elements of the strategy into the course's assessment, as part of some assessment elements. In this way, students could get involved in all the elements in a more decisive manner. On the other hand, we consider that the methodological strategy has been suitably refined and works for this course, so we could try it out beyond this course and apply it, with some adaptation, to other similar courses in this university and in others. Moreover, it would be interesting to take another look at the implementation of the strategy to strengthen its validation from the point of view of other stakeholders, apart from the teachers and students on the course. In addition, aspects other than liking, ease, usefulness and relevance, and transference to personal and professional futures, such as, for example, learning types in terms of processes - acquisition, collaboration, discussion, investigation, practice and production - [14], could be taken into account for further work on the strategy's effects and impact on students' learning.

Our future research lines are centred on lecturers' support for designing courses in open learning environments [7] in order to minimise workload and efforts, which they remarked on in these kinds of methodologies. For that purpose, we would propose using learning design tools (e.g. Collage, Compendium or Ldshake) that could enhance the design experience from the teachers' point of view [10] and could integrate elements of formal and informal learning from the institutional VLE and student's PLE. This fits in with the idea that teachers need environments that help them to monitor and orchestrate learning processes, and that include different learning scenarios [8].

6. ACKNOWLEDGMENTS
This work is framed within the research project EDU2011-25499 Methodological strategies for integrating institutional virtual environments, personal and social learning, developed by the Educational Technology Group (GTE) of the University of the Balearic Islands since 2012 and funded by the Ministry of Education and Science of Spain, within the National Programme for Fundamental Research. It is also part of a teaching innovation project funded by the University of the Balearic Islands in the academic year 2013/14 called Personal Learning Networks.

7. REFERENCES


