Advances in E-Learning: Experiences and Methodologies

Preface

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Biographical note:

Francisco José García-Peñalvo (1971) graduated from University of Valladolid with a degree in Computer Science, later to obtain a PhD in the University of Salamanca, and is currently *Profesor Titular de Universidad* (a Senior Lecturer) in the Computer Science Department of the University of Salamanca. He leads the GRoup of InterAction & eLearning (GRIAL), a research group whose main lines of work are Human-Computer Interaction, Web engineering, Software Engineering, Educative Computing and Communications Theory. He has published in excess of one hundred papers in international publications and conferences, and has participated in more than twenty research projects. He currently teaches in the *Programa de Doctorado del Departamento de Informática* (Computer Science Doctorate Program, which has been awarded the Quality Mention of ANECA since Academic Course 2003-2004), as well as in the *Máster Oficial en Sistemas Inteligentes* (Intelligent Systems Master), in the *Máster Oficial en TIC Aplicadas a la Educación* (ICT applied to Education Master), and in the *Programa de Doctorado Procesos de Formación en Espacios Virtuales* (Educational Virtual Spaces Doctorate Program) at the University of Salamanca. Dr. García-Peñalvo is currently Director of the *Experto/Máster en eLearning: Tecnologías y Métodos de Formación en Red* (eLearning Master). Lastly, as concerns administrative tasks, he is currently Vice-rector of Technology Innovation at his University.

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Web-based training, actually known as eLearning, has experienced a remarkable evolution and growth in the last few years. This is certainly due to enormous advances in Information and Communication Technologies (ICT), and also to the increasing demands to make training compatible with the professional and personal lives of any citizen, and not just something created for young students looking for a degree. Training must be available as a lifelong experience, both for academic studies and for non-formal or informal situations. eLearning is supposed to be an excellent solution for the old problem of mass education, beyond that of an impractical apprenticeship method, since there are far too many knowledge seekers and not enough knowledge providers.

The initial increase and even euphoria associated with eLearning, due to the new possibilities it seemed to offer, gave place to a generalized feeling of disillusionment, because results did not show eLearning to be a tool for quality training, and ROI were not really satisfactory. This was contrary to what we one could have thought initially (García-Peñalvo &López-Eire, 2007). There exists no single reason that can explain the failure of so many eLearning initiatives. Perhaps lack of maturity could be the most realistic and global cause. This situation was mainly caused, among other variables, by a pre-eminence of technological factors above other methodological or didactical elements. eLearning started as something mainly technological, not as an activity whose aim was human learning. In fact, most books on the subject show this unbalance clearly, because human aspects are considered as if they were unnecessary or, in many cases, because the human factor in eLearning is considered different from any other Learning modality. Consequently, the inefficiency of eLearning seemed to be due to technological elements, because the responsibility of success or failure in eLearning processes depended on the technological tools available. This was, of course, not true. Rosenberg (2006) points out very well this situation presenting the evolution of eLearning field in three phases. The first concerns itself with contents, that is, with the quantity of courses, and with the investment in technology needed to deliver them. This effort is focused on technology itself, taking as criteria for success how much you do, how quickly you do it, and how many courses you offer. A second stage is about quality and impact factors, and in this way success is related to innovative instructional applications, learning by doing models, and higher cost-benefit ratios. Finally, the third phase tackles business performance to design more comprehensive solutions that include training, improved knowledge sharing, and offer more intelligent ways of collaboration and interaction, all in the context of work. Business measures like productivity, customer and employee satisfaction, organizational agility, and marketplace performance are the metrics that matter here.

The real situation is that many organizations that are bogged down in the first stage. They have introduced different kinds of technology artifacts in a variety of innovative ways, and have met widely varying levels of success. Unfortunately, there are too many examples that show a very disturbing situation: these organizations do not get a reasonable relationship between investments in training and the results they obtain. This situation presents us with "black and white" eLearning, as Martínez (2006) says.

