Virtual Learning Environments in Spanish Traditional Universities

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Abstract—This communication is intended to provide some issues for thought on the importance of implementation of Blended Learning in traditional universities, particularly in the Spanish university system.

In this respect, we believe that virtual environments are likely to meet some of the needs raised by the Bologna agreement, trying to maintain the quality of teaching and at the same time taking advantage of the functionalities that virtual learning platforms offer. We are aware that an approach of learning from an open and constructivist nature in universities is a complex process that faces significant technological, administrative and human barriers. Therefore, in order to put plans in our universities, it is necessary to analyze the state of the art of some indicators relating to the use of ICT, with special attention to virtual teaching and learning, so that we can identify the main obstacles and design adaptive strategies for their full integration in the education system.

Finally, we present major initiatives launched in the European and state framework for the effective implementation of new virtual environments in the area of higher education.

Keywords—Blended learning, e-Learning, ICT, Virtual Learning Environments

I. INTRODUCTION

INTERNATIONALIZATION and globalization of education launched after the Bologna Process has resulted in the need for universities to increase the quality of their teachers, researchers and administrators. The objectives of the new European Space for Higher Education and the needs of today's society put emphasis on the capacity for innovation and entrepreneurship of future graduates; learning throughout life, *learning by doing* as well as active and collaborative learning approaches are critical to achieving these goals.

Around the European credit transfer (ECTS), it is known that its implementation will impose a methodological change both in teaching and learning processes. The pedagogical innovation should consist in putting into practice a differential model of teaching and learning process which is currently widespread in traditional university classrooms.

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Faced with the unidirectional communication that is established between teacher and student in the traditional teaching, the new methodology promoted by ECTS assumes many of the pedagogical principles of the social constructivist [4, 5]. Psycho-pedagogic research reveals that truly learning occurs when students "construct" knowledge through interaction with their environment, through the personal information searching, and through constructive problem resolution processes [14].

This new model of open and constructivist teaching involves maintaining the following principles for action:

- Encourage teamwork and collaboration.
- Encourage independent learning.
- Encourage practical skills development for conceptual knowledge application (case studies and real situations of the environment).
- Use various media, technologies and ways of representing information with special focus on computing resources.
- Encourage and facilitate analysis, debate and criticism of available knowledge.
- Address the individual pace of learning of each student through the supervision and monitoring of progress and participation in activities in the framework of the course.
- Use different techniques and procedures for continuous assessment of learning and report outcomes offering recommendations for improvement (feedback).
- Combine different types of strategies and teaching techniques such as seminars, practical activities, simulations or role plays, case analysis, problem solving, etc.
- Develop quality training materials or reuse others that have been created, which apart from the specific content of the course material, practical proposals are being included.

However, it is obvious that some of these principles are difficult to implement due to a number of reasons, including i.e. the existence of a large number of students, architectural configuration of the classrooms, teacher/student ratio, etc. Hence, we advocate a blended learning model, or stated in other words, a teaching modality that combines face to face teaching in classrooms, with the development of an independent and distance learning through virtual platforms or classrooms. This combination of different learning tasks that the student has to carry out using different resources and learning spaces is called Blended learning [11], which is a variant of the e-Learning concept. The model of Blended

learning that emphasizes active learning and a reduction of classroom time, is based on the concept of hybridisation, the bringing together of two dissimilar parts to produce a third result. In the case of an effective Blended learning course, these two dissimilar parts are the online and face to face classroom components [12]. When they are successfully combined, the potential result is an educational environment highly conducive to student learning. According to several authors, this teaching modality that facilitates a more flexible learning adapted to the student's own pace, will generalize in the coming years in the higher education systems.

Regarding to virtual learning environments, New Media Consortium published in 2005 a report about emerging technologies with the greatest impact in the education field with a time horizon of three to five years. That report included the social networks connected to the webs of knowledge or virtual areas in which common base of references and theoretical contents could be collaboratively built.