In spite of everything, the growth of eLearning is unstoppable, and every important institution (Academic, Enterprise or otherwise) knows about the necessity of creating and developing a Department or Service specially devoted to this subject. eLearning deserves to be considered as real revolution, "The Globalization of Training": this is not only because this sort of training is given on the Internet, but also because of the implication of entities very different from those traditionally "authorized" to do so, i. e., Academic institutions. Any institution (not just Academia) can plan its own training strategy, and so Learning is now possible anytime and anywhere.

Actual perspectives about eLearning initiatives are more realistic, and show a more mature conception of this field, but there is still a long way to go. The idea of "quality in eLearning" must guide us if we want to meet successfully our educational challenges.

In order to show possibly successful ways to plan and carry out such a complex project, we are going to study in depth the most relevant obstacles that hinder the eLearning process. After this, as preface to the practical knowledge and contrasted high-value experiences enclosed in the next chapters, we can propose a complete eLearning perspective in keeping with the concept of quality in eLearning.

A framework to avoid eLearning pitfalls

There exist quite a few works that describe a sad paradox in the deployment of eLearning systems. Many of them are in institutions in which a learning platform is in place (more than one in many cases), but only to be used by less than half of the teaching staff. This paradox is especially true in the context of higher education institutions, that is to say, in Universities. While it is true that some sectors demand investments in teaching technology, trying to get equipment whose utility has been tested before it is demanded, one can also find other institutional investments for which there is no clear need. If the teaching community sees no need for these resources, it will resist using them. This is probably the cause of the lack of interest one sees towards eLearning in the teaching staff: they do not appreciate any utility in its use in the context of standard teaching, because institutions tend to think that "everybody knows" what to do with these platforms. If bad comes to worse, there is a feeling that teachers will somehow end up knowing how to use them.

Now even this is clearly something to worry about, it is by no means the only problem that precludes a proper use of these resources. One could try to synthesize three categories in which one can group other causes.

1) There is no real intent in institutions ("use the platform or suffer"). If no need has been created before deploying the eLearning platform, it is essential to do it as soon as possible, and to do it properly. In most institutions there is a lack of a real policy as concerns ICT, and more precisely about eLearning. Setting up a virtual campus is a much more radical change than the incorporation of any other technology or means that has been added in a reasonable past. Using this virtual campus means a real shift in the training paradigm. Hence, on must prepare for this change, and for that it is necessary to develop specific policies about eLearning, with a clearly defined strategic model. The proper policy concerning eLearning must be complemented with investments in human resources, in technology and in methodology. Without this trio of elements, the tool itself is pointless, which is the worst possible outcome in training terms.

2) Users are alone. Any teacher that decides he or she is going to make use of an online training system, be it out of curiosity or just as a personal challenge, is going to meet a whole range of problems when trying to work things out just by himself. Which methodology should I use? Who will help me to create materials? How is this evaluated? Who will solve technical problems for me? How could I make this platform supply this or that need that I have in the subject I teach? Who will help me tutor if I have about 200 students? Many of these questions find no answer. The teacher, who so far was able to handle his class and managed to fulfill his duties, meets quite a few new tasks for which he has no training, and perhaps this lack is not his or her fault. eLearning necessitates many support services for teaching; without them, the teacher's job is severely limited, and consequently any formative possibilities are lost.

3) There is no recognition for the teaching effort needed for any online action. There are two rather common fallacies amongst those who know little about eLearning. One of them is that eLearning is virtual, that is to say, that it is a subproduct of training and not "real" training like presential teaching. The other is that any activity derived to an eLearning platform frees the teacher from a part of his or her duties, thus reducing the teacher's dedication. Nothing could be further from the truth, as is well known to those who are dedicated to online teaching. Rather on the contrary, correctly helping a group of students in the context of an eLearning methodology certainly enhances the trainee's experience, but it tends to increase remarkably the amount of time that the teacher must invest in teaching tasks, in formative training and in tutorial activity. Regrettably, as a consequence of these prejudices, teachers (and this is

especially true in university contexts) are "penalized" when using eLearning as a complement to their teaching activity. If they opt for meeting the challenge, they will get exactly no recognition in academic or economic terms. A large amount of time will have to be dedicated to this "silent" teaching effort, and the rest of the community will take no notice. Since everything happens in a "virtual" context, there will be no visible tracks left, no classroom or lab reservations. Any time dedicated to this job by the teacher is considered "virtual" in all respects. But his time is all too real.