Virtual environments for teaching and learning offer special features that allow promoting:

- Self-directed and autonomous learning
- Development of a flexible teaching
- Development of generic and specific skills.
- Knowledge construction by students.
- Collaboration between groups.
- Accessibility to shared resources.
- Searching for collaborative data and indexing information.
- Using multiple platforms, depending on the needs of creators, collectors and context.

Bearing in mind the above characteristics, the educational objectives pursued when designing a course supported by a virtual platform should be directed to:

- Finding a balance between student autonomy and flexibility of its learning.
- Developing generic and specific skills.
- Promoting interaction between students from different universities.
- Building learning in problem solving, case analysis and discussion.
- Involving students in the evaluation process by developing both continuous assessment and self-assessment.
- Harnessing Information and Communication Technologies to facilitate access to any kind of course material inside or outside the university environment.

There is no doubt that the methodologies that we have been using so far have to adapt to changes in society, to new environments, to businesses needs, to the students' demands. More specifically, a type of student who doesn't only attend a lecture, but discusses, gives his/her opinion and criticizes. The students' profile now has little to do with past decades. Current generation of students are *digital natives*, they were born with the Internet network, and now they are experiencing the transition from the old to the new web-based technology, which is more participatory, more collaborative and semantic, and in the future these students won't conceive a passive space without interaction.

Therefore, it's essential to introduce and expand a new culture of knowledge, based on active users who are able to create, search, analyze, communicate and share information and knowledge. In this respect, we believe that Blended learning constitutes a strategic environment which facilitates the adoption of the new educational paradigm based on active learning.

II. STATE OF THE ART OF E-LEARNING AT SPANISH UNIVERSITIES

Relating to this point, the results of the latest report published by the ICT Sector of Spanish University Rectors' Conference[1] [16] note that it is spreading increasingly the use of virtual technologies in teaching, further consolidating the initiatives to promote this type of teaching.

In that report, as shown in Figure 1, there are some indicators that reflect important positive trends over previous years relating to the "Teaching and Learning" strategic focus.
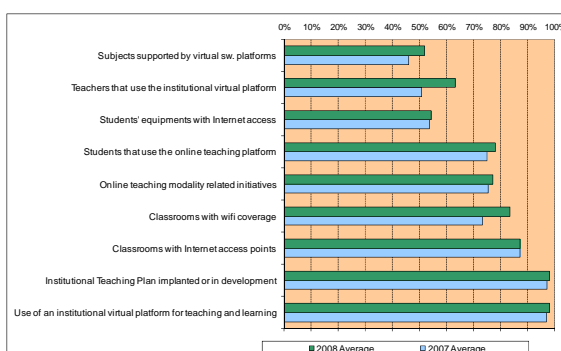

Fig. 1: "Teaching and Learning" strategic focus indicators

With respect to the most closely indicators related to virtual teaching, from Figure 1 we can highlight the following conclusions. Firstly, as it is reflected, almost all universities now hold an institutional platform for virtual teaching. It is also noted that a large proportion of universities (93%) include a corporate plan for virtual teaching, already implemented (79%) or in development (14%). Regarding to the use of virtual platforms, it can be said that just over half the teachers and researchers use the virtual platform, while this percentage is much higher in the case of students (82%). These indicators show an important improvement over previous years

In this way, the following chart presents the current state of more specific indicators of e-Learning in the Spanish university system (see Figure 2).

Among the positive aspects of stress it can be said that almost all Spanish universities already comprise initiatives to virtualize regulated subjects and also use virtual teaching technologies for support face to face modality teaching. It is also noted that universities present a high percentage of initiatives related to virtual teaching (which are already in place or in development) over the total number of initiatives considered important by the CRUE ICT Sector.