This type of situations, which have a most negative impact, should move any organizations that have an interest in online teaching towards the adoption of a strategic policy that will fulfill the requirements of a society that wants and needs information and knowledge in a flexible context. This society, however, is fairly strict as concerns the quality of the product it is going to consume. The context in Europe is expressed quite clearly in the definition of the European Higher Education Space (European Ministers of Education, 1999) which is definitely in favor of a lifelong training, since this will contribute to the improvement of the citizens' opportunities according to their aspirations and abilities, and consequently enhance their personal, social and professional development (Cieza, 2006).

Any ad-hoc solutions for this situation are bound to produce a small and not very positive return on our investments. Any attempts to make serious use of eLearning should be strategic, in such a way that the deployment of an eLearning platform must be one of the visible vertices in a polyedric set of measures. These must constitute a whole strategic plan, which will affect training of course, but also research, services, administration and even the management and leadership of universities. If this is not done in such a way, one will face the risk of having to redo part of the job if it was initiated in an erratic way through lack of foresight, or one can reach a state of rigidity in the electronic "structure", thus producing a fragmentation that would be harmful since it would keep apart organs of the institutions that should be perfectly well coordinated. The strategic foundations, which an institution must use when trying to adopt a policy for the deployment of an eLearning structure, can and should be based on the concept of "quality in eLearning".

Quality in eLearning

Before talking about quality in eLearning one must define what we exactly mean when we refer to eLearning. The application of web-based tools for learning purposes could be considered a simple definition of eLearning. However, a clearer eLearning definition, including a conceptualization of its modalities, is the best starting point in order to understand the quality reference framework on which we would like to develop this book. Hence, one could define eLearning as *a teaching-to-learning process aimed to obtain a set of skills and competences from students, trying to ensure the highest quality to the whole process, thanks to: the mainly use of web-based technologies; a set of sequenced and structured contents based upon pre-defined but flexible strategies; the interaction with the group of students and tutors; the appropriate evaluation procedures, both of learning results and the whole learning process; a collaborative working environment with space-and-time deferred presence; and finally a sum of value added technological services in order to achieve maximum interaction*.

It is quite common to associate adjectives like "virtual" or "distance" to "learning", in order to build synonyms for "eLearning". But it is important to clarify that we are not thinking about virtual learning or distance learning when we refer to eLearning, at least not necessarily. When we try to develop a quality eLearning initiative, the development of skills and knowledge is easier to demonstrate than in a traditional or presential context. So if we consider "virtual" as the opposite term of "real", eLearning is just real and not virtual learning. But, from a philosophical point of view, virtual is "all that can induce an effect". If we consider that eLearning is different from many other forms of "learning" because of its active approach, it is clearly "virtual"; that is to say, it has the virtuality to "create" and not only to "assume" knowledge and skills. Concerning distance learning, it's a common mistake considering eLearning as a form of distance learning, and applying its methods and categories to eLearning the results will be really

poor. This is because eLearning is not non-presential like distance learning is. The actors in this process are present, on a different time and a different place, but their presence is verifiable, and they leave certain tracks. So eLearning is more than distance learning, and this is because of the human presence behind the technology, the net and the computers.

One of the main issues in eLearning (and of course in every learning experience, as for any product or service), is the notion of "quality". This concept, in fact, does not belong exclusively to the universe of industry and economics. The academic world is fairly used to the need to measure certain items in order to determine quality in their learning processes.

Quality in eLearning has a twofold significance: first, eLearning is associated in many discussion papers and plans with an increase in the quality of educational opportunities, ensuring that the shift to the information society is more successful. This context is named "quality through eLearning". Secondly, there is a separate but associated debate about ways of improving the quality of eLearning itself; this context is called "quality for eLearning" (Ehlers, Goertz, Hildebrandt & Pawlowski, 2005).