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[1] The ICT Working Group of the CRUE has undertaken the study with the collaboration of 54 universities, representing almost 90% of students in the Spanish university system.
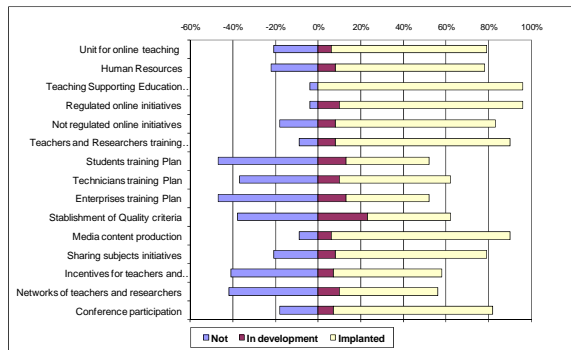
Fig. 2: e-Learning indicators. State of the Art

However, as shown in Figure 2, there are some indicators where is needed more progress, such as the establishment of incentives for teaching and researching community, organization of training plans, development of standards and quality criteria for publishing course and scientific materials in the network, establishment of internetworking collaboration among universities to share best experiences, information and knowledge.

These results come to corroborate the findings of the report on the development of e-Learning at European universities, which reveals that while all universities are undertaking the incorporation of ICT in their services, at present it hasn't still given an adequate response to the challenge of its pedagogical integration in higher education system [13]. In this respect, the latest report published by the Conference of Spanish University Rectors reflects a clear gap between the level of implementation and the effective use of virtual training environments in the Spanish university system [16].

As noted in that report, although the integration of ICT as a tool for support of teaching activities has increased substantially in recent years, its use is still under the traditional closed and unilateral teaching environments. So that if we compare our university system taking by reference other pioneering universities in this field, such as some European and U.S. universities (MIT, Stanford, Georgia Tech, Yale, Princeton, Oxford, Carnegie Mellon, to name a few) it could be argued that we are still at an embryonic stage in the use of virtual environments for teaching and learning.

As we know, the use of technology alone does not ensure any pedagogical change by itself. Many virtual classrooms that support face-to-face teaching modality only use the transmission medium as an end in itself, without exploiting the potentials of these new teaching environments. According to various studies in this line, the use of these tools responds to a more instrumental dimension than a didactic or pedagogical one and more related to researching activities than to teaching [1, 2, 15].

In this scope, some teachers are beginning to design and develop online activities, especially those due to time and space consuming which can not be realized within classrooms and laboratories. Another common use of virtual environments is to support teachers in administrative tasks, manage and evaluate works, distribution of grades, schedules, deadlines, etc. As a general rule, it can be argued that the teacher starts doing the same thing that he/she does within face to face

classrooms, and little by little, he/she will explore the new possibilities offered by the virtual platforms. At present, the tools less frequently being used, correspond to those resources that require further prior didactic development, such as workshops, self-assessment exercises, blogs, wikis, databases, portfolios, etc. But it is precisely in these resources where resides the real potential of virtual platforms and the new possibilities for its use.

Despite the above findings, it can be argued that universities are not making sufficient efforts to accommodate the new demands of a "network society". The unsuitability of our institutions can be explained by the obstacles and fears faced in the adoption of new educational paradigm based on active learning. One of the main barriers that it is necessary to face is the resistance to organizational change. Traditional universities are conservative by nature and in some cases show a culture of aversion to innovation.

It is logical to think that like any innovation in general, there is an initial period of resistance, and in this case, in particular, as a pedagogical innovation supported by technology and electronic media, there is a resistance toward its integration. It is clear that technology alone will not improve productivity, or expressed in other terms, the use of virtual learning platforms doesn't necessarily imply a positive increase in student achievement, or in the quality of teaching, or in researching. There must be significant cooperation through partnerships with students faculty, instructional technology staff, faculty developers, and administrators to succeed. Undoubtedly, new approaches to learning will require organizational and methodological changes to improve productivity.

We are aware that a learning approach from an open and constructivist perspective in universities is a complex process that faces significant technological, administrative and human barriers. Therefore, this introduction should be done through an adaptive strategy that in its design might integrate previous experiences of other educational, business and research organizations [9].

In this context, the following challenges may arise in the progress towards the effective integration of new learning approaches supported by virtual environments:

- Introduce ICT explicitly into the strategic plans of universities, moving from individual use to become a basic teaching ingredient (bottom-up perspective).
- Develop professional support structures to help the integration of ICT on course redesign. To ensure a successful blended learning experience for students there must be faculty support for course redesign and learning new teaching and technology skills. The course redesign involves assistance in deciding what course objectives can best be achieved through online learning activities, what can best be accomplished in the classroom and how to integrate these two learning environments [8]. Faculty members need to acquire new teaching skills such as how to foster online learning communities, facilitate online discussion forums and address and manage students' online learning problems. According to Voos [17] to overcome these support issues there must be an institutional professional development program for

the development phase of Blended learning course and ongoing institutional support during the initial delivery phase.

- Incentive teaching innovation and engage the employment of assessment and accreditation quality processes in education supported by virtual platforms.
- Participate in European initiatives to develop standards in the field of digital teaching and learning resources.
- Promote at European level, the development of common standards for accreditation, assessment and certification of students under the new training environment and virtual mobility.
- Develop networks to facilitate best practices experiences exchange among universities. It's important to learning from previous and on-going experiences, before developing a priori technology and protocols inside the institutions.

III. Virtual Campuses panorama at Spanish University System

Once the current state of e-Learning related indicators has being analyzed, in this section, we offer the recent view of e-Learning supply in the Spanish university institutions.

At present, almost all of the Spanish universities (90%), divided into 19 autonomous communities, offer training through Virtual Campuses, with a total of 66 Virtual Campus, 60 belonging to a single university and comprising several 7 universities. The landscape is characterized by a wide range of courses, although very scattered, and mainly postgraduate.

Virtual campuses are mostly concentrated in the Autonomous Communities of Madrid (16%), Cataluña (15%), Andalucía (13.6%) and Valencia (9.1%). Striking that in the Autonomous Community of Castilla y León (fourth region with the largest number of universities), only just over one third of them have a Virtual Campus, this issue might require a separate analysis.

For its part, attending to either public or private institutions, it should be noted that there is a further development of virtual services in public universities with respect to private ones.

Virtual Campuses at Spanish university system can be classified into three major organizational models:

1. *Virtual Campus of a traditional university*, in this case, most of the campuses offer virtual teaching modality to support face to face teaching.
2. *Virtual University*: this is the case of universities that originally constituted as distance training centres. As a reference model, in Spain we must mention the National University of Distance Education (UNED) and the Oberta University of Cataluña (UOC). And recently, *The Distance University of Madrid* (UDIMA) has been created.
3. *Inter-university Virtual Campus*: in this model, virtual spaces are shared by several institutions. These spaces are based on having a single virtual meeting point for several universities. Some examples of reference in Spain constitute the following:

- "Grupo G9": it constitutes an association formed by nine public universities from Spain (*Cantabria*, *Castilla La Mancha*, *Extremadura*, *Islas Baleares*, *La Rioja*, *Navarra*, *Oviedo*, *Zaragoza* and the Basque Country) to make a joint offer of subjects taught via virtual modality. This constitutes the group with most enrolled students in the Spanish network universities.
- "ADA Madrid": this project consists of six universities in the Community of Madrid: *Alcalá*, *Madrid*, *Carlos* III, *Complutense*, *Politécnica* and *Juan Carlos I*.
- "Intercampus": it's a network of universities in the Commonwealth of Cataluña, the Autonomous University of *Barcelona*, *Girona*, *Lleida*, *Oberta*, *Politécnica*, *Pompeu Fabra* and *Rovira i Virgili*.
- "College Graduate" (IUP) offers masters and is mainly formed by the Carlos III University, Autonomous University of *Barcelona* and *Alicante*, in collaboration with "Santillana Formación" group.
- "Institute of Continuing Education" (IL3)
- "AEU Institute": this higher education institute offers postgraduate online studies along with the participation of the following universities: *Alcalá*, *Barcelona*, *Granada*, *León* and the Institute of Continuing Education (IL3).
- Virtual Campus universities of *Andalucía*.
- "Universia" is a Latin American, Spanish and Portuguese network that promotes and facilitates the integration and development of university members in the knowledge and information society. Universia's mission is to offer the Latin American, Spanish and Portuguese university community the optimum mix of content and services so as to facilitate the creation of a common forum of higher learning through training, culture, research, and collaboration with the business world. Universia's membership includes 1.056 universities and institutions of higher learning.