Learning outcomes are at the heart of respondents' understanding of quality in the field of eLearning. When we talk about quality in e-learning, we assume an implicit consensus about the term "quality". The ISO (ISO 8402: 1986, 3.1) defines quality as follows: "The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs". In fact, however, "quality" means very different things to most eLearning providers. García-Peñalvo (2006) points out five factors: technology, services, evaluation/accreditation, contents and human factor (tutoring). Harvey and Green (2000) have suggested the following set of categories: exceptionality, perfection or consistency, fitness for purpose, and adequate return. Ehlers (2004) adds a fifth category, transformation, which describes the increase in competence or ability as a result of the learning process as transformation.

Matching these ideas, we can define quality in eLearning as *the effective acquisition of a suit of skills, knowledge and competences by students, by means of developing appropriate learning contents given with a sum of efficient web tools supported via a net of value-added services, whose process –from content developing to the acquisition of competences and the analysis of the whole intervention- is ensured by an exhaustive and personalized evaluation and certification process, and it is monitored by a human team practicing a strong and integral tutorial presence through the whole teaching-to-learning process*.

Organization of the book

In a few words, the idea behind this book is that a quality eLearning process is much more than technology. Technical issues will have an important place in this book, of course, but the whole question must be considered within other issues such as pedagogical, methodological, tutorial, evaluation, communication, strategic and so on.

Advances in E-Learning: Experiences and Methodologies is addressed to any scholar, technical, academic or manager that could play a role in the field of eLearning, so the public is extremely heterogeneous. In fact, it is difficult to determine a field of knowing or activity, because any field and any professional role could be potentially interested on eLearning because of its enormous capabilities applicable to institutions, schools, universities, enterprises, associations, etc. Above all, it will not give a restricted vision about eLearning, but a multidisciplinary, rich and complete analysis of the different issues involved, intending to become a reference on eLearning literature because the different issues will not be studied as separate matters, but any question related to eLearning studied in this book will be pointed to get the highest quality in eLearning activities.

In fact, the book is organized into nineteen chapters. A brief description of each of the chapters follows:

In Chapter 1, Ray Webster presents RAPAD, a reflective and participatory methodology for eLearning and lifelong learning. It is a proposal of an adaptive method where students can participate with peers, developers, teachers and trainers to think about their learning, discuss it and apply their thoughts to the design and development of websites which can serve as Personalized E-Learning Environments (PELE), promoting a deep understanding of learning on a metacognitive and personal level.

Chapter 2 introduces some ideas of the German philosopher Martin Heidegger and how they can be applied to eLearning design. This approach argues that practice must be the center of knowledge creation, which in the case of professional and corporate education is a real work situation. The chapter has been written by one of the most renowned eLearning consultants in the world, Dr. Sergio Vásquez.

Following with the philosophical approaches, Chapter 3 by Professors Seoane-Pardo and García-Peñalvo, outlines the background concepts in order to construct a human-centered methodology for online training. This chapter analyzes in a critical way the constructivism paradigm, stating that this framework is not a method and explaining the problems that are derived from this confusion.

Chapter 4, by Angelica Rísquez, addresses the issue of mentoring in the online teaching as a qualitatively different concept from its traditional face-to-face version, and how the relationship between mentor and mentee is modified by technology in unique and definitive ways. The chapter introduces a set of of best practices on design, implementation, and evaluation of e-mentoring programs.

In Chapter 5, Dr. Olga Díez deals with the issue of lifelong learning, and describes an experience in teacher training for eLearning in the field of adult education. The chapter discusses the balance between mere ICT skills and pedagogical competences. The author argues that the learning design should always allow that the teachers in training integrate in their work ICT solutions that fit to the didactic objectives, renew teaching and learning methodology, facilitate communication, give place to creativity and allow pupils to learn at their own pace.

Chapter 6 is about institutional and socio-organizational factors that influence the adoption and use of Learning Management Systems in higher education institutions. Ruth Halperin presents a hybrid eLearing case study to explore these factors, where institutional parameters have particular relevance underlining the tensions involved in integrating technological innovation into an established system.