It is also important to highlight the importance of partnership collaboration projects that various entities have kept, for example the EDP training entity –a pioneer in online management programs training at university level– along with academic institutions develops a set of training projects in order to provide to business professionals a variety of courses in some of the most prestigious universities and business schools in Spain, such as the *Universitat Oberta de Catalunya*, *Universidad Europea de Madrid*, IL3-*Universidad de Barcelona* and the Business Administration School, among others.

Moreover, regarding to the kind of virtual platforms, it can be noted that most Learning Management Systems being used at Spanish universities for a decade are mainly related to commercial software products or institutional self developments. It should be noted that universities have made, in many cases, large financial investments to develop proprietary software or purchase commercial software platforms. However, as noted by [9], this infrastructure today

could become, rather than an asset, a barrier, since most of these tools are going through a rapid obsolescence phase, and need to set up, integrate and combine with new tools that are available for free or at low cost in the market for developing new applications tailored to the individual user needs. By this issue, we note that in the "2.0 network" society the traditional concept of ICT is no longer a competitive advantage for organizations (although according to Nicholas Carr's controversial article [3]: "IT does not matter" (2004) who manage without them clearly will be at a disadvantage. And this can be applied to virtual platforms.

Today, almost all universities have a virtual campus and the choice of free software LMS products is taking power, establishing a positive trend towards such solutions. This is the case of Moodle, which is open source and free. It has a strong international support and is on track to becoming a standard virtual learning platform. Moodle is designed to support new learning methodologies based on the social constructivist theories, providing an environment that facilitates collaboration, sharing knowledge and generating new ideas.

In Spain, among the universities pioneering the use of Moodle platform are the University of *Las Palmas de Gran Canaria* and *Jaume I* University, who in 2004 adopted Moodle institutionally.

From there, several universities (both public and private) have been incorporating it. Although there is a trend towards the use of open source platforms or at least to use them along with other proprietary or commercial developments, as noted above, currently the use of trading platforms and/or institutional developments (own developments) dominate the Spanish university scope (see Figure 3).

There are some reasons that are hindering their full adoption at the institutional level. Perhaps one reason resides in that low costs in many cases generate distrust in the decision-making, and the incomprehension that still continues producing concepts such as free or open source software products.
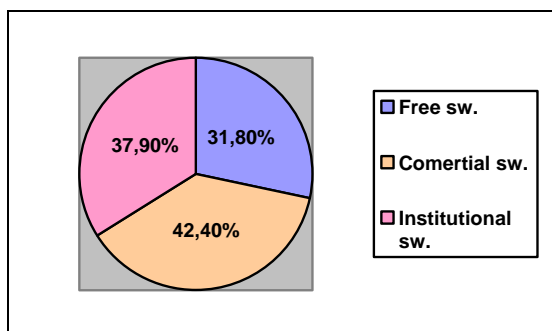

Fig. 3: Virtual Platforms distribution of use

It should be noted that among the commercial products employed, 80% corresponds to the WebCT platform, while among the open source software, Moodle is the dominant platform, in 60% of cases.

It is not the purpose of this paper to enter in the discussion on the appropriateness in the employment of a platform with respect to another; there are several projects and organizations that carry out assessments and comparisons of virtual platforms[2] (LMS or CMS). However, although it may seem obvious, it should be noted that the choice of a particular product will depends on the particular circumstances of each academic institution, so that the assessment should take into account the different scenarios or situations.

VI. EUROPEAN INITIATIVES

The e-Learning phenomenon, as a result of forthcoming changes in education, has been setting up many projects, and have also appeared numerous observatories and associations related to this teaching modality that serve as a meeting point and exchange of experiences on the use of virtual platforms to support training, as well as to investigate the latest trends in educational innovation and to propose action lines and quality standards in order to regulate both pedagogical and technical teaching quality.

At international level, UNESCO (through the World Conference on Higher Education), in the declaration of 1998 expressed the need to extend the ICT as a tool to democratize education, and therefore proposing it to the e-Learning as a tool for knowledge available to everyone. Proof of this has resulted, for example, into the transformation of the United Nations University in a virtual university (www.unu.edu).

In this line, the European Union also has positioned, adopting a program itself for the development of virtual education in various member countries, and the European Commission has promoted it by implanting ICT in the education field. Among the targets proposed by the Socrates and Leonardo da Vinci programs were included the use of ICT and the development of open and distance learning in higher education field.

Among the many projects funded by the European Commission it can be mentioned the EQIBELT project. The main of this project is to find the right way to integrate e-Learning into the higher education system. It is a joint project with partners in several European countries (University of Hull in Great Britain, University of Vienna in Austria, Helsinki University of Technology, University of Porto in Portugal, Estonian Information Technology Foundation, University of Leuven in Belgium, Vienna University of Technology, and University of Valencia in Spain, among others) and is funded by the European Commission's TEMP project.

In respect with the international associations working to promote virtual education it can be highlighted the Association for the Advancement of Computing in Education (AACD), which since over 25 years has been dedicating to the development of theories and models of teaching and learning supported by information and communication technologies. Another trend that has been developed as a product of the

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[2] At international level, Edutech (the group responsible for the Swiss Virtual Campus http://www.edutech.ch/lms/ev3) conducts evaluations of several Learning Management Systems. In Spain, there are also some initiatives in this regard, such as the University of Vigo, which carries out the analysis of actual use scenarios of open source LMS at universities across the JOIN! Project –*Guidelines 'e-learning at Spanish universities*', funded by the European Union, in an initiative aimed at providing information on free software virtual platforms.

emerging momentum of the integration of ICT in education is the establishment of partnerships among higher education institutions with the aim to conform internetworking organizations to share objectives, knowledge and technological structures.

Examples of this trend include:

- The Latino Americano Virtual Campus (CAVILA), a project that aims to contribute to the democratization of higher education through access to ICT at education. This initiative involves the University of Santiago de Chile, Argentine universities (*National University of Cordoba*, *Entre Rios* and *La Plata*), University of *Santa Maria* Brazil, University of *Guadalajara* in Mexico and the University of *Extremadura* in Spain

- (http://blog.pucp.edu.pe/item/7905).

- The Finnish Virtual University (FVU) is a consortium formed by twenty-one Finnish universities, aiming to support and develop a collaborative network that offers educational services that promote the use of ICT (http://www.virtuaaliyliopisto.fi).

- The Universities of Alicante, Barcelona, Carlos III of Madrid and the PRISA Group have created a Postgraduate Institute for the purpose of providing a wide range of postgraduate education (http://www.iup.es).

V. FINAL REFLECTION

Despite the good results that principal indicators on ICT penetration in the Spanish university system have shown, and also the many initiatives that are shaping the field of virtual environments for teaching and learning, there is still a clear gap between the level of implementation of these technologies and their effective use. We can say that the development of Blended learning in the university system is still in a nascent stage, so it is necessary to advance through its effective integration as an interactive tool, allowing cooperation between teachers and universities both at state and international levels. A policy framework should be developed, which explicitly states how Blended learning supports the vision, values, and principles of the institution. And related to this document should be a set of strategic and operational plans with the identification of needs, goals, potential costs, available resources and quality parameters for creating an effective assessment process. Also, according with [10] we strongly emphasize that a faculty development program should be central to the success of an institution's Blended learning initiative. The program should include opportunities for faculty to learn how to redesign their courses, teach well online, and effectively use technology. Without adequate preparation, most faculty will simply replicate their traditional class sections and the benefits, resulting from a Blended course, will not be achieved.

Within the European Space for Higher Education framework it will be ever more necessary the creation of university networks and associations and the establishment of standards and quality criteria to develop and publish open educational and scientific material.

We have before us many points on which further progress up to generalize and extend the teaching innovation to the whole university, so that the new model of teaching and learning will no longer be a novelty and become a common practice at Spanish university system. However, while the university does not detect this real need is evident that there will be a clear resistance to take this important step. And this is the main challenge.

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