Krassie Petrova and Rowena Sinclair focus Chapter 7 on understanding how the quality of student learning and the student learning experience could be improved given the pertinent environmental and academic constraints of an eLearning case. The main objective of the chapter is to identify some of the important issues and trends related to the perceived eLearning value. They state that new blended learning and teaching models should emphasize further the alignment of learning with work/life balance.

Chapter 8, by Giovannina Albano and Pier Luigi Ferrari, provides an overview of research on learning processes related to the use of technology and a sketch of constructive and cooperative methods and their feasibility in an eLearning platform in the Mathematics education context.

David Camacho et al. describe in Chapter 9 both the main issues related with Artificial Intelligent (AI) techniques and eLearning technologies, and how lifelong learning processes and problems can be represented and managed by using an AI-based approach in order to implement a group-based adaptation based on the actions not of an individual student but of a set of students who have accessed the system along a period of time.

Chapter 10 shows a study applied to the analysis of the utilization of learning web-based resources in a virtual campus. The authors, Addisson Salazar and Luis Vergara, use this case study to detect of learning styles of the students based on a known educational framework, and useful knowledge of global and specific content on academic performance success and failure.

In one of most computationally-oriented chapters of this book, Sergio Gutiérrez and Abelardo Pardo describe in Chapter 11 the use of swarm-intelligence techniques in the field of eLearning, analyzing several of such applications and expose their strong and weak points. Swarm intelligence is an AI technique inspired by the behavior of social insects. Taking into account that the Internet connects a high number of users with a negligible delay, some of those techniques can be combined with sociology concepts and applied to eLearning.

Chapter 12 is devoted to Web 2.0 applied to the eLearning area. Luisa Mª Regueras et al. present how this technology movement can be transferred and applied to the learning process, in terms of methodologies and tools, and taking into account different scenarios and roles in order to emphasize the collaborative way of learning.

As an example of the ideas expressed in the chapter before, in Chapter 13 Elena Verdú et al. discuss about competitive and collaborative learning; they analyze how adequate the different strategies are for different individual learning styles, all of them in an active learning context. The ideas are supported by a case study and an active learning system.

Chapter 14 presents a report system plug-in for Moodle developed by Clay Formación Internacional Team. It presents the possibility of doing adaptations on a LMS depending on the necessities of an institution. This is an interesting example of how combine the Open Software ideas into a enterprise context.

Nuria Hernández analyzes in Chapter 15 evaluation as a strategic instrument to promote active and significant learning. Inside of this strategy, the author argues that an electronic portfolio as assessment element will be able to help the student to generate suitable learning.

Chapter 16 presents a very valuable state of art of the formative assessment in eLearning-based systems. Izaskun Ibabe and Joana Jauregizar describe the four most used strategies for on-line formative assessment: online adaptive assessment, online self-assessment, online collaborative assessment and portfolio. Through a case study, they argue that all type of assessment needs to be conceptualized as "assessment for learning".

In Chapter 17, which is related to the previous one, Dr. Mª José Rodríguez-Conde analyzes the assessment term, applied over all the elements which constitute the environment of formation (evaluation), and also particularizing in the assessment of the learning process, developed in the frame of eLearning. The most interesting part of this chapter presents a high valuable discussion about institutional strategies for the incorporation of this e-assessment methodology in higher educational organizations.

Dr. Evelyn Gullett discusses in Chapter 18 the application of an e-Quality Assessment Matrix (e-QAM) as part of a quality assessment model that promotes continuous improvement of the eLearning environment. This model must be a reference tool for organizations to achieve a base standard of consistent quality that is essential for program accreditation and satisfaction.

In the last chapter, Célio Gonçalo Marques and João Noivo introduce a method to measure the quality of eLearning courses. They present a new quality reference model, e-Qual Model, which is derived from the analysis of reference frameworks developed through international projects. e-Qual is very flexible in order to adapt itself to the evaluator's perspective (learners, producers and distributors) and to the contents and contexts perspective.

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Acknowledgements

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